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DETERMINANTS OF LOGISTICS' PERFORMANCE: A NEW APPROACH TOWARDS ANALYSIS OF ECONOMIC CORRIDORS AND INSTITUTIONAL QUALITY IMPACT

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Abstract. Recently, the relationship between economic corridors and logistics performance has been intensively investigated. However, only few studies analyze other factors through which the economic corridors affect logistics quality. Therefore, we aim to estimate the impact of economic corridors on logistics performance, in a way to account for institutional effect, by constructing multiplicative interaction model. Our proposed model was tested using the difference-in-differences estimator and panel data of 36 European countries along The Belt and Road Economic Corridors between 2007 and 2018. Considering robustness tests and appropriate estimation techniques our analysis showed that economic corridors affect countries logistics performance via institutional quality. However, several limitations need to be acknowledged. The first one is related to the availability of the data as The Belt and Road Initiative (BRI) was introduced only recently, limiting the length of the analyzed period. Secondly, no official or generally accepted definition of the BRI exists, thus it is very difficult to identify its geographical scope. Therefore, applying the same methodology for data, several years after the announcement of BRI, future research could include more countries and additional time periods to explore the matter in more detail. Despite the fact, our approach assumes that the initiatives of economic corridors should be accompanied by stronger institutions and good governance to have higher levels of countries logistics performance. Moreover, this study confirms that economic corridors is very complex economic phenomenon and further studies should consider the role of moderators of this nexus.

Keywords: economic corridors; logistics performance; belt and road initiative; institutional quality; moderators; interaction term

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1. Introduction

In the context of globalization, the impact of economic corridors on international trade, investment, economic growth and logistics of countries and regions along them, acquires special importance. The development of economic corridors is closely related to the changes in countries logistics performance. (An et al., 2021; Li et al., 2021; Martí et al., 2014; Wang et al., 2018) Thus, the relationship between economic corridors and logistics performance raises a reasonable interest in the scientific community. Firstly, regional co operation on infrastructure improvements based on economic corridors could strengthen connectivity and reduce trade cost while at the same time make trade easier and foster economic growth of corridor economies. It is known that removing barriers, caused by national borders, and opening new transport markets, will lead to cross-border

cooperation, that significantly reduce geographical inequalities between countries. Secondly, the construction of new railways and roads creates added value for owner country, but if the new connection is international, the value acquires not only to the owner country, but also to the neighboring countries that use this connection. Consequently, further investigation of this issue could provide new insights that the investment in infrastructure will not only bring benefits but can also invoke spillover effect on individual countries' trade and gross domestic product. In other words, the country that invest in the development of transport infrastructure will not necessarily benefits of it the most. Thirdly, many studies, refer to customs indicator as one of the most important factors influencing the efficiency of the country's logistics performance (e.g. Kulish et al., 2021). In developing countries, customs indicator is very sensitive to the quality of public services and the degree of its independence from political pressure. The literature broadly agrees that the low level of corruption and (or) the high level of political stability leads to better logistics performance in a country (Arvis et al., 2014; Seabra et al., 2016; Wong & Tang, 2018a). Accordingly, the studies on the impact of economic corridors in the aspect of institutional quality is of particular importance.

The introduction of “One belt, one road” initiative has led to a new wave of studies investigating the relationship of economic corridors and logistics performance. However, only few studies analyze other factors through which the economic corridors affect logistics quality. Therefore, we aim to estimate the impact of economic corridors on logistics performance, in a way to account for institutional effect by constructing multiplicative interaction model. The analysis and evaluation of countries logistics performance in the context of economic corridors has become a difficult task. First, the phenomenon of economic corridors is not unambiguously defined. Second, considering the complexity of logistics services, the scientific literature differently treats the concept of logistics performance and its main indicators. Hence, in this article we construct a novel interpretation of economic corridor phenomenon together with a concept of logistics performance by providing the refreshed multiplicative approach to study the effect of institutional quality, through which economic corridors is affecting countries logistics performance.

2. The theoretical research direction of economic corridors

2.1. The interpretation of economic corridor phenomenon

In scientific literature the phenomenon of economic corridors is analyzed in various aspects. The origins of economic corridors are partly explained by the theory of new economic geography (Fujita & Krugman, 2003; P Krugman, 1998; Krugman, 2009, 2011), however in the current literature (Arvis et al., 2014; Arvis et al., 2018; De & Iyengar, 2014) the concept of economic corridors has not yet been fully disclosed.

In order to define the complex nature of the corridor phenomenon, researches present various classification systems in which economic corridors are considered as analytical (Chapman et al., 2003; de Vries & Priemus, 2003; Priemus & Zonneveld, 2003; Witte et al., 2016) or political concept (Gleave, 2018; Putten, 2016). Accordingly, a corridor could be understood in four different dimensions (de Vries & Priemus, 2003; Priemus & Zonneveld, 2003; van Duinen, 2013): (1) as a transport infrastructure axis; (2) as an economic development axis; (3) as an urbanization axis; (4) as an institutional axis. Witte & Spit (2015) summarizing the ideas of Chapman et al. (2003); de Vries & Priemus (2003); van Duinen (2013) proposed the concept of corridors, according to which the phenomenon of corridors is understood as a complex interaction between transport capacity, economic benefits, institutions and spatial structures. There is a broad consensus in the academic community that the development of transport corridors eventually results in economic corridors (De & Iyengar, 2014) and every successful trade route is an economic corridor.

While it is important to understand the main differences between transport, trade and economic corridors, their general similarity is to seek spatial economic growth. In addition, there is an evolutionary relationship between trade and the economic corridor, which means that the first is a natural extension of the latter.

2.2. Economic corridors of The Belt and Road initiative

The Belt and Road initiative (BRI) is an abstract and ambiguous concept. The academic community discusses the essence (Barisitz, 2020; Putten, 2016), and structure of the BRI, (Bardal', 2018), disagrees on terminology as no official or generally accepted definition of the BRI exists (Hillman, 2018; Wang et al., 2018). Some authors emphasizes the difficulties in assessing the economic benefits of the initiative (Besharati et al., 2017; Hillman, 2018; Ruta et al., 2019; Blanchard, 2018; Barisitz, 2020; Lai et al., 2020; Buckley, 2020; Mardell, 2020; Lugt & Wang, 2020).

Many papers analyzes the separate routes of Belt and Road economic corridors (Wong, 2018; Barisitz, 2020; Raza et al., 2014; Gudjonsson & Nielsson, 2015; Staalesen, 2013; Tillman et al., 2018; van Leijen, 2018; Taksami, 2018; Barisitz et al., 2018; Brînză, 2019; Levitin et al., 2016; Zhylankozova, 2018), and the benefits of investment in transport infrastructure for the countries along them (Brînză, 2019; Zeneli, 2020; Scimia, 2019; Champion, 2019; Jeffrey, 2019).

According to Chinas Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road, BRI is the synthesis of two main components – “Silk Road, economic belt,, or “One belt” and XXI century maritime silk road or “One road”. However, Chinas Arctic Policy announced in 2018, introduces an additional component of the BRI the "Polar Silk Road". The lack of a generally accepted definition of the BRI allows for the evolution of the concept of the initiative.

In summary, the concept of corridors, in a broad sense, highlights the fact, that the corridors are an infrastructure system that connects transport, economic, political, demographic, and other interrelated processes in a linear manner. The main characteristics feature, reflected in all dimensions of the research of economic corridor is their connectivity.

2.3. The concept and main indicators of logistics performance

Logistics is a key component of modern production and distribution systems, significantly affecting the economic development of countries. (Halaszovich & Kinra, 2018; Mariano et al., 2017; Rezaei et al., 2018; Savy, 2016) The nature of logistics is determined by the resources of infrastructure, technology and the labor force of required competencies, which are directly dependent on institutional aspects (Arvis et al., 2018; Martí et al., 2014; Savy, 2016). In the literature, the theoretical basis of the logistics performance is related to the theories of institutional economics (Wong & Tang, 2018a,b). Given the multifaceted nature of logistics services, the scientific literature treats the definition of logistics performance and its main indicators differently. It is agreed that one indicator cannot describe the level of logistics performance (Chow et al., 1994; Stainer, 1997; Green et al., 2008). Thus, the aim of researchers and practitioners is to find a set of indicators that covers many, or all, of the most important aspects of logistics services. (Andersson et al., 1989; Chow et al., 1994; Stainer, 1997).

The effectiveness of connectivity of economic corridors is analyzed through the World Bank's Logistics Performance Index (LPI), which is considered by both researchers and practitioners as a unique tool for benchmarking that explains the link between logistics processes and international trade. (Arvis et al., 2018). LPI consists of six different indicators reflecting main drivers of countries logistics performance: (1) the efficiency of customs and border management clearance (“Customs”); (2) the quality of trade and transport infrastructure (Infrastructure”); (3) the ease of arranging competitively priced shipments (Ease of arranging shipments”); (4) the competence and quality of logistics services—trucking, forwarding, and customs brokerage (“Quality of logistics

services”); (5) the ability to track and trace consignments (“Tracking and tracing”); (6) the frequency with which shipments reach consignees within scheduled or expected delivery times (“Timeliness”)(Arvis et al., 2018).

Logistics services are mostly provided by private companies, but the infrastructure is in many cases managed by public services. Countries with policy goals set specifically for transport infrastructure investment may create favorable conditions for private companies to provide high-quality and lower-cost logistics services.

According to the theories of institutional economics, which partly explain the efficiency of logistics performance, and summarizing the scientific literature analyzing LPI and its indicators it can be stated that a countries logistics performance is a measure of logistics efficiency determined by political stability and the institutional environment, containing of the resources of infrastructure, technology, and the labor force of required competencies.

2.4. The interaction of economic corridors and institutional quality

The relationship between economic corridors and the logistics performance is widely analyzed by large number of authors. However, these studies are limited as they do not cover other factors through which the economic corridors affect logistics quality.

In the literature, the moderating role of institutional quality seeking to explore the complexity of economic corridors and their impact on logistics performance to the best of our knowledge, has not been analyzed yet. Authors focused on moderating role of corruption (Larson, 2020; Uca et al., 2016), competitiveness, institutions (Haavisto & Vaillancourt, 2017; Halaszovich et al., 2020; Soh et al., 2021; Uyar et al., 2021), trade volumes (Uca et al., 2016), economic growth (Civelek et al., 2015) and other factors affecting logistics performance, but not the impact of economic corridors to logistics performance. However, authors emphasized the importance of institutional quality to be significant for the development of economic corridors (De & Iyengar, 2014) and in the context of BRI, the linkage between regional institutions and participation in Global value chains (GVC) appeared to be significant for encouraging firms to participate in GVCs (Ge et al., 2020); or the importance of conditions of institutional quality for attracting foreign direct investment (Aibai et al., 2019); of the role of institutional quality in the field of environmental protection (Wu et al., 2021).

Ge et al. (2020) revealed that a large gap exists in institutional quality between BRI countries and non-BRI countries. BRI countries have much weaker institutions than non-BRI countries. Countries with better institutions have a higher GVC participation ratio in those industries that are highly dependent on these institutions. Furthermore, weak institutions in BRI countries are significant barriers for GVC development and regional integration.

Aibai et al. (2019) found that foreign direct investment plays a more significant role in promoting financial development in countries with higher quality institutions. This indicates that a good institutional environment in the host country will help enhance the positive role foreign direct investment plays in its financial development. Thus, BRI countries are supposed to take measures to improve their institutional quality and attract foreign direct investment.

De & Iyengar (2014) showed that institutional support of economic activities along transport corridors are essential to increase regional trade and economic welfare. Moreover, good institutional quality is crucial for converting cross-border corridors into economic corridors.

The above-mentioned studies suggest that the quality of institutions can be understood as one of the key factors determining the impact of economic corridors on countries logistics performance. Accordingly, favorable policy decisions in the transport corridors, coordinated action by the responsible authorities and investment in "soft"

infrastructure are gradually leading to the transformation of transport corridors into economic corridors. Thus, a well-functioning public sector ensures the stable operation of governments and the efficient development of transport infrastructure. Consequently, when analyzing the impact of economic corridors on logistics performance, it is necessary to emphasize the link between the high level of countries logistics performance, the institutional quality and increased economic activity in the regions falling within the area of specific economic corridors.

3. Methodology: the institutional aspect

3.1. Conceptual framework for evaluating the impact of economic corridors to logistics performance of European countries

Studying the effect of economic corridors on the level of logistics requires the adoption of theoretical model that can serve as a foundation for the econometric specification. We estimate the effect of economic corridors on countries logistics performance relying on theories of new economic geography and new structural economics, while bearing in mind the evolutionary context of the corridor phenomenon. The conceptual framework for evaluating the impact of economic corridors to logistics performance of selected European countries consist of four dimensions: (I) the factors affecting economic corridors; (II) the phenomenon of economic corridors; (III) the impact of economic corridors on countries logistics performance, moderated by institutional quality; (IV) the evaluation of the impact of economic corridors to countries logistics performance (Fig. 1).

Empirical studies on the relationship between economic corridors and logistics performance lack of general provisions on which indicators most clearly reflect the phenomenon of economic corridors. However, the analysis of the characteristics of individual economic corridors suggests, that the main factors influencing the development of economic corridors are geographical position of a country, economic growth, international trade, infrastructure investment and logistics services. Current literature agrees that defining and measuring institutions across different territorial context is proven to be difficult (Álvarez et al., 2018; Barbero et al., 2021). In this conceptual framework by institutional quality, we mean government effectiveness that captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures (Busse & Hefeker, 2007) agrees that bureaucratic quality is closely associated with institutional strength of a particular country.

Uyar et al. (2021) highlights that the main determinants of logistics performance are related to public governance. The authors found that government effectiveness, as a proxy for institutional quality, can foster countries logistics performance through improvement in infrastructure as well as by formulating of sound and precise customs clearance process.

It should be noted that, government effectiveness depends on the political culture of public governance that was influenced by various historical circumstances. This is especially relevant in the case of European countries, some of which inherited the institutional environment from the West world and the other from the post-war regimes of the East. Western European countries, avoiding the ideological influence of the socialist regime, have developed a strong institutional and good governance culture. Nevertheless, the unequal distribution of the influence of the Eastern and Western bloc in Europe encourages the analysis of the countries' institutional environment and its significance for individual economic phenomena in our case the impact of economic corridors to countries logistics performance. This type of research where institutional quality is considered a moderator of the impact of economic corridors has remained mostly overlooked in literature.

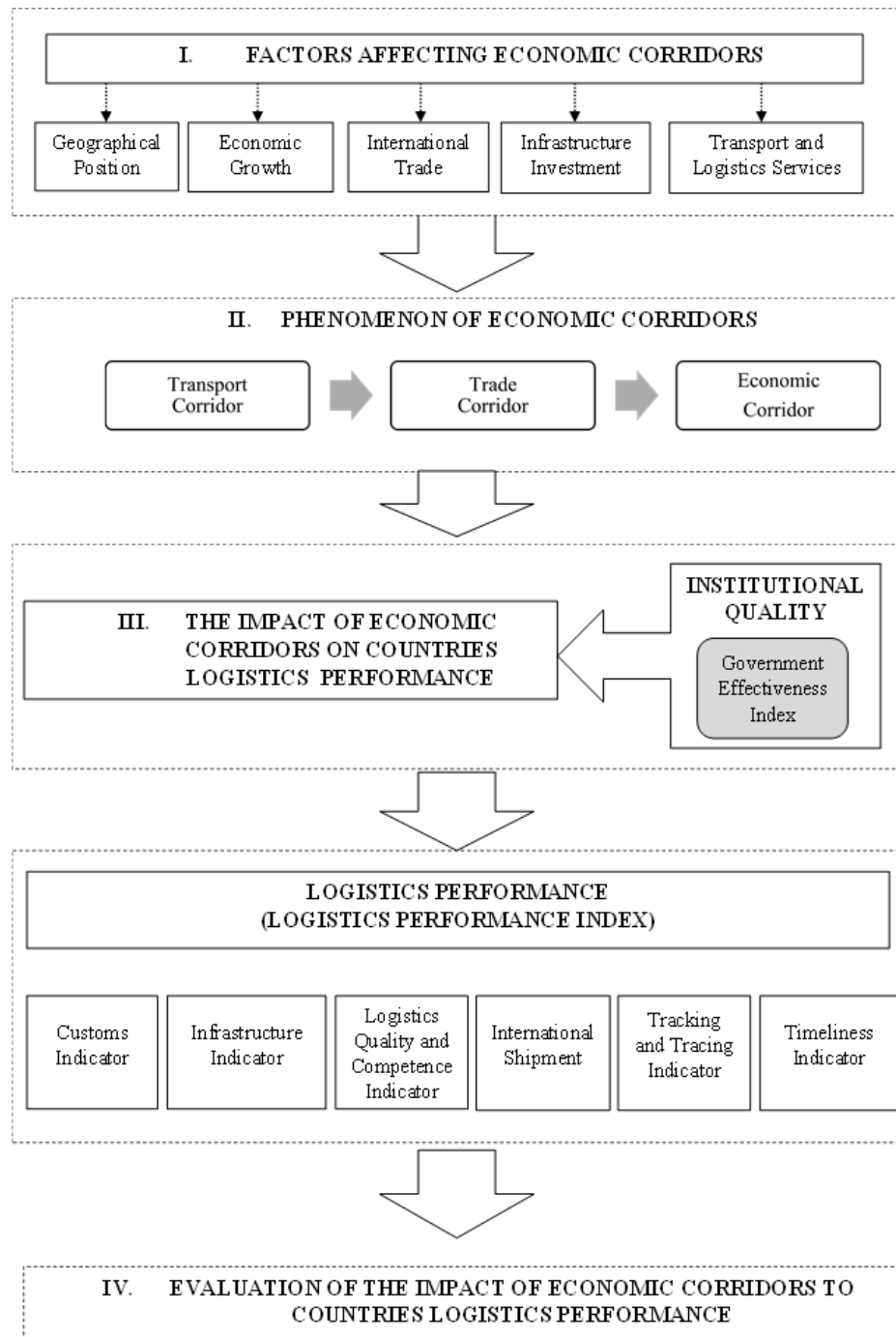


Fig. 1. Conceptual framework for evaluating the impact of economic corridors to European countries logistics performance

3.2. Research methods

To evaluate the impact of economic corridors on logistics performance of selected European countries, it is necessary to find a credible way to approximate what would have happened had the BRI economic corridors not taken place. The impact of economic corridors or, in other words, the change that can be credibly attributed to economic corridors is evaluated by comparing what is observed after countries accepted BRI initiative with what would have happened to those countries without the BRI. For this type of evaluation and seeking to understand how the economic corridors has been implemented, simple indicators are not sufficient, it is necessary to evaluate what effect *other* factors may have had on the European countries' logistics performance in the context of BRI. This kind of approach in the literature is defined as the difference-in-differences method (DID), firstly introduced by Ashenfelter & Card (1985) and later in theoretical work of Donald & Lang (2007), Imbens & Wooldridge, (2009) adapted for panel data.

The DID approach for a panel of countries takes the following form:

$$\ln Y_{i,t} = \alpha + \beta \times BRI_{i,t} + c_k C_{k,i,t} + \theta_t + \varepsilon_{i,t} \quad (1)$$

Where $i = 1, \dots, N$ for each country in the panel and $t = 1, \dots, T$ refers to the impact period. Variables given are in natural log form. Accordingly, $\ln Y_{i,t}$ is overall logistics performance index of country i over the period t (and alternatively customs and infrastructure indicator); β is the parameter of DID estimator; $BRI_{i,t}$ is a dummy variable, which equals to 1 if country i is one of BRI countries and 0 otherwise. BRI varies over time t , as the countries i joins the initiative at different time periods. $C_{i,t,k}$ is a vector that consist of k number of factors that may also have impact on the logistics performance of a country i over the period t . θ_t are time fixed effects. $\varepsilon_{i,t}$ is the error term which is often called the *idiosyncratic error* or time-varying error because it represents unobserved factors that change over time and affect $\ln Y_{i,t}$.

In this study, we apply DID regression to compare the changes of logistics performance of selected European countries after the BRI to that with non-BRI countries. All countries in the sample are divided into two groups, namely treatment group (BRI countries) and control group (non-BRI countries).

There is a consensus in the academic community that the different time periods of involvement of the countries in the BRI initiative makes the division of treatment and control groups a difficult task (Yu et al., 2020). Therefore, as shown in Table 1, in this study, the division of European countries is based on the *de jure* criterion, i.e., undersigned cooperation agreements in the context of BRI.

Table 1. The division of treatment and control groups based on the *de jure* criterion

BRI countries (23)	Non-BRI countries (13)
Austria, Belarus, Belgium, Cyprus, Bulgaria, Denmark, Czech Republic, Estonia, Greece, Croatia, Hungary, Malta, Montenegro, Portugal, Lithuania, Latvia, Poland, Romania, Serbia, Slovenia, Slovakia, Turkey, Ukraine.	Germany, Finland, Italy (until 2019), Netherlands, Norway, Sweden, France, Iceland, Luxembourg, Russian Federation, Spain, Switzerland, Czech Republic.

To define the complex nature of the corridor phenomenon, a comprehensive approach to evaluation their impact is needed. A comprehensive approach requires the evaluation of different channels like institutional effect through which economic corridors contributes to logistics performance of a country.

We transform our general model to include interaction between variable of Government effectiveness index to proxy institutional effect. Following equation correspond to and will be used to model institutional effect:

$$\ln Y_{i,t} = \alpha + \beta_1 \times BRI_{i,t} + \beta_2 \times GE_{i,t} + \beta_3 (BRI_{i,t} \times GE_{i,t}) + c_k C_{k,i,t} + \theta_t + \varepsilon_{i,t} \quad (2)$$

Where $GE_{i,t}$ is a proxy for institutional effect, multiplicative term $BRI_{i,t} \times GE_{i,t}$ allow us to examine how the institutional effect moderates the effect of BRI economic corridors on logistics performance of selected European countries.

Interaction term β_3 tests the conditional hypothesis that the institutional environment of a country shapes the impact of economic corridors on logistics performance. If coefficient of interaction term was statistically significant and negative, ($\beta_3 < 0$) it would give an evidence that institutional environment negatively affects the impact of economic corridors to countries logistics performance. Positive coefficients on interaction term ($\beta_3 > 0$) would indicate that better institutional quality in BRI countries leads to higher levels of logistics performance. However, as noted by (Dawson, 2014) the size and precise nature of this effect is not easy to divine from examination of the coefficients alone.

A large body of literature provides recommendations on how to test conditional hypotheses using multiplicative interaction models. (Brambor et al., 2006) suggests two fundamental rules how multiplicative models should be analysed: (1) all constitutive components of the interaction term (in our case BRI and GE) must be included in the model separately in the equation and cannot be interpreted as unconditional marginal effects; (2) the research should focus on computing substantively meaningful marginal effects and confidence intervals.

Following the rule (2), we rearrange Eq. (2) as suggested by (Dawson, 2014) to get the expression which would show that slope of economic corridors on logistics performance is conditional and manifests through the effect of institutional quality and all possible interactions between them:

$$\ln Y_{i,t} = [\alpha + \beta_2 \times GE_{i,t}] + [\beta_1 + \beta_3 \times GE_{i,t}] BRI_{i,t} + c_k C_{k,i,t} + \theta_t + \varepsilon_{i,t} \quad (3)$$

To evaluate whether the relationship (slope) between economic corridors and logistics performance is significant at a particular level of institutional quality we perform a simple slope test by substituting the value of GE into regression equation and calculating the standard error of the slope. The standard error of the sum ($\beta_1 + \beta_3 GE$) is calculated by:

$$S_{(\beta_1 + \beta_3 GE)} = \sqrt{var(\beta_1) + GE^2 var(\beta_3) + 2GE cov(\beta_1, \beta_3)} \quad (4)$$

Our strategy for choosing research methods is based on theoretical assumptions of (Imbens & Wooldridge, 2009) for estimating unobserved effects panel data using DID method.

We employ in our analysis a pooled Ordinary Least Square (OLS) estimator that is based on the time-demeaned variables and is called the Fixed effects estimator (FE). The FE on equations (1)-(2) uses the time variation in dependent variable and independent variables within each cross-sectional observation. Under a strict exogeneity assumption on the explanatory variables, the fixed effects estimator is unbiased: roughly, the idiosyncratic error $\varepsilon_{i,t}$ should be uncorrelated with each explanatory variable across all time periods. It should be noted that any explanatory variable that is constant over time for all i gets swept away by the fixed effects transformation. Therefore, we cannot include variables based on countries historical (colonial or not, common language or not, and etc.) or geographical (common border or not, landlocked or not and etc.) background that other authors often use while investigating the relationship between economic corridors and logistics performance.

As the panel data have a time series and cross-sectional dimensions, we will use robust estimation of the covariance matrix that will correct heteroscedasticity (if variance of the error term differs accros cross sectional units) and autocorelation (if covariance of the errors accros the units is non-zero in each time period). In that case, we will use the robust estimator (HAC approach) that is recommended by (Stock & Watson, 2008) for the panel data with relatively large n and small T variety. To validate the selected model Pesaran test for cross sectional dependance and Wald test for time-dummies should also be conducted.

3.3. Data specification

The empirical verification of the proposed conceptual framework is grounded on the unbalanced panel of 36 selected European countries, over the period 2007-2018. Defining the research period and dividing it into stages is an important aspect of the methodology for evaluating the impact of economic corridors on logistics performance in European countries.

The 2007-2018 period is divided in to two stages at two year intervals, as the World Bank conducts LPI survey every two years.: (I) 2007, 2010 and 2012 – this is the time before the launch of the BRI initiative and the start of investment in infrastructure in the countries along BRI economic corridors, in the context of BRI; (II) year 2014 marks the beginning of the development of BRI economic corridors in European countries; year 2016 marks the Chinese investments in Balkans in the context of BRI; year 2018 marks the announcement and development of The Polar Silk Road.

This approach to the research periods allows to compare the level of logistics performance in European countries before and after the emergence of BRI economic corridors.

Full description of variables, selected to evaluate the impact of economic corridors to European countries logistics performance, accounting for institutional aspect, their sources, descriptive statistics, and short names of variables, used later in the analysis are presented in Table 2.

For numeric form of logistics performance, the overall LPI index was used together with customs and infrastructure indicators. To proxy the institutional effect the transformed (+2,5) Governance effectiveness indicator was used.

Seeking to determine not only the impact of economic corridors on countries logistics performance, but also the relationship of this impact to trade and economics of European countries, additional indicators of international trade, gross domestic product (controlling the size of the country), population density (controlling the size of the country's market), foreign direct investment, investment, labor force and human development index were chosen as control variables. The data used in the analysis was collected from either World Development Indicators (WDI) database or from Worldwide Governance Indicators (WGI) database, except for Investment that was taken from Penn World Table version 10.0 database, Foreign direct investment that was taken from UNCTAD database and Human development index that was taken from UNDP Human Development report. All data are converted into natural logarithm for measurement uniformity.

The traditional approach to evaluate international trade is to use the sum of import and export. However, according to OECD reports, in today's global economy, this type of trade only represents around 30% of all trade in goods and services and about 70% of international trade today involves GVCs (OECD, 2018, 2020). For this reason, we will use the ratio between export and import. The main idea of this approach is that countries located at the beginning of the economic corridor (upstream) tend to import fewer intermediates and export more, this way the ratio will be lower than 1. In contrast, countries that specialize in assembly and are located at the other

end of the economic corridor (downstream) tend to import more intermediate goods and export relatively less, so the ratio will be close or equal to 1.

The Human Development Index (HDI) is a summary composite measure of a country's average achievements in three basic aspects of human development: health, knowledge, and standard of living. Considering, that logistics is organized by freight forwarders, and their work is essentially intellectual, requiring the competencies necessary to ensure the smooth flow of international trade, HDI is selected to control for education level of a country. Knowledge, as measured by mean years of schooling and expected years of schooling secure the goods, is the strongest component of HDI.

Table 2. Full description of variables, their sources, descriptive statistics, and short names of variables, used in the analysis

Abbreviation	Full Name	Explanation and measurement unit	Mean	Median	Std. dev.	Min.	Max.
Logistics performance							
LPIO	Overall Logistics performance index	Logistics Performance Index overall score reflects perceptions of a country's logistics based on efficiency of six sub indicators The index ranges from 1 to 5, with a higher score representing better performance.	3,35	3,35	0,503	2,28	4,23
LPIC	Logistics performance index Customs indicator	Logistics professionals' perception of the efficiency of country's customs clearance processes (i.e. speed, simplicity and predictability of formalities), on a rating ranging from 1 (very low) to 5 (very high).	3,15	3,17	0,564	1,94	4,21
LPII	Logistics performance index Infrastructure indicator	Logistics professionals' perception of country's quality of trade and transport related infrastructure (e.g. ports, railroads, roads, information technology), on a rating ranging from 1 (very low) to 5 (very high).	3,28	3,19	0,626	2,07	4,44
Economic Corridors							
BRI	Countries along „One belt, One Road „economic corridors	Dummy variable, which equals to 1 if country i is one of BRI countries and 0 otherwise	0,241	0,000	0,429	0,000	1,00
The Quality of Institutions							
GE	Government Effectiveness Index	Government Effectiveness captures perceptions of the quality of public services and the degree of its independence from political pressures. Estimate ranging from approximately -2.5 to 2.5.	3,41	3,48	0,767	1,39	4,85
Control Variables							
TR	Trade	The ratio of import and export of a country	1,02	1,02	0,216	0,502	1,71
GDP	Gross Domestic Product	GDP in constant 2015 prices, expressed in U.S. dollars	4,28e+011	4,28e+011	4,28e+011	4,28e+011	4,28e+011
PD	Population Density	People per sq. km of land area	147,	93,6	229,	3,11	1,51e+003

F	Foreign Direct Investment	Foreign direct investment inward stock percentage to GDP	138,	47,8	334,	2,64	1,86e+003
I	Investment	Investment at current national prices	8,86e+005	1,19e+005	2,99e+006	655,	2,29e+007
L	Labor force	Total Labor force comprises people ages 15 and older who supply labor for the production of goods and services during a specified period.	9,80e+006	4,36e+006	1,50e+007	1,67e+005	7,59e+007
HDI	Human Development Index	A composite index measuring average achievement in three basic dimensions of human development—a long and healthy life, knowledge, and a decent standard of living.	0,863	0,868	0,0552	0,712	0,956

4. Evaluation of the Impact of Economic corridors on European countries Logistics performance

4.1. Empirical results

As explained above, the FE estimator was used to estimate Equation (2). The analysis covers three dimensions of logistics performance (Table 3). We used every indicator of LPI individually as each of them measures a different facet of the logistics performance of a country. However, only three of them, i.e. Overall logistics performance index (LPIO), Logistics performance index infrastructure indicator (LPII), Logistics performance index customs (LPIC) appeared to show significant results. Results for each separate regression shows that the relationship between economic corridors and logistics performance is statistically significant and negative.

The negative coefficients indicates that economic corridors reduce level of logistics in selected European countries. This could be interpreted as following. The literature on economic corridors broadly agrees that the development of new infrastructure, in the context of BRI, increases countries connectivity. However, it should be noted that most of the countries participating in BRI are emerging and developing economies. Thus, the disempowering nature of social, cultural, economic, political, and institutional exclusion results in ineffective and non-transparent processes, that hamper the ability of states to extract gains from BRI projects. Therefore, for some countries, the negative effects of economic corridors are likely to outweigh the real benefits of new infrastructure. As in our sample the selected European countries are more developing than developed, the overall effect of economic corridors on their logistics performance is statistically significant, but negative.

The institutional effect of economic corridors on logistics performance which was modelled using interaction between dummy variable BRI and Government effectiveness index GE is statistically significant and positive. Estimated effects of the variables on LPI (and LPI indicators) and their statistical significance are consistent across all estimations. Thus we can confirm that better institutional quality in BRI countries leads to higher levels of logistics performance. Also, the Table 3 shows that the relationship between economic corridors and logistics performance vary (changes from negative to positive), depending on countries institutional quality. Visualisation of the estimations in Table 3 is presented in Fig. 2 where the simplified version of the conditional relationship between economic corridors and logistics performance for high and low levels of countries institutional quality in the sample are shown.

Table 3. The results of the nexus between economic corridors and logistics performance via institutional quality

Full variable name	Short variable name	Parameter	Fixed-effects estimates of Eq. (2) using robust standard errors (HAC)		
			LPIO as dependent variable	LPII as dependent variable	LPIC as dependent variable
Constant	Const	α	5,173* (2,685)	4,903 (3,738)	5,873** (2,697)
Economic corridors	BRI	β_1	-0,1135* (0,05636)	-0,2651*** (0,08960)	-0,1568** (0,06280)
The Quality of Institutions	ln (GE)	β_2	0,1331 (0,09743)	-0,03508 (0,1383)	0,1817 (0,1455)
The Interaction between Economic corridors and The Quality of Institutions	BRI ln(GE)	β_3	0,1041** (0,04074)	0,2328*** (0,06977)	0,1571*** (0,05343)
Trade	ln (TR)	c_1	-8,094** (3,184)	-9,290*** (2,989)	-7,749*** (2,351)
GDP	ln(GDP)	c_2	0,05080 (0,1233)	0,2467 (0,1551)	0,03128 (0,1245)
Population Density	ln(PD)	c_3	-0,2016 (0,3298)	-0,4888* (0,2476)	-0,4357* (0,2494)
Foreign Direct Investment	ln (F)	c_4	-0,01230 (0,02536)	-0,03391 (0,02410)	-0,05583** (0,02126)
Investment	ln(I)	c_5	0,01023 (0,01798)	0,03570* (0,01988)	0,02646 (0,01693)
Labor Force	ln(L)	c_6	0,2176 (0,2129)	0,06309 (0,2334)	0,2326 (0,1894)
Human Development Index	ln (HDI)	c_7	-0,9372 (0,6994)	-0,8687 (0,9125)	-1,638** (0,7906)
Time Dummies		θ_t	YES	YES	YES
Number of observations		n	211	211	211
Within R ²			0,4194	0,4353	0,3953
Panel Diagnostics:					
Wald test for heteroskedasticity ^a			7833,91 [0]	2985,46 [0]	1168,6 [0]
Wooldridge test for autocorrelation in panel data ^b			1,38418 [0,2473]	0,272057 [0,6053]	0,0476519 [0,8285]
Pesaran CD test ^c			-1,341 [0,1799]	-1,1508 [0,2498]	-1,14826 [0,250863]
Wald joint test on time dummies ^d			0,697232 [0,6264]	0,940543 [0,4569]	2,06112 [0,0739]

Notes: Robust (HAC) standard errors presented in parentheses. P-values presented in the square brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

^a p-value < 0.05 counts against the null hypothesis: the units have a common error variance;

^b p-value < 0.05 counts against the null hypothesis: no first-order autocorrelation;

^c p-value < 0.05 counts against the null hypothesis: no cross-sectional dependence;

^d p-value < 0.05 counts against the null hypothesis: no time effects.

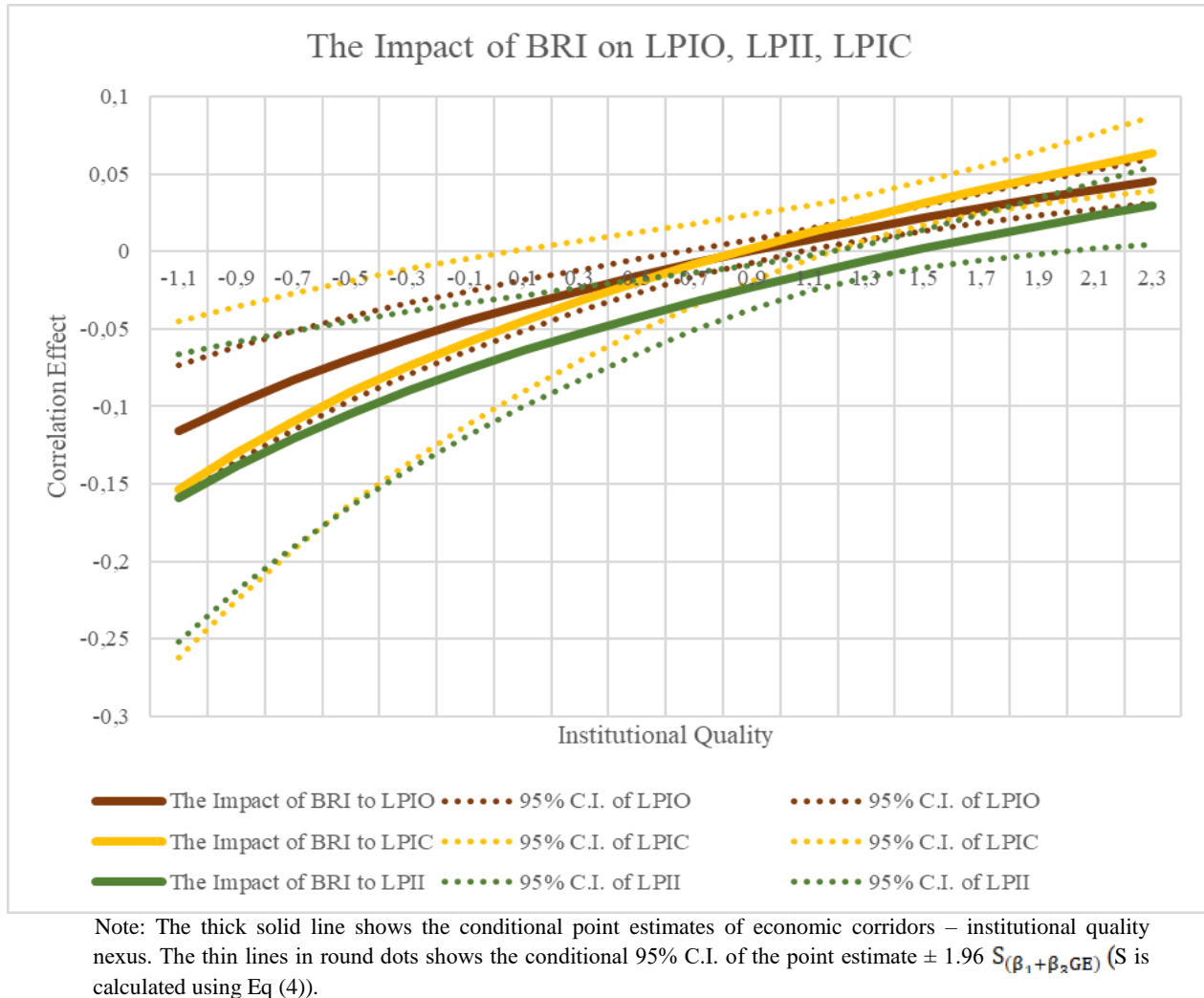


Fig. 2. Meaningful marginal effects and confidence intervals of the nexus between economic corridors, logistics performance and institutional quality.

For overall logistics performance index (LPIO) the negative and statistically insignificant impact of economic corridors appears in countries with an extremely low institutional quality (range from -1,1 to 0,3). The positive but still statistically insignificant impact of economic corridors on overall logistics performance index occurs in countries whose institutional quality is in the range from 0,5 to 1,5. Positive and statistically significant effects of economic corridors on LPIO only occur when the institutional quality of countries, i.e. The government efficiency index is in the range from 1,7 to 2,3.

For Logistics performance index customs indicator (LPIC) the negative and statistically significant impact of economic corridors appears in countries with an extremely low institutional quality (range from -1,1 to -0,9). The negative and statistically insignificant impact of economic corridors appears in countries with institutional quality that range from -0,7 to 0,1). The positive but still statistically insignificant impact of economic corridors on Logistics performance index customs indicator occurs in countries whose institutional quality is in the range from

0,3 to 0,9. Positive and statistically significant effects of economic corridors on LPIC occurs in countries with institutional quality from 1,1 to 2,3.

For Logistics performance index infrastructure indicator (LPII) the the negative and statistically significant impact of economic corridors appears in countries with an extremely low institutional quality (range from -1,1 to -0,3). The negative and statistically insignificant impact of economic corridors appears in countries with institutional quality that range from -0,1 to 0,5).

The results confirm that with the improvement of institutional quality the impact of economic corridors of logistics performance is increasing and from negative becomes possitive. Insitutional quality is a significant mediator in a relationship between economic corridors and logistics performance. Thus better institutions may inlist grater impact of economic corridors which protmote the growth of the level of logistics performance in a country.

4.2. Robustness Check

To ensure that our general estimates are robust we perform a series of robustness check. *Firstly*, we checked robustness by including additional control variables one by one in the general model (Table 4). The results showed that although the coefficient of estimates differ, the overall positive effect of the institutional environment remains unchanged. Secondly, to test weather institutional quality still has an effect on the relationship between economic corridors and logistics performance, instead of goverment effectiveness as the mediator we included alternative control for corruption estimator ($\log[CC+2.5]$) (Table 5). Although the estimation did not show significant effects, however the result in general is the same, i.e. less corruption will lead to less negative or greater positive effect of economic corridors on countries logistics performance. In other word the changes of the effect of the economic corridors is corresponding to the countries institutional environment. The same results have been confirmed in resent reserch as well, that the low level of corruption and (or) the high level of political stability leads to better logistics performance in a country (Arvis et al., 2014; Seabra et al., 2016; Wong & Tang, 2018a).

For the last robustness check we changed the strategy of the estimation, simmlar to that as suggested by (Butkus & Seputiene, 2018) by alternatively using the time-varying dummies. We constructed the dummy for high govermnet effectiveness $HGE_{i,t}$, which is equal to 1 if government effectiveness in country i during the period t is above the median 0,975 and 0 if otherwise. HGE varies in time t .

The results are consistent with the general model (Table 6). The impact of economic corridors in the group of countries with a relatively high institutional quality is positive and statistically significant. The impact of economic corridors in the group of countries with relatively low institutional quality is negative for LPIO and LPII and positive for LPIC, but statistically insignificant in general. The impact of economic corridors on logistics performance differs significantly between countries with relatively low and relatively high institutional quality (β_3).

All estimations confirm that a better institutional quality of a country shapes the impact of economic corridors to logistics performance in a way that a stable institutions can foster the growth of the level of countries logistics. Thus, the results are robust to alternative estimation strategy, alternative proxy for institutional quality and inclusion of additional control variables.

Table 4. The estimation of the impact of economic corridors on logistics performance with additional variables added

Full variable name	Short variable name	Parameter	Fixed-effects estimates of Eq. (2) using robust standard errors (HAC) with LPIO as dependant variable						
			(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	Const	α	8,756*** (3,013)	8,451*** (2,145)	8,474*** (2,202)	8,752*** (2,371)	8,658*** (2,286)	7,385** (2,735)	5,173* (2,685)
Economic corridors	BRIdj	β_1	-0,1179* (0,06164)	-0,1183* (0,06376)	-0,1177* (0,06361)	-0,1154* (0,06124)	-0,1176* (0,06079)	-0,1291* (0,06373)	-0,1135* (0,05636)
The Quality of Institutions	ln (GE)	β_2	0,09159 (0,08496)	0,09002 (0,08774)	0,09514 (0,1012)	0,1098 (0,1019)	0,1097 (0,1027)	0,1294 (0,1018)	0,1331 (0,09743)
The Interaction between Economic corridors and The Quality of Institutions	BRIdj·ln(GE)	β_3	0,1065** (0,04416)	0,1067** (0,04541)	0,1067** (0,04558)	0,1043** (0,04388)	0,1063** (0,04369)	0,1158** (0,04541)	0,1041** (0,04074)
Trade	ln (TR)	c_1	-7,688** (2,986)	-7,706** (3,055)	-7,748** (3,150)	-7,908** (3,181)	-7,842** (3,174)	-7,812** (3,214)	-8,094** (3,184)
GDP	ln(GDP)	c_2		0,01269 (0,07838)	0,009568 (0,08321)	0,005558 (0,08138)	0,005419 (0,08131)	-0,03350 (0,09934)	0,05080 (0,1233)
Population Density	ln(PD)	c_3			0,02107 (0,2143)	0,02479 (0,2161)	0,02217 (0,2139)	-0,1585 (0,3304)	-0,2016 (0,3298)
Foreign Direct Investment	ln (F)	c_4				-0,01231 (0,02453)	-0,01239 (0,02475)	-0,01079 (0,02495)	-0,01230 (0,02536)
Investment	ln(I)	c_5					0,003874 (0,01755)	0,005477 (0,01588)	0,01023 (0,01798)
Labor Force	ln(L)	c_6						0,1973 (0,2168)	0,2176 (0,2129)
Human Development Index	ln (HDI)	c_7							-0,9372 (0,6994)
Time Dummies		θ_t	YES	YES	YES	YES	YES	YES	YES
Number of observations		n	211	211	211	211	211	211	211
Within R ²			0,4033	0,4034	0,4035	0,4060	0,4062	0,4105	0,4194
Panel diagnostics:									
Wald test for heteroskedasticity ^a			9731,1 [0]	9488,89 [0]	9556,06 [0]	10508,8 [0]	9119,51 [0]	12401,2 [0]	7833,91 [0]
Wooldridge test for autocorrelation in panel data ^b			1,26644 [0,2680]	1,10944 [0,2994]	0,93998 [0,3389]	0,954679 [0,3352]	1,06238 [0,3097]	1,10672 [0,3000]	1,38418 [0,2473]
Pesaran CD test ^c			-1,31553 [0,1883]	-1,31805 [0,1874]	-1,31261 [0,1893]	-1,28504 [0,1987]	-1,29917 [0,1938]	-1,40682 [0,1594]	-1,341 [0,1799]
Wald joint test on time dummies ^d			1,30158 [0,2656]	1,27836 [0,2756]	1,08825 [0,3688]	1,08396 [0,3712]	1,08691 [0,3696]	0,964532 [0,4413]	0,697232 [0,6264]

Notes: Robust (HAC) standard errors presented in parentheses. P-values presented in the square brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

^a p-value < 0.05 counts against the null hypothesis: the units have a common error variance;

^b p-value < 0.05 counts against the null hypothesis: no first-order autocorrelation;

^c p-value < 0.05 counts against the null hypothesis: no cross-sectional dependence;

^d p-value < 0.05 counts against the null hypothesis: no time effects.

Table 5. The impact of economic corridors on logistics performance with control of corruption as alternative mediator

Full variable name	Short variable name	Parameter	Fixed-effects estimates of Eq. (2) using robust standard errors (HAC)		
			LPIO as dependent variable	LPII as dependent variable	LPIC as dependent variable
Constant	Const	α	5,592* (2,859)	5,131 (3,805)	6,350** (2,671)
Economic corridors	BRIdj	β_1	-0,07666 (0,05529)	-0,1791*** (0,06025)	-0,09679 (0,06448)
The Quality of Institutions	ln (CC)	β_2	0,03244 (0,08783)	-0,01419 (0,09051)	0,008077 (0,09808)
The Interaction between Economic corridors and The Quality of Institutions	BRIdj·ln(CC)	β_3	0,07386* (0,04137)	0,1639*** (0,04529)	0,1079* (0,05642)
Trade	ln (TR)	c_1	-8,064** (3,266)	-9,388*** (2,984)	-7,643*** (2,474)
GDP	ln(GDP)	c_2	0,05419 (0,1170)	0,2204 (0,1599)	0,04812 (0,1129)
Population Density	ln(PD)	c_3	-0,2812 (0,3246)	-0,5576** (0,2546)	-0,5536** (0,2439)
Foreign Direct Investment	ln (F)	c_4	-0,009822 (0,02493)	-0,03598 (0,02584)	-0,05237** (0,02085)
Investment	ln(I)	c_5	0,01163 (0,01749)	0,03788* (0,01900)	0,02787 (0,01704)
Labor Force	ln(L)	c_6	0,2124 (0,2011)	0,1175 (0,2307)	0,2121 (0,2006)
Human Development Index	ln (HDI)	c_7	-0,8644 (0,7326)	-0,8576 (0,9583)	-1,575* (0,7777)
Time Dummies		θ_i	TAIP	TAIP	TAIP
Number of observations		n	211	211	211
Within R ²			0,4141	0,4304	0,3953
Panel diagnostics:					
Wald test for heteroskedasticity ^a			5140,42 [0]	1786,77 [0]	1757,36 [0]
Wooldridge test for autocorrelation in panel data ^b			2,14497 [0,1519]	0,544583 [0,4654]	0,285021 [0,5968]
Pesaran CD test ^c			-1,24879 [0,2117]	-1,28611 [0,1984]	-1,144280 [0,253]
Wald joint test on time dummies ^d			1,61177 [0,1598]	2,65294 [0,0247]	3,07912 [0,0110]

Notes: Robust (HAC) standard errors presented in parentheses. P-values presented in the square brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

^a p-value < 0.05 counts against the null hypothesis: the units have a common error variance.

^b p-value < 0.05 counts against the null hypothesis: no first-order autocorrelation.

^c p-value < 0.05 counts against the null hypothesis: no cross-sectional dependence.

^d p-value < 0.05 counts against the null hypothesis: no time effects.

Table 6. The impact of economic corridors in the group of countries with a relatively high institutional quality

Full variable name	Short variable name	Parameter	Fixed-effects estimates of Eq. (2) using robust standard errors (HAC)		
			LPIO as dependent variable	LPII as dependent variable	LPIC as dependent variable
Constant	Const	A	5,773** (2,738)	5,296 (3,612)	6,737** (2,578)
Economic corridors	BRIdj	β_1	-0,01339 (0,02402)	-0,02564 (0,02886)	0,0007791 (0,02100)
The Quality of Institutions	HGE	β_2	-0,01781 (0,01662)	-0,01350 (0,02158)	-0,03389* (0,01879)
The Interaction between Economic corridors and The Quality of Institutions	BRIdj-HGE	β_3	0,04762** (0,02221)	0,07675*** (0,02561)	0,05601** (0,02671)
Trade	ln (TR)	c_1	-8,191** (3,181)	-9,759*** (2,914)	-7,730*** (2,399)
GDP	ln(GDP)	c_2	0,07696 (0,1188)	0,2494 (0,1529)	0,07202 (0,1149)
Population Density	ln(PD)	c_3	-0,2487 (0,3076)	-0,3886 (0,2548)	-0,5067** (0,2162)
Foreign Direct Investment	ln (F)	c_4	-0,01082 (0,02429)	-0,03871 (0,02532)	-0,05552*** (0,02029)
Investment	ln(I)	c_5	0,007212 (0,01764)	0,02645 (0,01715)	0,02194 (0,01702)
Labor Force	ln(L)	c_6	0,1676 (0,2121)	0,04095 (0,2180)	0,1452 (0,1801)
Human Development Index	ln (HDI)	c_7	-0,8478 (0,6503)	-0,9189 (0,8575)	-1,566** (0,7358)
Time Dummies		θ_t	YES	YES	YES
Number of observations		n	211	211	211
Within R ²			0,4203	0,3879	0,4258
Panel diagnostics:					
Wald test for heteroskedasticity ^a			4135,2 [0]	1391,2 [<0.0001]	1976,16 [0]
Wooldridge test for autocorrelation in panel data ^b			1,77777 [0,1910]	0,206433 [0,6523]	0,190077 [0,5968]
Pesaran CD test ^c			-1,23106 [0,2183]	-1,26571 [0,2056]	-1,144280 [0,253]
Wald joint test on time dummies ^d			1,68076 [0,1421]	2,78367 [0,0193]	3,29371 [0,0073]
H0: $\beta_1 + \beta_3 = 0$			0,05111 ^e [0,0144]	0,03423 ^e [0,0107]	0,0567891 ^e [0,0334]

Notes: Robust (HAC) standard errors presented in parentheses. P-values presented in the square brackets. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

^a p-value < 0.05 counts against the null hypothesis: the units have a common error variance;

^b p-value < 0.05 counts against the null hypothesis: no first-order autocorrelation;

^c p-value < 0.05 counts against the null hypothesis: no cross-sectional dependence;

^d p-value < 0.05 counts against the null hypothesis: no time effects.

^e value presents the sum of coefficients β_1 and β_2 .

4.3. Limitations and future research directions

This study introduces the multiplicative approach to analyse determinants of logistics performance – economic corridor nexus in the context of moderating role of institutional quality. However, several limitations need to be acknowledged.

The first one is related to the availability of the data as BRI was introduced only recently, limiting the length of the analyzed period. Thus our estimations do not capture the most recent trends of the increasing impact of economic corridors. Secondly, no official or generally accepted definition of the BRI exists, thus it is very difficult to identify its geographical scope. Therefore, applying the same methodology for data, several years after the announcement of BRI, future research could include more countries and additional time periods to explore the matter in more detail.

Furthermore, this study analysed the moderating role of institutional quality through which economic corridors affects logistics performance of a country. Future research could include additional channels as FDI, political or legal environment of a country to explore the economic corridor – logistics performance nexus in more detail.

Despite the fact, our approach assumes that the initiative of economic corridors must be accompanied by strong and efficient institutions, which will ultimately lead to better logistics performance in the country.

Conclusions

This study has delved into a question of whether the relationship between economic corridors and logistics performance depends on different factors, what was done very scarcely in the literature. Therefore, this paper, while exploring the complex nature of economic corridors phenomenon, has aimed to fill this gap by providing new insights analysing the impact of economic corridors to countries logistics performance via institutional effect. It has explored the extent to which institutions in Europe, inherited either from Eastern or Western governance cultures, affects the impact of economic corridors to logistics performance of selected European countries.

The results of the analysis point to the fact that the impact of economic corridors to countries logistics performance is ambiguous. The meaningful marginal effect of the impact of economic corridors varies depending on the political culture of public governance in a particular country, which determines the effectiveness of institutional quality. Once a certain level of institutional quality is reached, the impact of economic corridors on countries logistics performance changes from negative to positive. This means that better institutions in the country, eases development of economic corridors in favor of the quality of logistics services. The results confirm that logistics is easier in BRI countries with better institutions. However, in countries with weak institutions logistics service providers are failing to make effective use of the infrastructure being developed in the context of economic corridors, due to entrenched traditions of political and institutional jurisdiction that are reluctant to changes.

There are two major contributions associated with this study. In theoretical aspect, the frontier of the knowledge of economic corridors is complemented with logistics performance and institutional quality with their associated theories such as The New economic geography and Institutional economics. Considering the economic corridors as a phenomenon of complex nature, this paper shows that the impact of economic corridors to logistics performance varies across the perceived level of institutional quality. However, this research is not without limitations. This research assumes that economic corridors should be further investigated including additional channels such as FDI, political or legal environment of a country to explore the economic corridor – logistics performance nexus in more detail.

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CLEAN WATER IN THE SLUMS OF EAST AFRICA

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Abstract. Researchers on human security now know that science has to deal with the water issues of our planet, which significantly determines the sense of security of human life. Where is no water, there is no life, so safety is lost. However, where it is present but not of adequate quality, unsafe for the biological organism, it is equally a hazard. As a result of all this, a humanitarian crisis, a catastrophe, and a disaster is developing, which the state bodies must prevent and restore in an ideal situation with the non-governmental organizations and civil society organizations. Africa is most at risk today in this area because it is unable to provide clean water to its slums, but it is also unable to make other infrastructural developments. And to keep human life safe, that is, NGOs must act to give clean water to the people who live there.

Keywords: Africa; Slum; humanitarian mission; clean water; health crisis

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Introduction

Man and Earth are inseparable, and Earth and water are indivisible, too, and man could not live without Earth or water. Both elements need each other, but the parts also need a man to preserve or destroy them, but life cannot do without either. We now know that our planet was formed to have every opportunity to serve life, from the single-celled living being to the most complex organism. We know that everything on our Earth is there for life to live, but we also understand that the necessities of life, such as water, cannot be found the same way everywhere. There are places where there is a lot of water, and there are places where there is tiny, but there are places where, despite having water, it is not in the suitable composition or of the proper purity to be good for the more complex body of man. For a long time, the water problem did not appear in human societies. It is clear that more and more people are living on Earth, more and more people need to share the Earth's resources, more and more food, and water, and more and more energy are required (Giled, 2019).

Formulation of the humanitarian problem

Our blue planet is largely covered in water, but there is still little fresh water available for consumption. A few decades ago, humanity realized that the freshwater supply of our Earth was not infinite (Treszkai, 2021). Until then, we believed that water scarcity could only occur in desertified areas of the Earth, but even there, water could be in limited form. We now know that the Earth's water resources are finite, water is not everywhere in the right quantity and of the right quality, and even if there were enough supplies, we humans get them polluted, rendered unusable, poisoned so that it would not be suitable for human and animal consumption. We must understand that life cannot exist without water, be it in any corner of the Earth. Even the tiniest element of life need water, and it does matter what quality it is. The water right is due to all living beings and the right to life. We need to look after our water resources like we look after life because life without water is impossible. Today, more and more scientists, researchers, and philosophers are asking questions (Giled, 2009; Monni, Iorio & Realini, 2018; Muniz et al., 2018; Moumen et al., 2019; Sjaifuddin, 2020; Shevyakova & Petrenko, 2021). How much is freshwater underground? How long will it be enough? Where and what proportion of freshwater supplies are there? Where can it run out the fastest? How many people, animals, and plants can the current water reserve supply? What to do if it may run out? Is it going to run out at all? Is it not possible that water is not even running out, but there are more and more people on Earth, and more and more people are engaging in irresponsible consumption and pollution? Can it be that we do not take care of our clean waters? Of course, we could ask many questions, but that is not the point; we need to look at why our planet has reached the end where we are desperately thinking about why there is not enough water or, if there is, why not in the excellent quality? Why isn't it clean?

Along with this problem, continents and countries are facing each other. There are continents where these issues are not yet formulated with great weight; they are not a cardinal issue in everyday life, as there is still enough fresh water in sufficient quantity and quality. But there are continents where this is a fundamental issue, a matter of existence, the main issue of survival, and not only because there is no water, but because it is unfit for human consumption, not even good for the wildlife, or even adequate to shower the vegetation of the area. An example of such a continent is Africa. Problems are also spread unevenly within continents where some countries are not yet struggling with water problems, but at the same time, some countries are dancing on the brink of disaster (Ramin, 2009). Today we are seeing water shortages on the Australian continent as well, but there are already water shortages on the North American continent. And to be honest, even Europe is not without water problems. In the southern part of Europe, the situation is not rosy either, with dried-up rivers, lakes, waterways, and streams occurring inside the continent (Giled, 2009). What is causing this? Researchers are looking for the answer, but it's not easy to understand since we know from the law of physics that nothing is lost, just transformed.

Of course, we need to ask which areas are most affected. What causes water scarcity or its deterioration? What processes does water scarcity or poor-quality water trigger? The direct consequence of the unresolved issues so far formulated is the emergence of a humanitarian catastrophe, making it impossible to survive. If there is no water or in poor quality, the danger of dying of thirst and developing infections all lead to humanitarian crises and disasters.

By responding to and recovering from humanitarian disasters, the government's public bodies are fighting with the intuitions of non-governmental organizations that are being formed for this purpose. The United Nations and its accredited subdivisions, non-governmental organizations of democratic states, associations taking on humanitarian tasks, and all charitable and religious organizations can provide adequate answers to emerging and existing humanitarian crises and disasters. Today, such organizations work in all parts of the world to deal with famines, water shortages, natural and humanitarian disasters, and the resulting migrations (Solymári, 2020) (Solymári & Janet, 2020). Such an area is Central and Eastern Africa, or, as we know it, the Easter part of the

Sub-Saharan region, one of the poor regions in Africa, Uganda, Kenya, and Tanzania. Vast slums have emerged in the cities of these states, where human life is on the brink of disaster, where today, the biggest struggle for survival in everyday life is taking place (Solymári, 2012; Czirják, 2018).

Africa Yesterday and Today (Brief historical overview of Africa)

The African continent has a large area, medium-size population, and a very modest economy, covering 1/5 of the planet's land area with a population of around 1.2 billion today, accounting for only 3.5% of the global economy. This is very small compared to the land area and the mineral reserves available on the continent (Búr, 2005a; Gyuris & Szabó, 2020). Its land is quite diverse, with vast deserts, savannas, rainforests, and a wide variety of climates. We know there are two-seasonal rain belts and one-seasonal rain belts, but it also has zonal deserts. Currently, the UN recognizes 54 of the 56 states on the continent, 2 of which have disputed status (Western Sahara, Somaliland). The continent has relatively few islands, and its coastline is pretty monotonous. The biggest problem for the states is the border disputes, as the current borders are from the colonization era, and decolonization did not change them. The current borders were inherited; they did not follow and do not follow the ethnic, tribal areas. There were even occasions when they were drawn with a ruler by the great powers of that time (Búr, 2005b). Therefore, the continent is full of ethnic disputes and social conflicts, as its ethnic diversity, religious relations, and linguistic and cultural pluralism put it in a difficult position. And this partly led to the persistence of armed conflicts on the African continent, which various peace operations can only manage ephemerally. (Besenyő, 2019). To the best of our knowledge, the number of languages spoken on the continent is between 1,500 and 2,000. And the languages spoken by the colonists, such as English, German, French, Spanish, Portuguese, and Italian, have been added to them. In addition to its ancient tribal religions, Africa could not avoid the influence of world religions because North Africa mostly followed Islam due to the Arabs. In contrast, the southern part mostly follows Christianity due to colonizers and missionaries (Búr, 2006; Besenyő, 2010).

We know from our historical studies that it is the cradle of humanity, and thanks to its climate and natural treasures, we can believe it. Ignoring the prehistoric details, we cannot fail to mention one of the earliest and most powerful empires in our ancient history that developed here. Ancient Egypt, created along the Nile, is the most beautiful and valuable empire in our ancient past. This empire grew in the area of Northeast Africa, where the continent's most prominent and longest freshwater river is located because life and civilization are impossible without water. Its history, to our knowledge, dates back to the fourth millennium BC, when the existence of small communities alone defined the area. Still, it is beautiful to see that these loose little communities were already pursuing the science of channel construction, often in collaboration. The archaic era of the empire and its civilization were also affected by water 4,000 years before Christ. Its economy, culture, and religion were defined by its freshwater river. From the loose communities living side-by-side, the institution of the kingdom grew by the end of the fourth millennium, an institution capable of moving and controlling the systems of vast empires: roughly 3,000 BC, the I.-II. Dynasty of the Archaic Period began its reign, during which a millennial rule process began in North-Easter Africa, where one of the most beautiful and wealthiest civilizations in our ancient history unfolded. Our historical sources can trace this rich and valuable era until the start of the Common Era. During this time, we can map more than 20 dynasties and their rulers along with their well-defined historical significance (Polányi, 1973).

The rise of the Roman Empire and its expansion does not deprive Africa of its significance. Although it cannot be considered a power factor, its economic importance is enormous. Think of the history of the Roman Empire, when Egypt was an essential supplier of grain, without which the Romans would have starved (Ferenczy & Maróti, 1998; Normann, 2002).

We do not have extensive historical resources for the whole of Africa throughout the long middle Ages. Still, until the first era of Western discoveries, we could highlight the continent's significance through the Arab world. Think

of the Empire of Mali, which is no longer to be found in the north of the continent but south of the Sahara, in the upper reaches of the Niger River. This empire flourished as early as the 14th century and became famous for its vast gold reserves. This extensive stock of shiny gold is arousing the interest and envy of the Euro-Mediterranean area (Fernandez-Armesto, 2001a). To the best of our knowledge, this state existed until the beginning of the 17th century; among the admirers of her heydays is the Portuguese court. Bypassing the Ottoman Empire, these Portuguese circled the continent in the late 15th and early 16th centuries to get to India, the land of coveted spices. In addition to Mali, we can also mention Ethiopia, whose history dates thousands of years back and during which time it rose rapidly and irresistibly so that in addition to embracing Christianity, it became an essential player in the gold, ivory, and slave trade. The region of Zimbabwe may also have played an important role between the 12th and 16th centuries, as Portuguese sources reported that Zimbabwe's (buildings serving political and administrative functions south of Zambezi) revealed a colossal civilization (Fernandez-Armesto, 2001b).

The transition from the Middle Ages to the New Age is not Africa's most beautiful historical period. The history of the Western discoveries sealed the continent's fate, as we do not encounter serious, politically strong states on the continent at that time, as the continent is full of tiny ethnic groups that have taken a distinctive cultural and civilizational path that bears no resemblance to European development, nor to any public body of Western civilization. At the end of the middle Ages, for economic reasons, Europe had to break within its confines to refill its pantries because it seemed to run out of its noble treasures and food (Normann, 2002). Africa was not spared by its economic hunger either. Although the continent's rich minerals were not being exploited at this time, it was only during the colonization era that the slave trade reached enormous proportions. Serious accomplices in this were the prominent lords of the local leadership. They carried out the gathering and capture of the enslaved people and then sold them to the leaders of the ships moored on the west coast, transporting the valuable labor force straight to the new world. Unfortunately, the slave trade has claimed many African lives. There have been cases where almost the entire male population of an area has been sold as enslaved people, putting the tribe's survival or regeneration in danger. Some slaves transported from Africa to America did not even arrive at the destination because many lost their lives at sea before landing. It is estimated that almost 12,5 million enslaved Black people set sail, and about 1,8 million did not survive (Fernandez-Armesto, 2001c).

Africa was the most important source of the slave trade in the New World until the mid-19th century, when slavery was already becoming an undesirable phenomenon in North America, too. The Industrial Revolution, the development of Western civilization, the rearrangement of the world economy, and the desire for new raw materials were all enormous incentives for the rapid occupation of Africa. And although Africa was still a continent with many mysteries, we could see that the European powers were invading Africa with almost no resistance (Normann, 2002). All this was because the Europeans arrived in Africa with a substantial industrial and technical superiority. The last quarter of the 19th century and the first quarter of the 20th century seem to be short periods. Yet, it was enough for Britain, France, Germany, Spain, Italy, Belgium, and Portugal to divide the territory of Africa among themselves and dominate, exploit and partially transform it for decades after World War II. The borders of the occupied new states were redrawn, often using a ruler, ignoring tribal-ethnic and cultural differences, which would later remain sources of enormous tensions. So the "Scramble for Africa," or as others have said, the "Race for Africa," is a crucial period in human history because if the occupation of Africa had not occurred, we would be facing a completely different Africa today (Normann, 2002).

The bloody battles of the two world wars pretty much avoided the African continents; there were numerous battles only in the northern areas and primarily amongst European armies. After World War I, many European colonialists regarded their colonies as the primary source of their reconstruction because they sought to use and sell its raw materials and thus mitigate their losses as efficiently as possible. The local population has not been found fit to hold public office, so expert staff who did not know the needs of the people living there were transported from the colonial states (Búr, 2006). The subjugated state thus received an apparatus of experts from

outside who sought to live the hitherto traditional European way of life, which was utterly unfamiliar to the natives.

The decolonization of Africa, which began in the middle of the 20th century, cannot be sought only in the interior of Africa. The end of the II. World War, the establishment of the United Nations, and the independence of India have all contributed to the liberation of the African colonial states from the superpowers. Of course, the ideal of Pan-Africanism, which has existed since the 18th century and ultimately until the end of the 20th century, may have played a role, but the 54 states were never fully consolidated into an alliance. One well-defined phenomenon of getting independent is Africanization. We know for sure that in 1960 there were almost 6 million Europeans on the continent, most of whom were technicians, doctors, and civil servants. As soon as the colonizer left the country, the so-called takeover of power began. Positions are filled with local people. Boundaries are redrawn, names places and geographical names regain their original African name. Gaining strength is not going smoothly either. In 1963, the Organization of African Unity (OAU) was established in Ethiopia, which did not want a federation, but the management of the organization of African sovereign states. The Organization of African Unity is finally reaping its benefits within the African Union, which was set up in 2002 and has 53 members (Normann, 2002; Búr, 2006).

The decolonization of Africa in the mid-1970s, amidst huge hopes, gave the impression that its underdevelopment was not an African peculiarity but a consequence of the invaders that its occupation had hindered. Nevertheless, ethnic conflicts have not diminished but intensified. It is enough to think only of tribalism, regionalism, or particularism. Above all these conflicts existed the religious problems. Along with Arabization, the Islamic religion gained a foothold on the continent, just as missionaries and colonizers took their Christian faith to Africa. Thus, the continent is almost split under the auspices of the two religions, and we have not even mentioned the local tribal folk religions or customs (Búr, 2006).

With the advent of colonizers, urbanization processes are also underway, and once Europeans leave the continent, urban growth is not slowing down but even accelerating. And Africa faced an economic crisis back then, as it does today, too (Búr, 2005). Population growth is also a massive problem because economic development cannot keep up with the demographic explosion, and the surplus rural population is trying to move to the nearest big city in the hope of a better life ("Malteser International Annual Report", 2009; "Malteser International Annual Report", 2018). Population growth is also a generator of poverty, and the persistence of poverty is also a source of unhealthy living conditions (Alaazi & Aganah, 2019). It is no less important to mention that the independence of African states has not lived up to their economic hopes. One of the reasons is that the leaders of states are not taking over power in a democratic way, or if they are, their behavior is changing in their governance process (Búr, 2006). Financial resources are not spent for the benefit of their people and countries but are ending up in one of the different foreign banking systems in a way that can never be followed. Many of Africa's leaders are among the most corrupt in the world, and globalization does not help this but even opens up more space for local leaders to exploit their people (Klopp & Paller, 2019). These leaders greatly enjoy the powerful support of one of the leading political superpowers who, nonetheless, are collecting tariffs for it. Although we can say that Africa has the poorest population in the world, Africa itself has vast natural resources. However, we can state, and this is shared by international organizations, that the main causes of the continent's poverty are to be found in local corruption, regular and unsolvable political crises, local tribal conflicts, and ongoing religious conflicts, all of which have led to a petrified and perpetual civil war (Búr, 2005b; Berger, 2006; UN-HABITAT, 1986-2013).

The slums

Humanity only encountered the concept of the slum in its modern era. To the best of our knowledge, the emergence of slums can already be seen in the first stages of the advancement of the Industrial Revolution

(Czirják, 2015). The growth of cities was also due to the deprivation of the large numbers of people living in the countryside from their livelihoods from farming, land reforms, the liberation of the peasantry, the emergence of machinery, and the development of industry driving large masses into cities. As the land no longer provided a decent livelihood for the people living in the villages, the establishment and growth of the factories had a pleasing effect on these people, who moved to the cities in the hope of a better livelihood by taking up factory work. These processes accelerated in the 17th century, culminating throughout the 20th century, and continue. The expression slum has become known worldwide from the English word slum; not coincidentally, the first large and significant such slum in the world grew in London (Czirják 2018). The point is that poverty was prevalent in the slums, as they were characterized by a very crowded, huge population, in poor-quality flats, if the prefabricated buildings built there can be called flats at all. The slums on the outskirts of London are very different from the enormous slums that will later form around the world, as the homes are, in principle, built of stone and brick, but of poor quality, in a small and crowded place (Czirják, 2018). They had very narrow streets, no proper hygiene facilities, no toilets, and no sewers were developed, so the carrying off drainage water and waste matter was not solved. Often, those who moved here undertook to live in the slums hoping they would move on from here as soon as they had the financial opportunity, but unfortunately, this was very rare. Thanks to the development of sound economic potential and a social network, London's slums disappeared and were eradicated by the 20th century and are now seen by researchers as a bad memory or a good example (Ramin, 2009).

But let's see what happens in the rest of the world? The glorious 20th century has unfortunately dumped a lot on humanity. Of course, we know that the technical advances of the 20th century have had both advantages and disadvantages. The worldwide development of the industry has brought with it a lot of humanitarian problems, wars, and natural disasters. By the beginning of the 20th century, the number and proportions of slums in Europe and the more developed parts of the world will begin to decline, but this is not the case in the developing parts of the world. The most endangered continent on Earth is "Black Africa," where, according to the United Nations, 56% of the urban population lived in slums at the beginning of the 21st century. In South Asia, it is about 30%, 24% in Oceania and similar proportions in the rest of Asia, but unfortunately, Latin America is also affected by around 20%. It is currently estimated that 1 billion people live in slums and are projected to reach 2 billion by the middle of the 21st century ("Strategy for Water, Sanitation and Hygiene 2016–2030: UNICEF's Strategy for WASH" 2016-2030). It is also undisputed that today's Roma segregation in Hungary can also be classified here, as we encounter this phenomenon in about 300 settlements. The Hungarian Charity Service of the Order of Malta undertakes the task of achieving change at these places within the framework of the "Felzárkózó Települések" (Advancing Settlements) program (Romhányi, Solymári & Tihanyi, 2021).

The inhabitants of slums live their daily lives amid great dangers, poverty, lack of employment opportunities, inadequate infrastructure, the spread of diseases and epidemics, and the presence of crime in slums all make their mark on the daily lives of those living there (Kofi, 2021). Typhoid, cholera, tuberculosis, and all forms of AIDS are among the most common diseases in today's slums in Africa, and children are most at risk, with around 40% dying before the age of five (Solymári, 2012). Most importantly, these slums have massive water shortages, severe lack of hygiene, malnutrition, and a highly polluted environment, if one can talk about the environment at all (Albuquerque, Guedes, 2021) (Tibaijuka, 2007). People face almost the same problems in all parts of the world, be it in Mexico (Mexico City), Brazil (Sao Paulo), Indonesia (Jakarta), China (Shanghai), India (Mumbai), the Philippines (Manila), or Africa (Cairo, Casablanca, Lagos, Johannesburg, Nairobi, Kampala, Mombasa, Dar es Salaam), etc. Despite all this, we must see that perhaps the worst conditions are still in the slums of Africa (Madden, 2020). But even within Africa, huge differences can be observed ("Every child lives in a safe and clean environment", 2020). In the present study, we focus on the most severe slums in Sub-Saharan Africa, namely the four cities of Uganda, Kenya and Tanzania, where the Hungarian Charity Service of the Order of Malta has carried out huge and large-scale interventions in the slums of four major municipalities. The most common problems in these slums are rapid demographic growth, a lack of employment opportunities, a lack of clean drinking water, a high level of infection and crime, the spread of diseases and malnutrition, and the sexual

exploitation of minors (Wado & Bangha, 2020). It is part of the history of the development of slums in Africa that the processes of colonization and then decolonization contributed to the urbanization of a rapidly growing population.

The rapid urbanization process surprised the leaders of African states because they were by no means prepared to create housing conditions for the vast rural masses (Harrisberg, 2019). The groups that arrived in the cities settled where they had the opportunity to build from what they had just found, so neither the ownership norms prevailed nor the city's building regulations, if there were any (Collord, Goodfellow & Asante, 2021). The large population settling in the quickly made tumbledown cottages in a small area tried to create closed communities with humanitarian rationalities. Because several people crowded together to create a residential area, those people tried to help each other and protect each other, and this is so to this day (Nagy-György, 2019). The negligence of states, the lack of a concept of urbanization policy, corruption, and economic problems, which could be examined in a global context, are constantly generating the problems of slums (Collord, Goodfellow & Asante, 2021). The re-evaluation of the continent's rich raw materials and the possibility of exploiting the existing labor force on the continent may be at the heart of the rethought Africa policy of the former colonial states, not by capitalist approaches but by developing humanitarian ideologies and a focus on the well-being of local people. It would be essential to move in this direction in cooperation with local leaders and NGOs. By civil society, we do not necessarily mean locally established organizations but various UN agencies, charities, and non-profit organizations from all over the world that want to help. Mass of such organizations has been appearing in these settlements for decades. Still, due to the weak state will, the resistance of corrupt local political systems makes the conditions very difficult and opaque ("Strategy for Water, Sanitation and Hygiene, 2016–2030: UNICEF's Strategy for WASH" 2016-2030; UN-HABITAT, 2019). The European Union has already developed the concept of an African presence, which it seeks to implement through its Member States to the extent of their economic competencies (Besenyő, 2020). The US is also beginning to discover that the lack of rebuilding of their policies in Africa will be a significant competitive disadvantage in the global space. Therefore, its financial contribution has also entered a growth path in the light of all that it seems that China does not want to be left out of the 're-colonization' of the modern African continent either. (Arimah, 2017; Shittu et al., 2020).

The Hungarian Charity Service of the Order of Malta in Africa

The history of establishing the Hungarian Charity Service of the Order of Malta begins at the moment of the regime change in Central and Eastern Europe. It is formed in a year when it is most needed. The Sovereign Military Hospitaller Order of Saint John of Jerusalem, of Rhodes, and of Malta is not present-day conception. Several abbreviated names are used in the common Hungarian language: Maltese, Johannes, John Knights. The order formation could not be accurately determined by the researchers either, but the foundations certainly seem to have been laid down before the first crusade. The years 1070, but perhaps later the years 1113 or 1120, have a decisive certainty that brotherhood will be formed therein Jerusalem, which in the beginning will only nurture and care, and is not a military order. Only later, perhaps in the model of the Knights Templar, will it take on a military role (Török & Legeza, 2009; Hunyadi, 2019; Romhányi, Solymári & Tihanyi, 2021). The order appeared in Hungary almost in its initial period and in the whole of Europe. They will do much service to the Christian armies fighting for the Holy Land at the time, both in caring for the poor and caring for the sick, but their military role will also be enormous in this age. With the loss of the Holy Land, the order does not end, it persisted on the island of Cyprus until the end of the 13th century, and as the Knights Templar ceased, with the wealth of the Templars and many members of the temple, it grew stronger and stronger. After Cyprus, the island of Rhodes is acquired, and from there, the island of Malta became their home until almost the end of the 18th century. After losing the island of Malta, Rome will finally be their center (Hunyadi, 2019). The spirit and members of this order established the Hungarian Charity Service of the Order of Malta in 1989, which will be registered on February 10th. Of course, this does not mean that it had no precedent until then and just appeared out of nowhere since, as

it has been already mentioned, they have existed in Hungary since the middle of the 12th century (Romhányi, Solymári & Tihanyi, 2021). Their presence simply has not always been tolerated throughout history.

The Hungarian Charity Service of the Order of Malta is an aid organization of the Association of Hungarian Knights of Malta within the Sovereign Knights of Malta, which due to the Central European regime changes and its 1989 establishment, became one of the most prominent charitable non-government organizations in Hungary and the region. Its greatness is unquestionably reflected in its national reach, following the country's administrative rationalization, according to which it has a National Centre and seven areas. Its activities are not limited to the borders of Hungary. Still, as an organization of the Sovereign of Knights of Malta, it participates almost worldwide. It acts out its charitable, humanitarian, and security duties set out in its Charter, making it a member and active participant in the international Maltese organization. Its activities cover the entire Carpathian Basin, but it is present everywhere in the world, where humanitarian and natural disasters occur and is present in all segments of the security of human life. Its presence affects almost every continent in this way. In North America, in cooperation with the Hungarians living there, it manages and organizes procurement of medical devices of significant value and delivers them to those parts of the world where it is very much needed. The most significant presence, as well as cooperation with local organizations, is in Venezuela in South America, especially since the political situation has deteriorated significantly and the economy has been in decline, so the livelihoods of the people there have been a significant concern. We could highlight many countries in Europe, but perhaps the most important are Ukraine, Romania, and Serbia. In these countries, the organization has been active since its inception, as the humanitarian problems that have arisen there have not been resolved since then; indeed, more and more have surfaced. Lebanon, Jordan, and Palestine can be highlighted in the Middle East. These countries have been facing severe asylum and health problems in recent years, which is why the Hungarian Charity Service of the Order of Malta carries out its most extraordinary possible health activities here. In Asia, Pakistan and Thailand are the main focus of the organization's efforts to help people affected by natural disasters and mitigate the difficulties of local migration ("Hol Dolgozunk – Afrika/ Kenya, Uganda, Tanzánia", 2010-22).

The Service of the Charity in Kenya, Uganda, and Tanzania

Its activities in the three countries, the humanitarian and technical tasks of the organization, which are called to restore and ensure the safety of the inhabitants of the slums living there, are unique in the history of the Hungarians of the 21st century. As Hungary joined the European Union, it has created an opportunity for Hungarian non-governmental organizations to launch high-level professional tenders and establish ever more comprehensive cooperation with other international institutions through partnerships. This also had the advantage that the NGO, which is essentially known and active in the Carpathian Basin, could get into an internationally and professionally recognized field. Thus, in the years after 2010, the focus was on three states of Sub-Saharan Africa which have provided and continue to provide crucial ground for the fulfillment of the goals and missions set out in its memorandum of association. According to international organizations, almost a billion Africans currently live in slums or highly impoverished neighborhoods; if this continues, it could double by 2050. In this area, there are scores of problems faced by humanity, such as malaria, typhoid, dysentery, and cholera. Still, in addition to these, modern diseases such as AIDS and asthma reared their head.

Kenya: This country is a republic that gained independence from the United Kingdom in 1963. As a state on the shores of the Indian Ocean, it is an essential economic factor in the region. Its capital is Nairobi, home to one of the largest slums in the area, Kibera. The country is a member of the United Nations, the African Union, and the International Monetary Fund. Its currency is the Kenyan Shilling, perhaps the most dynamically developing country in the region in recent times. About 54 million people live in a predominantly Christian nation, and the official languages spoken are Sahelian and English. Poverty is prevalent, with substantial social inequalities exacerbated by the unexpected effects of ongoing global climate change. Most of the rural population who have moved to cities live in slums where there are no conditions for a healthy and dignified lifestyle. The most basic

shortcomings are no drainage system for clean drinking water, no sewerage system for sewage, no electricity, and no network of public health institutions. As a result, the most basic human need, such as clean drinking water, is lacking. The Hungarian Charity Service of the Order of Malta has launched four programs in Kenya, two considered closed and two still ongoing. In order:

1. Establishment of a Sanitation Centre at Kibera slum - Nairobi
2. Establishment of a Rehabilitation Centre at Bangladesh slum - Mombasa
3. Impact assessment for a water and sanitation project in Africa
4. Kenya Representation Program on Kibera slum

The program, which took place in the Kambi Muru district of Nairobi's Kibera slum, ran from 2011 to 2012, with the most significant financial sponsor being the Metropolitan Waterworks (Budapest), and partner organizations were the Kenyan NGO Maji Na Ufanisi (Water and Development) and the Nairobi City Council. The implementation cost of the program reached ten million forints. There were good reasons for the construction: the slum, which has a population of almost 1 million, has no sanitation facilities, no toilets, and sewers to drain bio-waste. People use pits dug into the ground for this purpose, surrounded only by a few shales, and when heavy rain arrives, it washes the feces out of the holes, bespreading the area and causing a high risk of infection. The concept of 'flying toilet' has also become established here, meaning a full bag is just sent flying. Although pipelines can be seen on the narrow streets, these carry stolen water from the urban water system. They are perforated, fragmented tubes in which the water reaches its destination already infected and is sold at a high price. As a result, 40% of children born here die before the age of five. That is why a rehabilitation center had to be set up to help and protect the most vulnerable, children, women, and the elderly. This sanitation center provides clean drinking water by officially connecting to the city's water system, filling the water tanks with thousands of liters from there, and then selling it for a symbolic amount to the residents of the slum. The revenue is used to maintain the facility and pay those working there as employees. The facility not only provides clean drinking water but also has rainwater collection tanks. The water collected is used in the toilet systems also constructed here. Moreover, showers have also been set up, which also greatly serve those who work here, as it is easier for them to find a job when they are clean and tidy. It can also be mentioned that the drainage system has also been developed ("Hol Dolgozunk – Afrika/ Kenya, Uganda, Tanzánia", 2010-22).

The next similar project by the Charity Service could have also been implemented in one of the Kenyan cities, in a slum in Mombasa called Bangladesh. This project was accomplished between 2012 and 2013 with the support of the Hungarian Ministry of Foreign Affairs and private donors, amounting to approximately HUF 15 million. The partner organization for this project was the local NGO Maji Na Ufanis (Water and Development) and the Water Board of the City Council of Mombasa. In this case, too, the Charity Service established a complex hygiene center, which had the exact solution requirements as in the case of Kibera. The problem was similar here, the official plumbing system was missing, the sewerage system was missing, and the removal of biological waste from the area was unresolved, leading to severe infection hubs. Water purification systems thus provide a solution for thousands of people living on the site; without water and hygiene, young children, women, and the elderly are most at risk. Thus, according to the report of the Charity Service, a legal drinking water system was constructed in this slum, as well as toilets, showers, and a rainwater collection tank using modern technology. Here, too, WASH (Water Sanitation Hygiene Alliance International) has been entrusted with the operation of the center, and its revenue is used to pay for the staff and to run and maintain the hygiene center (Romhányi, Solymári & Tihanyi, 2021) ("Hol Dolgozunk – Afrika/ Kenya, Uganda, Tanzánia", 2010-22).

The Impact Assessment for Water and Hygiene Projects in Africa program only started in 2019 and was scheduled to end in 2021, but unfortunately, the pandemic also slowed it down. The Charity Service funded the project from its resources, and the budget is planned for about HUF 3 million. Their partners, in this case, are the

Natural Capital Trust and the University of Nairobi. The program aims to examine the influence of the already established centers on the lives of the people living in the slums, as well as to gather experience to lay the foundations for new similar rehabilitation centers. Another intention of the program is to support the work of local professionals and researchers so that local civilians, with this knowledge, can put their resources to work and use external resources as well.

A project called Kenya's Representation Program from Kibera's Slum started in 2021 and is scheduled to run until 2023 unless the pandemic prevents it. This time the implementation of this program is funded by the Hungary Helps Agency and about 30 million will be allocated to it. Of course, the partnership here is also with the Natural Capital Trust, as any program can only be run with Hungary Helps if a local organization is involved. This program is very different from the previous ones, as the goal of the Charity Service is to research and help a unique phenomenon here. It should be noted that the supply of slums is provided by the rural population of the countries, who have livelihood problems and therefore migrate to the parts of the larger cities where the poorest classes live, and because they are also very poverty-stricken, could not rent or buy acceptable property elsewhere. The slum is meant to be a springboard, hoping that if they have the money, they will be able to move out, but unfortunately, very few will succeed. So, this program examines and tracks the lives of those moving from rural to urban environments. In the program, 50 families are selected who have moved from the countryside to the city and aim to relocate to their rural residence. They are getting prepared with training, so they have the proper knowledge to make a living. The Charity Service also provides financial support to help them implement their business plan. After the move, they stay in touch for a year, and the families can receive assistance if needed. It is also essential for them to be a retaining and valuable member of their community, not just for their family. This may make it possible for rural-urban migration to decline or if it can happen to be stopped. And even if that is a very distant dream, the trend is to get reversed, so the inhabitants of the urban slum can see an opportunity in rural life again, even keeping their traditions (Treszkai, 2021).

Uganda: The history of the country has been fascinating. First of all, it is essential to note that Uganda has a very advantageous position within Africa, as it is adorned with many streams and rivers, and there are also plenty of lakes and many savannas. There was a kingdom in this country that lasted for centuries, which was abolished by the English colonizers in the late 19th century, creating the Ugandan Protectorate with the Kampala center, which lasted until 1962. The period after the decolonization did not turn out well either because bloody dictators took turns, and military coups and civil wars did not escape its territory either. The conflicts in the neighboring countries have also left their mark on the land, resulting in millions of refugees coming here, thus generating high unemployment. Its economy is starting to recover, and poverty is slowly being reduced, but the country still has a long way to go. The slums of the Kampala Kironde Zone are nowhere near the size of the Nairobi Kibera. Still, its dimension is not negligible either, as it is estimated that hundreds of thousands of people may live in similar sheds, one-room barracks quickly built by rubbish, in many cases families of up to ten members. There is no legal waterpipe system here either, no sewers, and, more importantly, no public health system, and access to health care in the city is costly and cannot be paid for by slum dwellers.

The program of the Charity Service started here in 2013 and was completed in 2014. The program's sponsor was the Hungarian Ministry of Foreign Affairs, and the implementation cost about 15 million forints. Their local partners were SSWARS (Sustainable Sanitation and Water Renewal System) and UWASNET (Uganda Water and Sanitation NGO Network). As the problem is the same as in Kenya's slums, the Charity Service has set itself the goal of creating almost the same complex hygienic development here as in Kibera. The aim was also to provide clean drinking water to as many thousands of people as possible, create flush toilets, build a sewer system, reduce the number of infections by draining bio-waste, and increase the system's efficiency by setting up rainwater collection tanks. An anaerobic biogas producing unit has also been set up here so residents can use the gas generated by the chemical process for lighting and heating. With this ecological step, an essential aspect of

pollution has been reduced, so not only has the public health of the residents improved but the environmental impact has also been lowered.

Tanzania: This nation is different from the previous two countries. Although its history of colonization is similar, as the English were the colonizers here as well, the difference is more in the fact that we do not encounter such slums as in the big cities of the previous two countries. There is also poverty here, but impoverished streets and smaller townships are more noticeable, where the infrastructure is incomplete. In terms of population, it is the largest and also much larger in area, with some 13 million of its 58 million people living in deep poverty, which is not small or negligible. The Charity Service started its program in 2014 in one of the schools in Dar Salaam, the capital, which the Hungarian Ministry of Foreign Affairs also supported with HUF 15 million. The partners, in this case, are SAWA, Tawasa.net, and the City Council. The program took place in an elementary school attended by 1,200 children, where the entire water network of the school was renovated, and new toilets were created that boys and girls could use separately. Developing a rainwater collection system will also help the institution operate more efficiently ("Hol Dolgozunk – Afrika/ Kenya, Uganda, Tanzánia" 2010-22).

Africa's prospects - is there any hope? Conclusions

The vision of Africa's young population and overcoming past problems is not just a task for Africa (Fodor, 2008). It is the part of our Earth that is the cradle of humanity, with thousands of cultures lined up before us, hundreds of languages exist, and not to mention treasures that, due to their geographical location, are unique and special, nowhere else on Earth can be found. The continent had a peculiar development until the 19th century, avoided by modern industrialization, which would not have been to its disadvantage but rather to its advantage; however, the greedy behavior of the Western imperialist world had diverted this mainland in a terrible direction. With this in mind, those parts of the world that have practically completely exploited these ethnic groups should feel responsible for this continent, not forgetting, leaving them alone, or even exploiting these countries, but helping them conceptually through development programs so that the highest environmental standards can prevail. Today, the world is again seeing an opportunity to revitalize its policies in Africa. The US, China, India, and many European countries are rethinking their policies, however, not entirely selflessly, keeping in mind the perspectives of those who live there, but with a pragmatic approach. Africa is rich in mineral resources, several states are members of OPEC, several environmentally conscious industrial facilities are being constructed, and many high-quality research centers are being set up in many African megalopolises, but the developed world needs to take note that not only their interest can prevail

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THE ONGOING POLITICAL CRISES AND THEIR IMPACT ON MICRO AND SMALL ENTERPRISES: A CASE STUDY OF ETHIOPIA

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Abstract. This study aimed to highlight the challenges and difficulties that face small business enterprises in inhibiting Ethiopia. The author wants to reveal the impact of consecutive crises and conflicts on small businesses. To achieve this goal, a case study research in combination with a detailed review of the literature was done; the study population was 50 small business owners selected randomly from many small business owners. From the findings it was possible to summarize that the political environment has a significant and positive impact on small business success and the study also revealed that the war caused colossal material damage in the region, which has a total birr value of 288 billion. In addition, the most critical problems facing small businesses in Ethiopia's Amhara region are the difficulty of getting funds, poor infrastructure, corruption, difficulties in securing raw materials, lack of skilled employees, peace and security issues, challenges in getting licensing, and the absence of specific small business authority. Even though the political crisis is country wide and affects the business sector in the whole nation, the study is limited to Amhara region only due to certain constraints such as financial problems and time. In this regard, the findings of the study can be used to find a way to support small businesses to revive again. This study presents the effect of the current continuous war on small businesses in Ethiopia and will provide the basis for future researchers in this regard.

Keywords: small enterprises; crisis; small business success; obstacles; challenges; Amhara region

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JEL Classifications: O10, O55

1. Introduction

The Role of Small Business in the Economy

Small enterprises play a prominent role in enhancing a nation's economy and can provide income generation opportunity for low-income groups. These small-scale enterprises offer a work culture and boost the economy against economic crises, such as low per capita income, poverty, and unemployment. Based on the Government of Ethiopia, the sector contributes to job opportunities, income creation, and poverty alleviation. It is the primary source of employment and income for urban dwellers in most developing countries (Federal Micro and Small Enterprise Agency, 2018). Even if micro and small enterprises' performance is affected by different determinant factors, such as infrastructure, raw material, working premises, and human capital, it contributes to economic

growth, employment formation, and income generation for the local community in Tigray Ethiopia (Ayalu, Abbay, Azadi, 2022).

Micro, small and medium-sized enterprises (MSMEs) potentially impact achieving many sustainable development goals much more significantly than their size (Endris, Kassegn, 2022).

Small business enterprises are seen as the most crucial indispensable sector in fostering the socio-profitable development of developing countries. Mainly, they donate to employment in numerous developing countries where a challenge of high severance and poverty exists. Several studies reveal that MSMEs in developing countries are pivotal in employment creation and generally contribute to profitable growth as a machine of development and vehicle for fulfilling the Millennium Development Goals. Chief among these pretensions is the reduction of poverty through creating employment, wealth, and enhancement of living norms because poverty and severance rates are vastly advanced in these countries than in developed countries (Datta et al. 2018)

According to Zonouzi, Hoseyni, and Khoramshahi (2021), one of the significant challenges in the Iranian labor market is the closed, unchanged, and liberalized space of the laws and regulations, which is characterized by an annual decline in its position and rank in the global business arena. However, identifying and removing the existing barriers, especially political factors, contributes to organizing the business environment. However, the unfavorable situation of the business environment related to the unilateral sanctions has led policymakers and planners to resort to interim health policies in the critical conditions of the Iranian economy. The actual production overtaking is regarded as one of the implications.

The researchers argue that political factors are essential for the creation and survival of SMEs; they create a wide range of emerging entrepreneurs since they know the existing context and conditions and identify the risks caused by political factors.

A study conducted by Endeshaw (2005) also shows that the micro and small business sector is essential force-generating employment and more equitable income distribution. They activate competition, exploit niche markets, enhance productivity, and bring technical change through all of these measures to alleviate poverty. Micro and small enterprises can play a role in civilizing the socio-economic conditions because they generate job opportunities that enable access to socio-economic qualities such as education, better health condition, suitable housing, and nutrition (Belay, 2012; Setegn, 2010; Sherefa, 2012).

Different nations use various methods to separate micro and small business enterprises from other type of business, e.g. number of employees, financial strength, sales value, relative size, initial capital outlay, and industry types. For example, European Commission uses three criteria to determine whether an enterprise is a micro or small size. These are staff headcount, annual turnover, and annual balance sheet. According to the Commission, small enterprises employ fewer than 50 persons whose annual turnover or balance sheet total is not more than ten million Euros (Kushnir et al., 2010).

Today, many developing countries face various problems like extreme poverty, unemployment, low per capita income, and unequal income distribution. Due to this, different governments are creating different strategies and policies to create job opportunities and pull these countries out of their problems (Ermias, 2011). Like numerous developing countries, Ethiopia also suffers from severe poverty, severance, income inequality, and lower per capita income. In response to the mentioned problem, and by fetching this sector's significance, the Ethiopian government issued the National Micro and Small Enterprises Strategy in 1997. It established the Federal Micro and Small Enterprises Development Agency in 1998. The country's artificial policy in 2003 and the poverty reduction strategy program of 2006 have singled out MSEs as principal instruments to produce a productive and vibrant private sector and reduce poverty in the society (MoTI, 1997; MOFED, 2006; Setegn, 2010).

Endris and Kassegn (2022) found in their review that MSMEs significantly contributed to the sustainable development goals of Ethiopia through creating employment, alleviating poverty, and improving their living standards. However, access to finance, electricity, and trade regulation is a significant constraint for the sector's development. Their study also outlines critical policy implications to develop a comprehensive policy that alleviates the existing challenges of the industry and calls for further MSMEs impact evaluation research.

The difficulties encountered by small businesses are intertwined. Part of these problems is internally related to the enterprise or its proprietor. External issues are caused by external factors or the terrain girding these installations.

The small enterprises sector in Ethiopia, specifically in the Amhara region, suffers from numerous problems and obstacles despite its essential position on the chart of development plans in the country as one of the main pillars in developing the good life and its part in the growth of public income and contributing to meeting the requirements of society, by furnishing openings for people to get work and also the productivity. The main problem facing the small business sector in the Amhara region of Ethiopia is the violent conflict (war) that starts in north Ethiopia from October 2020 onwards, affecting the nation's macro economy as a whole.

A Detail Narrative of the Situation in Ethiopia

Ethiopia is one of the poorest and least developed countries in the world, with a GDP of 92.76 billion US dollars in 2021, according to official data from the World Bank and projections from Trading Economics), and ranking 145th among 167 of the poorest countries and regions in the world (Legatum Prosperity Index, 2021). Combined with high annual population growth (2.49% percent) (United Nations projection, 2021), Ethiopia has a high unemployment rate (estimated at 21.6 percent) (trading economics global macro models and analysts 2021). These negative figures were caused by many factors, perhaps the most prominent of the political problems since 2028 and the war that has existed in north Ethiopia from 2020 until now, and many other issues causing the low level of the Ethiopian economy's rising unemployment rates. Because of those problems, the sector of micro and small enterprises in the Amhara region, Ethiopia suffers from many problems and obstacles; one of the biggest problems facing the sector is the financing problem, which is the most critical obstacle preventing the sectors development establishments in the region.

Table 1. GDP rate of Ethiopia

Year	GDP growth rate compared to the previous year
2021	1.99%
2020	6.06%
2019	9.04%
2018	7.7%
2017	10.21%
2016	8%
2015	10.4%
2014	10.3%
2013	9.9%
2012	8.7%
2011	11.4%

Source: Statista 2022

The Problem of the Study

Small enterprises have massive importance for the overall economy of any nation, as they work to revitalize the economy, minimize unemployment rates, maximize production efficiency, and others. The sector in Ethiopia is in a challenging situation in every period due to the current political conditions and the continued war that has dramatically impacted small enterprises' growth and caused the deterioration of this capacity. The sector depends on the Ethiopian economy's growth and rising employment rates. Therefore, in this article, the researcher discusses the most critical problems and challenges facing the small business enterprise sector due to the ongoing crises in the Northern part that have affected Ethiopia from 2020 until now.

The Objective of the Study

The main objective of this study is to know the challenges and difficulties facing small enterprises in the Amhara region of Ethiopia. More specifically, this study aims to describe the impact of the war in northern Ethiopia and the political environment since 2020 on small business performance.

2. Review of Literature

Over the last two and half years (2019–2021), Ethiopia has undergone dramatic changes that began with a bold political effort to introduce democratic reforms and liberalize the economy but quickly descended into a fatal conflict between the country's three major ethnicities: the Oromo (comprise 34% of the nation's population), the Amhara (27%) and the Tigray (ca. 6%). Prime Minister Abiy Ahmed Ali's rushed the coronavirus pandemic and suddenly halted the reform plan in 2020, which forced an economic slowdown. Drawing on Article 93 of the constitution, the government declared a state of emergency as the pace of confirmed infections accelerated, peaking at 1,829 new cases per day in August 2020. Thousands of workers and employees lost their jobs and were dependent on humanitarian organizations for survival. In addition to closing both schools and land borders, the federal government postponed legislative and regional elections from August 2020 to June 2021. Viewed as a *casus belli* by the country's Tigray population because it implied an unconstitutional federal government over reach, the Tigrayan People's Liberation Front (TPLF) defiantly held its regional election on September 9, 2020. Addis Ababa responded by designating the Tigray leadership illegitimate, while Tigray declared it would not recognize Abiy's administration after its original term expired on October 5, 2020. Prime Minister Abiy – the much-celebrated winner of the Nobel Peace Prize in 2018 – chose to engage in forceful conflict resolution and proved to be a hard-nosed student of counter-insurgency warfare, and sent his army to the Tigray capital of Mekelle, where it bombed TPLF strongholds, arrested officeholders and expelled many citizens. As TPLF leaders increasingly retreated to the Tigray hills, reportedly expanding its regional army of approximately 170,000 soldiers, thousands of people on both sides lost their lives. Bombing raids and artillery attacks have caused widespread civilian casualties, and over 40,000 refugees have fled into Sudan from western Tigray. This latest confrontation in the Tigray-Sudan border area has also negatively affected another contentious issue in East Africa: the question of how to fairly distribute and use water from the Blue Nile River, which Ethiopia has been eager to store through the Grand Ethiopian Renaissance Dam (GERD). Ethiopia has been in moderate progress in opening the economy to private business, competition, and privatization before conflict escalates. The country has also made good progress in education, having established several secondary schools, targeted improvements in education for women, and created more than 30 universities since 2000. Ethiopia's economic boom, orchestrated under the so-called developmental state approach, has stagnated as a more liberal, flexible system, reflective of an open economy, has taken hold. Foreign direct private investments fell to about \$2.5 billion in 2019 (the lowest since 2016) due to political turmoil. The government has announced its intention to "green" the economy and initiated 2019 a massive campaign to plant four billion trees within one year (BTI 2022 Country Report).

The shift in focus, in developing countries, towards the development of micro and small-scale enterprises results from the fortunes being laid by the enterprises. These enterprises are said to be important contextually to the existing situations of the greatest developing countries. In most fast-developing countries, MSMEs, by size,

position, capital investment, and capacity to induce lesser employment, have proved their significant fuel effect for profitable rapid-fire growth (FDRE, MoTI, 2007). It is believed that in particular developing countries, most people are engaged in the operation of micro and small-scale enterprises, which are likely to locate everywhere (both in urban and rural areas). Due to their small and perceived flexible nature, MSMEs are expected to withstand adverse economic conditions and survive where many large businesses would collapse (Aryeetey, Ahene, 2004). The flexible structure is also an advantage in adapting quickly to customers' demands (Kayanula, Quartey, 2000: p.10). This study implies that the economic need of the mass of the people of these countries can be satisfied through the development of the sector.

The business development service field is now the fastest way to adopt a new strategy that can sustainably reach many businesses. The provision of some services, like communications and advertising, is on a fully commercial basis that has shown effective markets for business services offer the opportunity to help many small enterprises develop and complete. The business development service field is currently focused on (Abraham, 2006). The micro and small enterprises' role could be in job creation when the micro and small enterprises sector in Kenya create 50% of new jobs yearly to explain this sector's importance in any economy. Still, the micro and small enterprises sector faces many problems in accessing credit facilities in Kangemi Harambee Market in Nairobi City, County, Kenya (Gichuki, Njeru, Tirimba, 2014). Their study concluded that the critical challenge hindering the micro and small enterprises sector in Kenya was the high-interest rate, the problem of collateral to get funds, the guaranty problem, and the short payback period. Most of the prominent ventures were small and micro enterprises in the past. The impact of small and medium enterprises in Ghana's economy is still facing many challenges and difficulties when accessing financial institutions' funds because of the problematic requirement to get funds. The researchers found that financial institutions consider small and medium enterprises as risky, thereby offering them credit facilities at a higher interest rate than large enterprises. However, the developed countries' small and medium enterprises sector dramatically contributes to the economy and the countries' growth.

On the other hand, the SME sector in developing countries has not fared well. The failure of the developing countries to take the SME sector development initiative in the right direction has been the primary reason for this sector's slow process. According to Ilahi (2015), micro and small enterprises are the primary factor in accelerating economic and social development and play an essential role in the economic growth in any country. This role could be production, employment, and exports.

Micro and Small Enterprises

There are many definitions related to the concept of micro and small enterprises. They differ between organizations and countries; some look at it from the point of the number of employees. Another view is in terms of the size of capital. According to International Labor, there is found to be 75 definitions within 50 industrialized and developing countries. I consider the number of workers as a criterion for distinguishing between micro, small and medium enterprises. There is no agreement on a specific number as a basis for determining the size of MSEMs; the number varies according to the degree of industrial progress, which in turn differs from one country to another.

In Ethiopia, although there is specific legislation in which to distinguish micro and small enterprises from large enterprises, any of the following sources can be guided: the legislation which is effective from 2000 defined micro and small enterprises as any income-generating activity in the field of industry, trade, or services (excluding primary industries) that employs not more significant than ten workers and with a paid-up capital of not exceeding 20,000 birrs for micro and 50,000 birrs for small enterprises respectively, who are working in hotel and tourism, manufacturing and poultry, etc.

The Obstacles and Challenges Facing Small Enterprises

Many micro and small enterprises face several challenges that stand as a bottleneck in front of them to achieve their economic and social goals. The nature of these challenges varies according to the business's character, activity, and the country in which it operates. The novelty of the concept of the small enterprises is that it considers difficulties, especially in the Arab countries (Endeshaw, 2005). Micro and small enterprises face many obstacles, especially in obtaining capital and the lack of adequate distribution channels.

The United Nations stated that 2005 was the year of financing small projects to provide the necessary financing for more than 20 million families in developing countries (Prasad & Tata, 2009). One of the main obstacles for small enterprises is getting finance, where it isn't easy to rely on self-financing. The high cost of financing compared to the rate of return on the business, which in most cases leads to loss or stoppage of the company (Weldegabriel, 2012). Many studies show that new business owners suffer from insufficient financing, lousy product, and ineffective marketing (Endeshaw, 2005; Weldegabriel, 2012). The local consumer preference for similar foreign products is motivated by imitation. The lack of sufficient incentives for local products to strengthen their competitiveness compared to the foreign work and the pursuit of a dumping policy by some foreign institutions dramatically weakens the ability of the domestic product to compete.

Inflation is a significant reason for the rise in the prices of raw materials and workers' wages and the high operating costs of small businesses. It leads to higher prices for its products, which means its inability to face intense competition from large enterprises should not be undermined (Weldegabriel, 2012). The governmental measures are considered the high tax rates on small businesses are among the main obstacles to the development of this sector.

In addition to the inconsistency of information available between financial institutions and small enterprises, access to the required financing is one of the main obstacles for small and micro companies (Gebbru, 2009). In his study, Gebbru (2009) found that the lack of adequate guarantees that could cover the value of the required loan created a significant problem for small enterprises that do not have sufficient fixed assets, especially at the beginning of their working life. For these projects, the banks depend on the establishment's capital and not on the establishment's income to make the credit decision to grant or reject the loan.

In addition to the above obstacles, micro and small enterprises in Ethiopia are also facing innovation problems. According to a study by Shkabatur, Bar-El and Schwartz(2022), the innovation policy of low-income developing countries should not focus on new knowledge creation. The policy should instead support the adoption and adaptation of incremental innovations, which may have a significant multiplier effect, generating jobs, affecting numerous consumers and enterprises, and enhancing economic growth.

Challenges and difficulties facing small businesses in Ethiopia

The micro and small enterprises sector in Ethiopia, specifically in the Amhara region, suffers from many hurdles and obstacles despite its important position in the development plans of the country and the region. This sector is one of the main pillars in developing the economic life of the low-income households and its role in the growth of national and regional income and contributing to society's needs by providing opportunities for people to get self-employed and productivity. The main problem in the Amhara region since October 2020 was the violent conflict (war) between the Tigray region and the federal government of Ethiopia. It affected the economy in general and led to high inflation rates in the country, which is affected by the rise in the prices of raw materials and the cost of labor, which will inevitably lead to higher operating costs. These establishments face a significant problem: their confrontation with competition from medium and large enterprises in the rest of the country, which prevents them and limits their ability to raise prices to avoid raw material prices. And directly that will be reflected in the cost of capital, which is one of the biggest problems facing small business enterprises because it is directly reflected in

this business's profitability through the demand from the sector to pay a high-interest rate. Also, the enterprises depend on borrowing from banks, which leads to an increase in their costs.

War or Political Problems

The biggest problem facing small enterprises in the Amhara region from 2020 until now is the political situation represented by an intense war in northern Ethiopia that still ravages Ethiopia. Ethiopia is one of the poorest African countries. It has had an unstable political problem in recent years due to political and power disagreements between the former ruling party TPLF, and the new party prosperity of the federal government and its many nations and nationalities (more than 86 ethnic clans exist) (Girma, 2021). When the Tigray state government attacked the northern military command in the region, which led to the current chaos and weak situation, it escalated to the current conflict, which led to violence which started in November 2020 and resulted in devising the country into ongoing crisis. The private sector in the Amhara region is the most affected by the war because most of the fighting takes place in the area and leads to the closing of the small enterprises. Small business in the services sector was also the most affected, and most of them are closing. Also, the most physical harm was to the two zones of the Amhara region, which are the south and north Wollo zones, of which 95% of all small businesses are collapsed due to the war; most of these damages are complete disasters; on the other hand, the impact of war on businesses in North Shoa zone of Amhara region was not caused much harm compared to the damage in the two zones of Wollo. In addition to the business sector in the Amhara region, 4,107 schools were damaged, of which 25% were utterly destroyed, and 30 hospitals, 280 health centers, and 890 health posts were ruined due to the war (OCHA Ethiopia 2022).

Generally, according to a recent study performed by 10 Amhara region universities and Central Statistical Authority, the war caused a total of 288 billion birr material damage, equivalent to 5,555,137,600 USD (Amhara universities and CSA, 2022).

The problem of the global pandemic

Many small and large businesses are suffering challenges due to the unprecedented impact of the coronavirus crisis has destroyed many businesses around the globe, and it is challenging to survive with reduced revenue, jobs lost and life slowing down, and weak marketing performance even difficult to keep a calm head and their business alive. The government should use different mechanisms to support these businesses by cooperating with wealthy people and other non-governmental organizations. Besides, small business owners should manage expectations and communicate with staff, suppliers, banks, and customers throughout this frightening coronavirus. Reduce expenses be open to their employees about their finances and keep marketing, use different alternatives to deliver their product, and recover from the crisis (Engidaw, 2022)

Financing Problem

The shortage of adequate finance and credit has been one of the most hindering problems facing small business sectors in the Amhara region of Ethiopia because of their small size in providing collateral to get credit. Therefore, financing institutions are exposed to several risks when financing this sector in their various stages of growth; because of these risks, Amhara credit and saving institution (ACSI) commercial bank of Ethiopia (CBE) avoids providing the necessary financing for these businesses due to their keenness on depositors' cash. So, the biggest challenge facing this region sector is accessing financial institutions to get funds. Because of this obstacle, small business owners are forced to try to obtain finance from a different source, such as loans from family or friends. Compared to other lending institutions, ACSI is a little helping in providing loans for entrepreneurs, even with a high-interest rate. State-owned banks still dominate the Ethiopian financial system, which does not allocate credit to the firms with the highest rate of return to capital (Regasa, Fielding, Roberts, 2020).

According to Kar and Ahmed (2022), the support of micro and small enterprises is associated with perceived business performance and socio-cultural challenges but not with revenue. Entrepreneurs with minor age, education, and prior experience received more support than others. Entrepreneurs with higher need-for-achievement traits reported less support. Interestingly, entrepreneurs from business backgrounds are likely to perform better, with or without help.

Infrastructure Problem

Other challenges facing micro and small enterprises in the Amhara region of Ethiopia and according to the survey of micro and small enterprises in Ethiopia (Federal Micro and Small Enterprise Agency, 2018), the lack of infrastructure is rated third in the sequence of the problems that is facing the sector in the region. Developing countries like Ethiopia have a poor infrastructure. Many areas in the country are difficult to access by road, roads are not always well maintained, and in these two years due to the war, the roads have deteriorated because big war machines are moving on them. The roads are unsafe to travel, posing a significant challenge to micro and small enterprises. Also, electricity cuts since the beginning of the conflict were a massive problem for the business sector in the Amhara region, not just the industry. Due to that, every small business must have an electricity backup system or solar energy to keep running. Another problem facing the small business sector under infrastructure is that the water supply is available through the public network to the whole population. The collection for business requirements is unstable, so provisions are usually bought and delivered to the business premises. The extra costs are all incurred as a result of inadequate infrastructure. They need to handle stuff like securing water and maintaining power generators in addition to the financial costs, an additional burden on already weak management systems. According to Andaregie and Astatkie (2021), to be successful, MSEs need more education (information) on technology, greater access to credit, and incentives provided by the government of Ethiopia and other agencies to increase their adoption of technology.

Security Issues

Security problems and the rule of law were among the most significant challenges since the outbreak of the war, facing the growth of micro and small business in the Amhara region of Ethiopia, which put the country in a crisis-affected the economy which is now shattered. Also, the industry is damaged, affected, or at a loss. Crimes like theft and fraud were the biggest problems facing small businesses in connection with the war. In these aspects, due to the lawlessness status results from the fragile political situation.

Lack of Concerned Legal Authority

License and registering micro and small business could be a challenge for the owner because there is no particular authority for the small business enterprises in Ethiopia, which contributes to the lack of support for the sector. However, there is the responsible authority for medium and large enterprises dedicated to supervising the small industrial enterprises, according to which the enterprises were defined every year through a regulation based on the number of employees and the capital (Endeshaw, 2005). There is some organization working to help medium-sized enterprises, such as the Office of Development Commissioner (MSME), Khadi Village Industries Commission (KVIC), National Small Industries Corporation Limited (NSIC), and National Institute for Micro, Small and Medium Enterprises (NIMSME) with the help of the international community, in particular the World Bank, which they gave little focus for small enterprises. Based on the findings of Zhang and Ayele (2022), micro and small enterprise performance is affected by the mediating support from the government in the Amhara region with additional gaps of lack of long-term loans, access to lease machines, unfair interest rates, production and selling the place, shortage of defining MSMEs, and structural limitations.

Problem of Corruption

Ethiopia is one of the countries most corrupted in prior years, even if it shows some decline in recent years according to the Global Corruption Perceptions Index prepared by Transparency International. Corruption is considered one of the most common problems that affect MSMEs (Shumetie, Watabaji, 2019). It is problematic

and extensive-term may be by receiving informal money to complete work (bribery), and administrative leakage could also be classified under corruption. A feature of crime in the least developed countries, where facilitation payments or bribery are used to resolve or strengthen bureaucratic and administrative activities, becomes a significant impediment to investment (Shumetie, Watabaji, 2019). Please indicate the source in the list of literature. Small business enterprises in the Amhara region of Ethiopia face the problem of these types of corruption (see Table 2).

Table 2. Corruption rate in Ethiopia

Year	2016	2017	2018	2019	2020	2021
Rank	108	107	115	96	94	87

Source: Transparency International, 2022

Shortage of Raw Materials

The bottleneck in obtaining raw materials arises from the dependence of these firms on imported raw materials and local ones because they produce commodities that are substitutes for imported goods. This problem became apparent when the war began, and imports disturbed since 2020, leading to rising raw materials prices, making it difficult for these businesses to obtain the amount they want.

3. Methodology

A case study research method is used to know in-depth the impact of the war on small businesses. The population for this study is 50 small business owners in the Amhara region selected randomly from each region's city. Questionnaires and in-depth interviews are distributed and performed to know the impact of the political crisis on small business success from 2020 to 2022. The data generated for this study were analyzed using correlation and regression models with the help of SPSS version 25.0 software.

4. Discussion and results

In measuring the impact of the political crisis on the success of the small business, data on the political crisis were correlated with data on small business success. The results obtained are presented in Tables 3, 4, 5, 6 below.

Table 3. Correlation analysis

Correlations		political crisis	Effect on small business success
political crisis	Pearson Correlation	1	.399**
	Sig. (2-tailed)		.005
	N	50	49
Effect on small business success	Pearson Correlation	.399**	1
	Sig. (2-tailed)	.005	
	N	49	49

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

Source; SPSS version 25.0 outputs

Table 4. Model summary

Model Summary				
Model	R	R Square	Adjusted Square	R
1	.399 ^a	.159	.141	.757
Std. Error of the Estimate				

a. Predictors: (Constant), political crisis

Source: SPSS version 25.0 outputs

Table 5. ANOVA test

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.086	1	5.086	8.882	.005 ^b
	Residual	26.914	47	.573		
	Total	32.000	48			

a. Dependent Variable: Effect on small business success

b. Predictors: (Constant), political crisis

Source: SPSS version 25.0 outputs

Table 6. Coefficients

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	2.540	.596		4.265	.000
	political crisis	.434	.146	.399	2.980	.005

a. Dependent Variable: Effect on small business success

Source: SPSS version 25.0 outputs

The table above shows a Pearson correlation of 1, which is positive and offers the connection between political crisis and small business success in the Amhara region. One percent change in political crisis also causes a similar percentage change of decline in small business performance. The coefficient of determination of 0.596 suggests that about a 59.6% decline in small business success is due to political crisis and war.

5. Conclusions

The result of the analysis revealed that political crisis has a significant impact on small business success. The political environment in the Amhara region is characterized by frequent wars and clashes between various ethnic of the country, which is attributable to party politics with threats of conflict and wars, growing levels of crime and terrorism, kidnapping, and bomb blasts, among others, thereby hindering business patronage and scaring away foreign investors from the country. Small enterprises have great importance in any country's economy, whether developing or developed, and its significance lies in reducing unemployment rates and innovation by contributing to raising the GDP. Therefore, many countries seek attention and development of this sector in many aspects, whether financial or non-financial, by providing it with appropriate funds to start the business, issuing laws regulating its work, and reducing tax rates for them. From the above, it becomes clear the importance of small businesses. On the other hand, when the focus is on developing MSEs, the small enterprise sector in Ethiopia operates and functions in a harsh business environment. Ethiopia is one of the least developing countries and a more challenging environment in light of the current socio-economic unrest and instability. The challenges and difficulties became more affecting small enterprises' performance after the political crisis, which started in October 2020, and the conflict exists until now.

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IMPACT OF THE COMMUNICATED INFORMATION CONTENT ON EMPLOYEE RESISTANCE TO CHANGE*

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Abstract. Communicating information to employees is identified as one of the most important and effective measures. However, there is a lack of research publications that specifically examine what specific information is relevant to employees, what specific content of information can encourage employees to resist change or reduce their negative reactions towards change. In this context, the problem of the study is what specific content of information can reduce or increase employee resistance to change. The subject is the impact of the content of information on employee resistance to change. The aim is to examine the impact of the content of information on employee resistance to change. Objectives: 1) To define the concept of employee resistance to change; 2. To analyse the impact of communicating information to employees on employee resistance to changes; 3) To determine the impact of the content of specific information on employee resistance to change in specific organizations. An empirical survey– an anonymous paper questionnaire of employees of public passenger transportation companies - was carried out. The results may be instrumental for devising efficient economic policies.

Keywords: change; employee resistance; information

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JEL Classifications: M1, M12, O33

Additional disciplines: management, psychology, information and communication

1. Introduction

The everyday life of modern organizations is a continuous process of implementing change in order to adapt to changing external forces, to remain competitive and to stay in the market. The process of implementing change faces various challenges and does not always achieve its goals in every organization. Scientific research identifies various obstacles to the successful implementation of change (Videikienė & Šimanskienė, 2014; Das et al. 2018; Moussa et al., 2018, Antony et al., 2019; Horváthová, Hrnčiar & Rievajová, 2022), such as, inflexibility of

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managers, poor or weak leadership, lack of initiative and resources, hasty and inconsistent implementation of change, unfavorable organizational structure, lack of research, training, budget planning problems, lack of dialogue, and employee resistance to change. The characterization of the impact of the human factor and resistance to change as critically important factors determining the success of the implementation of change initiative is based on several studies (Waddell & Sohal, 1998; Bovey, 2001; Erwin, 2010; Mansor et al., 2013; Dumas et al., 2018; Čižo et al., 2022).

The use of different methods to reduce employee resistance or to incite positive employee reactions in the context of change is the subject of several scientific research publications (Aladwani, 2001; Berna-Martinez & Macia-Perez, 2012; Battilana & Casciaro, 2013; Georgalis, 2015; Lines et al., 2015; Buick et al., 2018). Communicating information to employees is identified as one of the most important and effective tools (Wanberg & Banas 2000; Allen et al. 2007; Matos Marques Simoes & Esposito, 2014; Georgalis et al., 2015; Akan et al., 2016; Ballaro et al., 2020).

However, there is a lack of research that specifically considers what type of information is relevant to employees, and what content of information can either encourage employees to resist change or reduce their negative reactions to change. It is therefore appropriate to study the scientific problem – insufficient analyses have been performed on what specific content of information can reduce or increase employee resistance to change. The subject is the impact of the content of information on employee resistance to changes.

The aim is to study the impact of the content of information on employee resistance to change. Objectives: 1) to define the concept of employee resistance to change; 2. to analyse the impact communicating information has on employee resistance to change. Research methods: for the research justification of the problem, a systematic review and comparative analysis of the content of literature was applied. Empirical research was carried out by conducting an anonymous paper survey among employees of public passenger transportation companies. Version 19.0 of the statistical analysis and data processing program SPSS was used to process the data obtained during the research study. Statistical significance was assessed at $p < \alpha$ level. In this paper, statistical significance was assessed at $p < 0.05$ level, and $0.05 < p < 0.1$ is considered a trend.

2. Research justification

The concept of employee resistance to change was first developed in research on the force field theory by Lewin (1945), and in further research conducted by Powell and Posner (1978), and Kotter and Schlesinger (1979). Initial research categorized resistance to change as a form of conflict, which signified divisions in otherwise ordinary interactions between individuals and groups (Kotter & Schlesinger, 1979; Waddell & Sohal, 1998; Weber & Weber, 2001), later research characterized it as a complex phenomenon defined as an individual negative response to change caused by various psychological reactions (Piderit, 2000; Oreg, 2003; Ford et al., 2009; Foster, 2010).

Research analysis conducted demonstrates that employee resistance to change is a natural, subjective, multi-dimensional process of negative attitudes or hostile behavior expressed by employees, the purpose of which is to maintain the current situation or interfere with the process of accomplishing the change. Table 1 presents definitions of employee resistance to change proposed by different authors.

Table 1. The Definition of Employee Resistance to Change in First Author Publications

Definition	Author
Resistance to change - any behavior that helps maintain the current situation in the face of pressure to change the current situation.	Zaltman & Duncan, 1977
Resistance is a multi-dimensional negative outlook or hostile behavior displayed by employees that incorporates unintended delays, costs, and instability into the process of strategic change.	Waddel & Sohal, 1998.
Resistance is a consequence of cognitive, cultural structures of and approaches to transformation.	Schein, 1987; Senge, 1990
Resistance is a form of disapproval of the process (a series of activities) of change that a person considers unpleasant, uncomfortable, or burdensome due to personal or group reasons. In all cases, the intention of resistance to change is in the interests of the participant or group to which it belongs.	Giangreco & Pccci, 2005
Resistance to change is a natural and human element of organizational activity, the natural primary reaction of an individual, more often defined as a process, rather than an event.	Van Dijk & Van Dick, 2009
Resistance is a concept that managers use to explain what they consider disliked and undesirable behaviors and interactions. What managers call resistance does not depend on the observed behavior but depends on the interpretation and decisions of observers.	Barely & Rupert, 2018
Resistance is a covert or overt expression of negative reactions, or a defense mechanism against planned change or restrictive influences which is used to oppose the management of change and the accommodation of new practices.	Berna-Martinez & Macia-Perez, 2012.

Source: Prepared by the authors, based on definitions of indicated scientists

In change resistance studies, the analysis of the manifestation of different dimensions of resistance to changes is crucial (Piderit, 2000; Giangreco & Peccei, 2005; Oreg, 2006). Piderit (2000) classified three different dimensions of resistance to change and proposed a three-dimensional concept of resistance. Resistance to change is therefore defined as a three-dimensional (negative) approach that includes affective, behavioral, and cognitive components. These components reflect three different manifestations of objective assessment.

- *The affective component* asserts how a person feels about change (e.g., angry, anxious)

- *The cognitive component* indicates what a person thinks about the change (for example, is it necessary? Will it be useful?)

- *The behavioral component* includes actions or intentions to act in response to the change (e.g., complaining about the change to convince others that the change is negative).

Oreg (2006) argues that these dimensions are interdependent on each other. Most commonly, what people feel about change corresponds to what they think about it and how they behave. Nevertheless, these dimensions differ from each other, and each individually outlines different aspects of the phenomenon of resistance. Fiedler (2010), Lines, et al. (2015) emphasized that cognitive and affective components are often considered sources or causes of resistance, the behavioral component is the true manifestation of resistance, demonstrated in the form of noticeable behavior, work performance and experiences. Research focuses on behavioral resistance, as it is the only directly observed dimension.

Giangreco and Peccei (2005) recognized that behavior exhibited while resisting change was often expressed in passive rather than active ways, such as disregarding initiatives for change or in behavior that covertly hinders the effectiveness or the pace of change. The behavior of individuals resisting change may be active or passive, overt or covert and expressed by specific conduct. Cinite and Duxbury (2018), based on Conner (1998) and Petrini and Hulman (1995), presented the following classification of opposing behavior in Figure 1.

	Overt	Covert
Passive	Coming late to work Abusing sick leave benefits	Not participating in discussions Withholding information Pseudo agreement
Active	Vocal opposition Sabotage Filing grievances	Requesting transfer Asking for more data

Figure 1. Conner (1998), Petrini and Hultman (1995) Matrix of Resistance Behavior Classifications

Source: Cinite & Duxbury (2018)

Given that resistance to change is one of the key factors determining the success of the change, research is constantly looking for the most appropriate means of reducing this resistance: employee engagement (Battilana & Casciaro, 2013; Georgalis, 2015), promoting affective commitment (Battilana & Casciaro, 2013), building a sense of justice (Georgalis, 2015), appointment of a change agent (Lines et al., 2015; Buick et al., 2018), and various other models of overcoming employee resistance are being developed (Lewin, 1945; Aladwani, 2001; Berna-Martinez & Macia-Perez, 2012).

One of the most commonly discussed and referred to as the most effective means of overcoming employee resistance is *communication* (Hay & Hartel, 2001; Weber & Weber, 2001; Proctor & Doukakis, 2003; Washington & Hacker, 2005; Lewis, 2006; Jimmieson et al., 2008; Battilana & Casciaro, 2013; Matos Marques Simoes & Esposito, 2014; Georgalis, 2015; Barrett, 2017; Schulz-Knappe, 2019).

According to Hay and Hartel (2001), HR professionals can reduce excessive stress caused by learning of change initiatives by delivering news in a timely and reliable manner. Employees should learn about change from managers, not from other sources, such as the media or rumors circulating in the organization. Information on the motivation, timing, and scope of change, as well as decision-making procedures and transitional support mechanisms, should be sufficiently detailed. Employee opinions will be influenced by the adequacy, consistency and accuracy of information provided, as well as reliability of and confidence in the source of information. Organizations that offer employees the ability to provide information and control its importance, structure, and decision-making criteria are also more likely to avoid the emotional stress that occurs in their employees.

Proctor and Doukakis (2003) stressed the importance of internal communication within organizations, arguing that communication is a vital part of the process of employee development, and one of the key elements of successful implementation of expansion. Therefore, it is essential to design a formal, coordinated internal communications system within the entire organization, which will facilitate the implementation and practice of employee development.

Research conducted by Washington and Hacker (2005) found that managers who understand the intentions of change are less likely to resist change. The better the manager understood the change, the more eagerly he anticipated the change, the less likely he was to think that the efforts of change will fail, and the less likely he was to desire for the change to not take place within the organization.

Lewis (2006) examined the impact of communicating information on change initiatives on employee resistance and found that the higher the quality of information received about the change initiative, the less resistance to change was palpable.

The findings of the Kulkarni (2016) study revealed that misinterpreted information can cause a negative reaction to change, even if employees do not have an issue with the proposed change in the first instance. Employees may not see their actions as resistance and justify their behavior by claiming it is for ideological reasons or that they are acting in the best long-term interests of the organization.

Schulz-Knappe (2019) also argued that transparency in communication and dialogue with employees is a key factor in employee acceptance of change. Ballaro et al. (2020) also confirmed that information and communication increase the likelihood of successfully implementing the intended change.

Not much research has been done on the content of the information communicated and the impact it has on employee resistance to change. Meier et al. (2013), Barret (2017) recognized the significance of the quality of information communicated and argued that positive information about change reduces employee resistance to change.

3. Research methodology

Transport organizations providing regular public passenger transportation services in the city of Klaipeda were selected for the study. The research method was a paper questionnaire. Research was carried out in August 2020. The questionnaire surveyed 316 respondents working at 7 companies.

Respondents were asked to use the seven-point Likert scale from "strongly disagree" (score 1) to "strongly agree" (score 7) to rate the specific emotions most often triggered by change and developments taking place in the companies they work for and the actions that are most taken upon learning about changes within the companies.

For the scale of this research, the Oreg (2006) scale which distinguishes three dimensions of resistance - affective, cognitive, behavioral – was adapted. Using the seven-point Likert scale from "Not Important" (score 1) to "Very Important" (score 7) respondents were also asked to rate individual factors regarding information communication that are personally relevant to them, or that are utilized by the companies they work for. Crombach's alpha coefficient, which is equal to, was calculated to assess the internal consistency of the questionnaire.

4. Results

The socio-demographic distribution of the survey respondents is presented in the Table 2 below.

Table 2. Socio-demographic distribution of respondents

Characteristics		N	%
Occupation	Drivers	254	81,9%
	Administrative staff	24	7,7%
	Heads	4	1,3%
	Service staff	28	9,0%
Gender	Male	275	90,2%
	Female	30	9,8%
Age	Under 25	2	0,6%
	25-34	26	8,3%
	35-44	63	20,2%
	45-54	90	28,8%
	55-64	101	32,4%
	65 and above	30	9,6%
Education	General	33	10,9%
	Secondary	112	37,1%
	General upper secondary	41	13,6%
	Vocational qualification	54	17,9%
	Higher education	44	14,6%
	Doctorate (PhD)	18	6,0%
	Other	0	0,0%
Company Type	Private	190	60,1%
	National	126	39,9%

Based on occupation, most respondents (82%) were drivers, while the fewest were managers (1%). By gender, most respondents (90%) were male, while by age the majority were respondents aged 45-54 (29%) and 55-64 (32%), and the minority – respondents under 25 (0.6%). By education, most respondents (37%) had secondary education, another 11% had general education, while only 21% of employees had higher education or above. Based on company type, 60% of respondents were employed by a private company, while 40% worked for a national company.

It was also established that the average time of employment in the companies surveyed amounted to 9.2 (\pm 8.4) years, the shortest time amounted to 0.2 years, the longest – 40 years. The average total length of employment amounted to 27.2 (\pm 10.5) years, the shortest length of employment amounted to 5 years, the longest – 56 years.

Data presented in the Figure 2 below demonstrates that employees rarely indicated that the changes that were being implemented caused them negative emotions. The responses of all respondents added up to less than 4 points. Most commonly change implementation resulted in feelings such as stress (3.19 points) and unpleasant, negative emotions (2.58 points). Upon learning about anticipated change, actions taken were most frequently complaining to colleagues (3.25 points) or opposing management (2.98 points).

Analysis of employee opinions regarding change implemented by the company leads to the conclusion that once implementation of change is in progress, most respondents believe that the change is beneficial for the company and its employees (- 3.75 and 4.45 points, respectively).

Analysis of employee actions during implementation of change demonstrates that most respondents indicated that they are more likely to not actively take any action to resist change rather than the opposite. None of the identified actions reached the limit of 4 points.

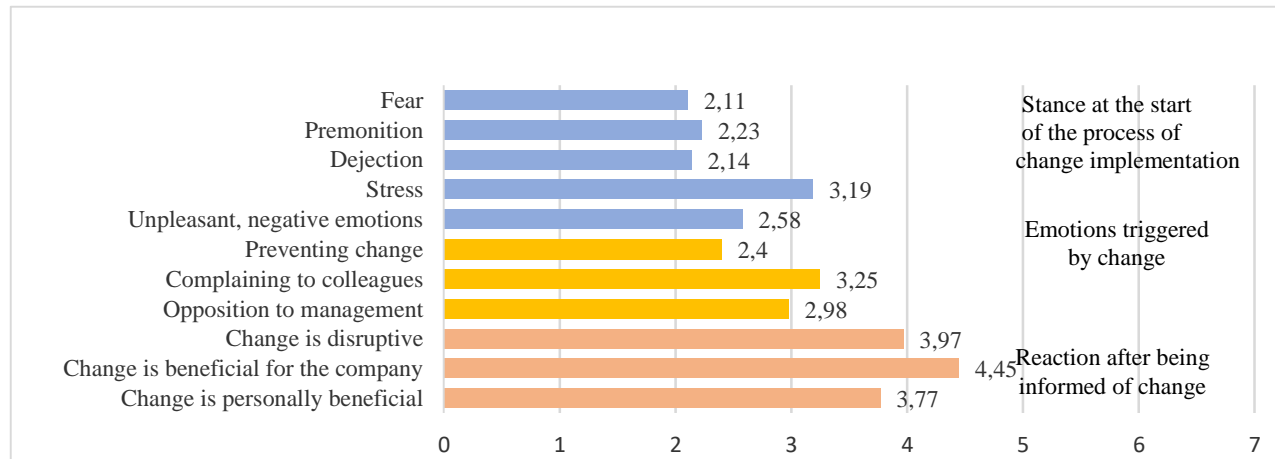


Figure 2. The mean of scores of emotions triggered by change

The correlation coefficient between individual emotions, opinions and actions that are triggered by change occurring in the company are calculated in Table 3 below. In most cases correlations were statistically significant ($p < 0.05$), for instance, when expression of one emotion is elevated, another emotion is also significantly more pronounced. However, it should be noted that the opinion that change is beneficial for the company is significantly correlated only with the desire to prevent change and unpleasant negative emotions (negative correlation), which indicates that the more common the opinion that change is beneficial for the company is, the less likely unpleasant emotions are felt and the less likely a desire to prevent the change. Also, the opinion that change is personally beneficial has no significant impact on employee stress levels, unpleasant negative emotions, or the desire to prevent change and complain to colleagues.

Table 3. Spearman's Rank Correlation between Individual Statements of Dimensions of Resistance Caused by Changes Occurring in the Company

		Fear	Premonition	Dejection	Stress	Unpleasant. negative emotions	Preventing change	Complaining to colleagues	Opposition to management	Change is disruptive	Change is beneficial for the company	Change is personally beneficial
Fear	r	1,000	0,762	0,649	0,541	0,552	0,363	0,302	0,246	0,322	0,014	0,121
	p		0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,808	0,040
Premonition	r		1,000	0,741	0,624	0,622	0,389	0,315	0,332	0,347	0,000	0,137
	p			0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,996	0,020
Dejection	r			1,000	0,630	0,695	0,428	0,326	0,351	0,348	-0,079	0,125
	p				0,000	0,000	0,000	0,000	0,000	0,000	0,184	0,036
Stress	r				1,000	0,746	0,345	0,432	0,377	0,320	-0,011	0,080

	p					0,000	0,000	0,000	0,000	0,000	0,848	0,175
Unpleasant, negative emotions	r					1,000	0,377	0,366	0,367	0,317	-0,118	0,032
	p						0,000	0,000	0,000	0,000	0,043	0,583
Preventing change	r						1,000	0,525	0,443	0,502	-0,130	-0,037
	p							0,000	0,000	0,000	0,027	0,529
Complaining to colleagues	r							1,000	0,477	0,427	-0,082	-0,095
	p								0,000	0,000	0,161	0,104
Opposition to management	r								1,000	0,483	0,015	0,185
	p									0,000	0,792	0,002
Change is disruptive	r									1,000	0,012	0,134
	p										0,833	0,024
Change is beneficial for the company	r										1,000	0,675
	p											0,000
Change is personally beneficial	r											1,000
	p											

Statistically significant (when $p < 0,05$) correlations are highlighted

Data presented in the figure below shows that in the case of each action the level of contemplation for personal benefits exceeds the level of execution by the company, which indicates that employee expectations are much higher than company execution. Factors such as information about salary changes (6.15 points) and information about changes in job specifications (5.97 points) are both most important for employees, and most frequently executed (5.60 points).

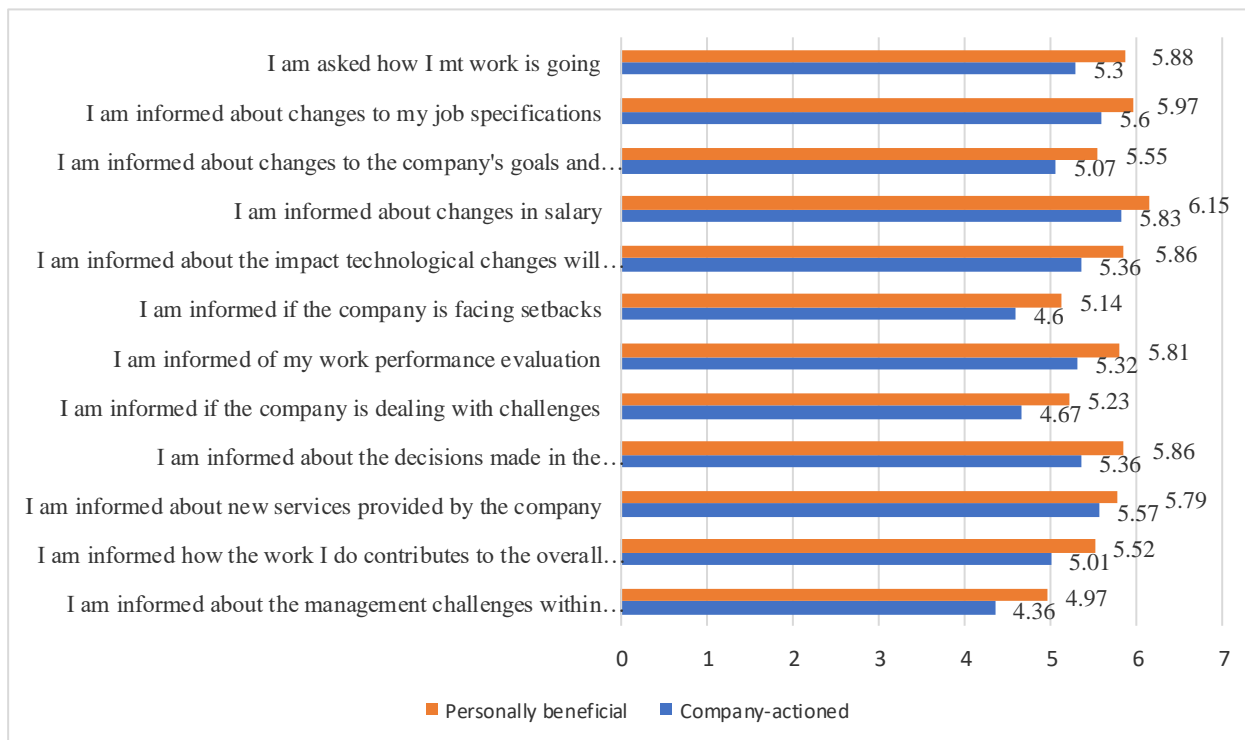


Figure 3. The mean of personally beneficial and company-actioned information communication factors

Table 4. Spearman's rank correlation between the means of communication used in an organization and the dimensions of resistance to change

		Fear	Premonition	Dejection	Stress	Unpleasant, negative emotions	Preventing change	Complaining to colleagues	Opposition to management	Change is disruptive	Change is beneficial for the company	Change is personally beneficial
I am asked how I my work is going	r	-0,014	-0,020	-0,005	-0,079	-0,040	-0,018	-0,005	0,022	0,097	-0,031	0,101
	p	0,814	0,738	0,930	0,185	0,509	0,769	0,939	0,718	0,109	0,600	0,095
I am informed about changes to my job specifications	r	-0,038	-0,093	-0,094	-0,043	-0,053	-0,061	0,016	-0,027	0,115	0,040	0,118
	p	0,523	0,117	0,119	0,476	0,374	0,309	0,782	0,651	0,056	0,506	0,050
I am informed about changes to the company's goals and activities	r	-0,001	-0,008	-0,009	-0,070	-0,058	-0,043	-0,117	-0,026	0,071	0,054	0,218
	p	0,981	0,889	0,885	0,242	0,330	0,474	0,050	0,667	0,241	0,362	0,000
I am informed about changes in salary	r	0,253	0,234	-0,296	-0,147	-0,229	-0,142	0,066	0,015	0,051	0,144	0,041
	p	0,000	0,000	0,000	0,013	0,000	0,018	0,264	0,805	0,396	0,015	0,498
I am informed about the impact technological changes will have on my job specification	r	-0,039	-0,043	-0,043	-0,040	-0,035	-0,053	0,013	0,002	0,129	0,021	0,107
	p	0,509	0,469	0,477	0,507	0,555	0,374	0,821	0,974	0,031	0,728	0,074
I am informed if the company is facing setbacks	r	0,096	0,135	0,178	-0,015	0,036	0,041	-0,109	0,161	0,180	-0,026	0,235
	p	0,109	0,023	0,003	0,802	0,543	0,501	0,067	0,007	0,003	0,666	0,000
I am informed of my work performance evaluation	r	-0,101	-0,106	-0,111	-0,078	-0,182	0,005	0,026	0,054	0,136	0,069	0,115
	p	0,089	0,075	0,066	0,194	0,002	0,931	0,664	0,365	0,023	0,244	0,056
I am informed if the company is dealing with challenges	r	0,079	0,101	0,135	-0,028	0,048	0,056	-0,158	0,152	0,147	0,011	0,225
	p	0,188	0,093	0,026	0,637	0,419	0,351	0,008	0,010	0,015	0,847	0,000
I am informed about the decisions made in the organization that directly affect the work I do	r	-0,053	-0,047	-0,140	-0,090	-0,054	-0,087	-0,028	-0,028	0,053	0,018	0,112
	p	0,373	0,428	0,020	0,131	0,366	0,146	0,632	0,642	0,381	0,763	0,061
I am informed about new services provided by the company	r	0,135	0,140	-0,201	-0,180	-0,183	-0,072	-0,023	0,032	0,115	0,115	0,085
	p	0,023	0,018	0,001	0,002	0,002	0,232	0,695	0,590	0,057	0,051	0,156
I am informed how the work I do contributes to the overall performance of the company	r	0,017	0,122	0,098	-0,048	0,011	0,026	-0,075	0,101	0,180	-0,032	0,167
	p	0,775	0,041	0,105	0,425	0,860	0,662	0,206	0,090	0,003	0,594	0,005
I am informed about the management challenges within the company	r	0,130	0,195	0,210	-0,007	0,068	0,122	-0,109	0,162	0,197	-0,018	0,248
	p	0,030	0,001	0,000	0,903	0,253	0,044	0,067	0,007	0,001	0,767	0,000

Statistically significant ($p < 0,05$) correlations are highlighted

The assessment of statistically significant correlation coefficients ($p < 0.05$) (see Table 4) demonstrates that:

- 1) In organizations where employees are informed about changes to their job specifications or are informed about changes to the goals and activities of the company, employees are significantly more likely to agree that implementation of change is personally beneficial to them;
- 2) In companies where employees are informed about salary changes ahead of change implementation, employees are significantly less likely to feel fear, premonition, dejection, stress, and unpleasant. Negative emotions, and are significantly less likely to attempt to prevent change;
- 3) In companies where employees are informed of what impact technological changes will have on their job specifications, employees are significantly more likely to think about the disruptiveness of the change;
- 4) In companies where employees are significantly more likely to be informed about the setbacks the company is facing, employees are significantly more likely to feel premonition and dejection, are more likely to oppose management and believe that the change will be disruptive but are also significantly more likely to believe that the change will be personally beneficial to them;
- 5) In companies where employees are informed about their work performance evaluation, employees feel significantly less unpleasant negative emotions, but are significantly more likely think about how change will disrupt activities;
- 6) In companies where employees are informed if the company is dealing with challenges, employees feel significantly more dejected, but are less likely to complain to colleagues, are significantly more opposed to management, are more likely to believe that the change will be disruptive, and that the change will be personally beneficial to them;
- 7) In companies where employees are informed about the decisions taken in the organization that directly affect their job specifications, employees are significantly less likely to feel dejected;
- 8) In companies where employees are informed about the company's intention to provide new services, employees are significantly less likely to feel fear, premonition, dejection, stress, and unpleasant, negative emotions;
- 9) In companies where employees are informed about how the work they do contributes to the overall performance of the company, employees are significantly more likely to feel premonition, are significantly more likely to believe that the change will be disruptive but are also significantly more likely to believe that the change will be personally beneficial to them;
- 10) In companies where employees are informed about company management challenges, employees are significantly more likely to feel fear, premonition, dejection, are significantly more likely to try to prevent change, oppose management and believe that the change will be disruptive and that the change will be personally beneficial.

5. Discussion

The research study established employees' high expectations of information communicated to them. This finding, similarly to other research studies conducted so far (Wanberg & Banas 2000; Allen et al. 2007; Matos Marques Simoes & Esposito, 2014; Georgalis et al., 2015; Akan et al., 2016; Ballaro et al., 2020), undoubtedly justifies the importance and significant impact of communicating information to employees in order to reduce employee resistance to change.

Research conducted found that when employees believes that change is beneficial for the company, they feel less unpleasant emotions and are less willing to prevent the change, but the opinion that the change is personally beneficial to the employees does not result is less resistance. These research findings validate the necessity for managers to inform employees about the benefits of change. Rogiest et al. (2015), Schulz-Knappe (2019) described change communication as comprehensive and honest information in the early stages which addresses the concerns of employees and ensures inclusiveness of employees. Weber and Weber (2001) argued that clarity of goals leads to a positive employee reaction to change. The must to inform employees about new projects and their objectives was also highlighted by Berna-Martinez and Macia-Perez (2012).

The research study also observed that the most important information for employees is information regarding changes in salary and changes in their job specifications. Similarly, a study by Allen et al. (2007) found that employees were more open to change if the information provided to employees reduced uncertainty regarding strategic and labor issues.

Our research, much like research conducted by Meier et al. (2013), found that both the action of communicating information and the quality of information communicated are significant. Lewis (2006) examined the impact of change initiative communication on employee resistance and found that the higher the quality of information received about the change initiative, the less resistance to change. In the meantime, our research demonstrates that the specific content of information can reduce or increase resistance. The findings of the research study clearly demonstrate that communicating information about salary changes, employee work performance evaluation, and the company's provision of new services reduces the affective, cognitive, and behavioral problems of resistance, and reduces negative emotions and the desire to prevent change. The significance of timely, efficient, accurate and detailed presentation of information is based on Barret (2017).

However, the research also identified the negative impact of providing certain information on the affective, cognitive, or behavioral dimensions of employee resistance. Communicating information regarding the impact technological changes have on job specifications, how work performed by employees contributes to the overall performance of the company, about the setbacks a company faces, management and other challenges leads to negative thoughts, emotions, or actions in response to change.

It was also noted that in the presence of negative emotions, the opinion about change itself can still be positive, for example, the affective dimension does not always determine the cognitive dimension. A research study by Meier et al. (2013) found that information communication influenced the affective and cognitive dimensions, but not the behavioral dimension. The fact that resistance to change is an ambivalent (Piderit, 2000) or sometimes even irrational (Heidenreich & Handrich, 2015) process is based on a number of studies.

Limitations of the study and directions for future research. When assessing the findings of the study, it should be noted that research was carried out in a very specific sector, where most employees are older, less educated, and male. Therefore, studies of companies of different socio-demographic characteristics and further research are appropriate.

Conclusions

Employee resistance to change is a significant factor that can lead to the collapse of an implementation of change initiative. Communicating information to employees is an effective tool for reducing employee resistance to change. However, the content of information provided is also important to the reduction of employee resistance to change.

When launching change initiatives, managers should inform employees in detail about the benefits of the change, changes in salary and changes in job specifications.

Since communicating information on salary changes, employee work performance evaluation, and the introduction of new services provided by the company may reduce employee resistance to change, greater attention should be paid to communicating this information to employees in a timely manner and ensuring the quality, clarity, and presentation of the information.

To mitigate negative reactions and employee resistance to change during implementation of change, managers should not emphasize information regarding setbacks and other challenges of the company, and limit unnecessary, excessive information, such as the impact technological changes will have on job specifications, how the work carried out by employees contributes to the overall performance of the company, etc.

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DIGITALISATION, KNOWLEDGE MANAGEMENT AND TECHNOLOGY TRANSFER IMPACT ON ORGANISATIONS' CIRCULARITY CAPABILITIES*

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Abstract. Transition to circular economy (CE) requires that organisations change the way they do activities. Through digitalisation the information flow can be improved across all the value chain. The information that is particularly relevant for CE needs to be created in the first place and shared within the organisation and among them to implement CE strategies. Implementation of CE strategies requires that organisations has the ability to access technologies through technology transfer to achieve higher co-operation levels. Circular processes can be defined as those processes within organisations that positively contributes towards CE principles implementation, such as re-using or recycling products and materials. Within this article knowledge management (KM), digitalisation, and technology transfer (TT) are analysed through systematic literature review to understand the impact of these three concepts on organisations capabilities to develop circular processes. The knowledge management theory demonstrate the need for higher attention on how within organisations and between organisations CE related information could be managed to achieve CE strategies for organisations and their networks, such as supply chain. Technology transfer ensures that there are pathways to transfer relevant technologies that can improve or enable CE processes to multiple organisations through open source or conditional transfers. A concept based on a literature review is proposed on how digitalisation facilitates knowledge management within & among organisations, improves decision making of circular processes, and enables CE strategies implementation.

Keywords: circular economy; digitalisation; technology transfer; knowledge management; circular processes

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1. Introduction

Organisations and governments are faced with the challenges of rapidly increasing production and consumption of goods. With a huge amount of resources needed to support markets demand the sustainability boundaries are being challenged. The raw materials extraction, usage of fossil fuels, waste generation, etc. are the issues that Circular Economy (CE) address (Jabbour et al., 2018). In practice, to ensure CE implementation organisations need to adapt their strategies and processes for developing and maintaining circular processes. The circular process can be defined as the actions and steps within an organisation that ensure the CE strategies, such as repair, design for circularity, etc. can be achieved by the supply chain. A difficult task for organisations is to find solutions for implementing such strategies when the supply chains are global, there is an increasing amount of varieties of products, etc. The developments of digital technologies enable such solutions through new business models, new processes, and optimisation opportunities for organisations function areas such as sales, marketing, procurement, etc. (Yadav et al., 2020). IoT, blockchain, Cloud computing, all these technologies that are transforming industries can be exploited for the circular processes development. With the increased exchange of explicit knowledge and co-operation-based developments the circularity gap can be closed (Cesur et al., 2020). With the increased options for organisations to manage their operations, develop strategies, and new business models there is a need to understand what are the impacts of digital technologies, knowledge management, and technology transfer in the context of organisations and their networks CE ecosystem.

The research goal of this article is to do a systematic literature review of digitalisation, knowledge management, and technology transfer impact for the organisations capabilities to develop circular processes. The object of the research is organisations and their capabilities to develop circular processes. To achieve the goal following research questions (RQ) are formulated:

1. What is the impact of digitalisation on the organisations capabilities to develop circular processes?
2. What is the impact of knowledge management on the organisations capabilities to develop circular processes?
3. What is the impact of the technology transfer on the organisations capabilities to develop circular processes?
4. How digitalisation can facilitate knowledge management and technology transfer for organisations capabilities to develop circular processes?

To answer the first 3 research questions systematic literature review will be used. To answer the fourth research question literature synthesis from the findings of the first three research questions will be used. Research objectives are:

1. To analyse the impact of digitalisation on the organisations capabilities to develop circular processes.
2. To analyse the impact of knowledge management on the organisations capabilities to develop circular processes.
3. To analyse the impact of technology transfer on the organisations capabilities to develop circular processes.
4. To propose concept how digital technologies facilitate knowledge management and technology transfer for organisations capabilities to develop circular processes.

2. CE, digitalisation and main theories

Circular economy surfaced from ecological and environmental economics and industrial ecology (Ghisellini, Ciacalini, & Ulgiati, 2016; Chehabeddine, Grabowska & Adekola, 2022). Academia and practitioners turned to CE when high production and consumption rates challenged resource scarcity and climate change. With limited resources available in the world recycling, reuse, using renewable materials, and other CE strategies are becoming a must objective for organisations to align with. The alignment with the CE principles requires organisations to adopt circular business model components, such as reverse logistics, and need to address CE strategies (Pieroni, McAloone, & Pigosso, 2020). It enables companies to think of new ideas, products, services, etc., within the context of CE and how to deliver the added value to customers and end users through a circular supply chain. There is a

strong requirement of collaboration from organisations networks (supply chains, clusters, etc.) to develop circular processes that can support and implement CE strategies. Not only organisations, but overall cities adopt CE principles (Farelnik, 2021; Napiórkowska-Baryła & Świdyńska, 2021). It is an challenge how CE should be managed in a optimized way when it involves multiple stakeholders.

It would be difficult to find an organisation that was not impacted by digitalisation. From physically written information transition to a virtual environment to decision making based on real-time data, organisations managers can increase their capabilities in performing everyday tasks. Data and value that is given from analysing it require organisations to adjust their business models (Ritter & Pedersen, 2020). Digitalisation supports business processes and is an enabler for digital transformation - the restructuring of the business model. The impact on business from digitalisation results in better marketing, improved strategic planning, and control (Truant et al., 2021). The adoption of digital technologies requires organisations to have employees with adequate competencies, investment capabilities, technological solutions, etc. (Nagy et al., 2018). Within the context of CE digitalisation could allow higher co-operation with the supply chain, partners, and various other stakeholders. The information generation and sharing flexibility could be a significant factor for developing the circular processes to support CE strategies.

Knowledge management allows organisations to improve competitiveness by utilising the knowledge to deliver new value propositions for customers, improve processes, create new products, etc. The main two dimensions for the knowledge management activities are enablers and processes (Bessant & Francis, 2005). Enabling mechanisms allow knowledge to be shared by individuals, teams, etc. It facilitates knowledge creation, sharing, adoption, and so on. The processes deal with how the knowledge is created, how it is shared, how it is stored, applied, etc. (Santoro et al., 2018). In the context of CE, knowledge management can enable to connect downstream and upstream supply chain organisations for collaboration on the CE strategies design.

Kogut and Zander were among the first ones to link the knowledge-based theory with competitive advantage (Wahab et al., 2009). Tacit type of knowledge, which is based on people's skills, competencies, know-how, etc., is difficult to transfer. Through socialising tacit knowledge can be passed on to another person. By receiving the tacit knowledge through socialising person can create new knowledge that could potentially lead to the generation of explicit knowledge. Explicit knowledge, based on software, hardware technologies, documents, procedures, etc. is the core of the technology transfer. Explicit knowledge is easier to transfer compared to tacit knowledge. To generate explicit knowledge, which can be used by organisations to improve their competitiveness, tacit knowledge is required. In the ecosystem of CE explicit knowledge allows organisation to develop strategies and processes to enable CE strategies. In this ecosystem, the roles of technology transfer and transferee are important for establishing CE strategies. Their management through digital technologies could foster the progress for adapting or creating new value chains in order to adress CE strategies.

In this paper organisations capabilities to develop, maintain and design circular processes are the main object. The surrounding concepts of knowledge management, technology transfer, and digitalization are supporting pillars of organization and its network CE ecosystem that enables new opportunities for circular processes development.

3. Methodology

Literature on the digitalisation, knowledge management, and technology transfer impact on organisations capabilities to develop circular processes will be investigated. For this purpose “Web of Science” database will be used. The articles were searched with the following keywords:

- “Technology transfer” AND recycling,
- OR “Knowledge management” AND recycling,
- OR “Knowledge management” AND circular supply chain,

- OR “Knowledge management” AND circular economy,
- OR “Technology transfer” AND circular economy,
- OR digit* AND circular supply chain.

The recycling keyword was used to identify which articles mention one of the most relevant CE strategies. Downcycling, high-efficient recycling, downgrading, etc. are some of the possible ways to address recycling in the CE ecosystem. With the dominant practices of materials and products quality degrading after recycling this is one of the most important topics to address from the CE perspective. To understand what role knowledge exchange takes in the recycling field of CE technology transfer and knowledge management were combined with the keyword “recycling”.

The circular supply chain keyword was used to filter articles that have content related specifically to supply chain. The networks of multiple organisations within CE strategies implementation are important, therefore the supply chain keyword was combined with knowledge management and digitalisation. Due to the significant amount of articles available the digitalisation keyword was combined with circular supply chain instead of circular economy to narrow down suitable articles that could address the research questions. Digit* was used to include digital, digitalisation, digitisation keywords from the literature. The keyword of the circular supply chain was not combined with technology transfer as there is a low amount of literature dealing with the CE and the concepts of technology transfer. Therefore, the broader term of circular economy was used as an additional keyword in the combination with “Technology Transfer”.

The presence of the digitalisation, KM and TT topics in the articles is required to answer RQ4. Therefore, the latest literature was decided to focus on this research as CE is a relatively new model. The date range of the articles was chosen from 2018 till 2021-10-16. The search resulted in **N (number of articles) = 340**. The following further elimination of the articles based on various factors were done:

1. Include only articles that are in the journals: **N = 152**. This criterion resulted in the further selection of only 152 articles. This criterion was used to ensure the higher quality of the papers to be used in this research.
2. Citations above 2: **N = 76**. The citation criterion is included to filter articles based on their relevance in the scientific community.
3. The next step was to screen abstracts with the following criteria's:
 - 3.1 To understand whether there is a connection with the CE, technology transfer, knowledge management, or digitalisation: **N = 71**. The criterion was used to eliminate articles that were not focusing on the relevant topics of this research paper or the connection to them was indirect.
 - 3.2 To eliminate technical reports: **N=63**. This criterion was chosen to filter out articles that deal mainly with technical solutions.
 - 3.3 To eliminate articles that do not address at least one of the RQ (1-3): **N=50**. The criterion was used to eliminate articles that had no implications or suggestions of what impact digitalisation, knowledge transfer, or technology transfer makes on the organisations capabilities to develop circular processes.
4. The final selection of papers was done through screening of the articles. 7 articles were eliminated which resulted in a total of **43** research articles to be used for this research article. The final selection of papers was based on the lack of results or conclusions that would allow finding answers for this research article's research questions. Figure 1 summarise the selection process of the articles.

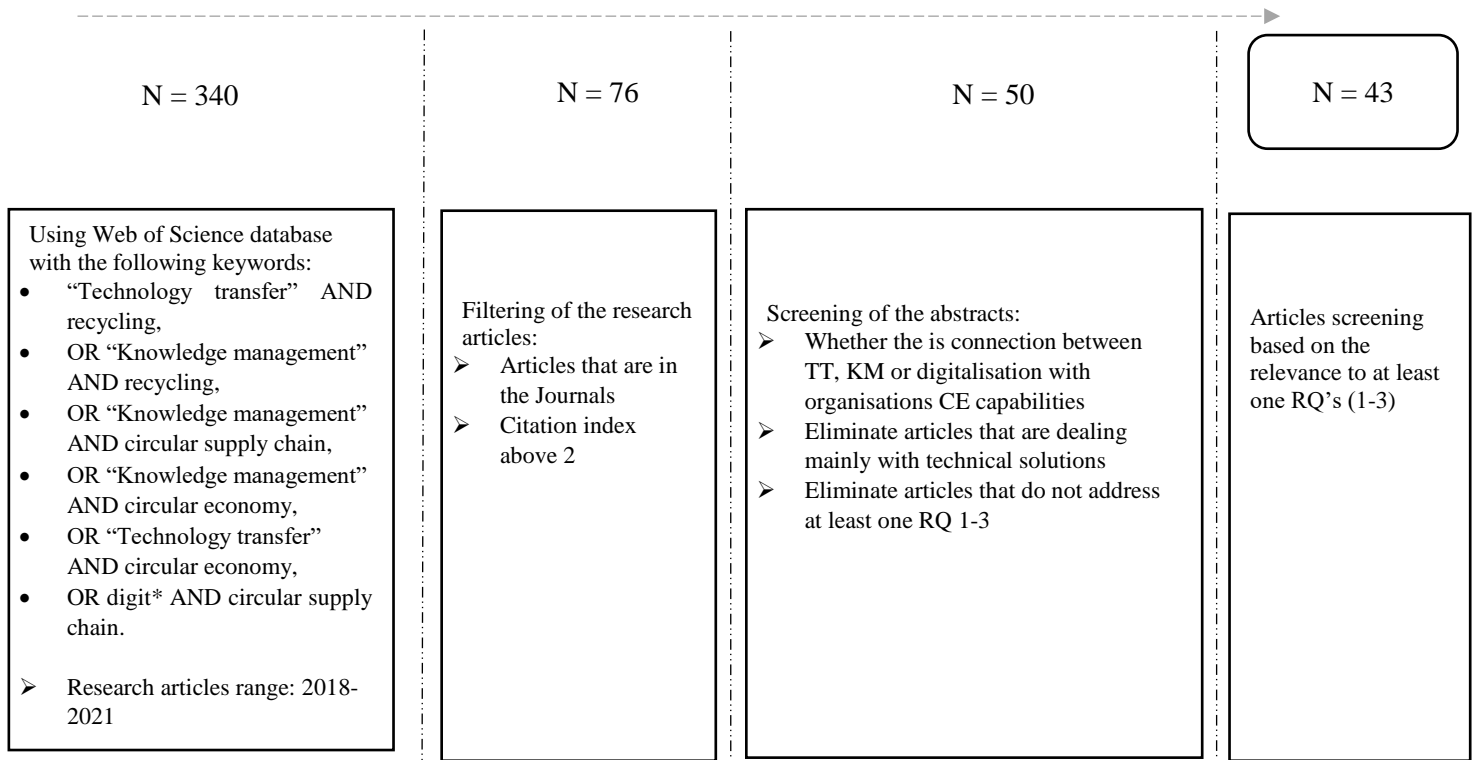


Figure 1. Selection process of the research articles

Source: made by authors

In total 43 research articles were chosen for this research. The following analyses are made based on which RQ’s articles address, the year of the articles, in which journal articles are published, what theories are used in the article, and what research methods were used. Figure 2 shows the dispersion of the articles based on which research questions they address. Most of the articles were related to RQ 1 (18 articles), followed by RQ 2 (8 articles) and RQ 3 (3 articles). 11 articles address both, RQ 1 & RQ 2 whereas RQ 1 & RQ 3 are addressed together in 3 research articles. To answer RQ 1-3 research articles were grouped into 3 categories: digitalisation (RQ 1, 22 articles), knowledge management (RQ 2, 15 articles), and technology transfer (RQ 3, 6 articles). Articles that address more than 2 RQ’s (14 articles) were appointed to only one type of the three categories. This process was based on which RQ the research article addressed mainly.

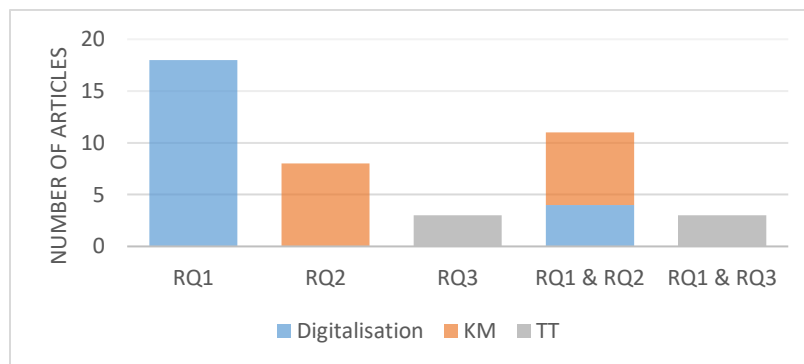


Figure 2. Dispersion of the articles based on which research questions they address

Source: made by authors

Figure 3 shows the year of publishing of the articles. Most articles were published in 2020 with the least in 2018.

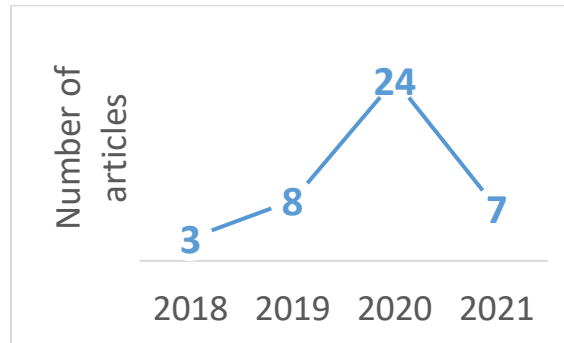


Figure 3. Number of articles based on their publishing year
Source: made by authors

Figure 4 shows which theories were used in the analysed research articles. The most used theory in the reviewed research articles that address RQ 1-3 is the resource-based view. Within the reviewed articles that are linked to RQ 3, there were no theories used.

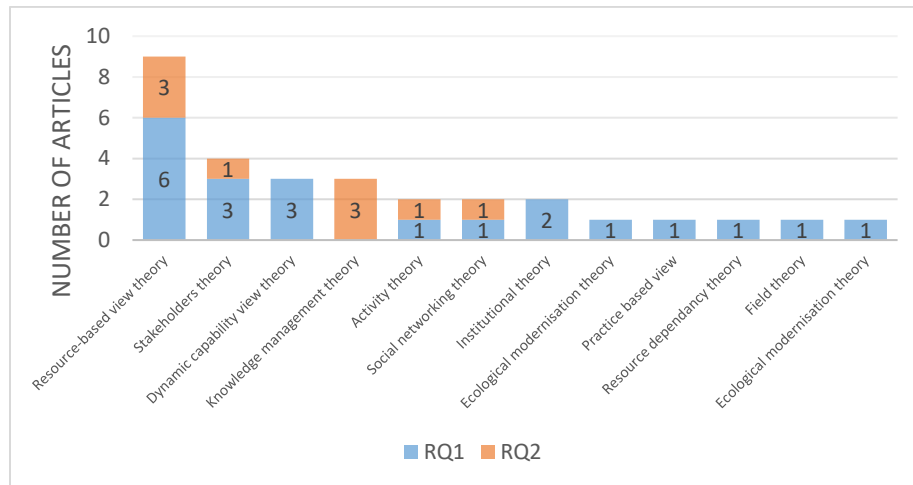


Figure 4. Used theories in the research articles that are related to RQ1 & RQ2
Source: made by authors

Figure 5 demonstrates the research methods (to collect the data or information) that were used within the analysed research articles. Literature review and case study were the most used methods in the analysed articles.

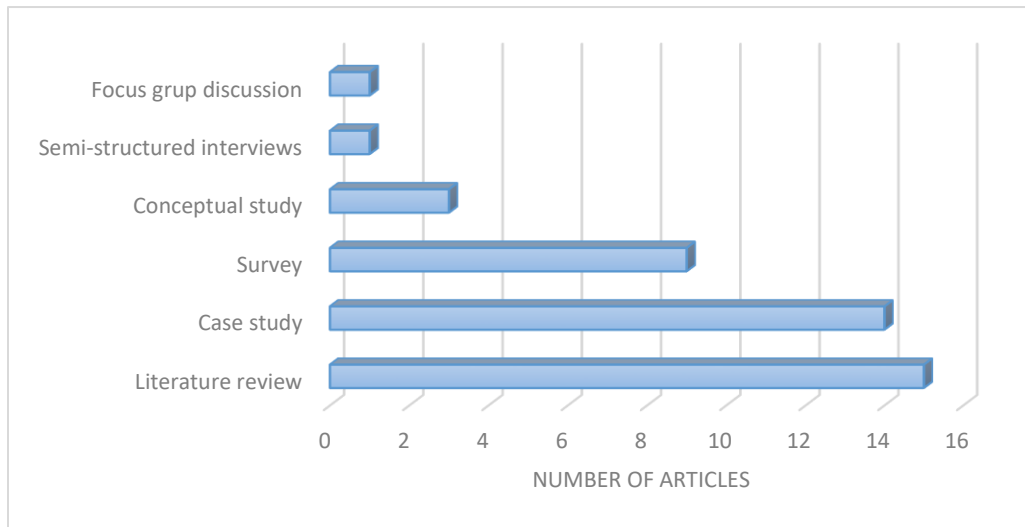


Figure 5. Type of the research methods used in the analysed articles

Source: made by authors

Figure 6 shows the distribution of the articles based on the journals they were published in. Sustainability (Switzerland); Journal of Cleaner Production; Resources, Conservation, and Recycling, and Industrial Management and Data Systems and Sustainable Production and Consumption journals had more than 1 article.



Figure 6. Journals of the selected papers

Source: made by authors

43 research articles will be used further to analyse their content. Three categories of the articles based on the first three research questions will be reviewed in the following section.

4. Findings of the articles review

To answer the research questions selected articles (43 articles) will be analysed. Each of the following thematic findings based on the research questions represents the analysis of articles that are from digitalisation (RQ 1, 22 articles), KM (RQ 2, 15 articles), and TT (RQ 3, 6 articles) categories.

4.1 RQ 1 thematic findings

Digitalisation improves economical activities by delivering value for various stakeholders. The ability to have rapid access to the questions, make a decision based on real-time data, and other examples allow organisations to explore opportunities of how to increase competitiveness. In terms of circular economy, the objectives are related to optimising resource usage by redesigning business as usual. Digital technology enables and improves various processes and business models that allow introducing competitive solutions that address CE objectives.

The impact on organisations of digitalisations is that it allows managers to improve or enable CE strategies and processes for internal purposes and/or for the supply chain (organisation network). Figure 7 shows that digital technologies contribute to the decision-making of an organisation. The organisation thus can choose whether to improve circular processes that are within (Internal) its organisation boundary or/and enable the opportunities of CE strategies for other organisations (External). By enabling the CE strategies further organisations in the circular supply chain can develop or adapt their circular processes to establish re-use, recycling, or other CE strategies.

With the increasing amount of supply chain shocks organisations are willing more to localise suppliers in order to have agility (respond fast in changing environment) by including digital technologies such as blockchain, sharing platforms, RFID's, cloud computing, etc. (Nandi et al., 2020).

Incorporation of CE related KPI's, such as energy efficiency, resources and raw materials consumption, use of renewable and secondary resources, etc., can assist managers and other employees within organisation to develop circular solutions. This can be achieved by utilising cyber-physical systems (digital twins as such), sensors, IoT, etc. (Nara et al., 2021).

Rossi et al. (2020) suggest that the interconnection of data and information about the products enables automatization and decision making in regards to how reverse logistic should be organized, processes for maintainance, how raw materials use and energy consumption could be reduced, etc. The synergy of different organisations information within the supply chain allows traceability which can enable circular strategies as products and materials can be located, their condition can be know and the information of the products and materials can be accessed.

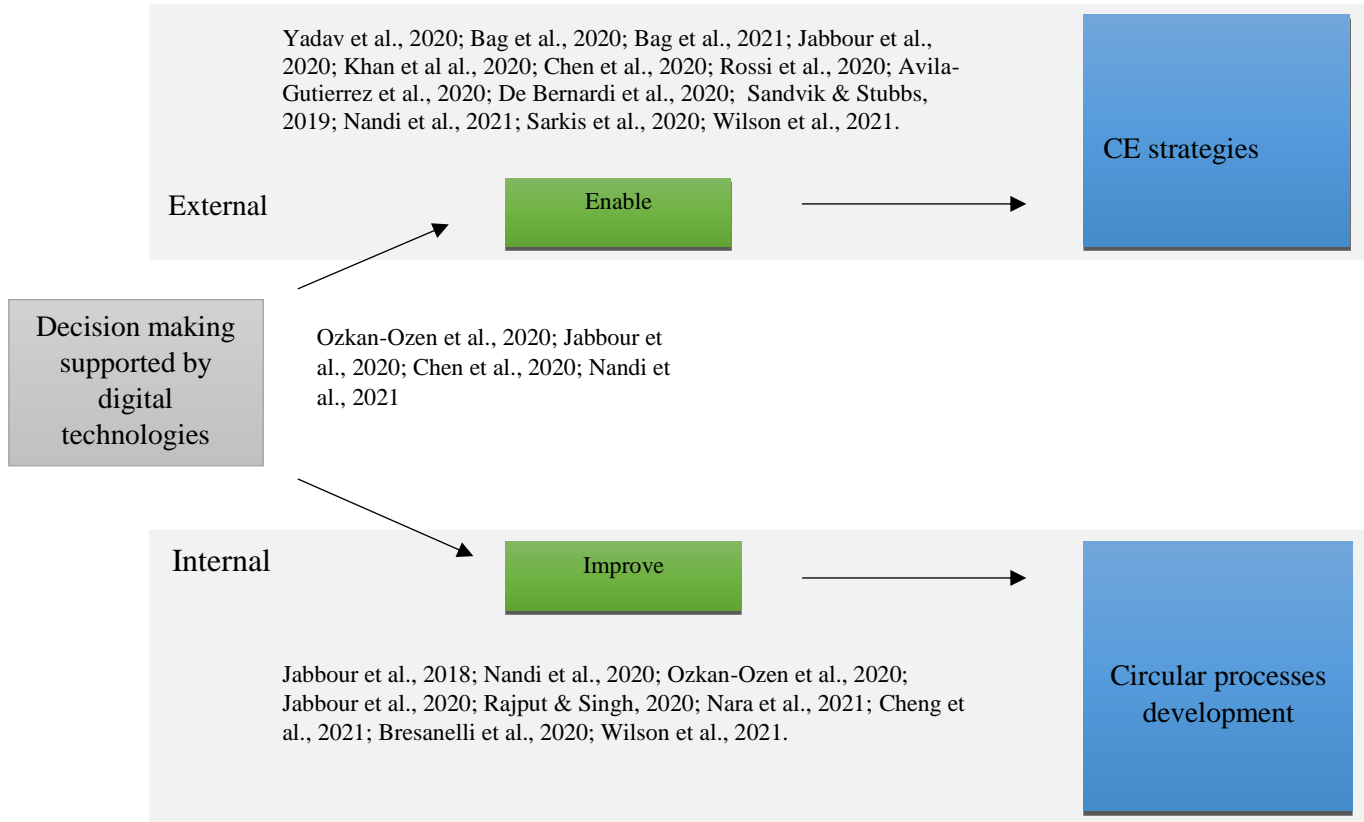


Figure 7. Conceptual framework of how digital technologies impacts organisation capabilities to develop circular processes

Source: made by authors

Digital technologies allow organisation to reduce materials consumption, decrease energy consumption, redesign products, and change business processes to tackle CE issues within its own organisations. The enabling condition for the circular supply chain existence is the organisations willingness to enable information access, co-operation, reverse logistics possibilities, etc. After that other organisations can follow up with their own circular processes, such as actions taken towards procurement or product design changes to reduce raw materials consumption, design out toxic materials, etc. This cascading effect can allow new circular business opportunities, ensure products and materials proper handling, re-use, recycling etc. along the supply chain. Digital technologies allow these processes to be more fluent and makes it possible to implement it with the help of digital technologies.

Figure 8 shows digital technologies which were analysed in the selected research articles. The most analysed technologies are IoT (10 articles), Big data (7), Cloud computing (6), and cyber-physical systems (5).

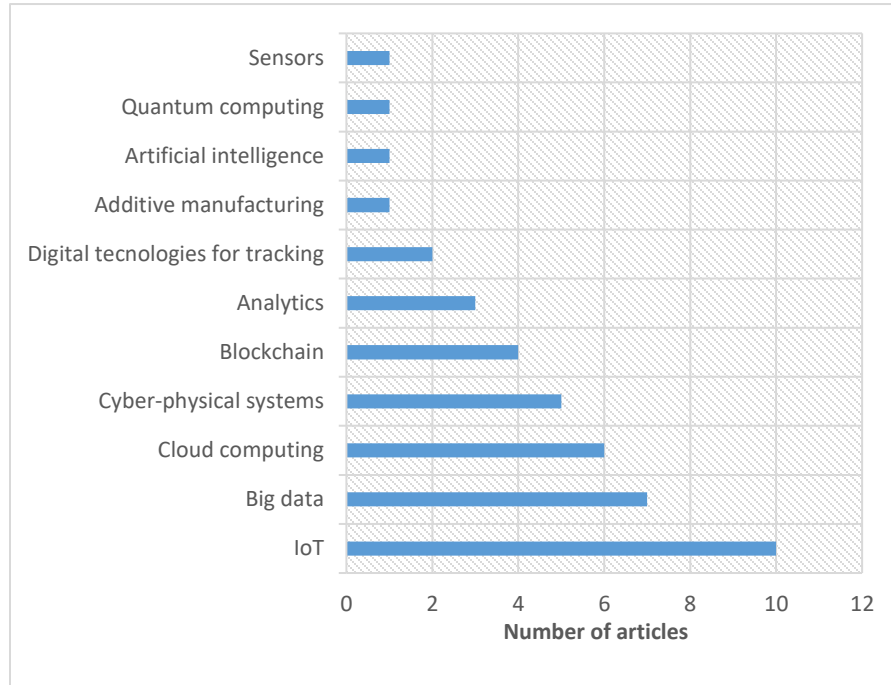


Figure 8. Digital technologies analysed in the reviewed articles

Source: made by authors

The reviewed research articles showcased what kind of impact digitalisation makes on the organisations capabilities to develop circular processes. Within the organisation, organisations are limited to redesign or develop new processes to address the circular economy through circular processes. Whether the process deals with reshaping the product design or decreasing resource consumption managers can make those decisions by utilising digital technologies.

The enabling conditions for implementing a circular supply chain, which means the supply chain ensures materials reutilisation, repair, etc., requires a significant amount of information sharing. It can be done through various ways that digital technologies support and enables, such as digital platforms, products tracking, etc. Managers of the organisations are capable to support the development of CE by the decisions they make to improve and/or enable conditions for circular processes development.

RQ 1: What is the impact of digitalisation on the organisations capabilities to develop circular processes?

Digitalisation allows better decision-making for organisations managers to develop and change business processes in a way that they would address CE objectives. Digitalisation is an enabler for achieving CE strategies by allowing organisations to work together to implement CE strategies at supply chain level.

4.2 RQ 2 Thematic findings

Knowledge management theory revolves around the central focus of the knowledge within organization. KM allows to attain, create and share knowledge for decision making purposes and for the creation of business strategies (Ferreira et al., 2020). It can contribute to new business structures and new concepts of management to improve the competitiveness of the firm. For the second research question of what is the impact of knowledge management on the organisations capabilities to develop circular processes 15 research articles will be reviewed.

Figure 9 shows the main findings of the reviewed articles. Knowledge management's impact on organisations capabilities to develop circular processes can be separated into Internal (within organisation) and External (organisation networks). Organisations can improve the skills and competencies of the employees within the company for them to perform daily tasks by taking into consideration the CE context (Giudice et al., 2020; Belkadi et al., 2020; Ortega-Lapiedra et al., 2019).

By accessing the relevant knowledge within the organisation's network managers can develop and improve circular processes (Clulli et al., 2020; Kristoffersen et al., 2020). By identifying the relevant knowledge it allows to reveal opportunities for adapting or creating new processes within organisation to address the CE objectives (Wu et al., 2019).

The ecosystem of CE involves multiple stakeholders within organisations networks. Organisations can contribute to knowledge sharing for the purpose of making other parts of the supply chain more circular (Moreno et al., 2019). By understanding the relevant information that is attributed to specific products or materials new circular processes can be developed (Ruel et al., 2019).

It can be supported by ensuring knowledge accessibility for the relevant stakeholders in the supply chain (Moreno et al., 2019). The circular processes are linked with various circular economy strategies, such as reducing materials usage, enabling reparability, etc. Those CE strategies implementation requires multiple stakeholders co-operation as it involves complex processes of different organisations.

By synergizing the organisations knowledge, actively sharing knowledge, and participating in its formation it requires close co-operation of organisations and their networks (Brown et al., 2020; Cesur et al., 2020).

Trust is required within the ecosystem of managing CE strategies when multiple organisations and their networks are involved (Cantele et al., 2020; Melander & Pazirandeh, 2019).

Each of the organisation benefits from the active part of co-creation and sharing knowledge through their own circular solutions creation within organisations leading to reduced waste generation, increased materials and products recycling, etc. (Haziri et al., 2019; Razminiene & Tvaronavičienė, 2018).

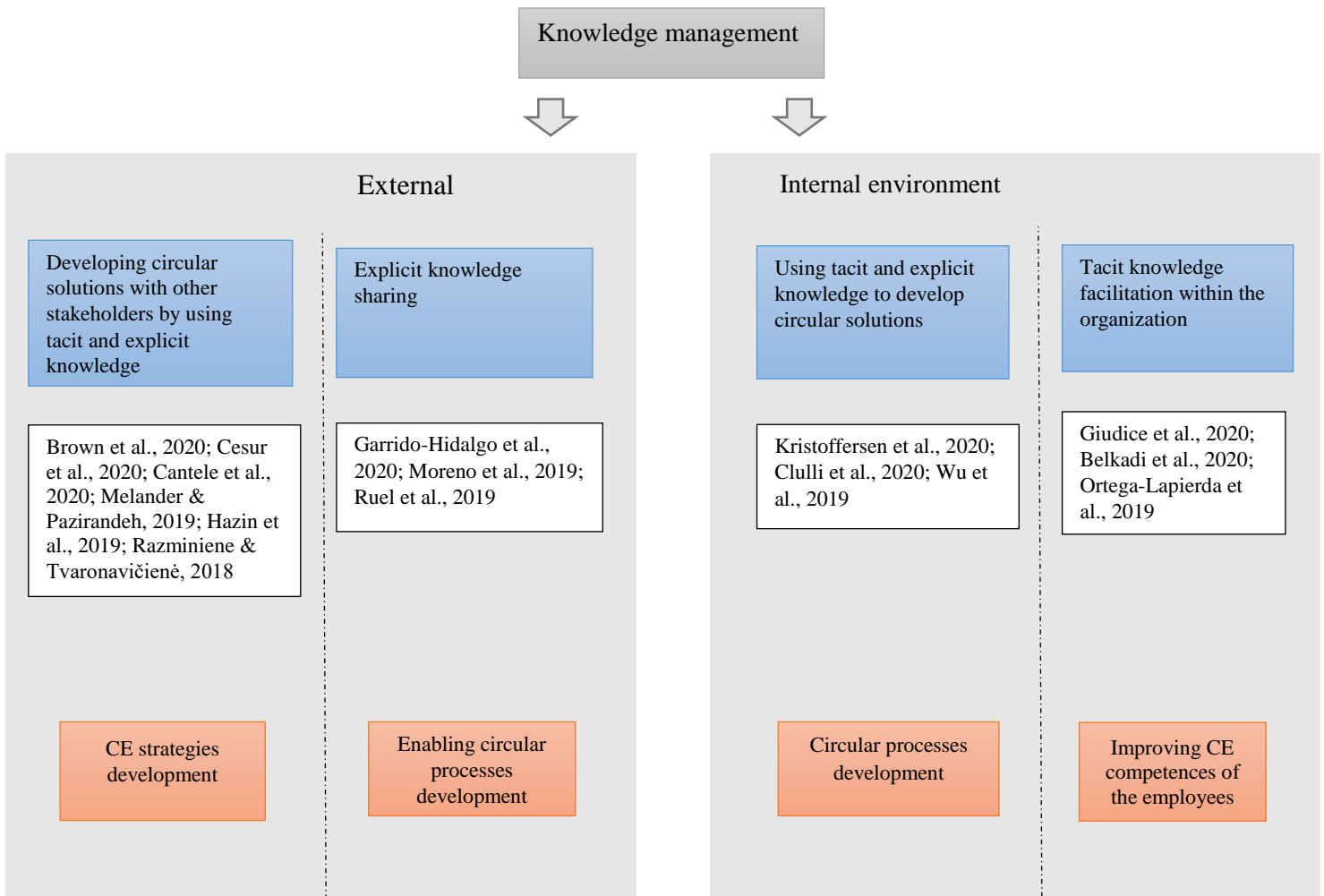


Figure 9. Conceptual framework of how knowledge management impacts organisation capabilities to develop circular processes.

Source: made by authors

Organisations capabilities are improved when they can facilitate tacit & explicit knowledge that is related to CE. By using the knowledge for their business processes and strategies organisations can develop their own circular solutions. To allow and foster CE implementation in other organisations there has to be knowledge sharing and co-operation of organisations and their networks. Within the CE ecosystem knowledge management of various organisations can lead to the creation of a circular supply chain through CE strategies implementation.

RQ 2: What is the impact of knowledge management on the organisations capabilities to develop circular processes?

Knowledge management contributes to organisations capability to develop circular processes by facilitating tacit knowledge within organisations. It allows organisation managers and employees to develop circular processes by utilizing explicit knowledge along the way. Each organisations explicit knowledge sharing enables other organisations to develop their own circular processes. When organisations work closely by using explicit and tacit knowledge they can implement CE strategies. The development and implementation of CE strategies require each organisation to contribute through their own circular processes development.

3.3 RQ 3 Thematic findings

The modern world requires complex solutions to solve issues that block CE strategies. Technological solution's existence is only a step in an ecosystem where the right solution from an economic and environmental perspective could be used to facilitate circularity. Technology transfer deals with explicit knowledge of the solutions created by one organisation that can be transferred to another organisation (Cho & Shenkoya, 2019).

The technology transfer impact on organisations capability to develop circular processes is shown in figure 10. Procedures, white papers, guidelines, physical assets, etc. can be transferred from one organisation to another. Either in academic spin-offs, focusing on specific technologies transferring (low carbon technology as such), or in other forms, organisations can share explicit knowledge (Poconi et al., 2020; Kirchherr & Urban, 2018). The acquired specific or adaptable technology to organisation context allows the transferee to develop its own circular processes. To enable scalability and allow various other organisations to acquire relevant technology for CE development objectives the technology can be acquired through various methods, such as licensing, franchising, etc. It is referred to as conditional transfer where two parties agree on the technology transfer with specific rules. These transfers differ from one organisation to another through scalability, speed, the technologies are easier to locate through various platforms, etc. (Chen et al., 2020; Guo et al., 2020). Based on the open-source principle organisations can access freely relevant knowledge on how to repair products, footprints for 3D printing, materials passports, etc. (Unterfrauner et al., 2019; Gonzalez-Varona et al., 2020). The open-source principles of easy to access it and free-of-charge allow CE ecosystem stakeholders to use it for CE strategies and circular processes development.

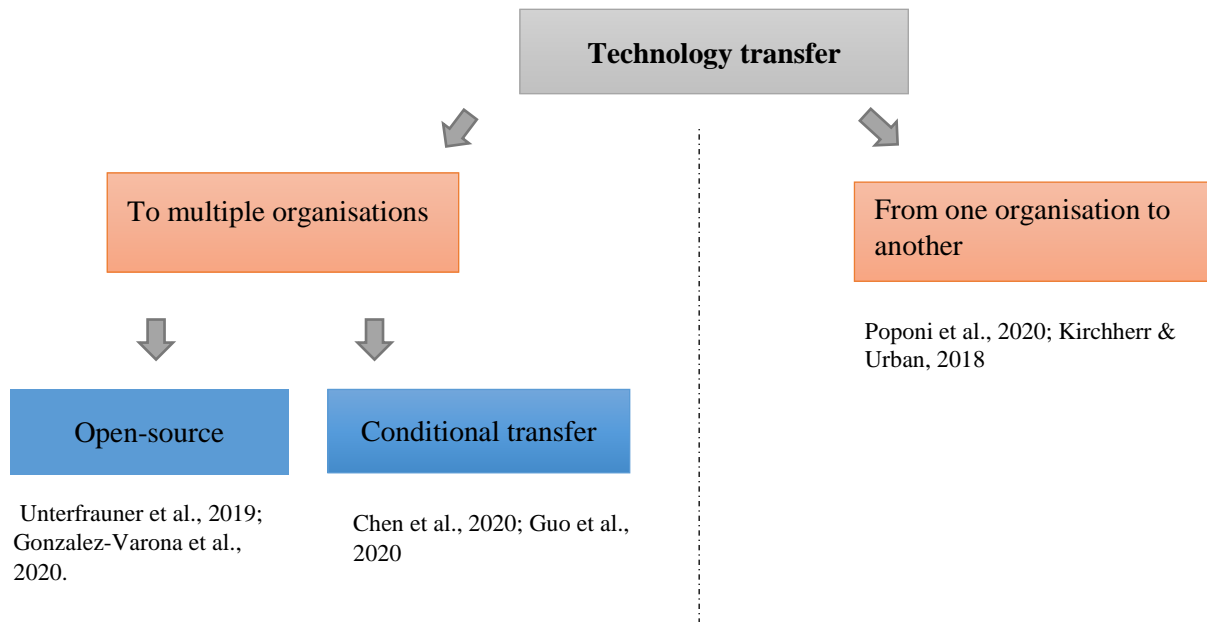


Figure 10. Conceptual framework of technology transfer impact on organisations capabilities to develop circular processes.

Source: made by authors

Technology transfer within the CE context allows relevant explicit knowledge diffusion among the organisations and their networks. It facilitates the capabilities of organisations to develop new circular processes within their organisations. By allowing the technology to be shared the CE ecosystem is enriched with the explicit knowledge to be used by various stakeholders which allows addressing the strategies of CE.

RQ 3: *What is the impact of the technology transfer on the organisations capabilities to develop circular processes?*

The transferer of explicit knowledge allows the transferee to use it for its own organisation circular processes development. Explicit knowledge can be shared with multiple organisations. Whether through open-source principles (open to everyone) or through specific conditions (licensing, franchise, joint-ventures, etc.) the explicit knowledge can be utilised on a larger scale to address CE objectives.

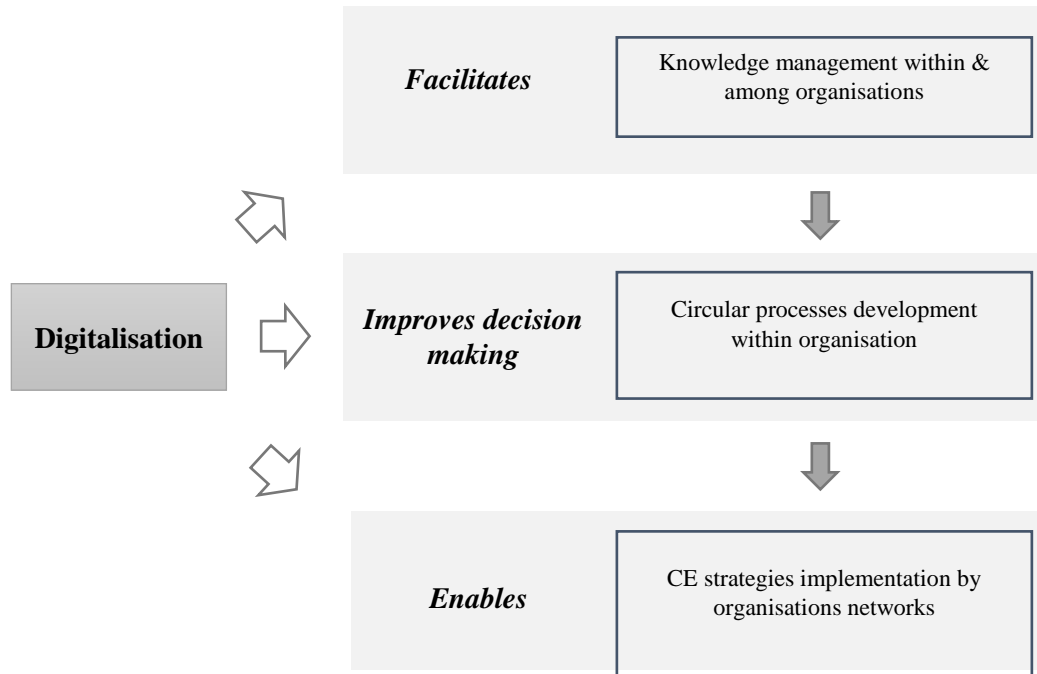
4.4 RQ4 conceptual framework

The impacts of digitalisation, knowledge management, and technology transfer support the capabilities of organisations to change business strategies or processes. The changes aimed at addressing the CE principles allow CE strategies to be achievable by various organisations networks.

Figure 11 provides findings from the reviewed articles on how digitalisation *facilitates* the knowledge management (implicit and explicit) of organisations, *improves decision making* on circular processes development, and *enables* CE strategies implementation. Databases, cyber-physical systems, IoT, etc. facilitate knowledge management within organisation and between them.

Real-time data, big data, data analytics, etc. improve decision-making for organisations capabilities to develop circular processes. It allows identifying what circular processes are needed, such as changing specific material of product design to make it more circular, developing guidelines for reparability based on the feedback from the downstream supply chain, and so on.

By accumulating and structuring the knowledge through digitalised solutions such as platforms, databases, etc. organisation networks can co-operate to align their business operations and processes for the implementation of CE strategies.

**Figure 11.**

Conceptual framework of digitalisation impact on facilitating, improving decision making and enabling knowledge management, circular processes development, and CE strategies implementation respectively

Source: made by authors

The proposed conceptual framework demonstrate the impact of digitalisation: facilitation, improved decision-making for organisations, and enabling CE strategies. Organisations and their networks, such as supply chains, clusters, etc. are able within the CE ecosystem to develop circular processes across each of the organisation to enable reparability, recyclability, and other CE strategies. The proposed framework depicts the most important functions of digitalisation in the CE ecosystem.

RQ 4: How digitalisation can facilitate knowledge management and technology transfer for organisations capabilities to develop circular processes?

Digitalisation *facilitates* knowledge in organisation and between organisations. It *improves decision-making* of organisation managers which allows them to perform better when developing circular processes. Digitalisation *enables* CE strategies by allowing multiple organisations networks to access relevant knowledge that is needed for them to implement specific CE strategies.

The findings of the reviewed articles demonstrated the impact of digitalisation, knowledge management, and technology transfer on organisations capabilities to develop circular processes. The impacts are related to allowing better decision makings, required conditions that allow CE strategies, and how digitalisation facilitates the whole process.

Conclusions

Various digital technologies can improve organisations capabilities to access, store, share, analyse data, etc. Digital technologies improve organisation managers' capabilities to make decisions related to their organisation circular processes. It also allows other organisations to develop their own circular processes by making it easier to use relevant data and information. By working together organisations and their networks, such as supply chains, clusters, etc, can implement circular strategies.

Knowledge management allows the management of tacit and explicit knowledge. Within an organisation it allows improving employees CE related competencies, skills, etc., which combined with explicit knowledge allows circular processes development. Managing explicit knowledge among different organisations and their networks improves the capabilities of the networks organisations to develop circular processes within their own organizational boundaries. The combination of multiple organisations tacit and explicit knowledge enables CE strategies implementation for their networks.

Technology transfer, the transfer of explicit knowledge, allow organisations to transfer or receive required knowledge that can allow the establishment of circular processes. Technology transferring to multiple organisations through open-source principles or with specific conditions (licensing, franchising, etc.) scales the availability of CE-related technology and knowledge. These type of transfers allows various stakeholders to participate in the development of circular supply chain.

Digitalisation facilitates, improves decision making, and enables CE strategies implementation for organisations and their networks. Various digital solutions, such as big data, cloud computing, blockchain, etc., reduce the number of obstacles that prevent organisation networks to implement CE strategies. By improving organisations networks capabilities to develop circular processes digitalisation works as an enabler for organisation networks to align those circular processes (product design for circularity, allowing reparability, etc.) for implementing high-efficient recycling, re-use of products, and various other CE strategies.

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SUSTAINABLE INTEGRATED SYSTEM FOR RURAL DEVELOPMENT: A CASE STUDY

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Abstract. India is one of the largest countries in the world, with a population mainly living in villages and primarily engaged in dairy activities along with agriculture. Despite being the largest milk-producing nation, lives of local farmers are challenging due to the lack of access to technology in rural areas. This study aims to develop an integrated system that can solve the problems faced by farmers by utilizing locally available resources. Due to the time lag between milking and storage, milk spoilage is more likely to occur in remote areas. Immediate pasteurization and storage facilities are required. Heating and refrigeration are essential for pasteurization. In India, most villages face power shortages, so biomass heat is suitable for pasteurizing milk. A steam jet refrigeration system is also proposed as it runs with waste biomass for chilling milk. Steam required for both heating and chilling milk is generated in the same biomass-fired boiler. Also, make-up water requirements in the boiler are fulfilled using a rainwater harvesting system. In a conventional dairy plant, a cooling tower is used to supply condensate water required in the condenser. Here this water requirement is fulfilled using a bore well. Subsequently, this water is stored in the irrigation pond to cool it by natural cooling through surface evaporation, making the water suitable for irrigation purposes. Also, the payback period of this system is estimated to be less than six months. Looking at the multiple benefits, this integrated system will further facilitate in achieving sustainable development goals through rural development by 2030.

Keywords: rural development; milk pasteurization; carbon neutral; water purification

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JEL Classifications: O1, 018

1. Introduction

Livestock, dairy activities, and agriculture have continued to be an integral part of human life since the beginning of civilization. These activities contribute to food baskets and maintaining the ecological balance in India and play an essential role in the country's overall socio-economic development. They also play an important role in creating jobs for rural areas, especially landless, small, disadvantaged farmers and women, and providing affordable and nutritious food to millions. India's dairy sector has grown significantly in the last few years. According to the Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, the country ranks first among the world's milk producers, achieving an annual production of 198.4 million tonnes in 2019-2020, compared to 187.75 million tonnes in 2018, showing a growth rate of 5.68%, as shown in Figure 1. Further, the global milk production increased by 1.43%, from 884 million tonnes in 2019 to 860.1 million tonnes in 2020 (Annual Report, Government of India, 2021).

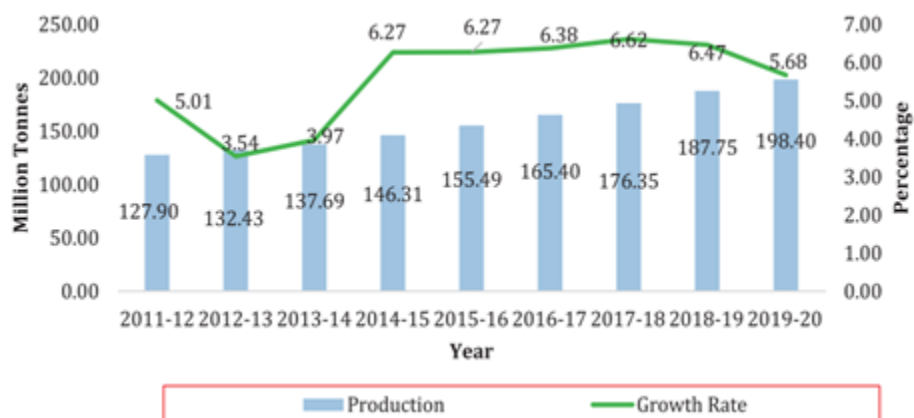


Figure 1. Milk production with corresponding Annual Growth Rate in India (Annual Report, Government of India, 2021).

Due to its enormous nutritional value, milk is the most vital food. Cow's milk has an average composition of 87.7% water, 3.4 percent fat, 4.7 percent sugar, 3.4 percent protein, and 0.7 percent ash and this 1/6 ash is calcium (Pandey & Gupta, 2013). On average, India's milk requirements are around 200 million litres per day. Moreover, this requirement is getting fulfilled by farmers in the villages as they own about 95% of the milk-producing cows in the country. The source of raw milk for processing in these plants is from rural areas. The nearest milk processing factory is often far away in many villages. The time it takes for milk to arrive at the processing facility due to a lack of suitable and rapid means of transportation is very long (Panchal & Patel, 2016). When it comes to milk, bacteria are active from the beginning. Delayed milk processing increases acidity and makes it unsuitable for milk processing. Hence, pasteurization is needed. Pasteurization is a mild heat treatment process designed to eliminate harmful pathogenic and spoilage microorganisms from milk to improve its quality and shelf life. Heating is essential for pasteurization. In India, rural areas have scarce electricity, so it would be a priority to look for some alternative options like solar heat or biomass (Panchal & Patel, 2016). In villages, biomass is readily available as a waste product from the agricultural farm. It can be considered as a suitable option. Biomass has generally been a significant energy source for the rural areas, so it could be an appropriate option. It is renewable, widespread, carbon-neutral, and capable of generating significant employment in rural areas. Biomass can also provide reliable energy, which currently contributes to more than 32% of the nation's total primary energy supply, with more than 70% of the people relying on it to meet their energy demands (Annual Report, Government of India, 2021). Along with heating, cooling is equally important to complete the pasteurization process. It requires storing the milk up to 5 °C until it gets sold to ensure longer shelf life. For this purpose, a suitable refrigeration

system is needed. As mentioned above, lack of electricity is one of the major constraints in the village; hence, steam jet refrigeration can be a possible option. This system simply runs on low-grade energy like biomass readily available in the villages from farm waste (Sriveerakul, Aphornratana & Chunnanond, 2007; Thongtipa, Ruangtrakoon, & Aphornratana, 2014). The steam jet refrigeration system is easy to operate and doesn't require high maintenance.

2. Current status of dairy and horticulture facilities in rural areas

In India, milk production employs around 80 million rural households, with many smallholders, marginal farmers, and landless people. However, for milk processing, the farmers have to encounter many challenges due to lack of proper technology, knowledge, and resources. Since 1991, when the era of industrial licensing reforms began, private companies have had remarkable growth in building their capacity to process milk and milk derivatives. They have made significant investments in the dairy sector, creating capabilities that exceed the combined capacity of dairy cooperatives and state dairy over the last two decades. These private companies are much more prominent than some cooperative dairy farms and have excellent growth potential. The private sector operates on purely commercial principles to maximize profits, so its social responsibility for farmers' development is seriously undermined. Private companies prefer to procure milk through vendors, and the farmers do not get a fair price for their products. In India, about 46% of the milk produced is consumed at the farm level or sold to non-producers in rural areas, and the remaining 54% is sold in the organized and unorganized sectors. The organized sector consists of governments, producer-owned institutions (dairy cooperatives and producer companies), and private sector stakeholders to provide a fair and transparent system of village-level milk collection throughout the year. In most cases, the unorganized/informal sector includes local milk vendors, contractors, etc. Generally, no one fixed price of milk is paid to producers, as it depends on the situation. In competitive and formal sector milk procurement, prices are usually high and, at the same time, do not offer reward prices to farmers that do not have access to the organized sector (Annual Report, Government of India, 2021).

Like dairy, agriculture and allied activities are also crucial to the Indian economy. This sector employs 54.6 percent of the total workforce, as per Census 2011, and accounts for 17.8 percent of the country's Gross Value Added (GVA) in 2019-20, as shown below in Figure 2 (Annual report, Government of India, 2021).

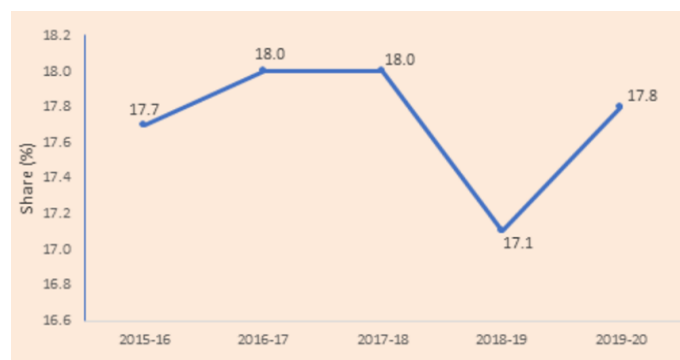


Figure 2. Share of GVA of agriculture and allied sector in GVA of total economy (Annual report, Government of India, 2021).

Considering the significance of agriculture and horticulture, the Indian government has taken many initiatives to ensure its long-term development. But these initiatives are generally more beneficial for big farmers.

Smallholders and marginal farmers still have to suffer a lot because, in the absence of storage facilities, they are bound to sell their products to vendors on a daily basis. Otherwise, it will get spoiled and not paid a fair price.

In rural areas, the health conditions of farmers are not that good because they are still dependent on untreated tube-well water for drinking and other household work. Rural people can't afford water filters that are available in the market. Underground water is not very good for health as its mineral contents vary depending upon the area. And in some cases, a few minerals like arsenic are present in excess which may cause serious health concerns.

Initiatives Taken By Government of India to Support Dairy Sector

- Under the initiative for self-reliance India (Atma Nirbhar Bharat Abhiyan), the government of India has launched a package worth 150 billion Indian rupee named "Animal Husbandry Infrastructure Development Fund" (AHIDF) for developing new dairy structures and supporting the existing plants in the rural areas.
- Another initiative named "e-GOPALA" has also been launched to provide market access to the farmers to buy high-quality germplasm. In addition, all the information related to animal food and vaccination is available with the help of information technology.
- The government has also recently started a special drive with the association of "Department of Animal Husbandry and Dairying" and "Department of Financial Services" to provide Kisan Credit Card (KCC) to 15 million dairy farmers to provide financial assistance to them.

3. Literature review

In a country like India, almost 55% of its workforce is primarily engaged in agricultural and allied activities (Annual report, Government of India, 2021) for their livelihood. This sector has a direct impact on the lives of millions of people. Many research studies have been carried out for agriculture and rural development in the Indian context. However, the more relevant studies with regard to this research are briefly presented here.

Rural development plays a very important role in the growth of any country. In this context, Rao (2019) has studied the challenges faced by rural people, like housing issues, infrastructure, and transportation. The main aim of his study was to discuss the various government policies for rural development and how effectively those policies can be implemented for the development of rural areas. Also (Takhumova, 2019) has discussed about the role of rural development in the economic growth of the country and its contribution in GDP. In a research study (Nedumaran & Manida, 2020) have discussed about the importance of agriculture in the growth of developing nation. They have discussed about the broad spectrum related to agriculture and economy of a country.

In the study by Prakash and Henham (2014) for Parag Dairy plant at Allahabad, Uttar Pradesh, India, they have proposed decentralized tri-generation system as a replacement to the conventional grid electricity based system. They have proposed "Combined Cooling and Heating Power (CCHP)" systems with three different configurations. All the calculations were based on the plant's primary energy consumption criteria. They concluded that proposed systems had multiple benefits for the processing plant and could make the plant independent of grid electricity supply.

The study of Dobrowsky et al. (2015) for milk pasteurization system coupled with rainwater harvesting system aimed to reduce the microbiological load in the water harvested through the rainwater harvesting technique and to analyse the change in the chemical composition of the harvested water so that large quantity of portable water can be produced from the system.

They have performed experiments in different temperature ranges to achieve the above objective and found that cat-ions were within the limits of drinking water except for a few, like iron and aluminium. Also, the growth of bacteria is below the detection level at higher pasteurization temperatures. To produce large amount of portable water from the mentioned technique, they suggested that the storage tank for milk should be of some alternative material different from stainless steel for the coupled system to work efficiently.

A study by Wayua et al. (2012) for milk pasteurization in a dry area like Kenya was done using solar energy. They have conducted the experiment using a cylindrical flat plate solar collector made from glass fibre of 1.5mm thickness. In this study, water was boiled using solar heat, and then they used this water for milk pasteurization. After conducting the experiment, it was concluded that this type of small-scale pasteurization unit is beneficial in the arid areas where dairy is an essential source of income for the people.

Delay in milking and its pasteurization in the rural areas due to lack of proper transportation facilities and electricity leads to milk spoilage. Sur et al. (2020) conducted an experiment using a parabolic solar collector for milk pasteurization. For milk chilling, they had used a vapour absorption refrigeration system that runs on low-grade energy which is easily accessible in the villages. During heating and storing milk at a low temperature, stainless steel (SS316) was selected as the material for the tank and piping so that it would not react with milk. After conducting the experiment, they concluded that solar heat-driven systems had several benefits for the rural areas.

Many research studies have been conducted in the field of milk pasteurization through solar heat. In this context, Panchal et al. (2020) reviewed the various research works done by other research scholars all across the globe for milk pasteurization using solar panels for rural areas and its feasibility. After analysis, they concluded that solar heat had a significant impact on the milk pasteurization technique. It is capable of reducing the cost of pasteurization and does not contribute to global warming.

In a study by Reddy and Verma (2004), heating and cooling are equally important for dairy activities. Generally, medium hot or cold steam or air is required, which can be easily obtained using solar heat. They have also discussed the feasibility of utilizing solar heat and showed that a significant amount of money can be saved using this technique. A study by (Dhankhar, 2014) on refrigeration found that refrigeration plays a significant role in food preservation. She has explained the basic refrigeration cycle and all the processes involved in it. She has also demonstrated the commercial use of refrigeration in the dairy industry.

A steam jet refrigeration system has been developed and tested by Thongtip et al. (2013) for Thailand. They experimented in ambient conditions, and geometries were kept constant throughout. From the experiment, maximum coefficient of performance was found to be 0.5. Yapici (2008) has designed and manufactured the experimental setup for a steam jet unit. He developed a novel ejector based on constant area and conducted the experiment in a wide range of operations. He had concluded that this system had coefficient of performance of 0.39 when the ejector was kept at the optimum area ratio of 9.97.

Presently water scarcity and energy availability are two major concerns. Increasing demand for energy increases its cost, and burning fossil fuels leads to global warming. Hence renewable energy can be a suitable option for this. Solar energy can be one option among them. A study by Gugulothu et al. (2015) discussed the challenges associated with harnessing solar energy as it is intermittent. They have proposed Thermal Energy Storage, which can be used for this purpose.

A study by Levy et al. (2008) have discussed water vapour recovery from flue gas using heat exchangers from a coal-fired plant. They have performed pilot-scale heat transfer test for established the relation between vapours. An experimental setup, has been used determined the amount of water vapour from flue gas that can be recovered.

As exhaust from the boiler is generally at a higher temperature, heat recovery from this exhaust can be made using heat exchangers. In this context, Li et al. (2016) have proposed a technique to recover the waste heat using an absorption heat exchanger in a gas co-generation plant. From the experimental analysis of this system, it has been found that waste heat recovery increases the plant efficiency significantly and also discussed the system's other benefits.

Distillation of water is one of the oldest techniques used to remove contaminants. A study by Kamrin (1990) have discussed the various steps involved in the distillation process. They also mentioned the main problems associated with contaminated water. Also, Lockett and Resetarits (2003), have examined the chemical processes that can be used to distill water in laboratories.

Prakash and Henham (2011) have studied small scale multi-generation systems and validated the results. They found that if a single generation plant gets converted into cogeneration plants or tri-generation plants, they can provide cooling or heating effects along with electricity generation. They concluded that it can increase the efficiency by 19% and the plant's carbon reduction potential up to 50%. By setting up this plant in the coastal areas, seawater cooling further increases the plant efficiency, and salt can be produced as a by-product of the system.

On a macro-level, Munasinghe (2019) studied three pillars of sustainable development i.e. social, economic, and environmental. In this study, he focuses on poverty, sickness, hunger, inequality, etc in addition to macro-economic growth, resource depletion, and environmental pollution. He has discussed an empirical approach to sustainable development through the concept of “Sustainomics”.

Prakash (2013) proposed a comprehensive development indicator HPI i.e. “Holistic Progress Index” as an alternative to conventional GDP. In his research, he has presented an original approach to its quantitative evaluation. The major parameters related to HPI and its evaluation methodology has been discussed. From this study, he has concluded that HPI is much more comprehensive than GDP and may lead to peaceful, sustainable growth with general happiness.

A study by Prakash and Garg (2019) presented a new approach for measuring the development of any country. They have proposed “Composite development Index” (CDI) in place of “Human development Index”. In their paper they have discussed about all the aspects of sustainable development including peace and happiness. They have concluded that CDI is more comprehensive than HDI and high CDI may pave the way to sustainable development of a country.

From the literature review, it has been found that in rural areas where there is a scarcity of electricity; solar and biomass are the best possible renewable energy resources that can be used for power generation. It is also evident that an integrated plant has better efficiency and output as compared to single-generation plants. In this study, an integrated multi-generation plant has been proposed for milk pasteurization, and biomass is considered as an option for heat generation. The research methodology adopted for the successful completion of this study is mentioned below in the Figure 3.

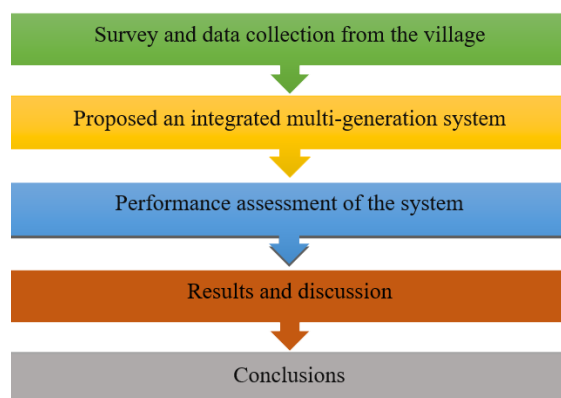


Figure 3. Research Methodology

4. Proposed integrated system

The main goal of this study is to develop an integrated small-scale multi-generation system for rural areas, lacking infrastructural facilities and advanced technology. The proposed system's schematic diagram is illustrated in Figure 4.

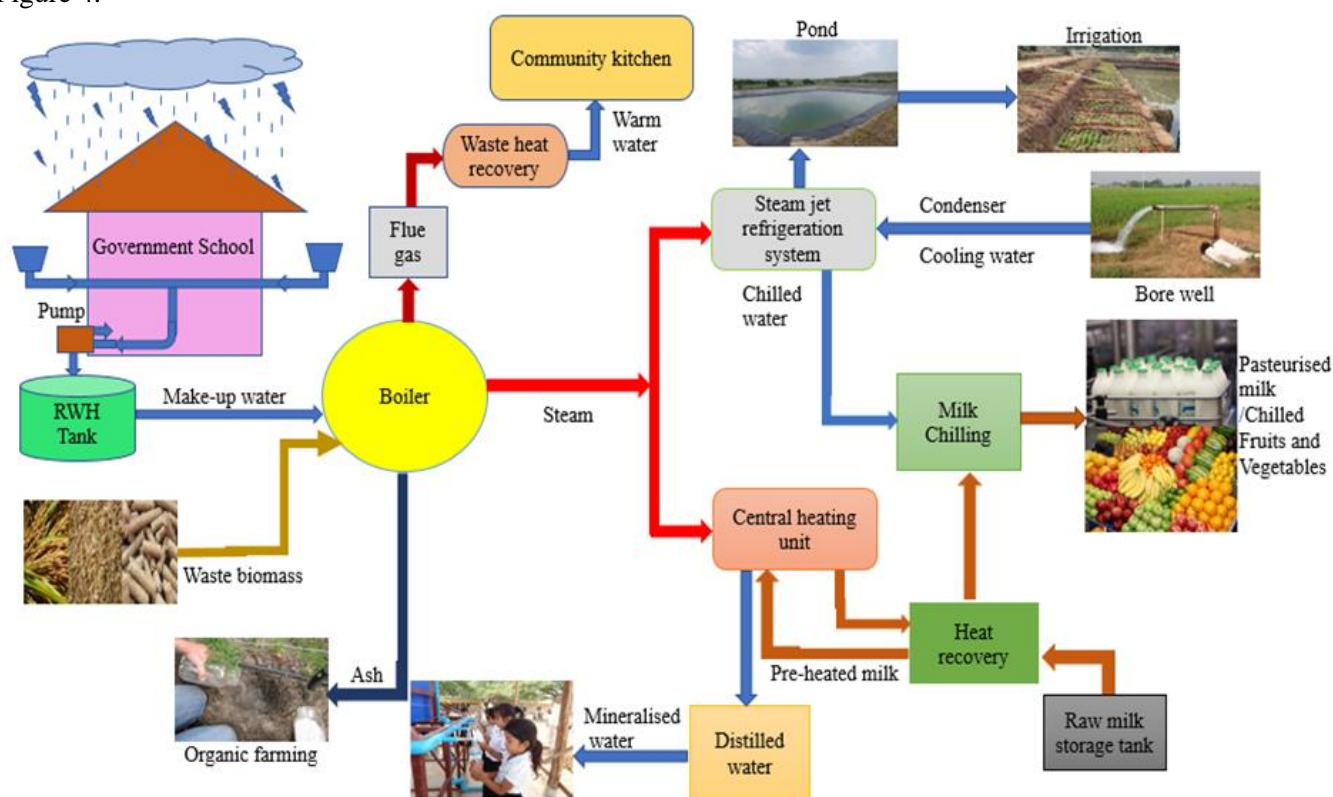


Figure 4. Illustration of proposed system layout

As demonstrated in the diagram, an integrated small scale system that is capable of pasteurization of milk, distillation of water, generation of warm water for the community kitchen, as well as ash from burning of biomass which is helpful for organic farming. Further, it will help in farm irrigation using condenser cooling water, which is naturally cooled through surface evaporation in the water storage pond.

Working Principle

In this proposed system, a waste bio-mass-driven boiler has been used to generate steam. This generated steam from the boiler is used both for heating and chilling of milk through a steam driven system. A “High Temperature Short Time” pasteurization process in which milk is heated at 73°C for 15 – 20 seconds is used here for the pasteurization of milk. The raw milk from the farmer is sent to the heat exchanger where it gets preheated, and then this milk is sent to the central heating unit where it is heated for the above mentioned time and temperature. A heat exchanger is a device used to transfer heat from hot fluid to cold fluid. After heating this milk, it needs to be stored in a cold chamber until delivered to the customers. A steam jet refrigeration system has been proposed for the chilling of milk, which works on the principle of boiling liquid at a lower temperature by reducing the pressure on its surface.

This system entirely runs on low-grade energy, and here this energy is generated using biomass which is renewable in nature and readily available in the villages from agricultural waste. In a steam jet refrigeration unit, condenser is the bulkiest component of the system. It requires a large amount of cooling water. This water requirement will be fulfilled using an existing bore well. After being used for cooling purposes, this water will be stored in the irrigation pond where it gets cooled through natural surface cooling, and then it may be used for irrigation on the nearby farms.

The water of the bore well is not pure, and it can cause erosion in the boiler. Hence, water treatment is needed, which requires significant investment. As an economical alternative, rainwater is stored here through rainwater harvesting. In rainwater harvesting, water is collected on the roof-top of a government school building and then transferred through a conveyor pipe system to a storage tank.

These storage tanks are usually situated above, middle, or below the ground as required. This system is simple and requires low maintenance. Water from this storage tank can be easily used in the boiler as it is pure and will not severely impact the boiler operation.

The government school building used for water harvesting is supplied with warm water in the community kitchen of the school by waste heat recovery from flue gas.

This system will also supply treated mineralized water to the school students. After heating the milk, condensed steam will be re-circulated back to the boiler, and some water is bled off from it, which after cooling and addition of minerals lacking in that area, can be used for drinking.

Further, burning biomass for steam production in the boiler will produce ash. This ash can be helpful in organic farming, e.g. for some of the vegetables like onions. Hence it is evident that this small-scale integrated system has many advantages.

5. Performance assessment of the proposed system

5.1 The case study

The case study involved a survey and data collection from a small village Gauspur Sarsouna which comes under the Samastipur district of Bihar, India (shown in Figure 5 and Figure 6). This village has the potential to grow but

lacks in access to technology. The data shown below in the Table1 is used to check the technical feasibility of the proposed system.

As explained above, an integrated multi-generation system has been proposed for rural areas. A case study has been carried out for the performance assessment of this proposed system. Results are presented below.



Figure 5. Rural area of Bihar, India



Figure 6. Google earth image of Gauspur Sarsouna, Bihar, India

Table 1. Statistical data of the village

State	Bihar
District	Samastipur
Village	Gauspur Sarsouna
Population	20,000
Households	4,000
Cattle	2,400
Average milk production	5 litres/cattle
Total milk production	12,000 litres/day

The proposed system is required to heat 6000 kg/hr of milk per hour in the heat exchanger for pasteurization, where 127 kg/hr of 1800C steam is needed. Further, for chilling the same milk through a steam jet refrigeration system, an additional 232 kg/hr of steam is required in the flash chamber of it. Flash chamber is an insulated container that separates liquids and vapour. Therefore bio-mass-driven boiler needs to produce a total of 456 kg/hr of steam, considering the losses that may occur in the boiler. Calculation of steam jet refrigeration system has been done considering its coefficient of performance as 0.5. Coefficient of performance is used to define the energy requirement of a system for achieving the desired output. The total cooling water needed in the condenser to complete the refrigeration process is 24507 kg/hr. This requirement is getting fulfilled using a bore-well, and subsequently, this water will be used for irrigation after getting it cooled through natural surface cooling in storage ponds.

During heating and storing milk at a low temperature, stainless steel (SS316) was selected as the material for the tank and piping so that it would not react with milk. Biomass generally has a calorific value of 15- 22 MJ/kg. Here the agricultural waste that is available for biomass production is having average calorific value of 17.5 MJ/kg, and 135 kg/hr of this biomass is required to burn, assuming boiler efficiency as 80 %. Flue gas or exhaust gas released through the chimney of the boiler is generally at a higher temperature of about 1400C. By passing it through a heat recovery system, 10 % of energy can be recovered from it, which has been utilized to heat the water, and this warm water at a temperature of 440C is supplied to the community kitchen of the government school.

This government school building has a rooftop area of 1780m^2 . Assuming annual rainfall in this village as 1186 mm and considering all other factors, it has been estimated that a total of 13.51×10^5 L of rainwater can be harvested.

Table 2. Inputs and outputs of the Integrated System

Inputs	Outputs
Raw milk = 12000 litres/day	Pasteurized milk = 12000 litres/day
Waste biomass burned = 135 kg/hr	Ash generated = 6.75 kg/hr
Rainwater harvested water = 13.51×10^5 litres/annum	Treated drinking water = 30 kg/hr
Bore-well water = 22507 kg/hr	Warm water in the community kitchen = 132 kg/hr

After a complete assessment of the proposed integrated system, following outputs are obtained as presented in Table 2 for the given inputs. On average, 6,000 litres of milk can be pasteurized per hour from the system and 12,000 litres daily. Also, 6.75 kg of ash will be produced per hour from the system, considering that 5% of the biomass will get converted into ash. 30 kilograms per hour of water for drinking and 132 kg per hour of warm water for the community kitchen can also be obtained from the system.

5.2 Cost analysis

It is essential to analyse the cost involved in the proposed system to determine its economic feasibility. In Table 3, costs of various equipment used in the integrated multi-generation system is shown. With the help of this table, payback period of the system has been estimated.

Table 3. Cost of various equipment of the system in Indian Rupees

Rainwater storage system	12,00,000
Biomass- driven boiler and auxiliaries	10,00,000
Steam jet refrigeration system and its auxiliaries	6,00,000
Heat exchanger	6,00,000
Auxiliary equipment (e.g. pumps etc.)	3,00,000
Set-up installation cost	5,00,000
Approximate total cost of proposed system	42,00,000

Including all the expenses, the profit per litre of pasteurized milk is assumed as Rs. 5. Therefore total profit made per day is Rs. 60,000.

$$\begin{aligned}
 \text{Payback period} &= \frac{\text{Investment}}{\text{Profit}} \\
 &= \frac{4200000}{60000} \\
 &\approx 70 \text{ days.}
 \end{aligned}$$

Taking into account the uncertainties in cost estimates, it is evident from the above result that payback period for the proposed integrated system is less than six months.

Conclusions and future scope

In this rural development study, a small village, Gauspur Sarsouna, in the Samastipur district of Bihar, India, has been selected. Based on technical analysis of the proposed integrated system for this village, following conclusions are derived.

Through an integrated small-scale multi-generation system, milk pasteurization is feasible using a biomass-driven boiler, and for chilling of milk, a steam jet refrigeration system is found as a suitable option. From this system, mineralized water can be produced and supplied to school students, which will improve their health conditions. Warm water obtained through the waste heat recovery of flue gas can be used in the government school's community kitchen for cleaning utensils. For irrigation of nearby agricultural land, water stored in the irrigation pond is used after it gets cooled by natural cooling through surface evaporation. There is a scope of examining the feasibility of steam operated absorption chillers in place of the steam jet refrigeration system, and solar heat can be an alternative to biomass. This system can also be utilized as a cold storage for vegetables and fruits, when there is no need for milk pasteurization.

This multi-generation system will run entirely on renewable energy resources available locally, i.e., waste biomass, which is carbon neutral, meeting the affordable and clean energy and climate action related Sustainable Development Goals. Installation of this system can help in generating more income for farmers. The payback period has been estimated to be less than six months. An additional income for farmers will help in achieving “No Poverty” goal is also met. It will fulfil the clean water and sanitation goals by supplying drinking water to school students. In addition, good health and overall wellbeing of rural people are also made possible through this system. Therefore looking at the multiple benefits of this integrated system, it can be concluded that this may be one of the steps toward achieving sustainable development goals through rural development by 2030.

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INVISIBLE CONSTITUTION AS AN INSTRUMENT OF CONSOLIDATION OF NATION AND DEFENCE OF DEMOCRACY

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Abstract. The paper's premise is that the invisible Constitution serves as an instrument to protect democracy and consolidate the nation. The discussion turns around the fundamental aspects of democracy and sovereignty to reveal the subject. The question which is particularly considered is how the Parliament and the Constitutional Court participate in the expression of the principles of democracy in the contemporary world. The paper concludes that the Parliament, through the formal legislative procedures, becomes less capable of achieving a social compromise. As a result, the same representative feature of democracy becomes more unpopular in society and continues to be a prevailing object of criticism among scholarly community. In contrast, the Constitutional Court's role in protecting democracy through the systematic interpretation of a constitution undergoes a profound change in the democratic world. Constitutional Court, through the understanding of both visible and invisible meaning of the Constitution turns it into an expression of the sovereign will of the permanent nation.

Keywords: invisible Constitution; democracy; the Parliament; the Constitutional Court; the sovereign

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Introduction

This paper explores the invisible Constitution as an instrument of consolidation of a nation and protection of democracy. More precisely, the paper analyses the role of the Parliament and the Constitutional Court in revealing the potential of the invisible Constitution. The paper also discusses whether a representative sort of democracy is still valuable in expressing the will of a sovereign written in the principles of an invisible constitution. Invisible Constitution is not so much about the new unwritten Constitution but rather about the systematic interpretation of the principles enshrined in the text of the Constitution and the demonstration of their new entities. Understanding the principles of democracy and their systematic interpretation with the "eternal satellites" – the rule of law and human rights.

Parliament, in the form of laws, has a mission to express the common will of the nation. However, it is possible that the political law issued in the Parliament tends to describe not the needs of society or the will of the country but interests of the governing groups. Regarding whether the Parliament can achieve a social compromise, it is necessary to discuss not solely whether the Parliament, in the form of laws, expresses the will of the nation. It is equally important whether the will of the legislator is discoverable in the labyrinths of procedural legislation. Whether the interests of the country are fully represented? Or instead, the interests of small groups receive attention, and the whole idea of representative democracy remains nothing but fiction. How openly are the parliament laws voted according to the procedural rules? By taking Lithuanian example, all these questions are discussed in Chapter 1.

Regarding the Constitutional Court, the question is whether and how this institution in the name of the Constitution, can promote democracy. One other opportunity to be a guarantor of democracy is to consider the political power appropriately, trying to extend the number of terms for the same person to serve as the President. Even if such textual amendments were offered, the Constitutional Court is often capable to nullify such initiatives grounding the arguments on the invisible Constitution. Based on comparative analysis, Chapter 2 of the paper considers this question by considering several practical cases from the experience of various countries, particularly Eastern European countries.

Constitutionalism as a legal paradigm in the West gave a second chance for the representative democracy to keep operating as the main sort of democracy. However, it is very likely that representative feature of democracy gives more than plenty of opportunities to be criticized or even discuss its transformation into another sort of democracy. It seems representative democracy is more about a state's institutions' institutional system than a society. If to look back to the Western legal and political roots, for instance, to the Declaration of the Rights of the Man and the Citizen (1789), article 16 announced firmly that: "Any society in which no provision is made for guaranteeing human rights or for the separation of powers, has no Constitution". Emphasis should be made on the words "any society". The logic of the term "any society" implies that society and not a representative democratic state, which depends on the temporal government changing every four years, is tied to the law.

1. Democracy and the Parliament: in search of a Social Compromise

Criticism of the law in the sense of legal technique was already known in Antiquity. Influenced by the worldview of individualism in the Renaissance era, when the Parliament law dissociated itself from the law, the Parliament law faced various problems, including the question of legitimacy and so on, leading to a crisis at the end of the 19th century (Bécan & Couderc, 1994). The ideological causes of this crisis can be attributed to the "sacralization" of the Parliament law (Favoreau, 2001). Since 1789 and throughout the 19th century and the beginning of the 20th century, J. Rousseau's claim that the Parliament law was infallible, which was hardly disputed by almost anyone, prevailed. The rule of law is the rule of Parliament law: the concept of legality coincides with the idea of legality, that is, with the conformity of the activities of public authorities or private individuals with the laws passed by Parliament (Rousseau, 1966). The law is increasingly being equated with the Parliament law. However, according to H. Kelsen (2002), if all Parliament laws are recognized as law, lawfulness is equated with legality, and then it is no longer clear how the concept of legality can further be developed. Positive criticism is and has been a condition for improving the idea of Parliament law. The will of the legislator is also criticized for several reasons.

First, members of Parliament cannot discover it in parliamentary debates. Everyone expresses only their subjective opinion, and no one can claim to speak what is called the "spirit of the law" (Commaille, 1994).

Members of the Parliament are also not competent enough as only a few of them are lawyers*. Second, a huge group of individuals cannot engage in legislation effectively. Aristotle's thoughts on this issue are very relevant today: "The best system should consist of democracy and tyranny, which some would not consider system at all. Those who mix more [systems] are right because a multi-order system is better. The legal system seems to have no elements of a monarchy, only oligarchic and democratic, and is more inclined towards the *oligarchy*." (Aristotelis, 1997). The features of the oligarchy become apparent when the laws express the interests of more robust, more influential groups. In this case, the representative democratic system is only a fiction, the actual name of which is the oligarchy. Third, the Parliament laws are created on anonymous procedures and are often characterized by false, incomplete and vague will, so jurisprudence and doctrine become the honest legislator, filling in the content of such laws (Bécan & Couderc, 1994). A concept governs doctrine: if it does not express the substantive features of the law, then the doctrine does not emphasize them but is directed to the description of standard features.

After the Second World War, criticism of the concept of Parliament law was supplemented by criticism of the legislative practice. Proponents of any legalism have supported the idea that the Parliament law will always find a way to improve until the possibility of creating new legislation and increasing the number of those laws is established through the adoption of various amendments or additions to the Parliament laws. However, such legislative practice inevitably violates the principles of legislation legal technique: stability, the generality of Parliament laws, their consistency and others. On the other hand, the development of democracy also causes legislation inflation, particularly in periods of social change. The abundance of adopted Parliament laws and their dynamic changes create instability in social processes and reduce the establishment and effectiveness of human rights and freedoms (Bécan & Couderc, 1994). Due to the abundance of Parliament laws, the Parliament law moved away from its essence as it became more notable than general; temporary, rather than stable; the Parliament law became not a rule expressing the law but means of government. Parliament law has evolved into a political law that represents not the needs of society but the will of the governing groups, which expresses the interests of the influence groups. In this way, the opposition of different social groups strengthens as the social order is destabilized because it is aimed at establishing a social compromise and a particular influence.

Through their empirical research, social sciences have confirmed the need for knowledge of the social reality of legislation. Due to the understanding of sociology, the public order is transposed into laws, which can no longer contradict the general social order and express the interests of only one or several influential groups (Holand, 1993). A sociological critique of legislative practice has opened up opportunities to improve the concept of modern Parliament law and the procedural requirements for enacting legislation. The controversy that began in the second half of the 20th century between E. Ehrlich, the founder of the sociology of law, and H. Kelsen, the author of *The Theory of Pure Law*, remains very relevant today and fuels the debate. The summaries of these discussions emphasize that the Parliament law must meet not only formal but also substantive criteria (Mader, 1985). According to Hegel, "in the image of legislation <...>, it is important not only to recognize that the Parliament law is a binding rule of conduct for all but more important is the essential inner moment - to perceive the content in the universality it defines" (Hegel, 2000). Consequently, Parliament laws must express the essence of law in their content. The aim is to return to the law concept and develop it.

Procedural legislation and expectations of the nation

Article 69 of the Constitution of the Republic of Lithuania, which provides that laws shall be adopted by a majority of votes of the members of the Seimas (Parliament of the Republic of Lithuania, n.d.) present at the sitting does not provide for the minimum necessary number of participants in the sitting of the Seimas. This is not

* After at least one term in the Parliament, members already consider themselves lawyers because they know how laws come into being and what is written in them. However, they are only legists because they do not understand what the law should be, what the requirements of its content should be and what should be possible directions for improving the law.

detailed in the Statute of the Seimas or other laws of the Republic of Lithuania. Therefore the Seimas is granted a privilege that relieves the members of the Seimas from the obligation to participate in the sittings of the Seimas. Laws (albeit conditionally) are adopted only by a small group of members of Seimas; members of Seimas are not universally obliged or mobilized to participate in the sittings; therefore, draft laws are not discussed in principle; they are only superficially "baked". Parliament laws and decisions adopted by the Seimas are only partially approved. Therefore we cannot even talk about just representing people's interests, coordination and social compromise.

In this case, compromising the interests of the people is impossible. Consequently, the rules of the legislative process criticized by us (especially the absence of the minimum required limit for the number of members of the Seimas present in a legislative sitting) contradict the essential feature of the Parliament law that - the Parliament law expresses a social compromise of different public interests. The Council of Europe emphasized the importance of social compromise in its recommendations, proposing methods and principles for the development of legal norms. The Council of Europe's Methodology emphasizes that "laws will be fair if they reflect the solidarity of society" (Conseil de l'Europe/Principes et méthodes d'élaboration des normes juridiques, Strasbourg, 1983, p. 20), i.e. a social compromise. A social settlement is not possible if only a small group of members of Seimas participates in the sitting, as it cannot correctly represent broad interests. Only the parties interested participate, and no other opinion is presented, defended or expressed. Therefore, the interests of the people are not adequately represented and the interests discussed in the Seimas are not opposed. Opposing interests cannot be reconciled and compromised because they are not fully defined. Without a balance of interests, we cannot talk about a compromise of claims because it does not exist. To eliminate this objection, it is first necessary to oblige the members of the Seimas to participate in the legislative sittings when adopting common Parliament laws or other decisions of the Seimas regarding draft laws. Sittings should be held with the minimum necessary threshold of Seimas members participating in the sitting, of course, no less than 2/3 of the total Seimas members (because social compromise requires all representatives of the nation, and in practice, no less than half of the representatives of the nation).

In many countries, parliaments vote openly. There are exceptions, such as in Italy, where parliamentarians vote secretly on a bill (Luchaire, 1989). However, this is not a general but a particular rule. Such a vote allows to identify each Member of Parliament and check if his words meet his actions. This is done in different ways: voting can be done by clearly saying "yes" or "no"; in some cases, voting is done by tacit behaviour - raising one's left or right hand, standing up or staying seated, entering or leaving, etc. Nowadays, the traditional methods of voting mentioned above are often abandoned, and electronic voting is chosen by pressing the appropriate button. The results of such a poll are automatically calculated and displayed on the boardroom table. The advantages of open voting are that the voting procedure is visible, voters are identified, and results are quickly published.

The Seimas in Lithuania holds open votes on issues discussed at the sittings of the Seimas, except in cases when the Speaker of the Seimas, his deputies and the Chancellor of the Seimas are elected, mistrust in the Government, Prime Minister or particular Minister, Seimas official is decided, a head of public institution appointed by Seimas is being let go, as well as when voting on the wording of the charges during impeachment proceedings. Voting is also done by secret ballot when the question of the appointment of judges of the Constitutional Court is decided. Lastly, if the Seimas chooses, there may be a secret ballot on other personnel questions as well (see Articles 111 and 115 of the Statute of the Seimas, Statute of the Seimas of the Republic of Lithuania, 1998 December 22).

When voting in other Parliaments around the world, decisions are made based on a double quorum: first, the quorum of the participants and, second, the quorum of the votes cast. In many countries, a quorum is recorded in the presence of half of all members of Parliament. However, in many countries, the quorum is significantly higher than half of all members. As mentioned above, there is no quorum of participants in the Republic of Lithuania to adopt ordinary Parliament laws. Therefore it is emphasized once again that this absence of a procedural

requirement cannot ensure the function of expression and implementation of the social compromise of the law. Article 159 of the Statute of the Seimas states that a bill is rejected if it does not receive the required votes. The "required" number of votes, in the absence of a mandatory quorum, can vary widely and is different on a case-by-case basis. The lack of the quorum requirement is very convenient for the legislature as it is relieved of its duty to the groups it represents and, at the same time, to the nation.

On the other hand, parliamentary political responsibility is masked because voters can't know which groups are responsible for a particular law or its numerous amendments; they usually blame the Parliament as a whole or the government or party in power. Therefore, in the consequent elections, the voters are unable to properly grasp the relations between the political forces and vote in favour of the most vivid electoral programs, often in favor of a new party or political power that has not yet been in power and responsibility wise is neutral to the previously passed Parliament laws, i.e. is not to blame for the current state of affairs. And, naturally, Parliament laws passed by a small part of the members of Seimas will never meet the expectations of the nation because they will not create a general compromise. When Parliament laws are passed only by a small group of members in Seimas, the author of that law becomes unclear.

2. The Constitutional Court as the Last Bastion in Saving a Democracy: A Comparative analysis

The Constitutional Court seems the most remote to be perceived as the embodiment of democracy among all governmental institutions. A body non-legitimized by the nation, which often opposes drastic reforms in the socio-economic field. The question is whether it can be treated as a guarantor of democracy. Aharon Barak, one of the most prominent constitutionalists and Supreme Court judges, formalized the role of constitutional judges as defenders of democracy through the prism of the traditional, modern constitutional justice concept of democratic values. According to A. Barak, the Court should be their guardian alongside the democracy (Barak, 2006). This traditional "gentleman's" set includes "the rule of law, judicial independence, human rights, and basic principles that reflect yet other values such as morality and justice, social objectives such as public peace and security, and appropriate ways of behaviour (reasonableness, good faith)" (Barak, 2006). Although such approach is reasonable, the constitutional courts are often mentioned in the context of the development of national democracy when the courts themselves face the dilemma of choosing between two principles of the constitutional order – democracy and the rule of law.

The question that needs to be answered is what the bodies of constitutional control protect in the real world and whether they can promote democracy. To provide an answer, the paper considers the most obvious situation for such confrontation: the abolition of constitutional restrictions on the number of terms for the same person to serve as the President.

On March 10, 2020, Valentina Tereshkova, the State Duma (Russian Parliament) deputy and former cosmonaut, unexpectedly suggested an amendment of the Constitution gives a chance for the President to run for the presidency for more than two constitutional terms. She argued that citizens fear what will happen after 2024, when Putin's term expires, so they (voters) should be given the right to decide for themselves and be allowed to leave Putin for another (or two) terms. President Putin supported the initiative, saying that a fundamental condition for its implementation in the text of the fundamental law should be the official conclusion of the Constitutional Court that "such an amendment will not contradict the principles and basic provisions of the Constitution" (The State Duma, 2020). The "spiciness" of the situation lies in the fact that Putin himself proposed to clarify the "restrictive" provision in the Constitution, setting restrictions on one person to be the head of state for not just two consecutive terms but for two terms in general. And such a proposal was included in the draft constitutional amendments.

The response of the Russian Constitutional Court was entirely expected. Examining this novelty for compliance with the principles of the constitutional order, the Court found that it faced the question of choosing a balance between such constitutional values as a democratic law-governed state, on the one hand, and sovereignty of the people, on the other (the latter, by the way, concerns the possibility for the people to choose freely a person it deems necessary). The Court did not find any violations of the constitutional order in such an ad hoc exception because, firstly, the people have yet to vote for such an amendment. Secondly, the abstract person will have the right to go beyond the standard two terms only "if s/he receives support as a result of the declaration of will of the people of the Russian Federation".

The Court also had to "balance" within its official constitutional doctrine, as in 1998, it was asked whether then President Boris Yeltsin, who was first elected before the 1993 Constitution adoption, would have the right to run for the presidency for the third (by actual count) term. The Court then acted as both a "court of law" and a "court of fact", citing actual political events, such as statements and actions by officials (including B. Yeltsin himself), who testified that both voters and election administration bodies, and the head of state himself, perceived Yeltsin's election in 1996 as the second term, not the first, under the 1993 Constitution. Consequently, there is no need to explain anything further, as the issue is clear, and Yeltsin has already exercised his right to be twice-elected President (Laws, codes and regulatory legal acts of the Russian Federation, 1998).

In 2020, the constitutional review body, formally without departing from previously developed legal positions, determined that it operates within the official constitutional doctrine, as the situation in 2000 is radically different from the situation in 1998 because this time, a special "Putin's" amendment is proposed to the Constitution (Rossiyskaya Gazeta, 2000). Thus, the Court chose the latter, choosing between the law-governed state and the sovereignty of the people.

The President of neighbouring Ukraine Leonid Kuchma once wrote a book, "Ukraine is not Russia". And in many respects, he was right because of the development of democratic processes in Ukraine, but he was wrong on one point. At the end of his second term, his administration devised a plan to extend his tenure, which also consisted of a formal interpretation of the constitutional provision restricting the presidency by one person for more than two consecutive terms. The Constitutional Court of Ukraine was asked, whether the restriction applied to a person who was first elected before the adoption of the Constitution in 1996. The Court concluded that the current Constitution, like any other legal act, cannot have a retroactive effect, and since the Constitution does not provide for the retroactive effect of the two-term restriction, there is no reason to restrict in this way the passive suffrage of a person elected before the entry of the Constitution into force (Ofitsiyni visnyk Ukrainy, 2003).

The situation with the third term of Croatian President Franjo Tudjman, who in 1997 was allowed to be re-elected by the country's Constitutional Court for the third time (Decision of June 11, 1997), stands somewhat aside in this cohort of "interesting" cases. However, in this case, compared to the previous case, there were a few fundamental exceptions. Firstly, when F. Tudjman was initially elected as President, Croatia was still part of the Federal State of Yugoslavia (SFRY). Secondly, the procedure for electing the President changed: F. Tudjman was elected by the Parliament for the first term and by the general election for the second. And thirdly, his first presidential term was shortened and was essentially transitional to the first direct Croatian presidential election since Croatia's independence in 1992.

Returning to the general trends in the protection of the illusory right to re-election for an indefinite number of times, it is necessary to expand the geography of analysis. So, the 2020 presidential election in Ivory Coast was not without scandals and fierce opposition (DW.COM, 2020). The country's Constitutional Council has allowed incumbent President Alassane Ouattara, who has twice headed the country, to participate in the election, using the following arguments to justify its position. Firstly, after the election for a second term, the country adopted a new Constitution in 2016, which was not a revision of the previous one, but became the basis for establishing a new

constitutional order in the form of the third republic. Secondly, the mentioned third republic represents a new system of power with the introduction of the position of vice-president, a bicameral structure of Parliament and a complete overhaul of the judiciary. Thus, the Council saw in such circumstances the emergence of a new representative mandate for the President, which in constitutional terms differed significantly from the previous two. And thirdly, the constitutional review body analyzed the facts of the 2016 constitutional referendum, namely the public statements of supporters and opponents of the new fundamental law that Alassane Ouattara would have the right to run for the presidency again in such circumstances (Conseil-constitutionnel.ci, 2020).

The Constitutional Court of Zambia used a different logic when it allowed President Edgar Lungu to run for the presidency for the third time in 2021. Edgar Lungu held the presidency for the first time in the pre-term election following the death of the previous head of state. The peculiarity of the electoral cycles under the constitutional system of Zambia is that the head of state is elected in the pre-term election only for the term remaining from the entire duration of office of the President. Their powers were terminated ahead of time. This is precisely the rule applied when Edgar Lungu was elected. He held office for a year and was re-elected for a full five-year term (followed by an amendment to the Constitution, including settling the issues of the President's term in office). As noted earlier, the Court, allowing Edgar Lungu to run for the presidency for the third term, recognized that the constitutional provision limiting the term of office of one person should be interpreted systematically, including the provision on early elections using the term "unexpired term" (Judiciaryzambia.com, 2018).

Perhaps the first in a series of indicative cases of restrictions on the presidency is the situation challenging establishing an absolute ban on re-election in the Constitution of Costa Rica. In 2003, the Constitutional Chamber of the Supreme Court, in the second attempt, succeeded in repealing the 1969 constitutional amendments that prohibited the re-election of a person to the presidency. The Court ruled that this violated the right to be elected, which is enshrined in the fundamental law, and, therefore a fundamental right (Martínez-Barahona, 2012).

Judges of the Venezuelan and Ecuadorian Constitutional Courts, as well as their Russian counterparts, in determining the constitutionality of the limitation on the number of terms of office for one person, ruled that under no circumstances should the people's right to elect a president and, accordingly, a specific program of political development of the country be restricted. The Nicaraguan Constitutional Court was not "original" in a similar case when in 2009, under rather strange circumstances, meeting at night and avoiding the participation of opposition-minded judges, pointed out that limiting the "presidential term" violates the principle of equality among candidates, especially of the former President Jose Daniel Ortega Saavedra to be re-elected, as well as the right of citizens to elect politicians of their choice. Similarly, the Bolivian Constitutional Tribunal supplemented its constitutional doctrine in 2017 (Landau, 2018).

Thus, there may be an illusion that in a situation of competition with constitutional values such as the sovereignty of the people and the rule of law, constitutional review bodies try to take a remarkably restrained position, not wanting to be criticized or pressured by the politicians or the public. However, in reality, there are opposite, somewhat favourable situations when courts, in search of a model of national constitutional identity, interfere with the whims of the current elite and do not allow the introduction of clearly unconstitutional changes to the Constitution.

The official constitutional doctrine of Colombia, developed by the local Constitutional Court, namely such a component of it as the doctrine of "replacement of the Constitution", can be an example. It has been used twice by the constitutional review body in cases of revision of restrictions on the re-election of the President. For the first time, it worked "in favour" of establishing the possibility of one-time re-election by setting a new limit at the constitutional level in two maximum terms (the situation concerned the current head of state Alvaro Uribe). The next time Uribe's supporters tried to "soften" the constitutional restriction from two to three possible terms, noting that these changes replaced such provisions of "identity of the Constitution" as separation of powers and the

democratic nature of the Constitution and were therefore unacceptable (Tashnet, 2016). In addition, the Court's argument that the President, who has held the post for eight years, has an advantage over rivals, which makes it much more difficult for an alternative to the incumbent head of state candidate to win, is noteworthy. In addition, the Court highlighted certain aspects of the constitutional scheme of public authority, which provides for inconsistencies during the tenure of a person as head of state and members of independent agencies (including the National Bank) who this person has nominated as a president. The latter factor is a separate guarantee of the autonomy of such structures. Therefore, if the term of office is extended for another 4-year term, the mentioned "cadence mismatch effect" will be eliminated (Cepeda Espinosa & Landau, 2017). The political context of the decision-making is important because, unlike many other Latin American leaders, A. Uribe won the second election as a political outsider with the support of an unstable majority in the Parliament, and therefore did not have such influence in politics as his other colleagues in the "presidential guild" (Landau, 2015).

It is important to note that among dictatorial regimes, trends on how to camouflage the preservation of power in an undemocratic way change periodically. Thus, over time, a new "constitutional initiative" to remove the head of state from another person instead of an autocratic leader by holding formally democratic elections when moving a dictator to a formally less important position of head of a Security Council or representative institution has emerged, which (position) becomes even more important than the presidential one.

Examples of the latter are the conditional transition in Kazakhstan, when former dictator Nazarbayev formally stepped down and resigned as chairman of the country's Security Council, changing the key position in security and law enforcement at the legislative level. And as we can see, the final imbalance of power has led to unrest in the country, which the new President Tokayev used to remove the clan of Nazarbayev from power (Official Website of The First President of The Republic of Kazakhstan - Elbasy Nursultan Nazarbayev. n.d.).

Most likely, another post-Soviet dictator Alexander Lukashenko will follow a somewhat similar path which, having held an unconstitutional referendum, amended the Basic Law, establishing an institution that has no analogues in other democracies at the constitutional level - the All-Belarusian People's Assembly. A body that is able to control not only the executive power but even the head of state himself. At the same time, this structure is knocked out of the general system of checks and balances since there are no levers of influence on it, neither the Parliament nor the judiciary (including the Constitutional Court, which has no right to check the constitutionality of the acts of these Assemblies), and therefore the head of these meetings simultaneously turns into a person with unlimited opportunities and limited terms of tenure (Zviadzda, n.d.). Who can potentially take this position, you do not have to guess.

The President of Turkmenistan Gurbanguly Berdimuhamedow also decided not to relinquish power, and by handing over the presidency to his son through formalized procedures portrayed as an election, he assumed the post of Speaker of the Upper House of Parliament with several hidden additional powers.

It is significant and regrettable at the same time that, compared to the cases on the abolition of restrictions on the stay of one person in the presidency, dictators are not even covered by the "constitutional veil" of formal compliance of the proposed reforms with constitutional principles.

To conclude the analysis of this issue, we should turn to the position of one of the most authoritative pan-European expert legal structures, which is a kind of a "tuning fork" for other jurisdictions – the Venice Commission. Its position in this aspect certainly deserves attention and is in fact, reduced to such key positions. Firstly, the right to re-election is not a fundamental right that cannot be equated with other fundamental rights (and it is hardly possible to speak of the status of such a possibility as the right). Similarly, the reference of some Latin American constitutional review bodies to international documents, which even standardize this right as a fundamental one, seems ungrounded.

Secondly, lifting restrictions on re-election may give the incumbent head of state a significant advantage in the next election and, in the long run, turn the country into a "republican monarchy". Thirdly, "term limits aim to protect democracy from becoming a de facto dictatorship. They also keep the opposition parties' hope of gaining power through institutionalized procedures, with little incentive to seize power in a coup. Term limits, therefore, aim to protect human rights, democracy and the rule of law, which are legitimate aims within the meaning of international standards." (Venice Commission. Council of Europe, 2018).

So, with this example, we tried to show that in our age of populism, the Constitutional Court can be the last bastion that will not allow democracy to self-destruct. Politicians such as Trump, Orban, and others have repeatedly called for unrestricted popular sovereignty to overcome the establishment's monopoly on power. By making decisions similar to the one mentioned by the Colombian Constitutional Court, constitutional review bodies can not only prevent usurpation of power, but also correct the mainstream in the ideological space, not allowing the forces that deny the rule of law as a value, equivalent to the constitutional order of democracy, to dominate.

3. Sovereign in the Representative Democracy

From the discussion above, the following preliminary conclusions come to mind. First, by passing the laws, the Parliament struggles to create a social compromise. Throughout the history of Western legal tradition, it is a well-known fact that the legislator, responsible for expressing the sovereign will, not rarely confused the will of the legislative organ and the sovereign will. For instance, under the III Republic of France, the essence of the principle that a law is an expression of the sovereign will be reconstructed into a thesis that a law is a sovereign will (Carre de Malberg, 1984). Later on, Eastern and Central European states followed such example. The second preliminary conclusion that can be derived from the pages above is that constitutional courts, as the specialized judicial organs responsible for constitutional justice, might be viewed as the last bastion in defence of democracy. The analysis of the role of the constitutional courts in the pivotal moments of democracy in some countries also showed that a test of democracy not always can be passed even in the constitutional courts. Sometimes the constitutional courts become a target of a political will and, later on, a representative of such a will, rather than remaining a mechanism aimed at announcing the sovereign will, written in the Constitution. Constitution, which is nothing but an instrument of consolidation of a nation.

The question often posed in the discussions regarding representative democracy is whether the legislative power truly and effectively represents the idea of sovereignty. More precisely, whether a representative sort of democracy can reveal the full potential of democracy itself, just to remind the concept of J. J. Rousseau: <...if there were the people of God, it would democratically rule itself. However, such a perfect rule never belongs to people...> (Rousseau, 1966). Many authors, who insisted on the impossibility of direct democracy in large European states, had taken this statement for granted as the point of departure to prove that the representative sort of democracy is inevitable. In the following pages, the aim is to discuss the possibilities of the transformation of representative democracy. Representative democracy, which in the XXI century seems to be in a state of disarray. The fact is that it could be transformed by means of law as democracy is nothing more or less than the rule of law. Supreme law, if to be precise. When comparing bad people with a state that produces excellent and bad laws, Aristotle noted that the state will not always follow the laws.

The discussion in the last pages of the paper revolves around several key ideas. Attention is paid to the Western concept of constitutionalism that ended the era of legicentrism and separated the will of the legislative organ and the will of the sovereign. Despite such a significant shift in the constitutional level, it seems that the representative clothes of democracy do not fit anymore, and another step in defending democracy is necessary to be made. The paper also considers the idea of transitioning from a representative democracy to a permanent one by stressing

that democracy needs to be linked not so much to the elections, the Parliament or the representatives but the rule of a supreme law and the doctrine of human rights. In other words, the aim of the mentioned transition might become promising under a condition if the meaning of the Constitution as a social contract remains the backbone of constitutional democracy. The discussion turns around the question of whether and how the transitional step could be accomplished and, if to be accomplished, how it could become more valuable in the consolidation of a nation and a defense of democracy itself.

3.1. Representative Democracy and the Concept of Constitutionalism

Sovereign will or the will of a nation in a democratic state might be expressed in two ways: directly or through the representatives in the Parliament. A representative democracy rather than the direct one is the most frequent in Europe, especially in Eastern and Central Europe. The referendums, where the nation directly decides the most important issues, are too rare to be named as an effective option to express the will of a nation. For example, in the thirty years, fifteen referendums were held in Lithuania (Voter page. n.d.). The legislative process is the most common way of expressing the sovereign will in a representative democracy. However, as it was stressed in this paper, the Parliament is neither successful in seeking a social compromise nor an effective guarantor. Philip Blacher went even further by doubting whether the legislative organ has always respected the most fundamental principles whereby citizens live in society (Blacher, 2001).

Legicentrism as a legal paradigm was based on the theory that the procedure of voting in the Parliament signifies an act of sovereignty. Further, a law voted by the Parliament expresses the will of a nation. Even more, a legislator's will coincides with a nation's will (Carre de Malberg, 1985). Such a legal tradition experienced a sharp change in 1985, when the Constitutional Council in France stated that law remains an expression of the general will only if it respects the Constitution (Judgment of Constitutional Council of the Republic of France of 23 August, 1985, Nr. 85-1970). One might argue that such a formula which came to be regarded as a turning point in a constitutional democracy in the XX century, does not sound newly. Hamilton, already in the XVIII century, said that the Constitution reveals the intentions of the people, and the statute issued in the Parliament expresses the intentions of the agents of a nation. As a result, Hamilton maintained that the Constitution should be preferred to the statute or any other act proceeding from the legislative body (Hamilton, 2001).

If to look at the Constitution of Lithuania, it is interesting to notice that in at least several textual instances the Constitution prescribes the judiciary and other institutions to obey a law voted in the Parliament. For instance, the article 109 of the Constitution states that when considering cases, judges obey only a law (Constitution of the Republic of Lithuania, Article 109). A law in Lithuania might be passed by the Parliament as the Parliament in Lithuania is the only institution having a right to pass such a legal act. Later on, the Constitutional Court of Lithuania clarified that the term 'obey only a law' means that the judiciary power and all the other state institutions must ground the decisions in accordance to a law voted in the Parliament and the law in general (Judgment of the Constitutional Court of the Republic of Lithuania of 11 May, 1999 No. 3/99-5/99). In other words, the rule of legal rules as the criteria to check the laws was strengthened by the rule of law. Thus, as a result of the institutionalization of constitutional control and its constant development, the theory of legicentrism in a slow pace has been removed by constitutionalism as a new legal paradigm in the Western side of Europe as well as Eastern one.

Under constitutionalism, the laws voted in the Parliament came to be controlled in the light of the Constitution as the supreme law to express the will of the nation. Democracy in its substance became not simply the rule of law, but the rule of supreme law. This considerable shift acknowledged that the will of the legislator might be incorrect and should be verified in the context of the Constitution. As a result of the introduction of the paradigm of constitutionalism into legal systems, such public law categories as sovereignty, the concept of Constitution, the

definition of a law voted in the Parliament or the constitutional idea of separation of powers have experienced a huge transformation in European law.

The concept of constitutionalism enabled clarification of the meaning of the sovereign will. The representatives, using voting the laws, certainly express the will of the actual (living) nation. However, the will of actual nation cannot be equated with the sovereign will. The sovereign will stem from the text of the Constitution. The constitutional creator creates the Constitution. Constitutional control is the mechanism to ensure that the laws voted in the Parliament are consistent with the Constitution. Thus, the legislative organ in the way of passing laws is not the only participant in expressing the sovereign will. As the laws have to be issued in accordance to the Constitution, the Constitutional Court is entitled to verify whether the legislator in the form of the laws respects the Constitution. By means of such control, the judge of the Constitutional Court speaks in the name of the sovereign and, in such a way, participates in expressing the sovereign will. Such a statement satisfied far from all constitutional experts. According to Dominique Rousseau, the Constitutional Court is not a representative of the nation: <...its mission is not without limits, and it is aimed at strengthening a political representation in the way of assuring respect to the Constitution...> (Rousseau, 1999). In contrast, Michel Troper agrees with the thesis that the Constitutional Court expresses the sovereign's will and makes an additional point. The Constitutional Court, according to him, in its mission, does not represent the same nation as the elected members of the Parliament do. According to M. Troper, the Parliament represents the actual nation, while the Constitutional Court represents a permanent nation (Troper, 1999), the will of which is written by an invisible Constitution. By such a representation, the Constitutional Court permits to separate the will of the legislator and the sovereign will be enshrined in the text and the content of the Constitution (Blacher, 2001).

The sovereign will, as it was already noticed, is expressed in the text of the Constitution. The sovereign agreed to express the will in the form of a constitutional text. In other words, a constitutional contract was signed by the sovereign. Constitution as a social contract binds a living and a future nation to live under the conditions written in the Constitution. Also, it binds a government not to violate a Constitution as a social contract. The nation decides on fundamental amendments of the Constitution. Here, the amendments of the Constitution of Ukraine, agreed in 2019 by the state actors, come to mind. It was decided then to add a provision into the Preamble of the Constitution in Ukraine. The identity of the Ukrainian people and geopolitical orientation was announced in the amended text of the Preamble in the following terms: <...confirming the European identity of the Ukrainian people and the irreversibility of the European and Euro-Atlantic course of Ukraine...> (The Constitution of Ukraine n.d.). Two aspects here need to be mentioned. On the one hand, a national security perspective implies that the geopolitical context surrounding the state of Ukraine is unpredictable and dangerous to such an extent that all measures must be taken inside the country to protect its sovereignty and independence. On the other hand, to regard the Constitution as a social contract expressing the sovereign's will, it is hardly permissible to decide a national identity and geopolitical course questions without consulting a nation in the referendum. The decision to make such an amendment by the agents of the sovereign returns the mind to the times when the concept of legicentrism prevailed in state politics and societal life.

Constitution as an agreement of a permanent validity is full of so-called 'majestic generalities'. All the principles and norms in the Constitution are general and abstract. This feature makes the Constitution visible as well as invisible. As a textual material, the Constitution is a visible document which can be read and explained according to the textual provisions. The richness of the inner side of the Constitution might be expressed in the process of legal interpretation. In such a way, the invisible Constitution turns into reality. In both forms, the Constitution as a social contract is grounded on fundamental values such as democracy, human rights, sovereignty, the rule of law, justice, separation of powers, etc. (Constitutional Court of the Republic of Lithuania of 11 July, 2014. Nr. 16/2014-29/2014). The constitutional project of the democratic state of Belarus was drafted by the Belarusian elite and European partners in November 2021 (The draft of the Constitution of the Republic of Belarus. New edition (25.11.2021)) divided the first part of the Constitution into the articles dedicated to the mentioned

fundamental values of a democracy. The articles on the fundamentals of democracy, separation of powers, and the rule of law find the place in the beginning of the Constitution, where these fundamentals are explained in an appropriate for democratic way. Such a textual picture leaves no doubt that this Constitution, in its visible as well as invisible sides, is aimed to consolidate a nation and defend democracy from any kind of authoritarian tendencies. In comparison, it allows one to read the Constitution of Lukashenka with fresh eyes and acknowledge that its invisible side is far more caricature than a document expressing the supreme law of the land.

As the sovereign will have been formulated over time, the constitutional courts have to analyze a bloc of constitutional texts to clarify the most fundamental constitutional values and express the sheer will of a permanent nation. For example, the Constitutional Court of Lithuania, in the recently published judgment, paid attention to the fact that the sovereign will is also expressed in pre-constitutional documents of Lithuania (Constitutional Court of the Republic of Lithuania of 30 July, 2020 No. 5/2019). The other three fundamental documents mentioned in the judgment of the Constitutional Court are viewed as the legal sources of the Constitution of 1992. As a result of such a statement, the Constitutional Court reminded us that the sovereign would begin with the year 1918. The Constitutional Court regarded all three historical documents as, above all, future constitutional documents. It was also declared that they could not be amended or abolished by any other Constitution. By expressing the sovereign will, the Constitutional Court also created a list of fundamental constitutional values (democracy, independence, geopolitical orientation and the natural sort of legal rights) that, according to the Court, cannot be changed or abolished under any circumstances. It is necessary to conclude that such a step reminds us that the Constitutional Court participates in representing not an actual nation but a permanent one. The will is written in many essential documents, full of visible and invisible values and principles.

Democracy, it is well known, is intertwined with the idea of the rule of law. The paradigm of constitutionalism added a new dimension to the concept of democracy by making it the rule of the supreme law. The Constitution in a state of democracy is an expression of the sovereign will, and the Constitutional Court is entitled to express it. The Constitution, as an expression of the sovereign will, is composed of the actual historical documents that need to be interpreted by the Constitutional Court to represent the permanent nation. In short, it is agreed that constitutional justice profoundly transformed the textual Constitution's classic theory. Moreover, it has changed the very concept of representative democracy itself.

3.2. From Representative to Permanent Democracy

Democracy means the rule of people. It is a living experience of people to whom sovereignty belongs (Pappas, 2008). The sovereignty can be represented directly by the people or indirectly through the representatives. The idea of representative democracy, which is most frequent in the West, lies in the agreement that the will of a nation (the sovereign will) has to be expressed in the Parliament by means of laws. Rousseau believed that the sovereign will is always right. However, the decisions whereby it could be guided are far from clear. As a result, the sovereign will require a guide to show the right path (Rousseau, 1966). From this point, the legislator's necessity, the nation's representative, was born.

As was discussed previously, the idea of representative democracy in the end of XX century in Western Europe and at the beginning of XXI century in Eastern and Central Europe has been transformed profoundly by the transition from the paradigm of legicentrism to constitutionalism. In the name of the constitutional creator, the Constitutional Court took control over the laws issued by the legislator (Blacher, 2001). The sovereign will, written in the constitutional documents, came to be regarded as criteria to verify the legislative process results. Therefore, the democracy with constitutional control and its representative quality was enriched. Now expected feature results in a dual manner: through an institution which permits representatives to vote a law (the Parliament) and through an institution that allows citizens to stand against a rule whereby the fundamental constitutional principles are violated (the Constitutional Court). Despite this shift in democracy, there are

suggestions to rethink a representative feature of democracy seriously. Dominique Rousseau has recently affirmed that democracy became a prisoner of the principle of representation. According to this line of thinking, representation does not produce democracy in any mechanical way, and, even more, representation as an element in relation to democracy should be replaced by the so-called "permanent democracy" (Rousseau, 2015).

Several authors participate in a discussion regarding the idea of permanent democracy. Before analyzing the meaning of it, direct democracy as a model deserves a word. The tradition of ruling in the form of referendums has no roots in Central and Eastern Europe. One could even say that the Brexit process needs to be reminded when someone wish to have more direct democracy on the Central and Eastern side of Europe. Regarding the perspectives of the direct democracy in the Eastern Europe, one good comparison, described recently, requires our attention: <...in the immediate aftermath of the Soviet collapse several independent Eastern European states found faking democracy perfectly natural since they had been faking communism for at least two decades before 1991...> (Krastev & Holmes, 2019). For instance, Belarus state is the most suitable example of fake democracy. As the project of new Constitution of Belarus ruled by Lukashenka announced, the sovereignty belongs to the nation which might be expressed directly and through the representatives (Art. 3). The President, the nation and two other subjects might initiate a referendum (Art. 74). From the first glance, all these provisions seem suitable for any democracy in the West. However, such a visible constitutional text of 2022 hides an invisible reality in the state, which has nothing in common with democracy, especially a direct one.

Returning to the discussion about a permanent democracy, Dominique Rousseau noted that the concept of permanent democracy (*one democratic continue*) is based on three principles: political, legal and sociological (Rousseau, 2015). Without going into details, it is necessary to note that our discussion is limited to the question of the ties democracy can establish with the nation or the sovereign. From the constitutional texts and public political statements, the representative system primarily refers to the nation and less to the society composed of individuals. Also, it seems that representative democracy is more about institutions institutional system of a state than a society. However, if to look back to the Western legal and political roots, for instance, in the Declaration of the Rights of the Man and the Citizen (1789), article 16 announced firmly that: "Any society in which no provision is made for guaranteeing human rights or for the separation of powers, has no Constitution". Emphasis should be made on the words "any society". The logic of the term "any society" implies that society and not a representative democratic state, which depends on the temporal government changing every four years, is tied with the law because of *ubis societas ibi jus*.

The Constitution, as the supreme law, affirms the principle of natural rights and freedoms; it announces the fundamental rights and freedoms of people and defines their limits. Also, that state organ is responsible for implementing the rule of the supreme law. In this regard, the Constitution is directly tied to society. According to D. Rousseau, the relation Constitution/society is ontological, and the relation Constitution/state is historical. Moreover, the latter belongs more to the past than to the future (Rousseau, 2015). Rousseau enumerates three areas where the concept of a state, as well as the representative aspect of democracy, became weaker: first, a state and the concept of its territory have less in common as people, money, pandemic diseases, all sort of information or everything else have no boundaries because of free movement and Internet; second, a state and its relation to the concept of nation is changing profoundly as a global movement of people made them more the citizens of the world than of a particular country, not to mention such modern ideas as e-citizenship and etc.; third, a state and the concept of sovereignty has changed because the state belongs to different international organizations, declarations, pacts, etc. (Rousseau, 2015).

In essence, all three points have a reasonable basis for stating that representative democracy needs to be rethought. Regarding the third mentioned area of weakness between a state and sovereignty, there is a need to illustrate by one example. In many significant cases, the Strasbourg court utilizes a particular interpretive method. European consensus as a legal interpretation method affirms a joint agreement on specific issues in Europe. In

such a subtle way, a particular country is pressured to comply and change a legal regulation inappropriate way. However, this method might cause not so much of a legal shift in a particular state. It might drive a fundamental transformation in questions belonging to the moral order of a specific state. However, this is an area protected by the invisible Constitution of a national state. European consensus became a key element in Strasbourg court's recognition of rights to homosexual sex (*Dudgeon v. the United Kingdom*, European Court of Human Rights, 22 October, 1981. No.: 7525/76), to same-sex relationship recognition (Law & Critique: Que(e)rying the ECHR's 'European Consensus', 2021) etc. If to apply such a verdict in a national state because a compromise, according to the Strasbourg court, exists in European law and society, the question that might be posed is whether representative democracy permits such a move. A move which might be totally different in relation to a tradition, culture and moral order rooted in a particular society. This example might illustrate that sovereign and the democratic state represented by an institutional mechanism can have totally different views of how society imagines its future in democracy. Permanent democracy is protected by Constitution as a will of the sovereign. More precisely, an invisible constitution is an instrument in the hands of the Constitutional Court to defend democracy and consolidate a nation.

Conclusions

1. The Constitution and democracy are often invisible. This is a reason why a question of the content of the Constitution is often being posed. The very process of revealing an invisible side of the Constitution as a body of fundamental values and of democracy as an expression, balance and implementation of those constitutional values is a necessary existential precondition. Furthermore, the process of revealing the invisible content of the Constitution and democracy should be treated as a primary condition and essential instrument to consolidate a nation and defend a permanent democracy.
2. The question of a guarantee of protection of the Constitution is one of the main actualities, which has several aspects. These aspects' essence lies in the Constitution's origins as a political and legal phenomenon. On the one hand, the Constitution consists of common guarantees of the democratic process. On the other hand, it is necessary to assure political and legal protection of the Constitution itself. That means the theoretical and practical essence of constitutional control is to protect the invulnerability of the Constitution and constitutional justice.
3. If to regard Constitution as a legal order both in a formal meaning (as the rule of legal rules issued in the Parliament) and in a material meaning (as the rule of law), then there is a possibility to speak about the Constitution which is indeed in force and plays a role in a state as a living instrument. Despite a declarative image of the Constitution, its meanings need to be revealed to transform an invisible Constitution into a visible one.
4. So the question arises, what are the mechanisms for protecting democracy through the mechanisms of the "invisible constitution"? As we tried to demonstrate, the "invisible constitution" is not so much about new unwritten constitutional principles but about the systematic interpretation of the principles enshrined in the text of the Basic Law, and the demonstration of their new entities. Thus, in the situation with the interpretation of the principles of democracy, their systematic interpretation with the "eternal satellites" - the rule of law and human rights - is critical.
5. Such a defender of a permanent democracy, the last bastion can only be the Constitutional Court or the body entrusted with its functions. However, much depends on how strong the institutional guarantees of the independence of this body are and how much it shares those liberal democratic values that are partly embedded in the texts of constitutions by their developers in countries that are only at the stage of electoral democracies and prone to slipping into dictatorship.

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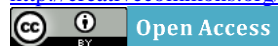
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ENHANCING SERVICE DELIVERY FOR METROPOLITAN MUNICIPALITIES IN SOUTH AFRICA VIA PROJECT MANAGEMENT

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Abstract. This study sought to explore the role of Project Management in enhancing service delivery for metropolitan municipalities. This study was conducted in each of the six metropolitan municipalities of South Africa, viz. eThekweni Metropolitan Municipality, the City of Cape Town, the City of Ekurhuleni, the Nelson Mandela Metropolitan Municipality, the City of Johannesburg, and the City of Tshwane. A qualitative and exploratory study was adopted using semi-structured interviews amongst a purposive sample of 60 respondents. The findings of this study showed that project managers lack Project Management credentials, which makes the implementation of projects at the Metropolitan Municipality level complex and demanding. The findings further revealed that some projects are encountering difficulties in project planning, quality management, monitoring and evaluation due to a lack of understanding and poor communication channels. These results were a highly intriguing breakthrough in understanding why Metropolitan municipalities fail to provide anticipated services. Thus, the proper execution and administration of the projects could result in a substantial improvement in the services that Metropolitan municipalities provide if municipal managers are equipped with the requisite Project Management theory and skills through training.

Keywords: Metropolitan municipality; local government; project managers; service delivery

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1. Introduction

The deterioration of municipal infrastructure is one of the myriad challenges that local governments have to overcome. Cities' infrastructure is in dire need of immediate repair, restoration or replacement. Thus, the essential infrastructure is degrading faster than anybody anticipated, and the cities are now unable to keep up with the rising demand for their services (Ntjatsane, 2017). The existing functional strategies in local governments are counterproductive to project efforts and are politically dominant (Parker, 2021). There is a lack of accountability and oversight, which cannot be achieved without separating the legal tasks, responsibilities and powers of

councils, mayors, executive committees and project managers. Today, many politicians and government officials are accused of acting out of greed and self-interest rather than in the spirit of self-sacrifice (Maloba, 2015). As a result, communities have been disgruntled with the local authorities' inadequate service delivery, which has led to regular demonstrations and service delivery protests over the level and quality of service delivery, leadership and lack of effective governance (Shai, 2017).

Local Government Agencies (LGAs) provide various services and goods to their constituents through executing a wide range of public works, health and safety, information technology, and other legally required projects and activities. These initiatives and activities are driven mainly by municipal ordinances, state legislation, federal restrictions and the organizations' commercial strategies. The public, elected officials, regulatory agencies and other government entities are the most critical stakeholders in LGA projects and initiatives (Khan and Morshed, 2012). The capability and capacity for productivity and service delivery are increased via projects. Therefore, the project method is important because it applies all management tenets more effectively than general management. Moreover, leadership is crucial in all sectors because it facilitates efficient policy-making, planning, organizing, leading, coordinating, directing and controlling, improving public service delivery and boosting private-sector output (Smith and Cronje, 2003; Fox and Meyer, 1995; Biljohn and Lues, 2019; Paes et al., 2021; Cetkovic et al., 2022).

Typical LGA project planning procedures and choices are often driven by stakeholder expectations rather than the opportunity to generate a profit. Project success is typically defined as meeting stakeholder requirements. To satisfy a portion of the Project's stakeholders, sponsors often drive the execution of the Project in haste and without extensive preparation. Some LGAs see systematic project planning as an expensive or superfluous phase, often reducing or removing the frequent application of all-encompassing Project Management techniques (Khan and Morshed, 2012). Local governments do not invest in Project Management systems, but instead, depend on consultants to provide project information that is easily understood. It is rare for municipal governments to purchase or employ project scheduling and cost software. National government Project Management is no better, and the provincial and national governments are responsible for the R70-billion infrastructure budget that was not spent by 2020 (Parker, 2021). Against this background, the current study sought to assess the role of Project Management in enhancing service delivery for Metropolitan municipalities.

2. Review of the Literature

2.1 Local Government in South Africa

The concept of "local government" refers to the practice of working with residents and organizations in the community to identify sustainable solutions to address the social, economic and material needs of the people in the community to improve the overall quality of their lives (Republic of South Africa, 1998). The preamble to the Constitution of South Africa has repercussions on South Africa's efforts to restructure its local government. As a result, the purpose of the Constitution is to advance democratic principles such as social justice and basic rights, as well as to improve the quality of life for all members of society as a whole. To accomplish these objectives, the structure of the government is essential. Therefore, local governments in their current form need to be converted into development-oriented governments capable of meeting and satisfying the needs and wishes of the people (Moosa, 2018; Rogerson, 2014).

Municipal Administration is likewise a broad topic of study with several sub-fields. Water, healthcare and housing are just a few municipal services that must be provided to a town (Craythorn 2006). Administrative management encompasses both local government and public administration. Therefore, principles of Public Administration also apply to local government administration, service delivery and management. As a result, it

may be concluded that the national, provincial and local realms of government must co-operate to accomplish public aims effectively. Local governments have several powers, with economic concerns being the most significant. Due to limited resources, the economic activities of local governments do not include direct engagement in the operations of specific businesses. They entail the management of economic processes within a certain region (Sebola, 2015; De Visser, 2009). The formation of a particular local economic policy is a plan for the community's economic growth and the definition of local economic policy. Important facets of the local economy include structural, investment, business and financial policy. In addition, it is vital to recognize that the municipal economy is interdependent on the public and private sectors of the economy. Egorov (2012) maintains that municipal economics is most evident in creating and executing the municipality's development strategy, providing services to the people, and social protection.

2.2 Project Management in Public Administration

Over many decades, contractors hailing from the private sector, whose primary motivation was the pursuit of financial gain, handled the management of projects in the public sector. Consequently, contractors would make compromises and choices that went along with them only to support their desire to earn a profit. However, this is no longer the case because rather than relying on external contractors, many organizations nowadays are gaining expertise in Project Management and managing their projects with internal staff members (Kerzner, 2013).

The management of projects has emerged as an essential component of the programme management of many businesses. As a result, the Project has become an integral component of contemporary organization (Van der Waladt, 2009). However, Project Portfolio Management competence at the Project Management office relies on the relationship between strategic governance at the highest level and operational Project Management capabilities. Senior management must give valuable direction and strategies and make intelligent, important choices whilst ensuring that the business has sufficient Project Management capabilities. Thus, municipalities must have Project Management methodologies for planning, communication, knowledge management and resource management, as well as expertise to support Project Portfolio Management activities. Information created at the project level is the foundation for Project Portfolio Management choices, which is why Project Portfolio Management will only be as effective as the organizational capacity for Project Management (Hill, 2013).

Van der Waladt (2014) adds that related planning tools and frameworks, such as the Provincial Growth and Development Plan; the Integrated Waste Management Plan; the Environmental Management Framework; the Spatial Development Framework; and the Capital Investment Programme, should be used to inform municipal infrastructure development projects. This material should avail opportunities for the community and other interested parties to give feedback on the prioritization of infrastructure projects in the form of the five-year Infrastructure Capital Plan. Therefore, Project Management is essential to implementing IDP and SDBIP, and supports a municipality's responsibility to provide services and encourage community involvement.

2.3 The necessity for Project Management in municipalities

Today, projects are seen as happening every day in all municipal areas. There is enough evidence to show that Project Management effectively improves and delivers services in municipalities. Thus, good Project Management could turn political promises into projects that provide services to help improve society. Municipal projects can be roughly divided into institutional, developmental and infrastructural projects. *Institutional* projects focus on the internal organization of the municipality to strengthen its capacity. *Developmental* projects focus on community development, with strong and firm development plans. *Infrastructural* projects entail things like building roads and getting water to people. Even though the primary goal of municipalities is to help the community, most decisions in municipalities are made through the political process. Most decisions are not just based on logic. Politics, stakeholder dynamics, and ideology are also affected (Van der Waladt, 2010).

In some cases, public projects are left unfinished, or a sub-standard level of service is provided to the general populace. For example, tarred roads are not always finished; even when they are, they are not of a high enough grade to be considered satisfactory. If such projects are not completed, it would negatively impact the citizens' welfare and result in a loss of billions of rands. It has come to light that the severity of these failures varies not only within the country but also from one region to another, contributing to national and global inequality (Bobby Banerjee, 2014).

The purpose of Project Management is to predict or forecast as many potential risks and difficulties as is practical, as well as to plan, organize and control activities so that the Project may be completed as successfully as possible despite the risks and obstacles. Project Management begins before the commitment of any resources and continues until the task is completed. A project aims to provide outcomes that meet the performance and quality requirements of the project customer within the agreed-upon time frame and without exceeding the allocated amount of money and other resources (Knipe and Nell, 2002). The need for Project Management is necessitated by the fact that ordinary tasks cannot create advantages, and the anticipated rewards of completing the Project greatly exceed the risk. Project Management is the method for managing projects and effecting change. Furthermore, Project Management is necessary to transition from a particular or present condition to the intended one. Lock (1996) maintains that it gives the capabilities for successfully and efficiently leading, defining, planning, organizing, concluding and managing a project.

2.4 Project Life-cycle

The project cycle is a mechanism for guiding all initiatives that may be eligible for funding. Like all human endeavours, the project process is prone to change, growth and decline, regardless of how well-defined the ultimate results are (Kotze, 1997). In this study, attention is given to some key aspects of the project life-cycle, viz., project initiation, planning, execution and project closure.

2.4.1 Project Initiation

As the name suggests, the initial phase of the Project Management life-cycle is known as the project initiation phase, and its purpose is to begin a brand new project. During the phase known as "initiation," a business issue or opportunity is recognized, a solution is outlined, a project is established, and a project team is selected to construct and deliver the answer to the end-user. The issue or opportunity is defined in-depth, and a preferable solution to the problem is determined to prepare a business case for its execution (Barron & Barron, 2022). Similarly, another school of thought suggests that the Project's success is primarily influenced by the origination and initiation phase, during which essential choices are made on the Project's goals and execution strategy. The authors concluded that not only does the production of official design and planning documentation significantly contribute to the success of the Project in meeting its timeline and financial objectives, but it also significantly boosts the benefits that customers derive from the end product (Dvir et al., 1999).

In managing increasingly complicated projects and the pressure, public organizations are under to produce practical projects, establishing a Project Management Office within public sector organizations may be pretty beneficial. The next issue is organizing a Project Management office inside an organizational structure. Regardless of where the office is deployed, it may impact Knowledge Management and Project Management processes. Its location would also impact managerial, information and resource sharing gaps across various organizational elements. There is also a concern that the installation of Project Management offices and their work will be hampered by a lack of Project Management maturity (Monteiro, Santos, V. and Varajão, 2016).

2.4.2 Project Planning

Modern Project Management emphasizes the importance of planning. Professional standards, such as the PMI Guide to the Project Management Body of Knowledge, emphasize the need to implement Project Management processes and procedures. Planning is thought to lessen project uncertainty and raise the chance of its success.

Project managers are encouraged to assume that even while preparation does not ensure project success, a lack of planning will likely lead to failure. Even if a project fails, there is still some degree of practice in the rise of computerized planning tools and the emergence of Project Management training (Dvir, Raz and Shenhar, 2003). According to Van der Waladt (2014), projects often come from a municipality's top-level Service Delivery Budget and Implementation Plan (henceforth SDBIP) and its Integrated Development Plan (henceforth, IDP). The creation and implementation of projects that re-align these plans are therefore mandated and the responsibility of each municipal agency. The Municipal Infrastructure Grant (hereinafter, MIG) should be implemented to provide certain infrastructure-related services. Hence, the infrastructure directorate should ensure that this is so.

2.4.3 Project Execution

The project phase, known as execution, is when the bulk of the work gets done. During this phase, tasks such as the implementation of the planning document, as outlined in the work breakdown structure (WBS), as well as the budget and the Gantt chart, are carried out (work schedule). Notably, the team is responsible for monitoring and supervising the Project and providing periodic reports on its progress and status to the governing bodies of the Project. These entities include the steering committee, the project sponsor and the management office. Political oversight of municipal projects is necessary within the context of local government to ensure that the administration is held accountable for the expenditure of the Project's budget and any additional resources that have been allocated (Van der Waladt, 2019). Executing the Project seeks to create favourable conditions for social and economic development; promote investment activity; and draw in new investors, all of which contribute to the municipality's expansion. Good leadership is vital in both the social and economic spheres. Project Management should be focused on resolving any challenges that arise when a project execution approach has to be changed. Thus, Project Management is more adaptable than traditional management, prioritizing stability and sticking to the plan regardless of outside factors (Safonova & Anchirov, 2015).

2.4.4 Project Closure

Four distinct methods may be used to conclude an ongoing project: extinction, addition, integration and starvation. Extinction as a method of project termination indicates that all of the Project's objectives were successfully met. A project may also be completed in one of two ways: either by adding it to the organization (which is called an addition), or by allocating its resources (equipment, staff and functions) across the company (integration). Cutting off resources or finances is one way to end undertakings that have been unsuccessful or have become outdated (starvation) (Dvir, 2005). However, in practice, the project closing method comprises two procedures: "commissioning project deliverables and documenting all project experiences" (Gardiner, 2005). After all of the Project's tasks have been finished and the customer has accepted the final product, it is required to conduct an assessment to highlight the Project's successes and/or learn from the Project's previous experiences. Yet, these are the more conventional aspects of a project. Projects and the methods for managing projects differ from industry to industry. However, they are still components of a project. The ultimate objective is often to assist the business by providing a product, altering a process or finding a solution to a problem (Jarrin, 2016). According to Havila et al. (2013), there is a requirement for Project ending competence, which can be defined as the capacity and skills of the organization and its employees to bring an end to the Project in a way that causes the least amount of damage possible to both the company's internal and external project stakeholders and the company's relations with other organizations.

3. Methodology

This study was conducted in all six of South Africa's Metropolitan municipalities, viz. the City of Tshwane, Johannesburg, Ekurhuleni Metro, eThekweni Metro, Nelson Mandela Metro, and the City of Cape Town. Ten project managers were selected in each metro. Thus, a purposive sample of 60 project managers from the six Metropolitan municipalities was selected. These project managers were chosen from a pool of managers working on various projects like housing projects; urban renewal projects; projects involving water and sanitation; projects

involving the construction of roads; projects involving the development of recreational facilities; economic development projects; tourism enhancement projects; heritage projects; and youth and women development projects. A qualitative research approach using semi-structured interviews was adopted to acquire the necessary information. Thematic analysis was used to analyze qualitative data. The study used inductive coding and theme development to portray specific Project Management methodological issues within the Metropolitan municipalities.

4. Results

The analysis from the interviews is presented in the sections that follow and are in two parts. The first part of the analysis presents demographic data of the participants in this study from the six Metropolitan municipalities. The second part focuses on the responses from the participants on the various issues that were canvassed based on the research questions and objectives of the study.

4.1 Demographic profile of respondents

The findings of this study show that 63% of the project managers were male, and 37% were female, as shown in Table 1. In terms of the race of the participants, the findings show that most of the project managers were Africans, accounting for 65%, followed by whites (30%) and Asians (5%). The findings further show that most of the participants have been working as project managers for a period of between 5 years to 10 years (45%), followed by 10 years to 15 years (30%); below 5 years (20%) and between 15 years to 20 years (5%), as shown in Table 1.

Table 1. Demographic profile of the participants

Description	Frequency
Gender	
Male	63%
Female	37%
Total	100%
Race	
Africans	65%
Whites	30%
Asians	5%
Total	100
Years of experience	
0 – 5 years	20%
5 – 10 years	45%
10 – 15 years	30%
15 – 20 years	5%
Total	100%

Source: Authors' construct

4.2 Role of Project Management in municipalities

The crux of this study was the role of project management methodology in enhancing service delivery. The participants in this study felt that Project Management is instrumental in delivering services in the municipalities. As stated by one of the participants, *“Metro municipalities often deliver services through a project approach. This emanates from the directive of the national government. Project Management is the most recent tool at metro municipalities' disposal to deliver services, especially infrastructure such as houses, roads, recreational facilities, water supply, and electricity supply and may include more services. Project management approach to service*

delivery enables metro municipalities to combine all management principles, skills, and techniques simultaneously to maximize output" (Participant 3).

4.3 Nature of projects in municipalities

The participants in the six municipalities were asked to identify the projects they have been involved in as managers. The study findings showed that all the managers in the six municipalities were engaged in relatively similar projects, viz. *"township renewal projects; heritage sites development; tourism and recreational facilities; urban renewal projects; housing development projects; economic development projects; and infrastructural projects development projects and building one-stop-shop projects"* (Participants 1 to 60).

4.4 Challenges in Project Management in municipalities

Municipalities in South Africa are confronted with several challenges that affect the smooth operation of various projects. The analysis from the interviews presents a bleak picture regarding the current state of project management in the six metropolitan municipalities. Thus, the participants that were interviewed from the six municipalities encounter relatively similar challenges which affect the success of the projects, such as *"lack of understanding; poor communication channels; joining the project in the middle; poor planning; lack of support from the executive"* (participants 1 to 60).

4.5 Project Phases

Project management sometimes requires that projects are completed or operationalized in phases for various reasons. The participants in this study argued that the municipalities divide their tasks into phases for multiple reasons. One participant remarked, *"A project can take more than one financial year, so it helps work in project phases. For instance, the first project phase can be done in financial year one, phase two can be conducted in the next financial year two, and the last phase may be conducted in financial year three. This can be determined by the project scope or resources required for the project"* (Participant 40).

4.6 Project Scope Management

As part of the planning process, project scope management assists in identifying and recording a list of all of the Project's objectives, tasks, deliverables, deadlines, and budgets. The analysis from the interviews conducted with participants shows that the project scope is not cast in stone and is Project specific. Thus, it is subject to change in the course of the Project, as intimated by one of the participants: *"Each Project differs in scope. The nature of the Project determines the project scope. Resources required in a project are determined by what will be achieved as the outcome/output. The interesting aspect in this area is that the scope can change as the project implementation occurs. This could be due to new priorities of the Council, challenges in implementation, redirecting funds to unexpected disaster or any contingency"* (Participant 18).

4.7 Project Quality Management

In any project, there is an obligation placed on team members to continuously monitor the quality of all operations and take corrective action to reach the expected target level of quality. In the context of this study, views were solicited from the participants regarding the quality management of projects in the municipalities and the consensus is that most municipalities have a quality assurance unit, which assumes the responsibility of monitoring the quality aspects of each Project against the set parameters, which are part of the project terms of reference. This is echoed by one of the participants who said that *"All project specifications are fully described in project terms of reference. When the Project is completed, the handover will be done, and the beneficiaries will review the Project. If there is any dissatisfaction, they will inform the municipality. After that, it is the municipality's responsibility to start the process afresh. A quality assurance unit ensures project quality"* (Participant 9).

4.8 Monitoring and Evaluation of projects

Many municipal projects fail to be finished for a variety of reasons. One of them is a misunderstanding of the importance of monitoring and evaluation. Sadly, many project managers do not appreciate the importance and use of these two. However, the participants in this study enjoyed the need for monitoring and evaluation as something that must be done during the entire project life span to check progress against the set performance indicators. As stated by one of the participants, *"Each Project is monitored according to articulated project specifics based on project outcomes, outputs and impact. The Project is monitored each step of the way. The monitoring process is checking the implementation of project steps against performance indicators. This process ensures the alignment of project proceedings to set standards. The monitoring process improves project quality and helps identify risks timorously and devise a strategy to manage them. As a result, resources are managed effectively and efficiently"* (Participant 46).

4.9 Project Management methodology's contribution to effective service delivery

The need to have strategies and processes that project members can use cannot be overemphasized. Not only do these methodologies have varied ways in which they are structurally arranged, but they also call for the creation of diverse kinds of deliverables and processes to ensure effective service delivery at the end of the day. The findings show that the participants believe a project management methodology is critical for effective service delivery. One of the participants remarked, *"Project management balances all management approaches and principles at the same time. Project management is more specific. For the task to be delivered, it requires specific resources at a specified time frame. As a result, this makes it different from the routine operations of the municipality. In a project approach of service delivery, the project team knows the objectives and due date to accomplish the project"* (Participant 17).

4.10 Project Stakeholders

Every Project has people and organizations directly engaged in the Project's activities or whose interests may be favourably or adversely impacted due to the Project's effective execution or its conclusion. The findings show that projects in municipalities have various stakeholders. As stated by one of the participants, *"the project scope determines the role players and stakeholders for the Project. Some projects cut across different units within the municipalities, local government departments and national and private sectors such as commercial banks, Donors Agencies and Non- Governmental organizations, Community Based Organizations, Councillors and Inkosi (Traditional Leaders)"* (Participant 31). In addition, every Project has what is known as internal and external stakeholders. Concerning internal stakeholders, one of the participants commented on their role and effectiveness as follows: *"Internal stakeholders play a critical role in the success of the project. This is the team that makes the project succeed or fail. The success of the project is more dependent on the project team"*.

On the other hand, external stakeholders are equally critical for the success of projects, as noted from the comments of one participant who remarked, *"The role of external stakeholders is to be overseer for what is about to be executed and what has been executed. They help to keep the internal stakeholders on their toes in all project phases. The most complicated external stakeholders are auditors and the media. These two are difficult in various ways. The media is interested in reporting on matters that attract the public and civil society. Auditors demand compliance with financial policies and procedures. Failure to comply results in the involvement of other role players in financial control. This can result in punitive measures against the responsible persons"* (Participant 57).

5. Discussion

This study aimed to ascertain the role of Project Management in enhancing service delivery for Metropolitan municipalities. This study's findings showed that Project Management's part in cities is indispensable as it is key to service delivery and infrastructural developments such as roads and housing. Barker and Cole (2013:11) assert that the need for Project Management can be deduced from the many advantages the discipline offers and the potential part it may play in expanding the local economy. The study further found that projects are completed in phases due to financial support and funding. Deene (2007) posit that projects are one-of-a-kind endeavours. Therefore, there is always some element of unpredictability around them. To increase management control and allow for ties to the organization's continuing operations, organizations that conduct projects will often break each Project down into various phases.

The findings also show that project managers in municipalities have monitoring and evaluation strategies to ensure project success. Activities such as monitoring and evaluation may be beneficial, provided they are carried out appropriately and the findings are correctly understood. Monitoring and evaluation in local government make policy formation and sound financial management more accessible and enables municipal officials to align their actions better with the goals set by the national government (Govender, 2013). Similarly, Kariuki and Reddy (2017) believe that there must be a commitment made toward the acceptance of city-wide monitoring and evaluation as a helpful Project Management instrument. Thus, municipalities' monitoring and evaluation must go beyond compliance and toward institutionalization in an incremental approach. If progress is not made towards institutionalization, municipalities' monitoring and evaluation procedures will devolve into nothing more than an exercise in ticking off boxes. In the long run, towns' capacity to be responsible may be undermined.

The findings of this study further showed that most respondents believe that a Project Management methodology is critical and contributes to effective service delivery. Mokgethi (2021) emphasizes the importance of a Project Management methodology. It is frequently required to use just specific components of a generic approach due to the significant differences between projects in their application, context, role-players, deliverables and resource restrictions. It may be necessary, for example, for towns to devise a one-of-a-kind methodology for developing their municipal infrastructure, which would be based on a combination of the best practices taken from several other approaches.

6. Conclusions

This study sought to explore the role of Project Management in enhancing service delivery for Metropolitan municipalities. Based on this study's findings, municipal project managers must conform to the project scope and the Project Management body of knowledge. The training and capacity building that takes place in metro municipalities needs to be ramped up, specifically in the following areas: project scope; project knowledge management; project quality management; project monitoring; project handover and project evaluation; and finally, project closure. The level of project monitoring must also be ramped up to improve the Project's success.

Metropolitan municipalities need to develop a synergy and harmony between the principles of Batho Pele, the management of projects and the delivery of services. This must be done by section ten (10) of the 1996 Constitution of the Republic of South Africa, which outlines democratic norms and principles. Since project managers are working for the public, it is essential that they comprehend the relevance of the regulations to the delivery of services and that they adhere to these values. Future research should focus on the challenges in managing projects in Metropolitan municipalities using a qualitative approach to understand the underlying problems affecting service delivery.

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**Publisher**<http://jssidoi.org/esc/home>**AGGLOMERATION DECAY IN RURAL AREAS*****Rasmus Bøgh Holmen***Institute of Transport Economics, Gaustadalléen 21, 0349 Oslo, Norway**E-mail: rbh@toi.no**Received 25 March 2022; accepted 10 August 2022; published 30 September 2022*

Abstract. Spatial proximity to other economic activities – occasionally labeled as ‘market access’ and ‘economic density’ – is associated with good economic performance. How the impulses from economic activities diminish over space is known as ‘agglomeration decay’ or ‘distance decay’. Although market access functions and the associated agglomeration decay constitute an important topic within spatial economic research, the phenomenon is seldom studied in a rural setting or addressed by non-linear estimation techniques. In this paper, we estimate the market access function in the relatively rural regions of Southern parts of Norway. We approximate market access in the national road network by alternative market access functions with power and exponential distance decay, applying ordinary non-linear least squares (NLS) and non-linear mixed effects (NLME). We apply labor productivity as the outcome variable, employment and population as alternative measures for potential market connections and traveling time as distance measure. In the regression, we control for capital intensity, industry structure and annual growth trend, as well as mixed effect in case of the NLME model. Compared to previous findings in the literature, we find evidence of relative sharp agglomeration decay in a rural setting, involving power and exponential distance decay parameters of about 2.3 and 0.07 respectively. Comparisons of the log likelihood from the estimation of market access functions suggest that exponential distance decay involve a slightly better fit than power distance decay. In addition, employment involves slightly more explanatory power than population as a measure for potential market connections.

Keywords: Urban economics; rural economics; productivity; wider economic impacts; market access; road constructions; agglomeration decay; distance decay

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1. Introduction

The positive correlation between density of economic activities and economic performance have attracted the attention of researchers in spatial economics for more than a century. Since the turn of the millennium, there has been a growing consensus in the literature that there may be causal impulses from economic density to productivity (see for instance Graham et al. 2010, Melo, Graham and Brage-Ardao 2013 and Behrens, Duranton and Robert-Nicoud 2014). Theoretical rationales for such linkages include direct transportation costs savings, production agglomeration and competition effects.[†] For an economic actor, decreased transportation costs to surrounding areas imply more potential profitable economic transactions with other actors, in addition to improved access to public goods and fiercer competition. Nevertheless, the occurrence of such impulses in rural areas are more uncertain (e.g. Holmen 2022b).

As traveling speed constitutes a direct substitute for physical proximity in context mobility that changes more rapidly, authors have in recent years argued that studies of road constructions may shed light on the relationship between productivity and economic density (e.g. Rice, Venables and Patacchini 2006 and Graham et al. 2010). Moreover, new major road constructions could potentially increase local value creation by growing the market access for local economic actors and strengthen the local competition.

How the economic impulses from economic density – and thereby so-called ‘market access’ – evolves over geographic space can be measured by so-called ‘market access functions.’[‡] Market access measures explicitly assesses traveling time to surrounding areas and the magnitudes of these areas. They capture that higher reach to neighboring areas may provide positive impulses on productivity (or other economic outcomes) for an actor, due to more potential profitable economic interactions, lower transportation costs for existing shipments and fiercer competition. The impulses of increased market access for an economic actor depend on several conditions, among them the magnitude of the relative increase, and how the importance of proximity evolves with the traveling time from the source. Other important factors include availability of other infrastructures, industry composition and the absolute magnitudes of the market enlargement and the initial markets.

Market access functions typically involve summation of fractions over adjacent regions. In the fractions, the numerators are subfunctions of variables capturing potential market connections (e.g. population, employment or production) and the denominators are subfunctions of variables capturing how the market potential diminish as the potential market connections become more remote (e.g. with traveling time, traveling distance or generalized traveling costs). The diminishing of impulses from economic activities over traveling time and traveling distance from each source of interaction is known as ‘agglomeration decay’ or ‘distance decay’. Several studies analyze and estimate market access functions in various applications, but the spatial settings are mainly relatively urban. In this study, we estimate market access functions in the relatively rural setting of the most Southern parts of Norway. We approximate market access in the national road network by alternative market access functions with

[†] Direct transportation costs savings involve cost reductions associated with actual transportation processes (e.g. Shirley and Winston 2004 and Venables 2007). Production agglomeration involves production synergies for firms and individuals being near each other. Potential production agglomeration impulses include sharing of product markets, factor markets and common goods; more efficient matching of factor inputs and learning in terms of knowledge exchange (confer Duranton and Puga 2004 and Rosenthal and Strange 2004 for overviews, both building on Marshall 1890). Potential competition effects are firm selection, disciplinary competition effects and impacts on market power exploitation (e.g. Fujita 1988, Melitz and Ottaviano 2008 and Behrens, Duranton and Robert-Nicoud 2014). A general review of impacts of transportation measures is provided by Holmen and Hansen (2020).

[‡] Note that while authors within the international trade literature commonly refer to this sort of functions as ‘market access functions’ (e.g. Fujita, Krugman and Venables 1999 and Redding 2010), others use terms such as ‘gravity functions’ (e.g. Hansen 1959 and Sevtsuk and Mekonnen 2012), ‘market potential’ (e.g. Harris 1954), ‘effective density’ (e.g. Graham 2007), ‘distance decay of agglomeration benefits’ (e.g. Graham et al. 2010) and ‘index of accessibility’ (e.g. Vickerman, Spiekermann and Wegener 1999 and El-Geneidy and Levinson 2006).

power and exponential distance decay. The estimation is carried out by ordinary non-linear least squares (NLS) and non-linear mixed effects (NLME) with labor productivity as the outcome, and employment and population as alternative measures for potential market connections. As distance measure, we apply traveling time, while we use capital intensity, industry structure and annual growth trend as controls. Our study distinguishes itself from earlier studies by addressing a relative rural area and by applying nonlinear estimation techniques. The estimation is conducted at regional level, such that local composition effects also will be considered.

A wide range of market access measures have been applied to address how market access decreases with traveling frictions. In particular, various specifications have been used for the nominator in this regard. Common specifications include summation of proportional subfunctions (e.g. Harris 1954, Hansen 1959, Dicken and Lloyd 1990, Graham 2007, Graham, Gibbons and Martin 2010 and Gibbons et al. 2019) and power functions (e.g. Huff 1963, El-Geneidy and Levinson 2006 and Graham et al. 2010), which is a straight forward extension of the former. Another common approach is to model agglomeration decay by exponential functions (e.g. Handy and Niemeier 1997, Fujita, Krugman and Venables 1999, Vickerman, Spiekermann and Wegener 1999, Waddell and Ulfarsson 2003, El-Geneidy and Levinson 2006, and Sevtsuk and Mekonnen 2012). Other specifications do of course also exist, including distance bands (e.g. Hanson 2005, and Graham et al. 2010) and ratios based on traveling costs in general equilibrium models as their market access measure (e.g. Redding and Venables 2004, Redding 2010, Donaldson and Hornbeck 2016, and Redding and Rossi-Hansberg 2017).

Much of the attention in the literature on market access has been devoted to agglomeration elasticities, which indicates how much increased agglomeration affect an economic measure (typically productivity). Estimates for agglomeration elasticities with regard to productivity differ substantially with regard to sector, geography, method of measurement, inclusion of controls for unobserved cross-sectional heterogeneity, differences in time-variant labor quality and handling of potential reverse causality. In their review of empirical findings on the elasticity of productivity with respect to the magnitude of the functional city area, Melo, Graham and Noland (2009) find an average elasticity around 0.058 and that service industries generally are subject to larger agglomeration elasticities than manufacturing industries. In line with these findings, Rosenthal and Strange (2003) conclude in their survey that the average elasticities of productivity with respect to city size lies between 0.03 and 0.08. Other more recent studies also approximate the agglomeration elasticity to around five percent (e.g. Behrens, Duranton and Robert-Nicoud 2014, Graham, Gibbons and Martin 2010; confer Graham and Gibbons 2019 for a brief and more recent review).

Agglomeration elasticities will however depend on how market access is measured and thereby the agglomeration decay pattern. Some studies also explore how market access is of different importance in different industries, and how it diminishes with traveling costs (i.e. agglomeration decay). Rice, Venables and Patacchini (2006) find that the agglomeration impact on productivity declines steeply with traveling time, ceasing to be important beyond approximately 80 minutes. Similarly, Duranton and Overman (2005) find positive effects from collocation within 50 kilometers. Estimating market access functions in the United Kingdom with linear methods, Graham et al. (2010) estimate sector-specific point estimates for the power distance decay parameter ranging from 1.06 to 1.48. They establish that the effects of agglomeration impulses on productivity diminish more rapidly over traveling distances to surrounding economic activities for service firms than for manufacturing firms. Similarly, Rosenthal and Strange (2003) find that the gains from agglomeration economies arising from spatial concentration diminish rapidly over traveling distances for most industries, before diminishing more slowly. We refer to Graham et al. (2010), Redding (2010) and Sevtsuk and Mekonnen (2012) for overviews over different areas of research addressing market access and agglomeration decay.

This paper is structured as follows: After this introduction in section 1, we present our empirical strategy in section 2 and the data applied in our empirical investigations in section 3. The empirical analyses are provided in section 4. We discuss our results and draw our conclusions in section 5.

2. Empirical Strategy

We will now introduce a framework suited for estimating market access measures that capture the agglomeration decay over space, controlling for differences in capital intensity, industry composition and economic growth trend. We start by some conceptual considerations, before we move on to our formal framework and how we carry out the estimation in practice.

2.1 Conceptual Considerations

In order to study how productivity depends on geographic configuration over space, we need to apply a market access measure that accounts for proximity to and the magnitude of places with economic activity nearby. Based on theory and earlier empirical findings, one should expect positive impulses on productivity from economic density of activities nearby and declining impact as the traveling time to surrounding economic areas increases.

The theoretical foundations for market access functions are clear, concerning economic benefits for local economic activities of proximity to other economic agents such as agglomeration synergies, competition effects and savings in direct transportation costs. Higher economic performance at macro level can both be caused by improved firm performance and composition effects. Accordingly, the market access measure captures how economic gains in a broader sense of economic activities nearby diminish over space, where the adjacent economic activities may be related to both the product and factor markets.

It is not obvious how agglomeration decay evolves over space. In our empirical investigations, we are interested in how market access affects local economic performance and utilization of local factor inputs. As mentioned in section 1, a standard approach in the literature is to assume that the market access function for a location follows a summation function over the ratio between a proxy for economic activity (e.g. employment) and proxy for transportation frictions to surrounding locations (e.g. traveling distances). We will estimate a generalization of this function, where the proxy for economic activity is raised to power of a decay coefficient, which no longer is restricted to one.[§]

Yet, functional form implies that proportional distance decay decreases as traveling time increases, whereas our preliminary empirical investigations on our data suggest that this assumption is unreasonable for how economic performance is affected by surrounding economic activities in our case. Accordingly, we have also made use of the common alternative approach from the literature, where the subfunction concerning traveling distances is formulated as an exponential function. This functional form suggests that distance decay remains proportional over traveling time.

2.2 Formal Framework

We will denote the functional forms of the market access functions by $f \in \{pow, exp\}$, indicating whether the subfunction in the denominator is a power function or an exponential function. The agglomeration decay patterns of the market access specifications can be referred to as ‘power distance decay’ and ‘exponential distance decay’.

[§] A disadvantage in abandoning the simple specification involving summation of the ratios between employment and traveling time is that activities within regions cannot be aggregated by weighted summation without creating aggregation biases. Yet, sticking with a misspecification to avoid aggregation issues appears as a misjudgment.

We let $\mathcal{D}_{r,t}$ denote the matrix consisting of traveling times between region r and all regions s at time t and \mathcal{N}_t be a vector of labor stock in all municipalities at time t . The applied market access functions are:

$$(1) \quad G_{r,t}^{pow}(\mathcal{N}_t, \mathcal{D}_{r,t}) = \sum_{s=1}^S \frac{N_{s,t}}{d_{r,s,t}^{\delta^{pow}}}, \quad G_{r,t}^{exp}(\mathcal{N}_t, \mathcal{D}_{r,t}) = \sum_{s=1}^S \frac{N_{s,t}}{\exp(d_{r,s,t} \delta^{exp})}$$

where $N_{s,t}$ is the magnitude of the labor stock in municipality s , $d_{r,s,t}$ is the minimum traveling time between municipality r and municipality s at time t . More generally, $N_{s,t}$ could be considered as a proxy for potential market connections at given locations, while $d_{r,s,t}$ could be considered as a proxy for frictions in connectivity. δ^{pow} and δ^{exp} are parameters that describe how the market access decreases with traveling time (i.e. distance decay parameters).

Before applying the gravity function, we want to estimate δ^{pow} and δ^{exp} . For this purpose, we introduce a function for aggregate productivity, $A_{r,t}$ for municipality r at time t , suited for empirical estimation, which depends on $G_{r,t}^f$ and other factors:

$$(2) \quad A_{r,t} = \exp(\alpha_0^f) G_{r,t}^f(\mathcal{N}_t, \mathcal{D}_{r,t})^{\alpha_1^f} \exp(\sum_{j=2}^J \alpha_j^f z_{j,r,t}) \exp(\psi_{r,t}^f)$$

where $z_{j,r,t}$ is expected relative productivity differences due to contextual factors other than market access captured by control j for with corresponding parameters α_j^f for functional form f . Furthermore, α_1^f is an elasticity for how the market access of functional form f varies with congestion in the labor market, which in its raw form could be considered as an agglomeration elasticity that is not adjusted for selection patterns. α_0^f are constants capturing the persistent productivity level. $\psi_{r,t}^f$ are the error terms for municipality r at time t .

Taking natural logarithms to assess our market access functions, we obtain:

$$(3) \quad a_{r,t} \equiv \ln A_{r,t} = \alpha_0^f + \alpha_1^f \ln(\sum_{s=1}^S G_{r,t}^f(\mathcal{N}_t, \mathcal{D}_{r,t})) + \sum_{j=2}^J \alpha_j^f z_{j,r,t} + \psi_{r,t}^f$$

where $a_{r,t}$ is the log impact measure for municipality r at time t .

Inserting our chosen market access function from equations (1) into equation (3) gives us the equations to be estimated, in order to obtain the distance decay parameters:

$$(4) \quad \begin{aligned} a_{r,t} &= \alpha_0^{pow} + \alpha_1^{pow} \ln\left(\sum_{s=1}^S \frac{N_{s,t}}{d_{r,s,t}^{\delta^{pow}}}\right) + \sum_{j=2}^{J=4} \alpha_j^{pow} z_{j,r,t} + \psi_{r,t}^{pow} \\ a_{r,t} &= \alpha_0^{exp} + \alpha_1^{exp} \ln\left(\sum_{s=1}^S \frac{N_{s,t}}{\exp(d_{r,s,t} \delta^{exp})}\right) + \sum_{j=2}^{J=4} \alpha_j^{exp} z_{j,r,t} + \psi_{r,t}^{exp} \end{aligned}$$

In our empirical estimation of equation (4), we apply net value added volumes per person engaged in the production (i.e. employees and self-employed) as our productivity measure ($a_{r,t}$). Thus, we both capture changes in technical productivity (i.e. productivity regardless of technology specification) and changes in capital intensity. Furthermore, we utilize three controls – overall economic development patterns (i.e. a year trend, marked by $z_{2,r,t}$), capital intensity (i.e. fixed capital services in fixed prices per person employed, marked by $z_{3,r,t}$) and industry composition (marked by $z_{4,r,t}$). In addition, we apply mixed effects (a combination of random and fixed effects) in estimation in some of the regressions, which we will return to soon. While the two first mentioned controls do not need further explanations, the industry composition control will be explained in the following. Within relatively homogenous developed countries like Norway, the main decisive factors for regional productivity disparities beyond differences in degree of urbanization are captured by differences in industry structure. Accordingly, we design our contextual control to address the productivity disparities caused by industry composition:

$$(5) z_{4,r,t} = \sum_{i=1}^N \frac{a_{i,b,t} n_{r,i,t_0}}{a_{b,t} n_{r,t_0}} - 1$$

where $a_{i,b,t}$ is labor productivity in industry i in benchmark region b at time t and $a_{b,t}$ is the same, but for all industries. Furthermore, n_{r,i,t_0} is industry i 's employment in region r at the initial period t_0 and n_{r,t_0} is the total employment in region r at the initial period t_0 . Thus, the ratio between the two variables corresponds to industry i 's share of total employment in region r at the initial period t_0 . This share is calculated with basis in the initial period to allow for changes in industry composition caused by market access over the study period.

The denominator of the fraction can be interpreted as the labor productivity in the industry reflection in region r . It captures what the aggregate labor productivity in the benchmark region would have been, if the industry composition was the same as in region r , and industry-specific labor productivities remained the same. Measured against the actual national labor productivity, the fraction gives a number below 1, if the industry composition suggests that the labor productivity should be expected to be lower than the national labor productivity. Analogously, it gives a number above 1, if the industry composition suggests that the labor productivity should be expected to be higher than the national labor productivity.

2.3 Estimation in Practice

Estimation of market access function in large datasets like ours constitutes a complex matter subject to computational limitations, so application of more advanced estimation procedures may limit the amount of possible regression controls. We estimate the market access function in equation (3) by ordinary non-linear least squares (NLS) and non-linear mixed effects (NLME) regressions (confer Davidian and Giltinan 2003 for an overview). NLME is an extension of NLS, where the coefficients incorporate mixed effects with fixed and independently distributed random components. The huge set of variables and parameters (although restricted) in the regression makes us unable to apply a general unstructured covariance matrix for the error term.

In our implementation of NLME, we thus use an exchangeable covariance structure, where the between-subjects and within-subject variances are assumed to be constant. Robustness checks where surrounding municipalities beyond some traveling distance were taken out from the dataset indicate that this assumption on covariance matrix structure only has minor impact on our results. We include estimates of NLS as a base of comparison, where the error terms across units are assumed independent from each other. In our applications of both methods, we let the error terms follow the normal distribution. In our practical implementation, we utilize the Stata commands '*menl*' and '*nl*' for NLME and NLS respectively.

3. Data Sources

In the following, we account for the firm and spatial data made use of in our empirical investigation.

3.1 Firm Data

We collect economic data for our study from the Norwegian Register of Business Enterprises at the Brønnøysund Register Centre (Norwegian Register of Business Enterprises in short) from 2004 to 2014. This data source covers roughly 95 percent of the Norwegian business sector employment including public firms.** We only include firms

** We approximate the ratio by a comparison between the Norwegian Register of Business Enterprises and the Enterprise Register of Statistics Norway. Note that the Norwegian Register of Business Enterprises involves stock companies and larger companies of all kinds, while the Enterprise Register of Statistics Norway also covers small firms with unlimited liability and small business-oriented firms with a public enterprise form. Furthermore, small firms that are either organized as unlimited liability corporate form or with a self-owned corporate form do not have a duty to report to the Norwegian Register of Business

with registered employees for each year. In case of reporting in foreign currency, we convert the monetary values to NOK using the Norwegian Central Bank's statistics over historical exchange rates. In a few cases where firm's zip codes are missing, we approximate their locations within the reported municipalities' bases on our own mapping of historical zip codes, time series of reported zip codes, correspondence between postal box codes and physical zip codes, and other reported geographical information to determine geographical location by zip code. As other European enterprise register data, our data involves a branch challenge in the sense that the geographic distribution of economic activities beyond employment in firms with branches at multiple geographic locations is unidentified. To prevent potential biases related to firms switching status from single-branch firms to multi-branch firms and vice versa, we remove all firms that have several branches at least once during our study period. We make use of the most detailed industry division in the national accounts at the time of our study, A64 second revision. Due to of measurement and identification concerns, we do not consider resource industries (NACE 1 to 9 and 35 to 39), construction (NACE 41 to 43), finance and insurance (NACE 64 to 66) and real estate (NACE 68) and non-market-oriented industries (NACE 84 to 99). These industries are either relatively volatile, not profit-driven, strongly driven by international prices and local natural resources, strongly regulated, requiring alternative measurement of value added, directly affected by road construction processes or poorly captured by the data.

We also omit oil and gas suppliers, since they have had a relative strong, heterogenous and volatile productivity development during our study period, which could be seen relation to quality competition and a global upturn in the associated markets during our study period (e.g. Grünfeld et al. 2013). These firms cut across the NACE classification system. Instead, they are identified by the firm population of Norwegian firms that mainly deliver goods to the petroleum extractors' value chain, developed by International Research Institute of Stavanger, Menon Economics and their regional collaborators^{††} (Blomgren et al. 2015).

We apply figures for fixed capital services in fixed prices, obtained from Holmen (2022a).^{‡‡} Furthermore, we operate with two forms of intermediates – 'commodity purchases' and 'service purchases' (including electricity purchases, but not financial costs). Commodity and service deflators are also obtained from Holmen (2020), which are based on the Norwegian national accounts' gross production and intermediate deflators and industry input-output matrixes. Note that regional price developments are accounted for in the capital deflators for buildings and land area and the service purchase deflators (which is affected at a rate proportional to share of services purchases related to real estate).^{§§} Gross production deflators are collected from Statistics Norway.

3.2 Spatial Data

In our study, we make use of annual traveling time data between all Norwegian zip codes (represented by post offices) from 2004 and 2014. The data are constructed by the Institute of Transport Economics and Menon Economics based on Geographic Information Systems data, containing periodical shapefiles of the Norwegian

Enterprises. Some industries such as for instance agriculture and forestry are also subject to less strict reporting obligations. Overall, primary industries and nonprofit industries are poorly captured by the Norwegian Register of Business Enterprises, but these industries are not in our study in any case.

^{††} The regional collaborators include Bodø Science Park, Center for Economic Research at Norwegian University of Science and Technology, Eastern Norway Research Institute and Impello Management.

^{‡‡} Holmen (2022a) make use of firm data from Norwegian Register of Business Enterprises and Norwegian National Accounts data to estimate fixed capital figures by the perpetual inventory methods with industry-specific capital deflators and depreciation rates, the. In case of assets without capital depreciation, the author estimates the capital by direct measurement based on book values. We utilize fixed capital services as our capital measure, which adjusts the capital utilization for capital composition by weighting each type of asset in accordance to their stock volume and annual required return (confer Jorgenson and Griliches 1967 and Christensen and Jorgenson 1969 for details on the concept). We refer to Holmen (2022a) for details on the practical implementation of the fixed capital services concept.

^{§§} In the fixed capital and deflator data applied, it is distinguished between regional price differences related to real estate capital and real estate purchases, based on processed price data from Statistics Norway and Eiendomsverdi (confer Holmen 2020 for details). The other price deflators are national, implying that we will not be able to adjust for local price variations for other economic components beyond what follows from differences in industry composition and differences in the relative strengths of the ground components.

route network from the Norwegian Mapping Authority (known as ‘*Elvegdata*’). The calculations are conducted, applying the Dijkstra’s (1959) algorithm and the application ‘Network Analyst’ in ArcGis.

Traveling time does not account for congestion, variations waiting time at ferry crossings, road tolls, logistical optimization or other cost or quality aspects beyond the speed limits or traveling distances. Moreover, such factors tend to be more likely to suffer for endogeneity issues in studies of local economic outcomes. For ferry transitions, we assume a traveling speed of 15 kilometers per hour and a boarding time of five minutes.

The traveling data involves snap shots of the road network at different points in time, but we have recalculated them into annual averages. Here, we have adjusted for what time of the year major road construction projects (defined as projects inducing traveling time reductions of at least five minutes within thirty minutes’ traveling time) have been opened. In the related quality assurance exercise, we have utilized the Norwegian Public Road Administration’s project database. In this regard, a few data breaches in the road network related to winter closed roads and ferry crossings were identified in the corrected. In a few instances, data from Gule Sider and Google Maps have been used to connect geographical destinations to the road network.

We have received statistics for the built-up areas of each zip code based on maps over buildings and population in Norway from the division for population statistics at Statistics Norway. Based on the spatial distribution of the built-up areas, we have approximated internal traveling distances weighted for population, assuming that the average traveling time equals half of the radius of a circle with similar area. On the advice from the division for population statistics at Statistics Norway, we assume a speed limit of 60 kilometers per hour within zip codes. We further assume that the internal traveling times within zip codes are time-invariant and equal to their value in the initial year of our study (i.e. 2004).

In addition to domestic traveling time data for Norway, the Institute of Transport Economics has by the help of Open Street Map gathered traveling times to all municipalities in Sweden. This data includes all foreign municipalities within six hours’ reach from Norway including travel by ferry. From this, we have calculated the traveling distances and traveling time between Norwegian zip codes and Swedish municipalities. We refer to the acknowledgement section in the end of this paper for credits to people that have contributed in processing of the applied traveling time data.

We have received employment and population figures at zip code level and municipal level from Statistics Norway’s divisions for population statistics and labor market and wage statistics. In this data, the geographical location information of between 1.5 to 3 percent of the employment figures at municipal level is not identified at zip code level. The municipal employment figures without known zip code location are distributed proportionately to the annual employment shares within each municipality. Employment and population figures for Swedish municipalities are collected from Statistics Sweden.

4. Empirical Analyses

In this section, we conduct empirical analyses on the market access function in line with the framework and procedure outlined in section 2, before we provide some recommendations.

4.1 Estimation

We estimate the distance decay parameters in equations (4) by NLME with exchangeable covariance structure and by ordinary NLS. This involves parameter δ^{pow} in the market access specification, where the distance decay follows a power function, and parameter δ^{exp} in the market access specification, where the distance decay follows an exponential function.

We explore three alternative potential source of market access – employment by workplace, employment by residence and population. We have not used value added, as it fluctuates relatively much compared to labor over time (particularly in Norway where labor rights stand strong). We do this under two alternative assumptions – one where the potential market connections are allowed to vary over time and one where they are held constant to their initial levels (of 2004) to control for the most severe endogeneity challenges related to urbanization.

Due to computational limitations and challenges in convergence, we are not able to estimate market access for all of Norway in a single operation. Instead, we limit ourselves to southern parts of Norway, which also ensures somewhat more comparable municipalities with more homogenous industry structure and degree of urbanization. In practice, we delimit the region for which we estimate market access parameters to the two counties of Southern Norway (i.e. Aust-Agder and Vest-Agder), their bordering counties (i.e. Rogaland and Telemark) and their bordering counties again (i.e. Buskerud, Hordaland and Vestfold). In our estimation, we also face a computational need for limiting the number of geographical units that are source for market access.

In context of sources for market access, we also include municipalities in the closest Norwegian counties beyond our estimation region (i.e. municipalities in Akershus, Hedmark, Oppland, Oslo and Østfold) and county observations for the closest Swedish counties (i.e. Halland, Värmland and Västra Götaland in Sweden). Combined, the region which gives source to market access covers all areas within four hours' reach from our estimation region.^{***} Altogether, our selection enables us to investigate how market access in 142 municipalities is affected by proximity to 260 regions (including themselves) over 11 years. We have not operated with industry-specific decay parameters in our study, as we also want to capture factor usage and composition effects.

Our results under the assumption of power distance decay are reported in Table 1, while our results under the assumption of exponential distance decay are reported in Table 2.

^{***} Although omission of regions far away may involve small selection biases, our estimated decay parameters suggest that the impact of regions many hours away is negligible. While the impact of potential market connections approaches zero for this traveling time in case of exponential distance decay, it will be nearly constant for moderate traveling time changes in case of power distance decay. Market access to regions beyond the ones included in our regressions is so far away that the proximity becomes roughly constant for the municipalities investigated, such that it mostly will be captured by the constant and potentially changes in traveling time to areas in the outskirts of our estimation region. The correlation patterns between economic performance and concentrations of economic activity beyond two hours' reach are weak, underpinning this point. Moreover, other biases such as to omission of other modes of transportation infrastructure are likely to be considerably more severe. Since the agglomeration decay parameter turns out to be above one, aggregation of regions can be expected to underestimate market access. Yet, robustness checks in region composition indicate that the aggregated municipalities are so far away that they have very limited impact on regression results.

Table 1. Impact of increased market access through expansions in the road network on net value added per employee in fixed prices from 2004 to 2014, estimated by NLS and NLME with time-invariant and time-varying market connections

Labor productivity (<i>logarithm</i>)	Employment by workplace				Employment by residence				Population			
Market connections	Time-invariant		Time-varying		Time-invariant		Time-varying		Time-invariant		Time-varying	
Est. procedure	NLS	NLME	NLS	NLME	NLS	NLME	NLS	NLME	NLS	NLME	NLS	NLME
Constant (α_0)	4.897*** (0.104)	4.967*** (0.190)	4.903*** (0.103)	4.980*** (0.184)	4.860*** (0.104)	4.932*** (0.188)	4.856*** (0.105)	4.914*** (0.194)	4.798*** (0.109)	4.869*** (0.200)	4.801*** (0.109)	4.865*** (0.202)
Market access (α_1) (<i>logarithm</i>)	0.072*** (0.007)	0.072*** (0.014)	0.072*** (0.007)	0.072*** (0.014)	0.077*** (0.007)	0.077*** (0.014)	0.077*** (0.007)	0.078*** (0.015)	0.077*** (0.007)	0.077*** (0.015)	0.077*** (0.007)	0.077*** (0.015)
Year trend (α_2)	0.005 (0.003)	0.006** (0.003)	0.005 (0.003)	0.005* (0.003)	0.005 (0.003)	0.006** (0.003)	0.005 (0.003)	0.005 (0.003)	0.006 (0.003)	0.006** (0.003)	0.005 (0.003)	0.005* (0.003)
Capital intensity (α_3) (<i>logarithm</i>)	0.135*** (0.016)	0.115*** (0.022)	0.135*** (0.016)	0.115*** (0.022)	0.134*** (0.016)	0.115*** (0.022)	0.134*** (0.016)	0.115*** (0.022)	0.134*** (0.016)	0.115*** (0.022)	0.135*** (0.016)	0.115*** (0.022)
Industry composition (α_4)	0.773*** (0.160)	0.765*** (0.135)	0.787*** (0.160)	0.778*** (0.135)	0.773*** (0.160)	0.765*** (0.135)	0.787*** (0.160)	0.778*** (0.135)	0.773*** (0.160)	0.765*** (0.135)	0.773*** (0.160)	0.764*** (0.135)
Agglomeration decay (δ)	2.376*** (0.215)	2.341*** (0.427)	2.408*** (0.215)	2.396*** (0.424)	2.325*** (0.196)	2.297*** (0.389)	2.320*** (0.198)	2.258*** (0.394)	2.300*** (0.197)	2.270*** (0.392)	2.305*** (0.199)	2.260*** (0.395)
Within-group error variance		-0.957*** (0.024)		-0.958*** (0.024)		-0.958*** (0.024)		-0.958*** (0.024)		-0.957*** (0.024)		-0.957*** (0.024)
Between-group covariance		0.302*** (0.034)		0.301*** (0.034)		0.301*** (0.034)		0.301*** (0.034)		0.302*** (0.034)		0.302*** (0.034)
No. of observations	1,562	1,562	1,562	1,562	1,562	1,562	1,562	1,562	1,562	1,562	1,562	1,562
Log likelihood	-720.7	-572.3	-719.1	-571.4	-719.5	-572.0	-719.1	-571.7	-720.7	-572.3	-720.1	-571.9

Note: The agglomeration decay pattern is assumed to follow an exponential function. Estimated by ordinary NLS and NLME with exchangeable covariance matrix. Potential market connections are held constant to their initial value or allowed to vary. (* for $p < 0.1$, ** for $p < 0.05$ and *** for $p < 0.01$)

We see that all parameters are significant with signs and magnitudes in accordance with what one could expect. The choice between our two estimation procedures and measures for potential market connections has only limited impact on the estimation results. The productivity growth during the period (reflected by α_2^f) is estimated to 0.5 to 0.6 percent annually, although the coefficients' p-values are only around ten percent. The impact of capital intensity (reflected by α_3^f) is estimated to be around 10 to 13 percent, which also seems reasonable considering the net operational profit's share of net value added. Industry composition that enhances labor productivity (reflected by α_4^f) somewhat less than aggregate productivity differences between industries suggest, which is partly related to collinearity with the other explanatory variables. Although not reported, it could also be noted that omission of any of the controls or adding of controls do not change our agglomeration decay estimate considerably.

Our point estimates for the raw agglomeration elasticity is also relatively high, confer our discussion in section 1. As we have not controlled for location selection and find evidence of relatively sharp distance decay, this is also as expected. We estimate the distance decay parameter in the power function specification, δ^{pow} lies around 2.2 to 2.4 (point estimates), being significantly different from 1, which often is assumed in empirical studies. We estimate δ^{exp} to be around 0.07, which also indicates much faster distance decay than the standard assumption.

Our estimates also imply sharper distance decay than the ones found by Graham et al. (2010), as mentioned in section 1. Compared to the United Kingdom, our study region is considerably more rural. In addition, we carry out our estimates on municipality level, while Graham et al. conduct their investigation on firm level, indicating that our measure accounts for composition effects, while their study focuses on firm performance. Another important difference, which we will return to in a moment, is that much smaller geographical distances are observed on disaggregated than aggregated geographical levels. As empirical investigations suggest that changes in traveling time within the immediate vicinity are of limited importance for economic performance, while the distance decay assumed in the market access functions suggests the opposite, inclusion of such short traveling times in the regressions on market access functions are likely to produce lower distance decay parameters.

We estimate the distance decay parameters to be barely higher under NLME with exchangeable covariance structure than under NLS, and for employment after workplace than employment after residence and population. The number of observations in the regressions is somewhat lower in the specifications with the exponential distance decay than the specification with power distance decay, since the estimation algorithms throw out some observations with peculiar characteristics under the first-mentioned specification (i.e. remote islands with relatively low internal traveling time and relatively high external traveling time). Yet, if we take these municipalities out from the regressions on market access with power distance decay, the log likelihoods are still lower (in absolute value) for the specification with exponential distance decay. This indicates that the exponential distance decay is barely closer to the true distance decay pattern than the power distance decay. For given model specification and estimation procedure, the explanatory power of each estimation model is slightly lower when population is applied as potential market connection measure rather than an employment measure (again indicated by lower log likelihood), but again the differences are small.

Population is less connected to the business sector than employment, although it may capture firm-to-consumer linkages better and may fluctuate less over business cycles. Yet, in further empirical investigations, one may in any case keep potential market connections constant to the initial level to limit potential endogeneity challenges. From a theoretical point of view, it is not obvious whether employment by workplace or employment by residence should be applied to measure potential market connections in market access functions. While employment by workplace is likely to capture business-business interactions most precisely, employment by residence could be expected to better capture linkages in the local labor supply and business-to-consumer markets. A possible challenge with employment by workplace is that regional integration could seemingly decrease, when potential market connections are measured by employment by workplace, due to higher commuting (i.e. the same challenge as with value added, although somewhat less severe). Moreover, we do not see any strong general reason to choose one of the employment measures over the other, as their relevance depend on the markets under investigation. A possibility in generic applications of market access functions (without pre-estimation) could be to simply apply the average of them.

Table 2. Impact of increased market access through expansions in the road network on net value added per employee in fixed prices of industry composition in the initial year and market access from 2004 to 2014.

Labor productivity (<i>logarithm</i>)	Employment by workplace				Employment by residence				Population			
	Time-invariant		Time-varying		Time-invariant		Time-varying		Time-invariant		Time-invariant	
	NLS	NLME	NLS	NLME	NLS	NLME	NLS	NLME	NLS	NLME	NLS	NLME
Constant (α_0)	4.699*** (0.113)	4.712*** (0.195)	4.709*** (0.111)	4.731*** (0.188)	4.685*** (0.113)	4.699*** (0.197)	4.686*** (0.113)	4.694*** (0.199)	4.638*** (0.116)	4.652*** (0.206)	4.645*** (0.116)	4.652*** (0.206)
Market access (α_1) (<i>logarithm</i>)	0.067*** (0.006)	0.067*** (0.012)	0.066*** (0.006)	0.066*** (0.011)	0.069*** (0.006)	0.069*** (0.012)	0.068*** (0.006)	0.069*** (0.012)	0.069*** (0.006)	0.069*** (0.012)	0.068*** (0.006)	0.069*** (0.012)
Year trend (α_2)	0.006 (0.003)	0.006* (0.003)	0.005 (0.003)	0.005* (0.003)	0.006 (0.003)	0.006* (0.003)	0.005 (0.003)	0.005 (0.003)	0.006 (0.003)	0.006* (0.003)	0.005 (0.003)	0.005* (0.003)
Capital intensity (α_3) (<i>logarithm</i>)	0.107*** (0.018)	0.100*** (0.024)	0.107*** (0.018)	0.100*** (0.024)	0.107*** (0.018)	0.100*** (0.024)	0.107*** (0.018)	0.100*** (0.024)	0.107*** (0.018)	0.100*** (0.024)	0.107*** (0.018)	0.100*** (0.024)
Industry composition (α_4)	0.784*** (0.162)	0.781*** (0.138)	0.797*** (0.162)	0.795*** (0.138)	0.784*** (0.162)	0.781*** (0.138)	0.797*** (0.162)	0.794*** (0.138)	0.784*** (0.162)	0.782*** (0.138)	0.783*** (0.162)	0.780*** (0.138)
Agglomeration decay (δ)	0.071*** (0.014)	0.067*** (0.025)	0.073*** (0.014)	0.071*** (0.026)	0.071*** (0.014)	0.067*** (0.026)	0.071*** (0.014)	0.066*** (0.025)	0.071*** (0.014)	0.067*** (0.026)	0.071*** (0.014)	0.066*** (0.026)
Within-group error variance		-0.959*** (0.024)		-0.959*** (0.024)		-0.958*** (0.024)		-0.958*** (0.024)		-0.958*** (0.024)		-0.958*** (0.024)
Between-group covariance		0.286*** (0.034)		0.286*** (0.034)		0.287*** (0.034)		0.287*** (0.034)		0.288*** (0.034)		0.288*** (0.034)
No. of observations	1,518	1,518	1,518	1,518	1,518	1,518	1,518	1,518	1,518	1,518	1,518	1,518
Log likelihood	-699.1	-565.0	-698.1	-564.6	-699.1	-565.2	-699.0	-565.1	-699.9	-565.4	-699.6	-565.2

Note: The agglomeration decay pattern is assumed to follow an exponential function. Estimated by ordinary NLS and NLME with exchangeable covariance matrix. Potential market connections are held constant to their initial value or allowed to vary. (* for $p < 0.1$, ** for $p < 0.05$ and *** for $p < 0.01$)

4.2 Recommendations

Based on our, we approximate the distance decay parameters in rural areas to $\delta^{pow} = 2.3$ for the market access specification with power distance decay and $\delta^{exp} = 0.07$ for the market access function with exponential distance decay. Admittedly, the estimated distance decay parameters may not only reflect causal influences of increased market access, but also location effects. Nevertheless, our estimated parameter values change little when we omit firms moving in or out of our sample or fix the traveling times to the initial period (as in our reported regressions). This indicates that they are not too far from the true ones, adjusted for location selection.

In empirical investigations based on pre-calculated market access function, low traveling time may constitute a challenge, both due to measurement errors and missing theoretical justifications for why changes in low traveling time should matter as much as the assumed functional forms typically suggest. A simple possible solution could be to add a fixed number to all traveling times (which could be interpreted as the time used to begin and end a journey). Our robustness checks suggest that operating with a minimum traveling time of ten minutes has limited impact on the distance decay parameter estimates. Ten minutes seems like a reasonable choice for the minimum

traveling time threshold, as it passes the robustness check, and ten minutes is of about the same magnitude as the typical internal traveling times within municipalities. Persistent differences in traveling time below this limit may still be captured by fixed effects in estimation models that applies pre-estimated measures for market access.

An alternative solution to the challenge with low traveling time would be to add a constant to the actual traveling time, which could be interpreted as a fixed traveling time mark-up regardless of actual transportation process. Yet, this alternative assumption did provide less robust results in our empirical estimations of the market access function, so we have abandoned it.

The estimated market access functions and the corresponding marginal distance decay functions are illustrated in Fig. 1 with straight lines, where we have operated with the suggested minimum traveling time of ten minutes. As benchmark, we have illustrated the market access-decay curves for proportional distance decay with a dotted line – a standard assumption applied in much of the literature (corresponding to $\delta^{pow} = 1$ in the power distance decay function). Analogously, we have also illustrated a benchmark with flatter exponential decay (with $\delta^{exp} = 0.03$, also marked with dotted lines).

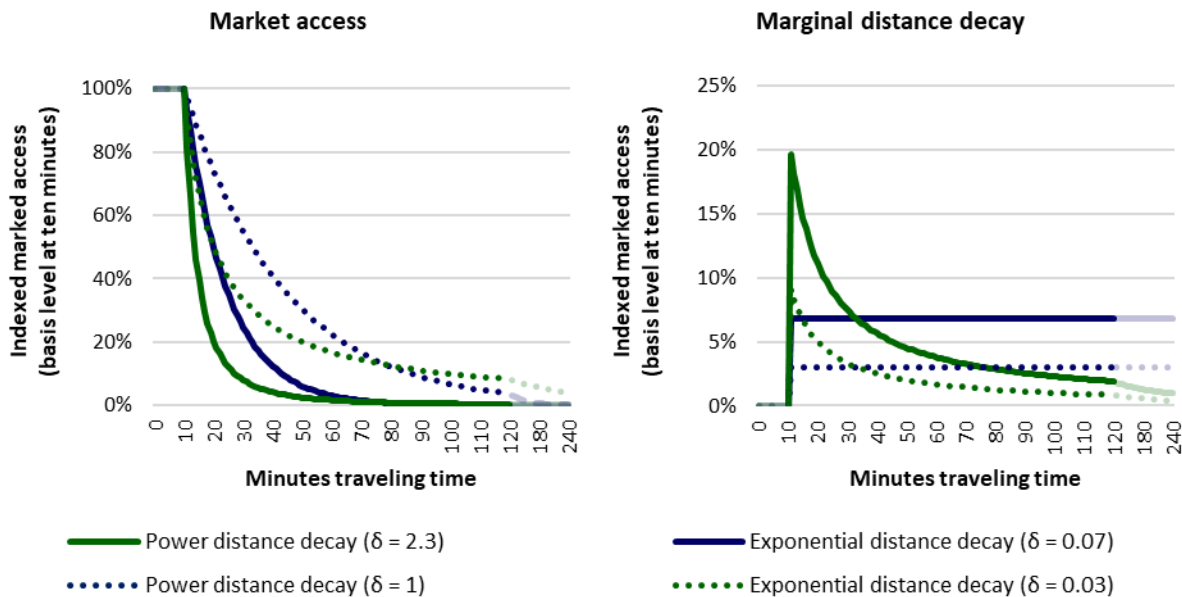


Fig. 1. Comparison of development in a) market access (l.h.s.) and b) marginal decay (r.h.s.) over minutes of traveling time under the assumption of exponential distance decay (with $\delta^{exp} = \{0.03, 0.07\}$) and power distance decay (with $\delta^{pow} = \{1, 0, 2, 3\}$)

5. Conclusions

For economic actors, spatial proximity to other economic activities – so called ‘market access’ and ‘economic density’ – is often associated better economic performance. How the impulses from economic activities diminish over space is known as ‘agglomeration decay’ or ‘distance decay’. Market access functions and the associated agglomeration decay constitute an important topic within spatial economic research. Yet, the phenomenon has mostly been studied in urban settings. Furthermore, market access functions are seldom estimated by non-linear estimation techniques.

In this paper, we investigate how market access develop in rural areas. We estimate market access measures for the Southern parts of Norway by nonlinear estimation techniques, namely ordinary non-linear least squares (NLS) and non-linear mixed effects (NLME) with exchangeable covariance structure. Here, we utilize labor productivity as the outcome variable, traveling time as distance measure, and employment and population as alternative measures for potential market connections. We control for capital intensity, annual growth trend and industry composition with the help of an ‘industry reflection’ control. This control reflects what the labor productivity can be expected to be given the local industry composition and each industry’s performance in the rest of the country. In addition, we operate with mixed effects in our application of the NLME model.

Our results support sharper agglomeration decay in rural areas than what is usually assumed in the literature, involving power and exponential distance decay parameters of about 2.3 and 0.07 respectively. This suggest that the agglomeration decay is stronger in rural areas than in urban areas. Comparisons of the log likelihood from the estimation of market access functions with power and exponential distance decay suggest that later function constitute a slightly better fit than the former. In addition, employment involves slightly more explanatory power as a measure for potential market connections than population. To cope with the market access functions’ sensibility to traveling frictions near zero, operating with a minimum traveling friction involve more robust results than adding a constant to all traveling frictions.

We see many fruitful avenues for future research. In particular, alternative choices of estimation techniques and the form of the market access function can be explored further. We also hope to see further investigations on how market access function depends on spatial configuration and industry composition.

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