# VIII. International Winter Conference of Economics PhD Students and Researchers

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# Conference Proceedings

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# COVID-19 and the Europe 2020 targets: A comparative study of V4 and other EU countries

Timothy Yaw Acheampong[1]

**Abstract**

The COVID-19 pandemic that started out as a health crisis quickly turned into a global economic crisis resulting in the worse economic recession since the Great Depression of the 1930s. Following the global financial crisis of 2007-2008, the European Union set for itself various socioeconomic development targets that it aspired to achieve in its Europe 2020 strategy for smart, sustainable, and inclusive growth. Among 5 headline objectives, it was the aim of the EU Commission that 75 % of the population aged 20-64 should be employed and that 20 million less people should be at risk of poverty. The COVID-19 pandemic has inevitably impacted the achievement of these targets in one way or another. Yet, as the world enters the 3rd year of the pandemic, the nature and extent to which the Europe 2020 targets have been impacted in the various EU member countries is yet to be independently investigated using the most recent data. This paper therefore seeks to fill this empirical gap by answering the following questions: how has the COVID-19 pandemic affected the socioeconomic development aspects of the Europe 2020 strategy? Were the impacts symmetrical or asymmetrical across the various EU member countries? To answer these questions, quantitative statistical analysis techniques are used to compare the socioeconomic development indicators of V4, Central Europe and other EU member countries before and during the first year of the pandemic. The results suggest that the COVID-19 pandemic adversely impacted the achievement of the Europe 2020 targets with respect economic growth, employment and poverty. Whereas the V4 countries more adversely affected in terms of economic growth, they did better with respect to employment and the number of people at risk of poverty and social exclusion, when compared to other EU countries.

Keywords: COVID-19; socioeconomic development; V4 and Central Europe; Europe 2020

JEL code: O1, I13, F6, J6

## 1. Introduction

Crises of various forms have been found to impact socio economic development negatively. That is why the ongoing war between Russia and Ukraine is worrying especially at a time that

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many countries across the globe are still in the process of recovering from the adverse socioeconomic effects of the COVID-19 crisis. Until the COVID-19 pandemic, the last time the world had witnessed a crisis with as far-reaching socioeconomic consequences particularly in Europe was during the global financial crisis of 2008 and 2009, which was closely followed by another recession in 2011 and 2012 (Jones – Sloman, 2017). According to Swinnen – Herck (2009) the ripple effects of the global financial crisis on the industry and the households was evident through increasing unemployment.

During the first year of the COVID-19 pandemic, the global economy contracted by 3.5 percent (IMF, 2020, 2021) causing a worldwide economic recession. The recession experienced in 2020 has been described as the worse since the time of the Great Depression in the 1930s (Acheampong 2021; Acheampong – Ogbebor, 2021; Wheelock, 2020). According to the World Bank's most recent *Poverty and Shared Prosperity 2020* report, hundreds of millions of people in the developing world became at risk of falling back into poverty as a consequence of the pandemic (World Bank, 2020). The report notes that between 88 million and 115 million people were likely to fall back into extreme poverty in 2020, with an additional increase of between 23 million and 35 million people in 2021. In addition to increasing poverty, the World Bank (2020) points out that the COVID-19 pandemic has contributed to increasing inequality across the globe with large human capital losses among people who were already disadvantaged; thereby, making it more difficult for countries to return to inclusive growth even when the acute shocks associated with the COVID crises subsides. Meanwhile, Kulcsár – Kulcsár (2010) have noted that persistent inequalities are unjustifiable from a social equality view point as well also serving as a barrier to economic growth and contributing to underdevelopment. This makes it imperative for policy makes to put in place measures to reverse the adverse effects of the pandemic and facilitate inclusive growth.

Over the years governments across the globe have adopted various policy measures to facilitate sustainable growth and development as well as to reduce poverty and inequality. At the global level, world leaders adopted the Sustainable Development Goals (SDGs) in 2015 with a pledge to eradicate poverty and to reduce inequalities both within and among nations (UN, 2015, 2017). Apart from this global development agenda, there are also various regional as well as national policies adopted by various governments to facilitate socioeconomic development for their citizens. For instance, about 10 years before the COVID-19 pandemic, the European Commission (EC) adopted the Europe 2020 Strategy which among other things intended achieve sustainable and inclusive growth in Europe. The Europe 2020 Strategy was necessitated by the stagflation that characterised economies of EU member states as a consequence of 2007-2008 global financial crisis. The Strategy had 5 headline targets in the areas of climate change, research and development, employment, education, and poverty reduction. While it is obvious that the various locked down measures adopted to limit the spread of the coronavirus has affected the entire global economy and all countries across the world including the European Union member states, independent empirical studies are yet to

investigate how the pandemic affected the achievement of the Europe 2020 Strategy for sustainable and inclusive growth. This paper therefore seeks to fill this empirical gap by answering the following questions:

1. How has the COVID-19 pandemic affected the socioeconomic development aspects of the Europe 2020 strategy?
2. Were the impacts symmetrical or asymmetrical across the various EU member countries?
3. How did effect of the pandemic on the V4 countries compare with other EU countries?

To answer the research questions the study analyses data on the socioeconomic development components of the Europe 2020 Strategy (economic growth, employment, and poverty reduction) from 2010 to 2021. The next section discusses empirical literature on the impacts of crises on socioeconomic development. This is followed by a summary of the objectives and indicators of the Europe 2020 strategy. This is followed by an overview of the data and statistical methods used in this study. The study concludes with key findings and recommendations.

## 2. Theoretical background

### *2.1. Impact of crises on socioeconomic development*

There is ample evidence that crises of all forms whether humanitarian crises, conflicts, epidemics, or financial crises have been known to have negative impacts on socio economic development (UNDP, 2018, World Bank, 2020). For instance, UNDP (2018) has noted that while there has been some progress in global human development since 1990, many countries have suffered reversals in human development due to conflicts, epidemics, and economic crises. According to UNDP (2018) many countries in Eastern Europe and Central Asia experienced reductions in their HDI values in the 1990s due to the collapse of the Soviet Union and military conflict, hyperinflation, as well changes from more planned to capitalist economies. Similarly in Sub-Saharan Africa, UNDP (2018) points out that the Human Development Index (HDI) of some countries declined in the 1990s due to conflict and the HIV/AIDS epidemic, which caused life expectancy in the affected countries to drop dramatically. Recently, Libya which was classified as a high human development country and was among the most developed countries in Africa before the Libyan civil war started in 2014 dropped to the medium development group. Although the country has rebounded since, it is still yet to reach its pre-crisis HDI levels. Similarly, between 2012 and 2017 the Syrian Arab Republic and Yemen also had declining HDI values and ranks due to violent conflicts. Furthermore, extreme poverty rates nearly doubled between 2015 and 2018, from 3.8 percent to 7.2 percent, as a result of the Syrian and Yemen conflicts (World Bank, 2020).

Apart from conflicts, climate change and pandemics also have been found to impact socioeconomic development negatively. For instance, the UNDP and World Bank have both noted that natural disasters and climate change also have adverse impacts on socioeconomic development. The World Bank (2020) has also observed that 132 million people may fall into poverty by 2030 due to the adverse effects of climate-related threats such as flooding and vector-borne diseases. The recent COVID crisis, has further highlighted how pandemics also impacts on socioeconomic development negatively. In this regard, the recent *Poverty and Shared Prosperity 2020* report of the World Bank posits that hundreds of millions of people in the developing world were at risk of falling back into poverty as a consequence of the COVID-19 crisis (World Bank, 2020). According to the report, between 88 million and 115 million people could fall back into extreme poverty in 2020, with an additional increase of 23 million to 35 million people in 2021, potentially bringing the total number of new people living in extreme poverty to between 110 million and 150 million. In addition to increasing poverty, the World Bank (2020) noted that the COVID-19 pandemic was contributing to increasing inequality across the globe with large human capital losses among people who were already disadvantaged; thereby, making it more difficult for countries to return to inclusive growth even when the acute shocks associated with the pandemic subsides.

According to the World Bank, data from their frontline surveys and economic simulations, suggest that COVID-19 pandemic-related job losses and deprivation worldwide was hitting the already-poor and vulnerable people hard, while also partly changing the profile of global poverty by creating millions of "new poor" (World Bank, 2020). Meanwhile, before the COVID-19 pandemic, governments across the world had adopted various policy measures to facilitate sustainable growth and development as well as to reduce poverty and inequality. The Sustainable Development Goals (SDGs) which was adopted by world leaders at the 2015 United Nations General Assembly for instance had the objective to eradicate poverty and to reduce inequalities both within and among nations (UN, 2017). Several regional as well as national policies had also been adopted by various governments to achieve similar socioeconomic development objectives. For instance, following the 2007-2008 global financial crisis the European Commission (EC) adopted the Europe 2020 strategy for sustainable and inclusive growth which among other things intended achieve a sustainable and inclusive growth in Europe.

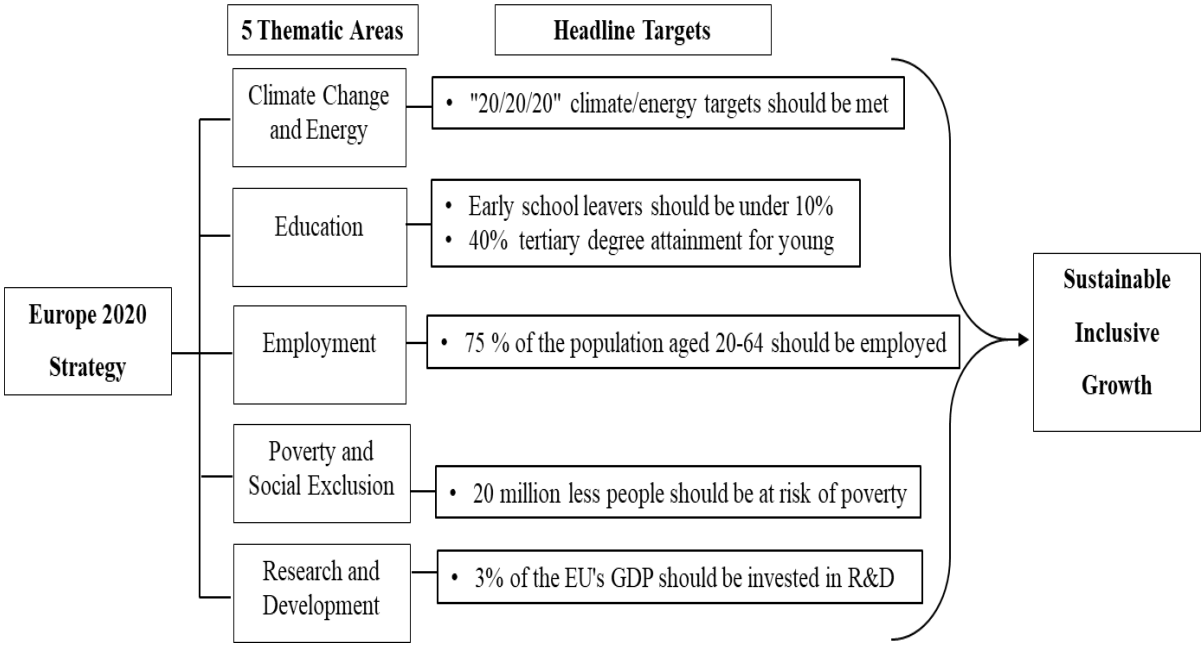
### *2.2. The Europe 2020 Strategy*

The Europe 2020 Strategy for sustainable and inclusive growth was initiated primarily based on the adverse impacts of the global financial crises on the economies of EU member countries. According to EC (2010) the crisis wiped out years of economic and social progress whiles exposing the structural weaknesses in the economy of Europe. In this regard, the EC (2010) notes that GDP fell by 4% in 2009, whiles the industrial production dropped back to the levels of the 1990s and 23 million people representing 10% of the active population of the European

Union became unemployed as a result of the global financial crisis. The Europe 2020 Strategy was therefore initiated as means to facilitate recovery from the crisis and also to turn the EU into a smart, sustainable and inclusive economy that delivers the promise of high levels of employment, productivity and social cohesion for citizens in all member states (EC, 2018).

The Europe 2020 Strategy had 5 headline targets in the areas of climate change, research and development, employment, education, and poverty reduction as indicated in Figure 1. It was the expectation that the targets of the Strategy would be achieved by the year 2020. However, in 2020, the coronavirus which was first discovered in Wuhan, China in December 2019 had spread to all regions of the world causing a global pandemic and becoming a worldwide crisis. As at March 2020, Europe has been the most affected region of the world in terms of coronavirus cases and deaths behind the Americas and South East Asia regions respectively.

**Figure 1. Conceptual framework of the Europe 2020 Strategy**




*Source:* Author's construct based on European Commission, 2010.

Aside the impacts of the COVID-19 pandemic on human health, the pandemic has also impacted the global as well as regional, and national economies. Although the targets of the Europe 2020 Strategy were expected to be achieved by 2020 which coincided with the first year of the coronavirus crisis, independent empirical studies are yet to investigate how the COVID-19 pandemic impacted the Strategy. This paper therefore seeks to investigate how the pandemic affected the achievement of the Europe strategy targets with respect to economic growth and employment as well as poverty and social exclusion in the various EU member states. In addition to determining the extent to which the targets were achieved, this paper also investigates how the Visegrad Four (V4) countries performed compared to the other EU member countries. The next section discusses the methods and data analysis techniques used to answer the research questions.

## 3. Materials and Methods

With respect to research design, the study was evaluative in nature since it sought to investigate the extent to which the Europe 2020 Strategy was achieved. The target population for this study therefore included all the current 27 member countries of the European Union. However, the study was also comparative in nature since it sought to compare the performance of the V4 countries with other EU member countries. In this regard, the 27 EU countries were subdivided into 2 different country groupings namely the V4 and other EU member countries excluding the V4 (Appendix 1).

The current V4 group began as cooperation between 3 countries that had all suffered from totalitarian systems (Baba et al., 2021). The Visegrad Cooperation, which was established in 1991 was among the first 3 forms of cooperation established in Central Europe during and after the 1989-1990 period of democratic change. The other two regional cooperation entities were the Central European Initiative (CEI, 1989) and the Central European Free Trade Agreement (CEFTA, 1992) The Visegrad Cooperation initially began on the 15$^{th}$ of February 1991 with 3 member countries namely Czechoslovakia, Hungary, and Poland. The Visegrad Four (V4) was formed in 1993 when Czechoslovakia was divided into the Czech Republic and Slovakia respectively.

According to Baba et al. (2021) regional cooperation is considered as very necessary to promote the political and economic needs of member states in the EU; however, over the years, a fundamental question has arisen as to the extent to which membership in the various which membership in the various groups can help to articulate the regional interests of participating states. It is in this regard that the study sought to investigate, how the V4 has performed on the Europe 2020 Strategy compared to the other EU countries since these countries had similar historical experiences and economic conditions as well as also lagged behind the other member states when they joined the EU in 2004 (Kulcsár – Kulcsár, 2010).

**Table 1. Study variables, indicators, and data sources**

| Variable | Indicator | Data source |
|---|---|---|
| Economic growth | Real GDP growth (%) | IMF |
| Employment | Percentage of adult population employed | Eurostat |
| Poverty | Number of people at risk of poverty and social exclusion | Eurostat |

Source: Author's construct

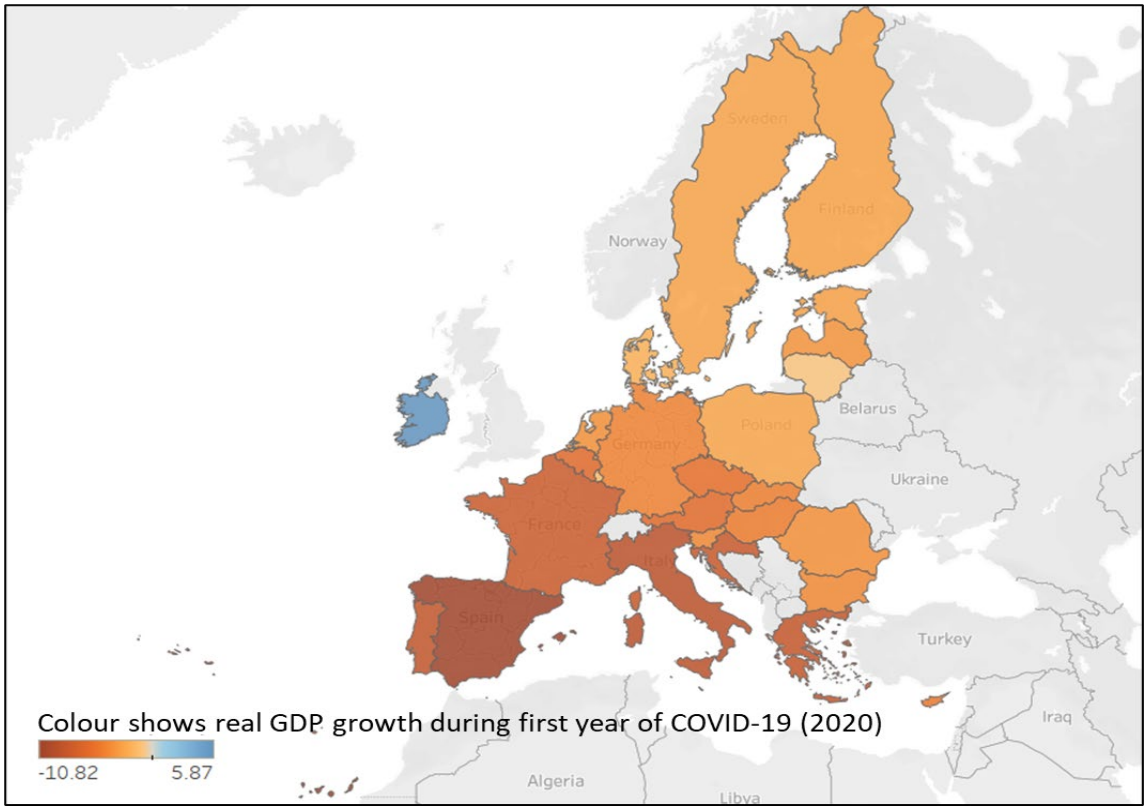
Since the objective of the study was to investigate the impact of the COVID-19 pandemic on the achievement of the Europe 2020 strategy, the study utilised utilises trend analysis and descriptive statistics to analyse data on real GDP growth, the percentage of adult population employed, and the number of people at risk of poverty and social exclusion from 2010 to 2020. The next section presents and discusses the key results.

## 4. Results

### *4.1 Impact of COVID-19 on economic growth in the European Union*

With respect to economic growth, the study finds that the COVID-19 pandemic had an adverse effect on the economies of the EU member states. Consistent with global trends, there was also a recession in the European Union where the real GDP growth rates contracted by 4.73% overall. Aside from Ireland which recorded positive growth during the first year of the pandemic (Figure 3), the study finds that all other EU member countries had a recession.

**Figure 2. Real GDP growth rate of EU member countries during COVID-19 crisis**

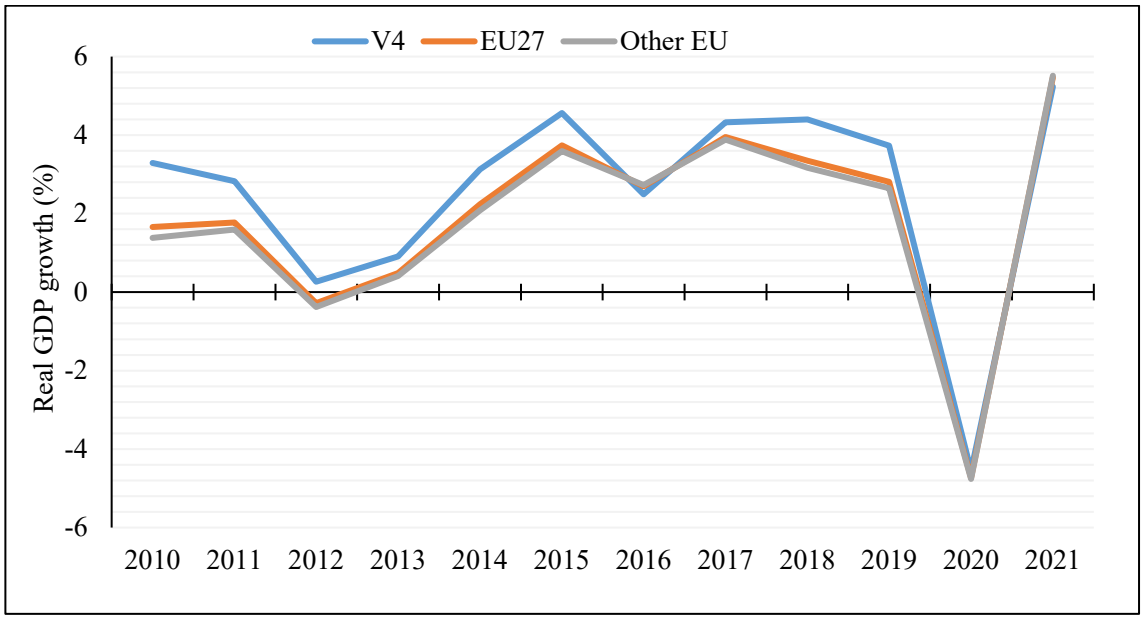



Source: Author's construct and calculations based on data from IMF

Compared with the other EU member countries, the study finds that the V4 countries with a real GDP growth rate of -4.56% did slightly better than the other EU member countries, which collectively had a real GDP growth rate of -4.76 (Figure 3). Further analysis of the data from

IMF also indicates that over the study period (2010-2021), the V4 countries on average recorded higher real GDP growth rates as compared to the other EU member countries prior to the COVID-19 pandemic. However, while there was a rebound in 2021 from the 2020 recession, the rebound in the V4 countries (5.23%) was less than the EU27 average of 5.47% and also less than the other EU member countries (5.51%).

**Figure 3. Real GDP growth trend of the V4 and other EU member countries 2010-2021**



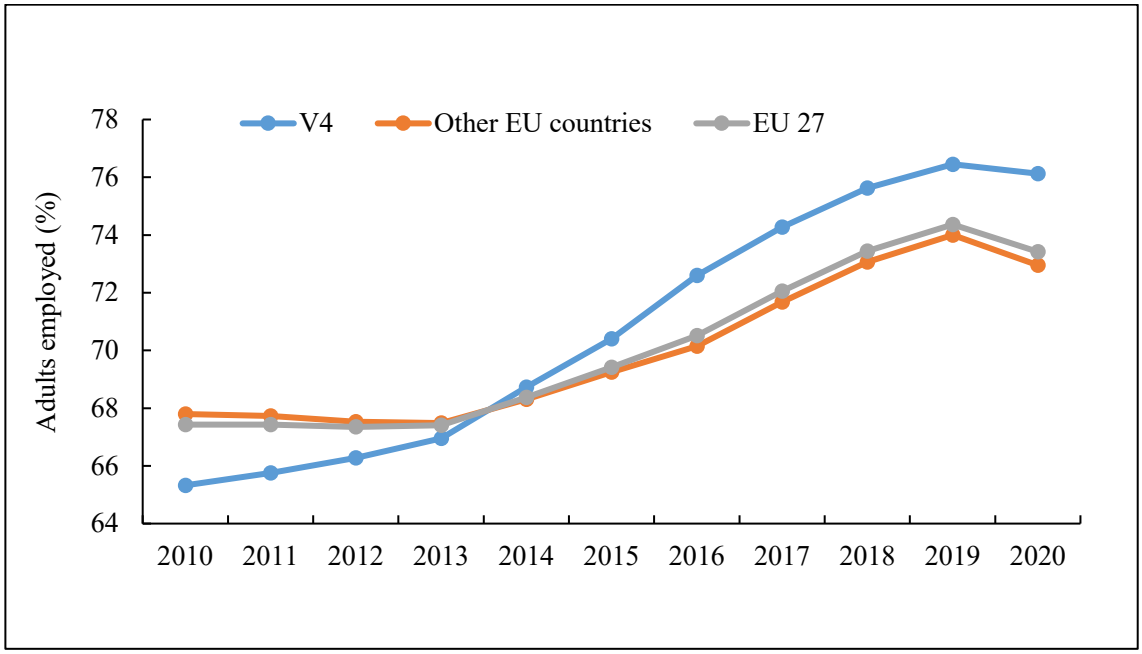

*Source:* Author's construct and calculations based on data from IMF

### *4.2. Impact of COVID-19 on employment in the European Union*

With respect to employment, the headline target of the Europe 2020 Strategy was to ensure that 75 % of the population aged 20-64 should be employed by 2020. The study finds that by 2020, this target was was only achieved in 15 out of the 27 EU member countries. Furthermore, the study finds that the COVID-19 pandemic adversely affected the achievement of this target as thousands of people lost the jobs due to the various lockdown measures to contain the spread of the coronavirus.

Further analysis of the trend from 2010 to 2020 indicates that since 2013 the percentage of adults employed in the EU trended upwards until the first year of COVID-19 pandemic. Also, the study finds that since 2014, the V4 countries have had higher percentages of their adult population employed when compared to other EU member countries (Figure 4). Also, while the V4 countries collectively met the Europe 2020 the target on employment as 76.1% of their adult population were employed as at 2020, this target was not achieved for the EU as a whole since only 73.4% of adult population of the EU were employed as at 2020.

**Figure 4. Employment trends of the V4 and other EU member countries 2010-2020**

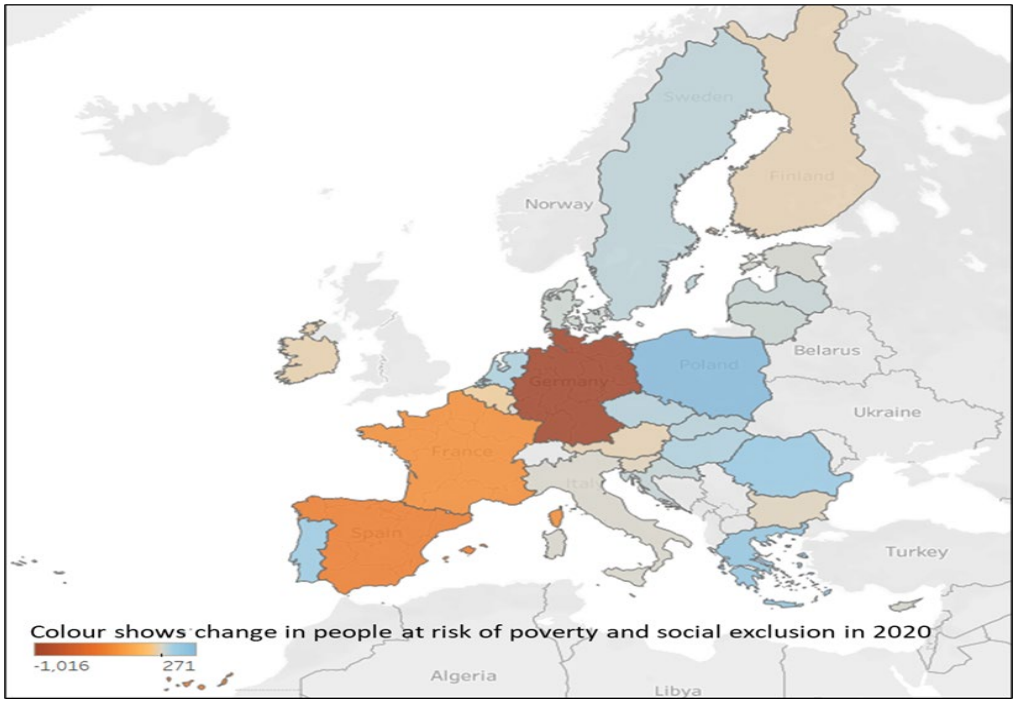



*Source:* Author's construct and calculations based on data from Eurostat

### *4.3. Impact of COVID-19 on the number of people at risk of poverty in the European Union*

With respect to the number of people at risk of poverty and social exclusion, the study finds that during the first year of the COVID-19 pandemic, there was a year-on-year reduction in the V4 countries; however, particularly in Western EU member countries such as Germany, Spain, France, Belgium, Ireland, and Austria the situation worsened as the number of people at risk of poverty and social exclusion increased. Germany was the most affected country where an addition over 1 million people becoming at risk of poverty and social exclusion during the first year of the pandemic (Figure 5).

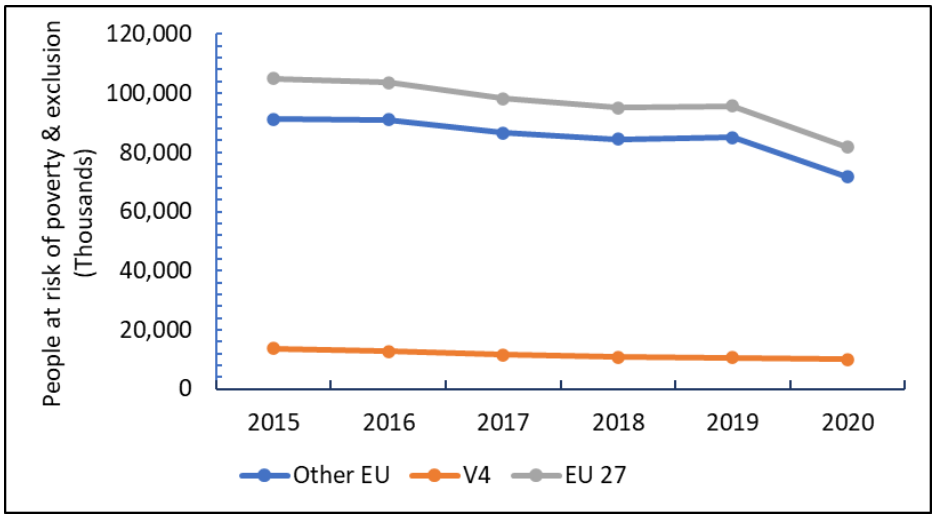
**Figure 5. People at risk of poverty and social exclusion (Thousand persons) during COVID**




Source: Author's construct and calculations based on data from Eurostat. Note: Negative values represent a worsening situation or increase in people at risk of poverty and exclusion.

Although countries of Western Europe recorded an increase in the number of people at risk of poverty and social exclusion during the first year of the COVID-19 crisis, further analysis of the trend for the past 5 years before the pandemic suggest that overall, the number of people at risk of poverty and social exclusion has been declining in the EU (Figure 6).

**Figure 5. Trend of the people at risk of poverty and social exclusion 2015-2020**




*Source:* Author's construct and calculations based on data from Eurostat

## 5. Conclusions and recommendations

This paper investigated the impact of the COVID-19 crisis on the achievement of the socioeconomic components of the Europe 2020 targets and how the V4 countries compared with the other EU member countries. Specifically, data on economic growth, employment, and the number of people at risk of poverty and social exclusion for the period 2010 to 2021 were analysed. The findings of this study suggest that the COVID-19 pandemic adversely impacted the achievement of the socioeconomic development aspects of the Europe 2020 strategy. The impacts were however asymmetrical across countries and also across targets. For instance, Whereas the V4 countries more adversely affected in terms of economic growth, they performed better with respect to employment and reducing the number of people at risk of poverty and social exclusion, especially when compared to other EU countries particularly in western Europe. The Europe 2020 target of ensuring that at least 75% of the adult population in the EU were employed between 2010 and 2020 was achieved in the V4 but not the entire EU. The asymmetrical nature of the impact of the pandemic on the EU member countries could be due to some of the underlying trends that existed before the pandemic as well as some of the policy measures response measures initiated by the various governments to combat the adverse impacts of the pandemic. For instance, in Hungary, when the country first went into lockdown in March 2020, the Prime Minister Viktor Orbán announced a fiscal stimulus package of 7.9% of GDP and several new economic policies to protect the economy by providing relief to workers and businesses. Some of the policies included the government taking over a portion of wage payments from firms that have had to resort to shortened work hours due to the coronavirus epidemic. All these measures were intended to minimise job losses. That notwithstanding it can be concluded that the EU did not achieve the level of sustainable and inclusive growth that it aspired to achieve from 2010 to 2020 and one of the major factors was the COVID-19 crisis. Nevertheless, more in-depth studies would be required to understand the factors that influenced the performance of the various EU member countries and their susceptibilities and resilience to various crises. Although, many of the EU member countries had already begun to rebound from the effects of the COVID-19 pandemic by early 2022, it is currently unclear how the ongoing war between Russia and Ukraine will impact socioeconomic development in the EU. Already over million refugees from the war zone have arrived in neighbouring countries in Eastern Europe. The energy shock and the disruption of trade will also inevitably have socioeconomic consequences on the V4 and other countries in Central and Eastern Europe. Since, the EU collectively was unable to achieve all the Europe 2020 targets, it would be interesting to investigate the future actions that the EU would take to address the shortfalls as it also seeks to recover from the COVID-19 pandemic and the negative externalities of the Russia-Ukraine crisis.

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**Appendix 1. List of countries analysed**

| Country Group | List of countries |
|---|---|
| **EU 27** | Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Czechia Republic (CZ, Cyprus (CY) Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (EL), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE) |
| **V4 Countries** | Czechia, Hungary, Poland, Slovakia |
| **Other EU Countries** | Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Cyprus (CY) Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (EL**),** Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Portugal (PT), Romania (RO), Slovenia (SI), Spain (ES), Sweden (SE) |

*Source:* Author's construct

# Culture and Organizational Social Networks: Intersections in the Case of Expatriates in Hungary

Máté Baksa[1] – Gréta Gaál[2]

**Abstract**

In the past decade, there has been an explosion of interest in the analysis of organizations as networks of interpersonal relationships. Assuming that these networks of communication between employees are the "hardware," or in other words, the system of channels through which different content flows, culture can be interpreted as the "software" that spreads across the network. Actors pass on values, stories, behaviors, and attitudes to each other through their interactions. Organizational networks have a strong and intertwined relationship with the national culture of their external environment and the organizational culture, i.e., their internal context. Lately, a growing number of empirical studies have examined the dynamics of tie formation in organizational social networks, that is, the mechanisms that explain the generation of new relationships between network actors. A promising field of research is proposed as the analysis of networking patterns of expatriates. Expatriates, i.e., workers who are permanently posted abroad by their employer for a fixed period, are in a unique situation in that they have little or no contact with their peers in their host country at the beginning of their mission, so the formation of their new social networks could be observed over time. In our study, we are looking for an answer to the question of whom expatriates tend to bond with, how, and for what motivation. Our empirical research is exploratory in nature, so we employed qualitative research methods and carried out semi-structured interviews. The research sample includes expatriate employees of for-profit organizations posted in Hungary.

Keywords: organizational social networks, culture, tie formation, expatriates

JEL code: M10, D23

## 1. Introduction

Networks are ubiquitous in modern societies. The more intricate and complex our social systems become, the more valuable it is to examine them from a network perspective (Borgatti et al., 2009; Cross et al., 2013). While conducting network analysis, researchers intend to find meaningful patterns in a system of interconnected entities that would otherwise remain hidden

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(Baksa & Drótos, 2021). The network perspective helps them separate the mass of irrelevant individual data from the essential information on the structure and interplay of actors (Borgatti & Halgin, 2011). In organizational social networks, it is usually employee relationships and communication interactions that are analyzed in order to identify informal key players and anomalies that require actions from the management (Cross & Parker, 2004; Cross & Thomas, 2009).

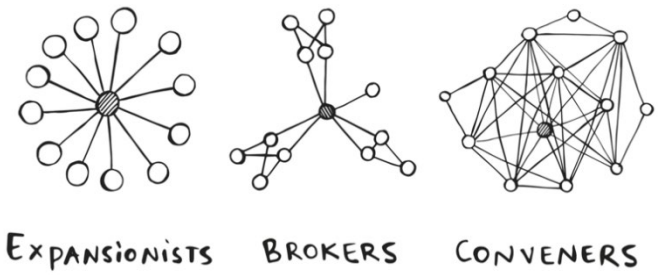
One of the key streams of organizational network research examines the conditions and mechanisms of relationship formation (Bjorklund & Daly, 2021; Fuhse & Gondal, 2022). In the literature review of our study, we present some of the research results obtained so far in this field. During our own empirical research, we chose a particular situation as the framework of our research: we examined the relationship-building habits of expatriate employees stationed in Hungary. The examination of the expat workers is particularly exciting because they have little or no local connections when they arrive at their new place of mission, so in this unusual situation, their social networks in the host country can be observed from the beginning.

## 2. Literature review

### *2.1. Connection styles and mechanisms of edge formation in social networks*

When examining organizational networks, we can analyze not only the entire network structure but also the actors' individual networks, the so-called ego-networks. Individual networks of communication can usually be characterized by their *extent* (number of relationships), *diversity* (differences in relationships along specific dimensions), and *connectedness* (degree of familiarity of acquaintances) (Shipilov et al., 2014). In her recent book, Marissa King identified individual relationship-building styles based on these three factors, that is, the patterns of behavior that characterize each actor over the longer term. According to King (2021), people can be classified into one of three types based on the structure and nature of their personal network: *expansionist*, *convenor*, and *broker*. Expansionists have many connections in the first place; the networks of brokers mainly strive for diversity and to connect different communities, while the convenors create embedded structures of deep and stable connections.

**Figure 1: Connection styles of network actors**




Source: King (2021), p.11.

It is important to note that it is possible for an individual, to some degree and with the dominance of a specific style, to apply multiple styles at the same time. It is also common for connection styles to change as individual life situations change. Below, we compare these connection styles based on aspirations, characteristics, and strengths.

**Table 1: Comparison of connection styles**

| | EXPANSIONISTS | CONVENORS | BROKERS |
|---|---|---|---|
| **Main aspiration** | quantity | quality and interconnectedness | diversity |
| **Characteristics** | they create a large and extensive network of weak ties | they plan for the long term and strive for stability | social chameleons interconnect many communities |
| **Strength** | influence, insight, information gathering, | relationships of trust, mental health, social stability | innovations |

Source: own compilation based on King (2021)

For instance, in the research setting, we examine, i.e., after the expatriate worker has settled in the host country, they may pursue an expansionist connection strategy if they are looking for opportunities where they can quickly establish many new connections. Due to the scarcity of time and attention, individuals with a large number of relationships tend to invest little in a specific relationship, and so these remain weak ties in a granovetterian sense (Granovetter, 1973). On the other hand, they can strive for diversity in their new relationships: for example, they can make contact with mother-, host-, and third-country nationals, and they can specifically look for relationships outside the workplace (such as those related to sports, hobbies, or religious communities). Finally, they can also choose the convenor style: in this case, they will try to deepen their already acquired relationships and spend as much time as possible with their new friends and colleagues whom they have already met. In this case, they will also try to introduce their new friends to each other, thus increasing the transitivity of their personal network.

According to the research of Harrigan and Yap (2017), the formation of new relationships in social networks (i.e., tie formation in graph theory) is driven by the following mechanisms (Baksa, 2019):

i. closure: open triads tend to become closed – meaning a network actor is more likely to connect with someone they have a mutual friend with;
ii. reciprocity: relationships seek reciprocity – that is, a network actor is more likely to befriend someone who is friendly to them;

iii. homophily: there is a greater likelihood of a relationship between actors who are similar in some way - “birds of a feather, flock together”;
iv. popularity: actors with many relationships are more likely to gain new relationships - the “rich get richer” principle;
v. activity: actors from whom many directed relationships come are more likely to initiate further relationships,
vi. entrainment: between actors who already have some type of relationship, other types of relationships are easier to develop.

### *2.2. Definition and types of expatriate workers*

The concept of *expatriates* also needs a definition at this point. The term *sojourner* appeared in the literature more than 50 years ago, which can be best described as a guest in English. By these visitors, we mean persons going abroad who voluntarily and temporarily move to a foreign country, usually not for business purposes but for tourism, war or emigration, or possibly for a religious mission (Gudykunst & Hammer, 1984). However, the term sojourner did not prove to be sufficient, as it was applicable only to non-business travelers. With the expansion of markets and the spread of globalization, it was necessary to create a new concept, which became *expatriate*. From the 1980s and onwards, “expat” is the name given to a posted worker in an economic organization who is temporarily sent abroad. In connection with their travel and staying abroad, they are commissioned by the parent company to perform work assignments, which may be for a specified time (Harrison et al., 2004).

We may find different typologies of expatriates in the literature, from which we present a well-established and popular one (Harrison et al., 2004). The classification is made according to the country of origin, the nationality of the company, and the country of mission: 1) parent country nationals (PCNs), 2) inpatriates, 3) third-country nationals (TCNs), and 4) host country nationals (HCNs). Those in the PCN category are characterized by that they are nationals of the country from which the organization also originates. Inpatriates are workers who live in the country of their nationality but have been transferred from the company’s foreign division to the company’s headquarters. A TCN is an employee whose origin and place of employment are different from their host country. Finally, under HCN, we define the workers who work for the organization to which the expats are posted.

The efficiency of expatriates and its measurement play a crucial role in relevant organizational research. Efficiency is measured by both the degree of organizational integration and corporate performance (Black, 1988). Defining cultural identity (i.e., self-image formed from a specific national identity) or cultural intelligence are both important in terms of the extent to which an expatriate adapts to the host country (Peltokorpi & Zhang, 2020). According to identity theory, the social environment influences self-determination, which in turn influences workers’ behavior (Stryker & Burke, 2000).

## 3. Research methods

In the present phase of our research, we focused on the causes and background of the relationship-building habits of expatriate employees, not on the identification of general regularities and extensible findings. Accordingly, we used qualitative research methodological tools: semi-structured interviews and content analysis as methods of data collection and data analysis. After a better understanding of these patterns, our goal is to continue the research on a larger sample using other tools.

In our empirical research, we interviewed six individuals. All of them are foreign nationals stationed in Hungary; in the above-presented typology, they came from the PCN and TCN categories. In the selection of the sample, we applied the principles of comfort and snowball methods, i.e., we first selected the interviewees from the circle available to us and then based on their recommendations; and from Facebook groups inviting expatriates in Hungary (Expats in Budapest; Hungary EXPATS :); Brits in Budapest + Friends of UK in Hungary). We posted a message to the groups on the social networking site, attaching a cover letter to which we received answers. Based on these responses, an interview pipeline was prepared, of which the results of the first six completed interviews are described in this study.

As there are fewer than usual expatriates in Hungary due to the epidemic situation, keeping in mind the minimization of interactions and adapting to the agenda of corporate professionals, we conducted the interviews in an online video call using the Microsoft Teams program. We carried out the interviews in English, and the conversations lasted 45-60 minutes. The interviews were conducted in the winter of 2021 and spring of 2022. In terms of the interview technique used, we tried to create personal conversations, so we asked our conversation partners to turn on their cameras, if the internet connection allowed this. With prior consent, we recorded the discussions, which were then transcribed using Alrite's artificial intelligence-based speech recognition software for later analysis of the research findings. We also made short notes during the interviews. The descriptions were coded and analyzed using NVivo content analysis software.

## 4. Results

The interviewees we asked were Indians, Malaysians, Kenyans, Nigerians, Bolivians, and British, respectively. The British interviewee worked for a British multinational company, so they can be classified as a PCN expatriate, while the others are third-country nationals (TCNs) based on their employing company. Half of the subjects reported that they arrived in Hungary within two or three years, just before or during the coronavirus epidemic (this, of course, fundamentally affected their ability to network), and the other half had been given their job or assignment in Hungary for five years or more.

In the case of expatriates living in Hungary for a long time, it was a recurring pattern that their time here could be divided into three phases: (1) the short period after the assignment, (2) the period of settlement, two to three years later, and (3) the longer-term settlement phase. In the first period, they did not typically seek contact with the citizens of the host country but made acquaintances with people from their mother country or, if there were none, mostly other expats. It is also typical that in the early days, corporate and collegial relationships meant a significant part of their network, and only later did they become acquainted with, for example, sports, hobbies, or religious communities. Expatriate workers who have lived here for a long time also reported that their identity had changed over the years: their life in Budapest had become an increasingly important part of their self-image.

Each of our interviewees emphasized that the orientation programs organized by the employing companies and the services to help them settle in (often part of the relocation package) also played a key role in the building of their initial relationships. Many of them mentioned that language barrier is a constant problem in establishing contacts in the host country. Not only did they find it challenging to make themselves understood in government and other administrations procedures, but they also had a problem finding a place where English was the common language when searching for a sports club or a church community. Due to language barriers, they had to rely on their contacts from their mother country, from whom they had received helpful advice and guidance if they had lived in the country for some time. In the same way, they were more open to people from third countries who faced similar challenges and with whom they could form a problem-solving community.

The importance of corporate orientation is also supported by the results of King (2021), who emphasizes the significance of sponsorship in addition to mentorship: while a mentor primarily passes knowledge and expertise onto his mentee, the sponsor shares his own social capital with his protégé. The transfer of social capital (e.g., introductions, involvement in communities, drawing the attention of others to the newcomer) provides significant assistance in the first phase of integration, socialization, and networking.

One of our interviewees mentioned that it is also easier to make contact with other expatriates because they have more “free valence” in the sense of relationships, meaning they still have free time and energy to make new relationships – as opposed to host citizens who also manage their existing network. In connection with the results of Borgatti et al. (2009), we can state that expatriates make acquaintances mainly with persons with some proximity: with whom they share a national identity, corporate identity, and everyday challenges.

An essential difference between our interviewees was whether they came to Hungary alone or with their families. Expatriate workers who arrived alone reported that they had made more significant efforts to establish new relationships in the host country and that the social networks they formed were characterized by a predominantly brokering connection style: diversity in

their networks was prominent. In contrast, expats who came with their families or (in one case) had Hungarian friends chose a convenor style in their private lives: they took care of their existing relationships, made some new friendships – but it was also important for them to integrate them into their family and pre-existing friendships. Each of the expatriates we interviewed work in global teams at their company: as a result, they are in daily contact with members of many other nations through virtual interfaces. Most of them work in a way that requires collaboration with a large number of colleagues – so just by looking at their social network at work, we can see that they have followed an expansionist style, meaning they have developed a huge number of weak tie relationships.

Based on the present phase of our empirical research, we can see that the networking patterns of expatriate workers are fundamentally determined by whether they arrive alone or with their family and friends, what is the time frame of their mission, what orientation and sponsorship they receive, and how many new acquaintances from their mother country they find in their host country. Our research results are limited by the size and composition of our sample, and we plan to continue the research by extending it in the future.

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# International transport accessibility of developing countries – case study for Kenya railroad transport

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**Abstract**

Transport accessibility is one of the key characteristic of any country. It determines the possibilities of interactions in the given space to occur, taking into account its resistances. It can be analyzed both at internal or external perspective. The former determines the degree of internal ties between the space of a given country. The latter, on the other hand, relates to the connections between the space of the given country and the space outside its borders. In a globalized world, transport accessibility largely determines the possibilities of the functioning of a country's economy in international value chains by shaping the possibilities of the flow of goods in import and export.

Africa is a continent with great economic potential. In order to fully use potential of developing countries one of the basic requirement is to properly prepare the transport system – not solely the infrastructure but also the method of its operation - to ensure a high level of transport accessibility. While research of this type are common in highly developed countries, they are rare for growing African economies. This article aims to conduct a preliminary study of the Kenya transport accessibility from an international perspective, focusing on railway transport. This study is intended to serve as an example and encouragement for future in-depth studies, highlighting potential research gaps.

Keywords: transport accessibility, infrastructure, international trade

JEL code: F1, R1, R4

## 1. Introduction and theoretical background

In colonial times, the development of African transport infrastructure was strictly subordinated to the needs of the colonizing countries. Many of the transport routes built at that time are the backbone of national transport networks today. The organization of transport on the continent remained subordinated to the needs of other countries even after gaining independence. In most cases the poverty of African countries does not allow them to independently carry out costly infrastructure projects (Meredith 2013). One of the methods of assessing transport systems is

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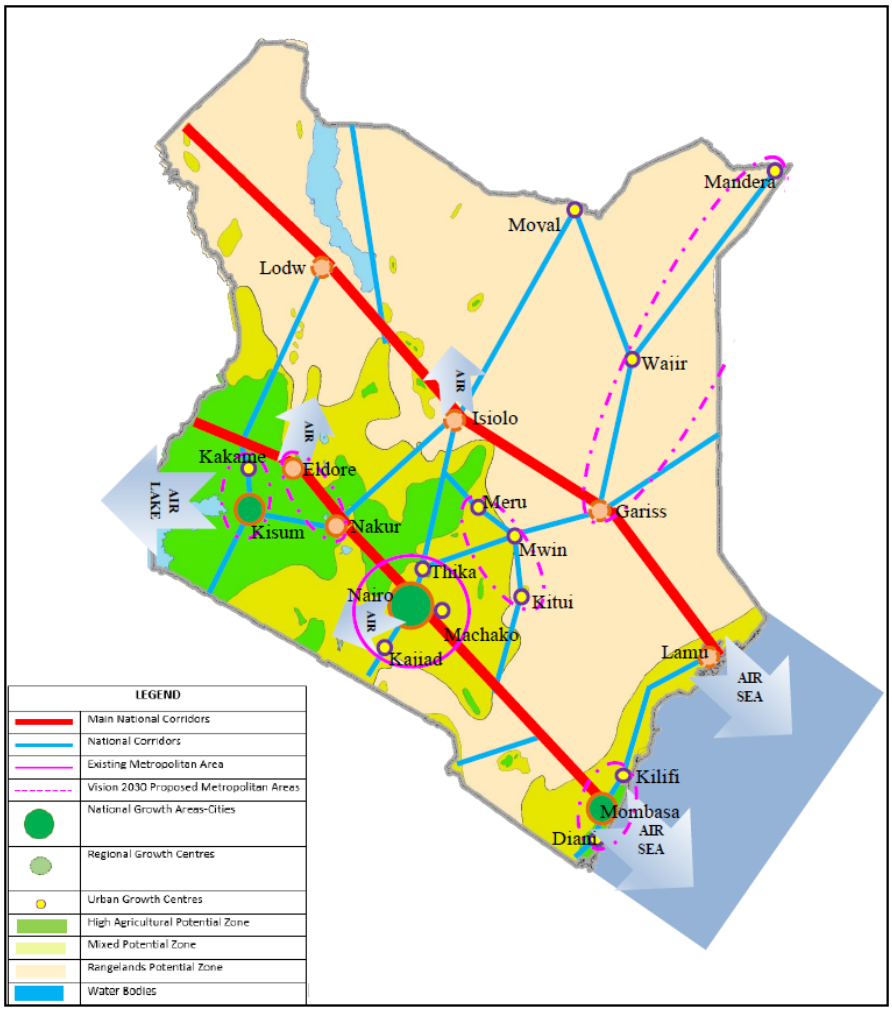
the study of transport accessibility. It determines the possibility of spatial interactions to occur referring to the concept of attractiveness and costs (for example time or money) (ITF 2020). The LPI and GCI provided by the World Bank clearly show the underdevelopment of the infrastructure in Africa (World Bank 2020). To strengthen competitiveness both quantitative and qualitative development is necessary (Yogo et al. 2015). The assistance of international organizations and foreign governments of developed countries with their know-how and finances is an important factor here. However many aid projects implemented so far in Africa were accompanied by numerous embezzlement and corruption which puts a question mark on their effectiveness and the willingness of donors to get involved (N'Diaye 2014, Meredith 2013). The last two decades have seen changes in the sources of aid to Africa. Traditional Western donors have reduced their influence as a result of the 2008 financial crisis and the recent COVID-19 pandemic. On the other hand, China, by implementing the One Belt One Road plan, significantly increased its involvement in this continent. The aid reaches many countries and covers various areas of activity. One of the countries that is developing its cooperation with China is Kenya.

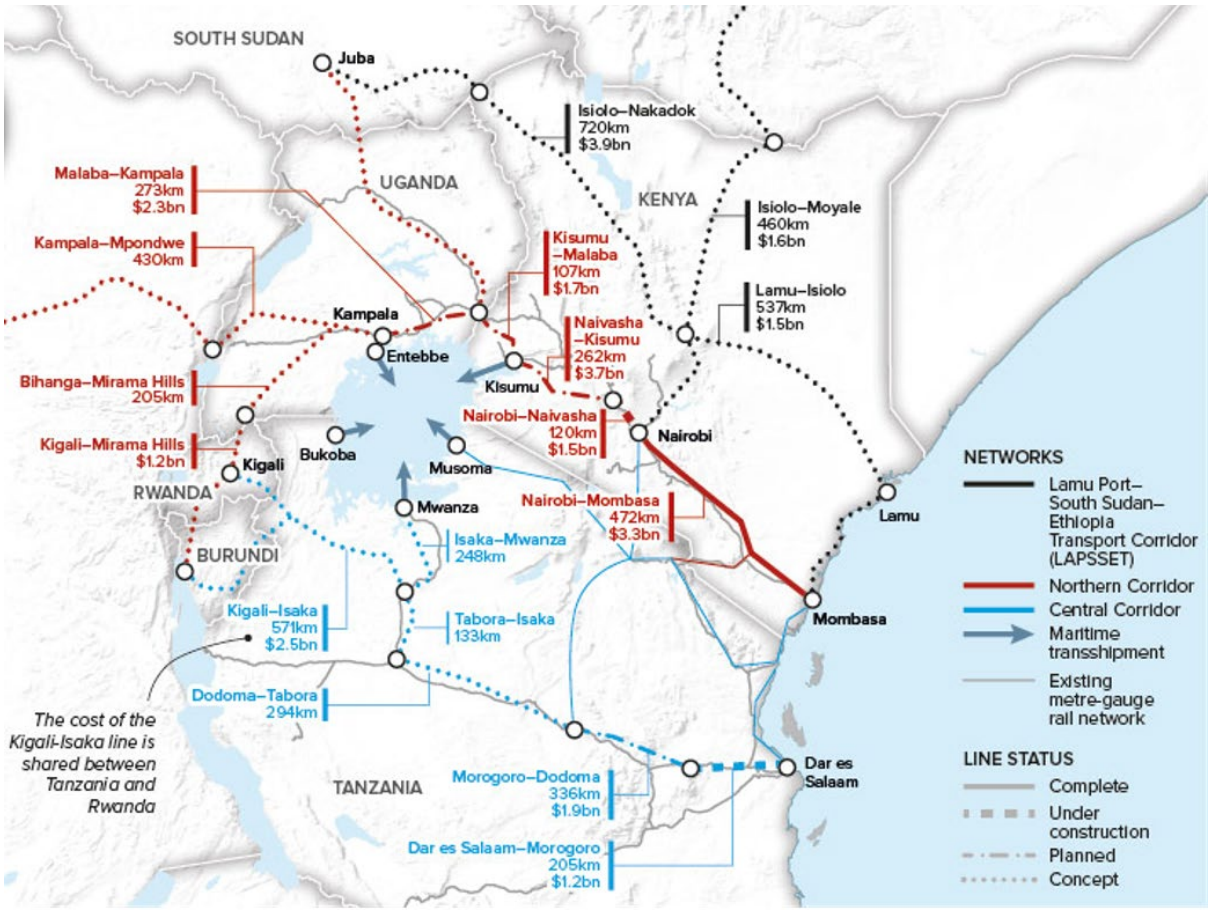
**Figure 1. Kenya's National Spatial Plan Conceptual Framework**




Source: Ministry of Lands and Physical Planning, Department of Physical Planning (2014). National Spatial Plan 2015-2045 – An integrated Spatial Plan for Balanced and Sustainable National Development.

Chinese money is invested in various ventures. One of them is the construction of two transport corridors (Fig. 1). Their main element are railway lines. As the National Spatial Plan shows the SGR corridor (short for Standard Gauge Rail) begins at Kenya's main port, Mombasa, reaches the capital city of Nairobi, and continues towards the Uganda border. This corridor in many places uses elements of the already existing railroad infrastructure built by the British in colonial times linking the fertile regions of the White Hills with the coast. The second LAPSSET corridor begins at the new port of Lamu and runs through cities such as Gariss, Isiolo and Lodw to the border with South Sudan. Its aim is to activate the poorer and less developed regions of Kenya. The main corridors are supported by a network of secondary corridors. The entire transport network is to improve the transport conditions in the country and become a factor in its development. In addition, connections with neighboring countries and creating new East African railway transport network are to be conducive to increasing trade (Fig. 2).

**Figure 2. A planned regional standard-gauge rail network in East Africa.**




Source: Oxford Analytica. East African rail links may miss their connections – 7th May 2019. https://dailybrief.oxan.com/Analysis/GA243676/East-African-rail-links-may-miss-their-connections (online access 04.03.2022).

Chinese involvement in infrastructure projects in Kenya, as in other cases, is related to the implementation of the One Belt One Road initiative. Although there are many similarities in terms of standards for the implementation of aid projects by Western donors and China, there

are still differences that may favor the latter (Esteban and Iliana 2021). Despite China's declaration to invest in a win-win model, the real outcome of this infrastructural project is not clear both among the public and scientists. Dossou (2018) notes that China is currently the largest trading partner, the largest supplier, the largest lender, and the largest source of foreign tourism, in terms of Kenya's rapid growth. Such a strong relationship, although it certainly brings many benefits, can also pose a serious risk. The right question is therefore not whether the infrastructure will have a positive impact on the development of Kenya by improving its transport accessibility, but rather whether the strong dependence of the implementation of infrastructure projects, in this case SGR and LAPSSET corridors, on external aid from China is efficient and effective taking into account balance between possible benefits and costs.

## 2. Materials and Methods

Research into infrastructure projects can be based on quantitative or qualitative methods. Their selection and application depend on the available data and the specific circumstances of the case to be studied. Considering the above and the preliminary nature of this article, SWOT will be the most appropriate method of describing potential consequences of tightening Kenya infrastructure development with China's aid. This is a widely recognized and commonly used method of project evaluation. Its purpose is to identify internal strengths (S) and weaknesses (W) and external opportunities (O) and threats (T).

In order to complete the SWOT matrix, selected items from the literature on the subject were reviewed. In particular, attention was focused on the reports of international organizations, the publications of the Kenyan government and research studies on the development of African countries and the importance of infrastructure projects.

## 3. Results

Based on the literature review and using author's own experience from previous research, the SWOT matrix was prepared (Fig. 3).

Strengths. African countries need an inflow of funds to implement new infrastructure projects. The developing Chinese economy, guided by its needs, has an interest in cooperation with African countries. China is able to provide not only project financing, but also knowledge, technology and equipment. Years of own economic development based on ambitious infrastructure projects can be a source of valuable knowledge supporting the implementation of projects in Africa. Kenya's starting position in terms of the quality of transport infrastructure is also not without significance. These two combined can provide Kenya with a strong leverage for development.

Weaknesses. Strong ties with a single partner in trade and politics can lead to dependency, especially in the case of a significant potential difference between parties involved. A possible

change in China's priorities is also a significant weakness. Kenya is one of the many partners for China while China is the main partner for Kenya. In such a case, a focus on cooperation and a sudden breakdown of it could have very negative effects on the Kenyan economy. The use of external funds to finance costly infrastructure investments is related to the widening of the deficit. Also there is still high risk of corruption and other incorrect practices. Some studies indicate that the planned transport corridors based on rail transport are characterized by low efficiency, especially in terms of responding to real needs and maintaining the proper costs level (Otele et al. 2022).

**Figure 3. Chinese infrastructure investments from Kenya's perspective - SWOT matrix.**

| Internal | External |
|---|---|
| **STRENGHTS** | **WEAKNESSES** |
| - ease of raising funds for new investments<br>- provision of a complete project package (employees, technology and know-how)<br>- two well established sea ports and formed skeleton of land infrastructure<br>- relatively good level of transport infrastructure in comparison to other African countries<br>- China already have experience in similar projects | - increasing dependency (loans and debt, technology)<br>- lack of effectiveness and efficiency in planning, implementation and operation of new infrastructure projects<br>- ethnic and political divisions<br>- the risk of China changing its priorities |
| **OPPORTUNITIES** | **THREATS** |
| - better infrastructure and higher transport accessibility may lead to new foreign investments<br>- increasing international trade done by linked countries may lead to higher incomes from duties in taxes<br>- chance to become a regional logistic hub<br>- development of Pan-African transport network | - tightening of economics cooperation can lead to a crisis if the lead partner is in difficulties<br>- political and economic instability in neighboring countries<br>- competition of other countries with similar advantages |

Source: own work – see reference list at the end.

Opportunities. Development of Kenya's transport network and connecting it with those of other neighboring countries to create an efficient international transport system in East Africa, may result in an opportunity to gain the status of a regional logistics hub (Bonfatti and Poelhekke 2017). Achieving such status would be conducive to attracting further foreign direct investment, which could become an important element of the development of the economy (Burgi et al. 2017). In addition, handling the import and export of third countries would increase revenues from stamp and customs duties.

Threats. As previously noted, Kenya, while essential, is only one of many partners for China in Africa. Thus in threats section competition for Chinese funds should be emphasized. This rivalry may lead to the weakening of one's own negotiating position and the resignation of important postulates only in order to receive funds and block their obtaining by other countries. Kenya's neighbors have witnessed years of unrest. Rwanda, South Sudan and Somalia are countries with a relatively difficult internal situation. The escalation of internal conflicts may

weaken the position of neighboring countries, including Kenya, and also reduce profits from implemented projects. In the geopolitical context, the rivalry between China and the USA is also important, as it may affect trade relations.

## 4. Recommendations and Discussion

The transport infrastructure of African countries requires additional investment. For individual countries, affected by numerous economic and social problems, it may be difficult to undertake such investments. Although the scale of the importance of infrastructure projects may be debated, there is a common consensus that a minimum level of infrastructure is essential for the development process. The example of Kenya shows that, despite limited own founds, it is possible to obtain large financial resources from outside, in this case from China. The conducted SWOT analysis indicated the existing opportunities as well as strengths for the implementation of railway projects in Kenya financed by China, at the same time pointing out weaknesses and threats.

While all the points mentioned in the matrix seem important, a few of them should be given particular attention. All projects must meet the actual needs of the inhabitants of the countries in which they are implemented. The terms of cooperation between partners should not make one country dependent on another. The disproportion between China and other partners seems to be so significant that it may hinder objective negotiations. In addition, all projects implemented by beneficiaries should include the possibility of termination of funding and engagement of the donor. Taking into account such a scenario will ensure the purposefulness and usefulness of the implemented project even when the conditions in the environment change, minimizing the risk of collapse of the entire project. There may also be doubts as to whether the scale and scope of the selected projects is adequate in relation to the needs. As stated by Jedwab and others (Jedwab et al. 2016 – both entries) whether the currently implemented under China's aid giant transport infrastructure projects will have a significant impact on a national or African scale is a complex issue and requires the analysis of many variables and contexts. Although mentioned conclusions are confirmed by the works of other researchers (for ex. Iradu and Owillo 2020), still many issues remain unanswered. Further research on this topic should be carried out. In particular, the development models used for the needs of African countries should be revised in an appropriate manner, taking into account the issue of foreign aid, so that after analyzing the costs and benefits, it will actually be a step on the path towards development. Finally, foreign aid cannot be treated only as a pure and free gain. Obviously it is a chance to improve own situation but still its possible costs should be borne in mind. That is why the use of foreign aid should be implemented with great caution. No continent understands this better than Africa.

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# Family firms & non-family firms – investigation of differences on perceived business environment and innovation performance

János Bujáki[1]

**Abstract**

Some decades ago, researchers around the world have recognised the significant and growing role of family businesses within national economies. However, we still do not have a generally and broadly accepted definition for family business. A study made in EU estimates family firms' proportion 70% to 80% of all companies in the community, adding their 20-70% share in GDP and 40-50% in labor market. Several papers presume family firms might be more innovative than their 'non-family' competitors – some studies even confirm such findings.

Based on the above, it is expedient to analyse whether there are significant differences between family firms and non-family firms in areas like perceived business environment, fundraising ability, innovation performance or factors hindering their successful business activities. Analyses are based on data I had collected from primary research.

However, majority of findings in this paper, applying statistical methods, have not confirmed significant differences between family businesses and non-family businesses.

Keywords: innovation, investment, family firms, business environment, devision making practices

JEL code: O0, O2, O3, O4

## 1. Introduction

As a result of social, political but especially economic changes starting in 1989 in Hungary, the command economy that earlier existed has been replaced by 'Western-type' free market economy. Upon widespread establishment of private business organizations all over the country, the number and importance of private sector's employers have been significantly changed – and increased. Based on the 2020 data of Hungarian Central Statistical Office[2], micro, small and medium-sized enterprises were responsible for 65,82% of all jobs in the private sector. Significance of these companies also lies in their contribution to the generated economic value added (~50%) in the national economy and their share of nearly one third of

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[2] https://www.ksh.hu/stadat_files/gsz/hu/gsz0018.html

foreign trade exports. It is apparent that their performance fundamentally determines the size of GDP and Hungary's competitiveness.

Some decades ago, after researchers around the world had recognised the determining and growing role of family businesses within each national economy, the number of papers and studies concerning family businesses began to increase. However, we have information and estimates on family businesses mainly from developed economies of the Western world, data on the same cluster of companies are quite poor and inaccurate in Central & Eastern Europe including Hungary. Truth be told, approximate number and economic weight of family firms in Hungary are unknown (Kása – Radácsi – Csákné, 2019). According to a research made in EU, ratio of family businesses is somewhere between 70-80% taking all member states into account. Their contribution to the Community's GDP is between 20-70% and 40-50% to employment (Csákné, 2012). Size of aforementioned percentages largely depend on the definition applied for 'family businesses' (Howorth et al., 2010).

Based on the above, I deem worthy to investigate differences on characteristics and performance between family businesses and non-family businesses based on data provided by primary research. In the present paper, I analyse data collected in 2019 to confirm whether there are significant differences between family & non-family firms in the following fields: perceived business environment, innovation performance and decision making practices. Therefore I have formulated below hypotheses:

- There is a significant difference on **perceived business environment** between family businesses and non-family businesses.
- There is a significant difference on **innovation performance** between family businesses and non-family businesses.
- There is a significant difference on **decision making practices** between family businesses and non-family businesses.

## 2. Literature review

There is no generally and broadly accepted definition in international literature for 'family businesses' (Littunen & Hyrsky, 2000, Csidei, 2017). Astrachan, Klein & Smyrnios (2002), in their work, deem it practical to distinguish definitions by their content, objective and form. Since the research of family businesses had begun, many different definitions have been conceived, however, large part of those shows similarity with each other. In her research including 33 countries' applied definitions for family businesses, Mandl (2008) identified 90 various interpretations. Over half of those assume majority of shares within the one family and the management of the family firm by the family's members.

Earliest definitions in literature mainly focus the issue of, on the one hand, the founding family's shares (Berry, 1975, Lansberg, Perrow & Rogolsky, 1988) within the company and,

on the other hand, the top management involvement in the family business (Burch, 1972, Barnes & Hershon, 1976). According to some researchers' opinion, process of inter-generational transfer often causes difficult times in family businesses' lives (Ward, 1987), since based on international experiences, nearly two third of family businesses, that were doing successful and profitable business over decades, are not able to succesfully manage the generational change. Due to their significance detailed in Introduction of present paper, this might unfavourably affect national economies. According to Lee (2006), majority of shares or top management control shall be considered as primary characteristics of family businesses, adding that almost every company starts as family firm which makes 'family business' the most common sort of business organizations worldwide. In his research, Lee (2006) found that family firms account for over 80% of all businesses and are responsible for 12% of GDP and 15% of jobs created in the private sector in the United States. Casson (2011) only considers such companies family businesses, in which the founders of the company or their successors constantly are in executive positions and have the majority of shares. Unlike many researchers, who link the liaison of ownership rights and the matter of management control with 'or', Casson did it by using 'and'. Which is not the same. As per study of Chua, Chrisman & Sharma (1999), it is a generally accepted fact that the family founded the company must actively participate in its everyday business life but they emphasize the family may only do it by practicing ownership rights along with decisive influence on management control. Kotey (2005) shares the same opinion but his definition is more strict. Family firms are companies that may be characterized by the following at the same time (Kotey, 2005): decisive ownership rights and management control, family's influence on decision making, employment of family members in the company and last but not least the very intention of heirs to keep operating the company after its founders would step aside of executive positions to the firm. To distinguish companies whether they are of family nature in the sample I have used for analyses in this paper, I stipulated below characteristics for family businesses:

- over 50% of shares must be within one family and
- active and formal position in executive role of at least one member of founding family or their successor.

## 3. Data & Method

### *3.1. Data*

Analyses of present paper were based on online survey made in 2019. The online questionnaire consisted of over 40 questions and focused on answers of owners and managers of micro, small and medium-sized enteprises in Hungary. The questions were available on the website of Szent István University (today: Hungarian University of Agriculture and Life Sciences) from 1st March, 2019 until 30th April, 2019. In total, owners and managers of 259 enterprises have answered all items, of which

- 219 were family businesses and
- 40 were non-family businesses.

### 3.2. Method

Analysis of data has been made by MS Excel and IBM's SPSS. For the analyses to assess the plausibility of hypotheses outlined in Introduction, I have applied Mann-Whitney non-parametric U test and Chi-square test. Research questions along with regarding statistical methods applied were summarized in Table 1.

**Table 1. Research Questions and Applied Methods**

| Research Question | Applied Method |
|---|---|
| Is there a significant difference between family firms and non-family firms on perceived business environment? | Mann-Whitney non-parametric test |
| Is there a significant difference between family firms and non-family firms on hindering factors of business success? | Chi-square test |
| Is there a significant difference between family firms and non-family firms on past innovation performance? | Chi-square test |
| Is there a significant difference between family firms and non-family firms on expected future innovative investments? | Chi-square test |
| Is there a significant difference between family firms and non-family firms on decision making practices? | Chi-square test |

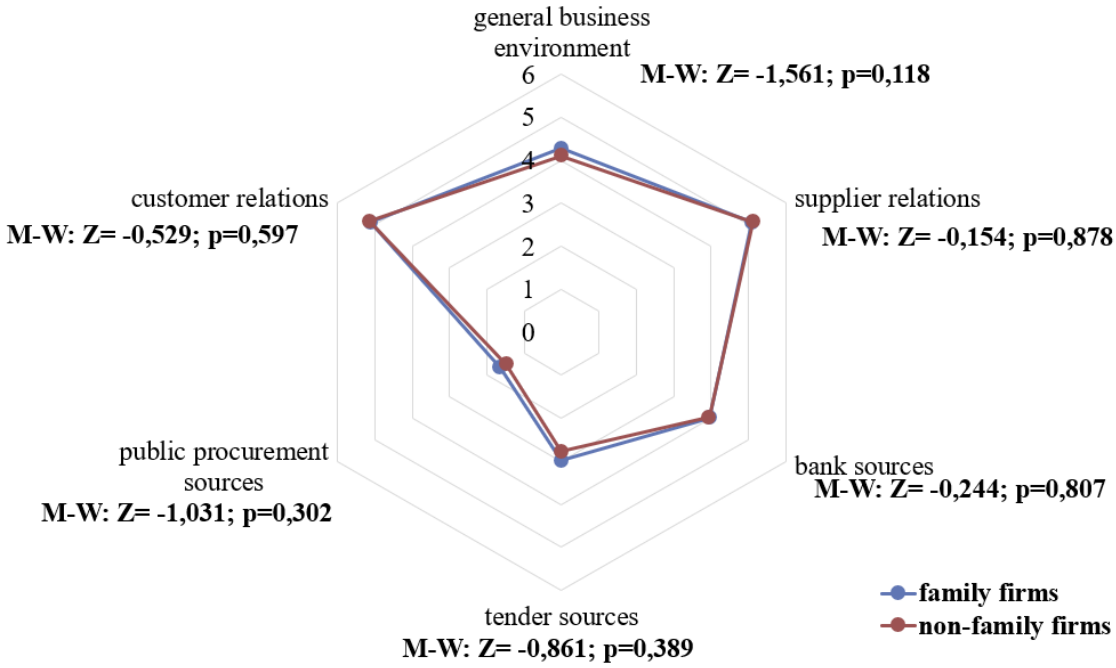
Source: proprietary edit

## 4. Findings

### *4.1. Perceived Business Environment*

Figure 1 shows how the 259 entrepreneurs assessed some components of the perceived business environment on a six-point Likert scale (where 6 was the best, 1 the worst). On the radar, the average values have been indicated along with regarding Mann-Whitney test's 'Z' and 'p' values. **No significant difference** could be confirmed in any aspect of those provided in the questionnaire.

**Figure 1. Is there a significant difference between family & non-family firms in perceived business environment?**

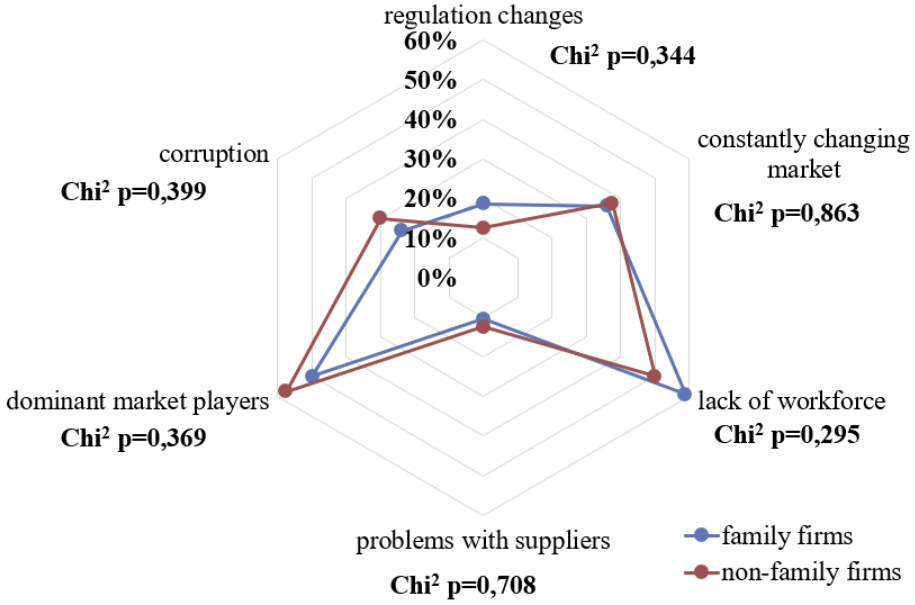



Source: proprietary data collection

### *4.2. Factors Hindering Business Success*

In the field of business environment, I have also investigated to what extent some aspects can hinder the entrepreneur's business success according to their assessment. These were factors entrepreneurs often complain of such as the phenomenon of constant policy changing or the lack of workforce. Six answers were each optional, thereby I have applied the method of Chi-square test. The method **did not indicate significant difference** between family firms and non-family firms in any case (Figure 2).

**Figure 2. Differences in factors hindering business success between family & non-family firms**

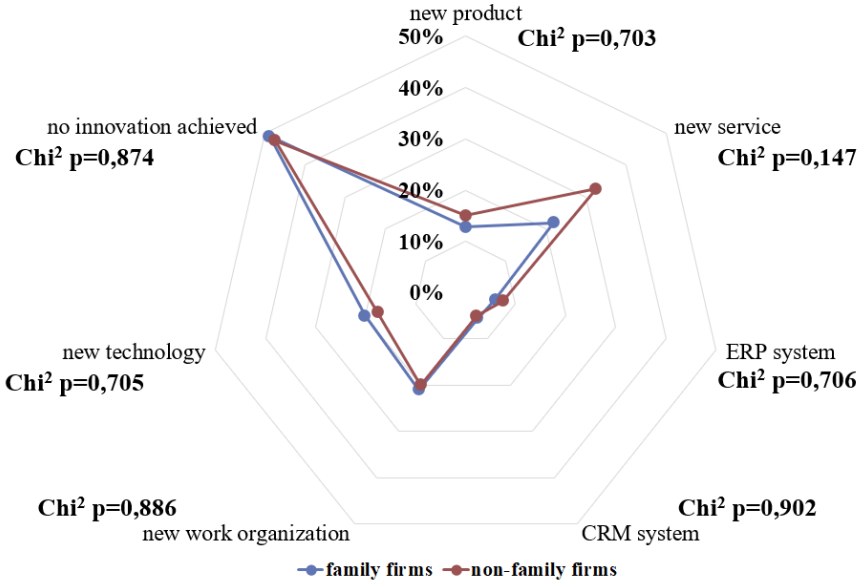



Source: proprietary data collection

### *4.3. Past Innovation Performance*

As the second part of analyses, I investigated differences on innovation performance of the 259 respondents' enterprises. The question surveyed whether the entrepreneur's company has achieved any sort of innovation within five years prior to completion of questionnaire in 2019. Chi-square tests **have not indicated significant difference** in any aspect in this field either (Figure 3).

**Figure 3. Analysis of differences on past innovation performance of respondent companies**

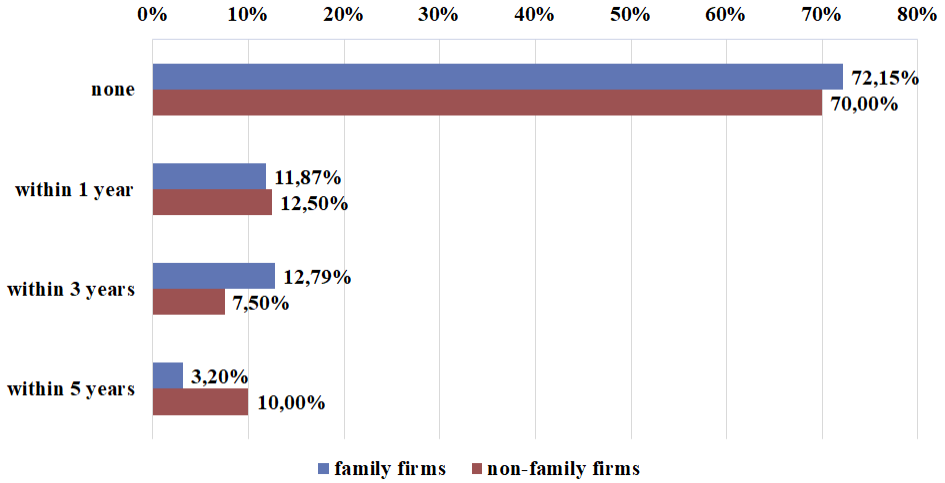



Source: proprietary data collection

### *4.4. Expected Innovations*

Like in the last subsection, expected (or future) innovations have also been analysed by using Chi-square test. The method **did not confirm significant difference (p=0,212)** in this case either (Figure 4). Respondents had to answer whether they planned to invest in any sort of innovation and, if so, within how many years at the latest.

**Figure 4. Do you plan to invest in any sort of innovation within 5 years?**

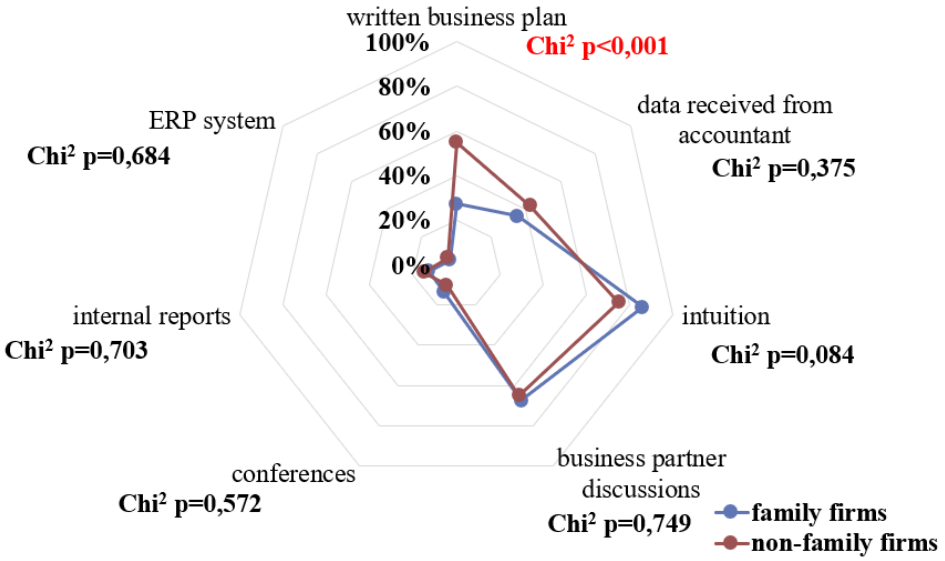



Source: proprietary data collection

### *4.5. Decision Making Practices*

The only field where I found an aspect which significantly differed between family businesses and non-family businesses was the field of decision making practices of respondent entrepreneurs (Figure 5).

**Figure 5. What do you build your decision making upon?**




Source: proprietary data collection

Ratio of entrepreneurs of family & non-family firms were similar in many aspects of decision making practices except for the existence of a formal business plan. The reason for it might lie in the simple fact that family members spend time together also apart from working hours and are more likely to constantly follow up on business issues within 'family atmosphere' therefore they may not feel the need of a formal business plan to follow.

## 5. Conclusions & Recommendations

Applying Chi-square test and Mann-Whitney test have not confirmed significant difference between family businesses' and non-family businesses' perceived business environment nor their innovation performance. The only aspect indicated significant difference was found in the field of decision making practices. Therefore I can state the 'family nature' of a company does not significantly affect the following:

- perceived business environment,
- factors that may hinder the companies' business success,
- past innovation performance,
- expected innovative investments,
- majority of components of decision making practices.

Based on the above, plausibility of my hypotheses detailed in Introduction could not be confirmed.

Due to the enabled maximal length of the present work, more findings my research has surveyed in 2019 could not be detailed herein. Though, considering all the experiences I have learned analysing the full data, I recommend those below.

- Further reduction of **bureaucratic burdens** of companies would be welcome.
- Lowering **minimum amount to apply for tenders** would be practical – especially for micro and small-sized enterprises. It may broaden opportunities to more companies to apply for external funds.
- State should support **generational transfer** at family businesses. They might be 'small', but in total, their significance is decisive for our national economy. Successful generational transfers are of Hungary's interest.

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# Literature Review Analysis of The Macroeconomic Environment of China

Cai Jing[1]

**Abstract**

The People's Republic of China was founded on 1 October 1949 and brought an end to the long war. In the 30 years between 1949 and the 1978, the economic development recovered rapidly, but slowed down as political movements continued to fluctuate. Then, China has created a socialist over the past 40 years since 1987. During the reform and opening up period, China's economy has shifted from a stage of high-speed growth to a stage of high-quality development since 2017.

Since China's economic development has made great achievements in the world and the future direction of its economic development will not only concern China itself but will also have an important impact on the world economic situation, therefore the research for this field is critical. The researcher has reviewed the relevant papers (international and Chinese academic journals) on China's economic development from 1949 to 2021, and state the current situation of China's economic development, and predict future direction of Chinese economic development.

Keywords: Economic Development Path, Chinese Economic Development, Regional Economic, Literature Review, Macroeconomic Environment

JEL code: E01

## 1. Introduction

The People's Republic of China was founded on 1 October 1949 and brought an end to the long war. In the 30 years between 1949 and the 1978, the economic development recovered rapidly, but slowed down as political movements continued to fluctuate (Walder, 1995). From December 1978, the Third Plenary Session of the Eleventh Central Committee of the Communist Party of China was opened, and China began the process of comprehensive reform and opening up, with a new stage of economic development. Over the past 40 years, China has created a socialist economic development path with Chinese characteristics in terms of economic development. Its economic development has been driven by the institutional benefits of the socialist system with Chinese characteristics, large-scale government investment, the investment of private capital (rural township enterprises and urban individual economy) and

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the introduction of foreign investment (Vogel, 2011). Then, China became the world's second-largest economy in 2010. As show in below, figure 1 highlights China's big economic development event by the timeline.

**Figure 1. China's Big Economic Development Eve**


China’s economy has shifted from a stage of high-speed growth to a stage of high-quality development since 2017. It is a critical period of transforming its mode of development, optimizing its economic structure, and shifting its growth momentum. Today, China's economic development is entering a "new normal", a phase characterized by a slowdown in economic growth, a shift in the dynamics of economic growth and the optimization of the economic structure (Yu & Zhang, 2015). With the further increase in the level of openness to the outside world, China's international status has been rising. Low-end manufacturing has lost its original advantage and many investors have set their sights on Southeast Asian countries where labor costs are lower. China's previous human capital and investment-driven approach to economic development is facing serious challenges (Dai et al., 2021; Zhu & Pickles, 2013). As a result, China's approach to economic development must be transformed. So, what kind of path of economic development will be picked by China? what is the current situation of China’s economic development? Is there any issues exist in current situation? What’s more, since China's economic development has made great achievements in the world and the future direction of its economic development will not only concern China itself but will also have an important impact on the world economic situation, therefore the research for this field is critical. Based on this, the researcher has reviewed the relevant papers (international and Chinese academic journals) on China's economic development from 1949 to 2021 to answer those questions.

## 2. Theoretical Background

The year 2021 marks the 100th anniversary of the founding of the Communist Party of China, and the trend of economic and social development will change in the nine years from 2012 to

2021. Many Chinese scholars believe that the shift from high growth to high quality development is an inevitable trend in China's economic development, and that promoting high-quality development is an inevitable requirement to meet the changes in the main contradictions in China's society (Yang & Yan 2018; Yang & Liu, 2019).

The report of the 19th National Congress of the Communist Party of China points out that the main contradiction in our society has been transformed into the contradiction between the people's growing need for a better life and the unbalanced and insufficient development. It also requires that in the process of economic construction, issues such as income distribution, employment, healthcare, pensions, and the ecological environment be addressed in a targeted manner. In addition, the unbalanced and insufficient development requires the country to make every effort to solve the problems and contradictions between regions, industries and between economic development and resources and environment, and to improve the quality of economic development (Communist Party of China, 2017).

The challenges to sustainable economic development are a direct result of China's economic shift from high growth to high quality development. Some scholars predict that China's economy is about to face multiple difficulties. Firstly, the stock and carrying capacity of natural resources such as land, water and energy are getting smaller and smaller (Sun et al., 2017). Secondly, food self-sufficiency is weakening, and the food safety situation is not optimistic (Li et al., 2021). Thirdly, it is becoming increasingly difficult to control pollution in the natural ecological environment and to invest in it. Besides the population is ageing seriously, and the issue of old age has become a social problem (Lu et al., 2015; Yu et al., 2019; Zhang et al., 2021). The most worrying thing is that there is an obvious shortage of labor of the right age, which will inevitably lead to a shortage of human resources and rising labor costs (Liu & Sun, 2014). Fourthly, the demand for infrastructure construction has been drastically reduced after the urbanization process is basically completed. In addition, various social distribution systems including pensions, medical care, education, and industry income disparity will also face challenges (Lu & Xia, 2016; Zhang et al., 2021).

The continued upgrading of the market demand structure is one of the driving forces behind China's economic shift from high growth to high quality development. With the strengthening of China's national strength and the general improvement of people's living standards, the structure of social demand has also undergone an obvious upgrade. The main manifestations of this are followed. Firstly, the first thing that needs to be addressed in the modernization of agriculture is to improve labor productivity, combine agriculture with technology and information and big data, cloud computing, and so on. Focusing on improve the management and service level of agricultural mechanization, taking the new road of agriculturalization and to promote the promotion and use of modern equipment and technology. Secondly, the promotion of a new type of urbanization urgently requires comprehensive improvements in

urban infrastructure, the construction of basic public services and the construction of elderly facilities (Zhu et al., 2018).

Due to geopolitical imbalances and other reasons, the political situation in the world today is complex and volatile, such as the UK's exit from the European Union, the Middle East crisis, and the North Korea nuclear issue, which has brought many uncertainties to economic development and increased the complexity of economic construction. China is playing an increasingly important role on the international stage. The policy of comprehensive opening up to the outside world has brought many development opportunities to China and strengthened the links and dialogue between China and other countries in the world, but at the same time it has also brought huge challenges to China's economic development (Zhou, 2016).

## 3. Materials and Methods

This paper uses the literature review research methodology, a literature review is, after all, limited in capacity, and as the literature was collated, considered, and analyzed, further screening of the selected literature was required, culminating in the collation of twenty-two pieces of literature.

The literature for this paper was collected mainly from databases on the web, such as Web of science, Google Scholar and Scopus and so on. A chronological approach has been chosen for this paper, moving from the recent past to the distant past, as the most recent studies tend to include previous information. The author hopes that this paper will useful for researchers who are interesting in Chinese economic development.

## 4. Results

In the context of the new era, the Party has led governments at all levels to insist on combining theory and practice to accelerate the transformation of economic development, and the reform of China's high-quality economic development has now begun to show results. First, the economic structure is being optimized day by day. The industrial structure has been continuously optimized, with the basic position of agriculture becoming more solid, the efficiency of industrial development improving, and the proportion of the tertiary industry rising year by year. According to the 2018 China Statistical Yearbook, the tertiary sector accounted for 51.6% of GDP in 2017, a significant increase from 39.8% in 2000. The regional structure has been optimally reshaped, while strategies such as the coordinated development of Beijing, Tianjin and Hebei, the revitalization of the old industrial bases in the northeast and the development of the west have been promoted. The dichotomous structure between urban and rural areas has been broken down and the urbanization process has been accelerated.

Secondly, the capacity for scientific and technological innovation has been continuously enhanced and innovative achievements have been emerging. With the increasing investment in

science and technology and the rising strength in science and technology, China has made significant breakthroughs in many key areas, for example, China's high-speed railway technology is far ahead in the world, and the added value brought by scientific and technological innovation is constantly emerging. Thirdly, the supply capacity has been significantly enhanced. With the development of productivity, product performance has continued to improve, basic industries and infrastructure have developed by leaps and bounds, and the ability to meet people's needs for a better life has been increasingly enhanced. Fourthly, people's living standards have been significantly improved. The living conditions of the residents continued to improve, and the trend of upgrading the consumption structure was obvious. Poverty eradication has achieved remarkable results, and the achievements in poverty alleviation are world-renowned. Social security undertakings have continued to advance, and the social security system has been continuously improved (Guan et al., 2006).

Fifthly, foreign investment cooperation has been developing rapidly, and the construction of "One Belt, One Road" has achieved remarkable results (Cai, 2018). It also initiated the establishment of the Asian Infrastructure Investment Bank and the Silk Road Fund, and successfully hosted the "Belt and Road" International Cooperation Summit, the Asia-Pacific Economic Cooperation (APEC) Beijing Summit, the G20 Hangzhou Summit, and the Boao Forum for Asia, contributing Chinese wisdom and solutions to the transformation of the global governance system (Chin & Dobson, 2015).

## 5. Discussion

The main challenges of Chinese economic development are insufficient independent innovation capacity, overcapacity, and the overall low level of industrial hierarchy. At present, China has made tremendous efforts for science and technology innovation and has made a series of significant progress. However, China's independent innovation capacity is still insufficient and cannot fully adapt to the needs of current economic development. If the independent innovation capacity is insufficient, the driving force for the transformation of the economic development mode will be insufficient, which is not conducive to breaking through the limitations of energy, capital and human resources and other factors. Besides, insufficient independent innovation capacity will lead to inefficient use of resources. If China's economic development does not rely on scientific and technological innovation to improve the efficiency of resource use, the problem of resource shortage will become more prominent, which is not conducive to sustainable economic development. In short, the lack of independent innovation capacity is a serious constraint on the transformation of China's economy from "high growth" to "high quality development".

China's overcapacity consists of three main types of overcapacities, one being the absolute overcapacity in the relevant industries due to industrialization and urbanization processes. The first is the absolute overcapacity in the relevant industries due to the slowdown of

industrialization and urbanization and so on. The second is the relative overcapacity affected by economic fluctuations or short-term changes in supply and demand. The second is the relative overcapacity affected by economic fluctuations or short-term changes in supply and demand. Thirdly, there is a structural surplus, for example, excess supply of low-end capacity and insufficient supply of high-end capacity (Xie, Gao & Xie, 2019). In February 2016, China's State Council issued an opinion paper on the steel and coal industries to resolve excess capacity and achieve development. It is proposed that in three to five years, coal production capacity will be withdrawn by about 500 million tonnes, reduced and restructured by about 500 million tonnes, and steel production capacity will be reduced by 100 million to 150 million tonnes. Although the problem of backward production capacity in China has been solved to a certain extent, the problem of excess backward production capacity still exists.

At present, China has become the world's largest manufacturing country, but the capacity and level of scientific and technological innovation in the manufacturing industry are insufficient, so China's manufacturing industry is at the middle and low end of the global value chain, relatively lacking in innovation capacity, and many core technologies and high-end equipment need to rely on imports. At the same time, the weak innovation capacity of the manufacturing industry leads to low industrial profits, such as in the entire selling price of Apple mobile phones, the profit China gets is only 1.8% of the selling price of labor costs (Chan et al., 2013). The existence of these problems is not only detrimental to the long-term stable development of enterprises, but also to the transformation of the momentum of China's economic development and the improvement of efficiency.

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# The Four Faces of Competitive Advantage
# Multi-theory Description of a Hungarian Blended Learning Platform

Mátyás Hartyándi[1]

**Abstract**

This paper offers a multi-theory interpretation of a blended learning platform, developed by a Hungarian consulting firm. To understand its strategic competitive advantage, one must analyze it through various firm theory lenses.

Keywords: multi-theory, competitive advantage, blended learning platform

JEL code: L25

## 1. Introduction

The primary assets of consulting firms are intangible, constituting human and intellectual capital as a knowledge-intensive organization. Consequently, the main value creation processes in the firm cannot be automatized. However, the Digital Platform Economy, or DPE (Acs et al., 2021), is transforming the markets. Every organization has to respond to the challenges of the sharing economy (Puschmann – Alt, 2016) and digitalization to survive and prosper.

Using EU funds, a leading Hungarian consulting firm offering solutions for organizational and human development since 1994 developed its cloud-based, integrated blended learning platform (BLP) to offer its portfolio (like workplace learning solutions) with a hybrid approach.

This paper assumes that investing in the development of the BLP was a wise C-level decision. Its strategic advantage can be highlighted by applying the firm theories of academia to the concept of cloud-based platforms supporting blended learning and contrasting it with the professional experiences in the organization itself.

## 2. Literature review

Blended learning denotes a set of pedagogical strategies and practices that combine face-to-face and online learning (Castro-Rodríguez et al., 2021) to optimize learning outcomes (Singh – Reed, 2001). While its usage has apparent connections to business and organization studies,

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it is mainly researched concerning higher education (Ashraf et al., 2021). Bridging this gap constitutes this paper's relevancy and contributes to the research question: *Why would a consulting firm invest in a BLP?*

This paper reviews contemporary firm theories to connect our subject with the topic of strategic advantage. In the last 50 years, the direction of focus in the advancement of strategic management research entailed multiple historical 'pendulum swings' between internal and external considerations, while the level of analysis also shifted *"constantly and simultaneously"* between the macro and micro levels (Guerras-Martína et al., 2014:75.). We can form a 2x2 matrix where an ongoing research direction could represent each quadrant (see *Table 1*).

**Table 1. Theories of the firm (and their *key concepts* regarding competitive advantage) in contemporary strategic management research**

| | **Internal** | **External** |
|---|---|---|
| **Marco** | Resource-based view *(VRIN/O)* | Institution-based view *(influence rents)* |
| **Micro** | Behavioral theories *(strategic ambidexterity)* | Entrepreneurial theories *(dynamic capabilities)* |

*Source:* by the author, partially based on Guerras-Martína et al. (2014)

In the following, these four views of the firm will be used as research lenses to gain a '360 degree' insight into the need for a BLP. In the external, macro-level corner lies the *institution-based view* of the firm. Its central concept is the influence rent, which is described as *"extra profits earned by an economic actor because the rules of the game of business are designed or changed to suit an economic actor or a group of economic actors"* (Ahuja – Yayavaram, 2011:1631). Influence rents can significantly influence strategic competitive advantage. These could be understood as the fifth type of economic rents besides efficiency, entrepreneurial (or Schumpeterian), monopolistic, or quasi-rents.

In terms of institution-based view, it is difficult to analyze our subject as we need to turn our attention to the external macro-level. However, institutions (the 'rules of the game of business') might positively impact the firm to achieve influence rents. Formal and informal institutions (North, 1991) are the yin-yang of the institutional environment. The *"former are understood as laws, rules and regulations, and the latter as culture, norms and values."* (Garrido et al., 2014:83.). Concerning the formal institutions of Hungary, we can thus form the following hypothesis:

***H1: The formal institutions of Hungary do favor a consulting firm with a BLP.***

Informal institutions have a strong connection with organizational culture. However, assessing these is even more difficult than formal institutions. Unfortunately, comparing the two most popular measures for informal institutions (Hofstede and GLOBE) with each other is highly problematic (Garrido et al., 2014). Still, the question stands as our second hypothesis:

***H2: The national culture of Hungary does suit an economic actor with a BLP.***

Also at the macro-level, the *firm's resource-based view* (RBV) lies on the inner side. It holds that to achieve sustained competitive advantage (SCA), organizations (O) need valuable, rare, inimitable, and nonsubstitutable (VRIN) resources (Barney, 2001). It is worthwhile to mention that an offshoot of RBV, the knowledge-based view, conceptualizes firms as knowledge-integrating organizations with the primary role of knowledge application (Grant, 1996).

The competition between consulting firms is fierce, as there is considerable overlap between their service offers. This situation signals that these human and intellectual resources are, in fact, not necessarily rare, inimitable, or nonsubstitutable. Thus, the BLP might change this:

***H3: The BLP counts as a valuable, rare, inimitable, and nonsubstitutable resource.***

The *behavioral theories of the firm* (BTF) are also interested in the internal aspects of organizations. However, their analysis is micro-leveled, as these focus on a small number of critical economic decisions made by the firm (Cyert – March, 1963). From this point of view, to achieve SCA, firms have to dynamically balance between exploiting existing certainties and exploring new possibilities, thus becoming 'ambidextrous' (March, 1991). These claims help us to formulate our fourth hypothesis:

***H4: The BLP was developed to achieve strategic ambidexterity.***

This aspect links our topic to entrepreneurial aspects as well. The *entrepreneurial firm theories* also delve into the black box of the firm (micro-level) but focus on the entrepreneurial role of managers who have to compete in sensing and seizing opportunities in the (external) business environment. For this, firms need dynamic capabilities. These are *"higher-level activities that can enable an enterprise to direct its ordinary activities toward high-demand uses, develop new capabilities, and effectively coordinate (or "orchestrate") internal and external resources to address and shape-shifting business environments"* (Teece, 2016:204–205.)

The successful development of the BLP can be understood as a higher-order dynamic capability that alters the firm's resource base by integrating, extending, and modifying it (Helfat – Peteraf, 2009). This is precisely our last hypothesis:

***H5: The development of the BLP proves a dynamic capability in the consulting firm.***

## 3. Materials & Method

Based on the linguistic turn, research programs could be differentiated by the origins of their concepts (Deets, 1996). This approach circumscribes the 'local' or 'emergent' theories from academia's 'elite' or 'a priori' theories. This binary can be used to find answers to the research question: *Why would a consulting firm invest in a BLP?*

First, a narrative literature review was carried out to understand better the strategic potential of a company-owned BLP for consulting firms. It was based on the PhD course *Business Economics and Firm Theories* syllabus at Corvinus University Budapest, 2021 autumn. This list was supplemented by firm theory articles identified with the snowballing technique and further complemented by blended learning articles found in the Google Scholar database using the following search terms: “blended learning” + ” bibliometric review” or “systematic review.” The literature review was used to formulate hypotheses about the research question.

To compare the already existing theory of the academic literature with the local experiences of the professional organization (Deet, 1996), theoretical or deductive thematic analysis was used on five semi-structured interview transcripts conducted with important stakeholders of the BLP's development to discover and summarize the local experiences of the project management team of the BLP (Braun – Clarke, 2006). Theoretical saturation was reached after four interviews with (ex)members of the platform development team and tested by conducting an extra interview with a platform-user trainer.

## 4. Results

This top-down, analyst-driven approach attempted to fit the results of transcript data condensation into the preexisting coding frame formed from the hypotheses (Boyatzis, 1998). Unfortunately, no data was found regarding H1:

***F1: It is undefinable whether the formal institutions of Hungary favor a consulting firm with a BLP or not.***

However, regarding H2, interviewees viewed the Hungarian work culture as an obstacle: *"Blended learning needs a user culture of putting time into learning." "If it has no culture in the organization, it will fail, even if the HR wants it." "This must be some Hungarian cultural feature."* These data extracts suggest that the Hungarian informal institutions do not favor a firm with BLP in the short run:

***F2: The national culture of Hungary does not suit an economic actor with a BLP.***

Considering resources (H3), the picture was more very complex. This BLP was described as not a typical learning management system (LMS) as it was designed from the start to fit the firm's needs. It combines the features of multiple cloud computing tools, namely LMS, social

networking, and synchronized tools (Al-Samarraie – Saeed, 2018). As the interviewees said, "*our competitors only have LMSs" and "our UI is top-notch*."

It was gamified but "*not over-gamified*" to fit the "*new market segment's need* ."The platform can offer traditional gamification (points, badges, and leaderboards-based, PBL) functions and differentiated, playful learning journeys for every learning group besides (Hartyándi, 2021b). It measures learning performance and community activity separately. Its introduction to the market started in November 2020, and (semi-)online solutions were still unorthodox before the second wave of the COVID-19 pandemic. A BLP offering e-learning solutions became a valuable asset. Some customers gave the feedback that "*It knows everything we want.*" Nevertheless, some interviewees admitted that it is "*not as saleable as expected*" and that employees often prefer on-site training or e-learning, but not their blending.

As a summary, the interviewees were divided about the VRIN aspects, and based on their answers:

***F3: The BLP counts as a rare and inimitable resource. However, its value and non-substitutability were questioned.***

The interviewees outlined the company's approach to strategic ambidexterity (H4). The product development came with risk-taking as it tried to reach new markets. It is not sure if it can be profitable in the long run. Regarding exploration, it was said that *"Our chairman is a visionary," "Blended organizational development was a niche*," "[We tried to figure out] *how could we support the deeper integration of learning outcomes."*

On the other hand, the whole innovation makes sense as refined exploitation of existing capabilities. "Our two-year experimentation with LMS was a pilot study for our own platform." "The platform helped to hold training during the pandemic." "It is another aspect in hand-tailoring our portfolio to the client's need." Offering the consulting firm's solution portfolio with blended options increased the efficiency of the current operations and increased its presence in the existing markets. Thus exploration enhanced exploitation. The firm's previous experiences with LMS software helped them design their BLP to meet their needs. Thus the results of exploitation supported the exploration as well. Based on the findings, one can argue that:

***F4: Developing the BLP was a balanced approach toward strategic ambidexterity.***

The interviewees mentioned about dynamic capabilities (H5) th*at "we made our move when the time was right." "One and half years ago, we had no competition with an LMS* ."They not just sensed but seized this opportunity: *"We brainstormed two days a week with the other team member." "The new CEO had a lot of experience with digital projects."* However, no data extracts were found regarding the transforming capabilities. These indicate that the

organization did have some higher-order dynamic capabilities, but these might not contain reconfiguring competencies.

***F5: The development of the BLP proves some dynamic capabilities in the organization.***

The applied nature of this study highlights already exploited certainties within the BLP and shows gaps and unexplored possibilities, which could offer further opportunities for the firm.

## 5. Implications & Suggestions

As an academic contribution, this paper took a largely uncharted route and connected blended learning solutions to strategic management research by grounding the subject in various firm theories and local, professional experiences. Blended learning is usually discussed in the context of higher education. Thus the relevancy of the paper lies in linking the subject to (hybrid) workplace learning and trying to answer the seemingly simple question: Why would a consulting firm invest in a blended learning platform?

There are severe limitations to this study. First, as it merely tried to understand the strategic competitive advantage of one BLP, it focused only on comparing literature-based hypotheses with stakeholder experiences. Quantitative research should be conducted to confirm (or weaken) our findings. For a start, it should be carefully observed whether the technological innovations (like gamification of the BLP) would constitute valuable, rare, inimitable, and non-substitutable (VRIN) resources.

An implication for young researchers in organization and management sciences is that they should always try to tie their research interests to various firm theories to gain multiple interpretations (and research lenses) and a '360 degree' understanding for their study. This is also a valuable suggestion for managers considering a strategic investment in new technologies.

Until today, the BLP is only used as a channel for the firm's blended activities. However, based on the current Digital Platform Economy (Acs et al., 2021), the firm could turn it into a B2C or even a C2C platform (Kortmann & Piller, 2016). Based on the interviews, the program itself is capable of these functions. However, there is a chance that this move could potentially cannibalize the firm's portfolio and harm its competitive advantage. The consulting firm leaders should consider all the above aspects if they want to open their BLP for third parties. The four lenses above might help the decision-making process.

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# Financing model for solar power plants

Csaba Iván[1]

**Abstract**

My research describes the financing model for solar parks in the Hungarian market. My research is theoretically based on a technical and regulatory part. In the research itself, I investigated the business model of the known banks and its effects. Then I formulated my conclusion and the result of the research on the basis of these.

Keywords: solar power plants, financing model

JEL code: O33

## 1. Introduction

The use of renewable energy sources and the energy efficiency of their use can contribute to reducing energy consumption and greenhouse gas emissions, thereby mitigating the risks of climate change. The most frequently mentioned and most important renewable energy sources are solar, biomass, hydropower, wind and geothermal energy, of which we still do not use enough, so their potential remains high. However, a number of stimulating measures have been taken recently, the most effective of which is the introduction of a feed-in tariff for renewable energy, and the industry has started to develop in many European countries. To create a low-carbon economy, the private sector needs to recognise and exploit the potential of suitable management options. In our country, solar energy has become the focus of interest among renewable energy sources, despite an initially low uptake rate. It is precisely this fact, and the special financing requirements of such an investment, that led me to choose the solar park sector as the subject of my study. The business model that can be set up for the installation and operation of solar parks provides a guaranteed, secure income for the investing company in the long term (20-25 years). This is why this market is currently a booming and dynamically changing sector in the domestic energy production sector.

## 2. Secondary research

Solar energy can be grouped into several categories. The literature distinguishes between passive and active use. When passive use is referred to, the efficiency is low (15-30%), while active use doubles (30-50%). In passive use, solar energy is directly harnessed (e.g. shading in

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the orientation of residential buildings). We can save energy without any intermediary medium between the solar energy and the user surface (e.g. a residential building). (Michelberger& Wimmer ,2020)

However, in active use there is a mediating medium, typically some technical equipment. On this basis, the equipment converts the radiation into either thermal energy or electrical energy. Thermal energy can be generated by solar collectors, while electricity can be generated by solar panels. (HAFFNER, T. 2017)

A further distinction can be made from the former grouping: solar collectors can be used to produce hot water for domestic use and heating, and as such, they are essentially localised. The storage of the thermal energy produced can be bypassed by means of a solar thermal storage system, which collects and stores the thermal energy until it is used, due to the time difference in use. Solar radiation can be converted into thermal energy through some type of intermediate medium (liquid, gas).(Viktor et al. 2021a) In addition to domestic use, the stored thermal energy is used to a large extent in agriculture, particularly in the heating of greenhouses and in the drying process. At the same time, the electricity generated by the solar panels can be used anywhere, through the grid system, and can also be used in remote, non-local locations. (Molnár et al, 2021)

The technical solution for solar panels is to convert solar energy into electricity. The electricity thus generated can be used locally or at remote sites via the grid-connected system mentioned above. Solar PV systems require a much more complex technical solution, which is justified by the need to feed electricity into the grid.(Viktor, 2021b) Solar PV systems consist of several pieces of equipment, requiring a support system, solar panels, inverters (conversion equipment), high safety devices (earthing), cabling, transformers, to name but the most important ones. In solar PV, solar energy is converted into electricity by the voltage generated in the installed diodes.(Viktor et al, 2021)

In my view, one more distinctive aspect of recovery can be established, namely the grouping according to the way in which the production is used. This is important because of the different pricing and subsidy schemes for the two groups. There is the so-called full (Kovácsné & Michelberger, 2019) solar farms, which sell all the electricity generated to the electricity supplier. My main focus is to study these parks. There is also the type of investment where the electricity produced is used by the company (or individual) to replace its own consumption. This latter version is not examined in this paper. (Viktor et al, 2019)

The use of solar energy has a high unit investment cost and consequently a long payback period. However, this varies widely between different solar energy systems. For greenhouses, it is 5-10 years, for dryers 1-8 years, for hot water and heating systems 6-10 years, while for solar panels it can be up to 10-30 years. (Keszthelyi& Michelberger,2012) Costs have fallen dramatically over the last sixty years. While in 1960 it cost $1000 to generate 1 W of electricity

from solar energy, this had fallen to $100 by 1970, $10 by 1980 and $4 today. At the beginning of the decade, a 3 kW household power plant in Hungary could be built at a cost of about HUF 2 million. (LUKÁCS et al., 2010)

Despite the still relatively high costs, solar power has developed into a huge industry. It has a high potential for innovation, with many research and technical innovations to be implemented to increase the efficiency of solar solutions and to make them more widely available.(Viktor et al, 2022)

**3. Primary research**

In my research, I would like to find out why the domestic banking system is very cautious towards the sector and why there is no - or only limited - good financing process to meet this need of enterprises.

In order to assess the banks' attitude towards renewable energy sources, I searched through various articles and statistics of the banks in order to get a summary of the number and quality of applications received for the implementation of renewable energy sources, including solar panels in particular.

Banks are less flexible in their assessment of this type of loans, as there is a much higher risk to be taken into account, which is why the assessment process is subject to very strict conditions.

I found articles on the websites of two banks on the situation of solar parks. One of them is a 2017 study by MKB Bank, but it does not focus on the loan, but on the sector itself and its success and development, as well as on the characteristics that affect the sector and are of interest to the bank: the solar market, including the penetration of certain types; the domestic support system; unit costs compared with potential sales prices; and finally, the unit cost of solar panels.

MKB Bank draws a positive conclusion from the analysis regarding solar PV investment:

- The price of solar panels shows a significant downward trend;
- solar parks are able to provide attractive returns;
- the technology is developing and becoming more stable, but they also conclude that there is no reason to expect further stability, as price changes are expected to continue;
- a favourable financing environment with low interest rates;
- electricity prices are rising steadily from a wholesale environment, which has a greater impact on returns and thus risk is much less likely to be taken into account, so as long as risk is decreasing, the high return is shifted towards the more likely direction;

- technology is showing an improving trend in terms of competitiveness.

The findings listed here provide an opportunity for banks to show much greater confidence in the loans they are launching to implement solar farms and to invest more energy in the marketing part of this. Within the scope of the questionnaire, only 12 out of 22 companies said that they had experience in linking renewable energy projects. The 55% positive response rate justified the next question, which asked firms for their reasons for not participating in these schemes. Here, the majority of responses were as follows, which is entirely consistent with what has been discussed in the previous parts of my thesis, and these are precisely the factors that are subject to strict conditions when applying for bank loans:

- inadequate preparation of the project, lack of professional knowledge;
- lack of confidence in the stability of government regulation, fear of change going in the wrong direction;
- lack of a long-term transmission law;
- there are not a large number of projects, so implementation is longer and more cumbersome.

Of the types of financing, project finance loans were the most common (9), but there were also responses (6) for equity financing, mezzanine loans (1) and guarantees (5). Other options mentioned were grant pre-financing, investment loans for long-established companies. According to each institution, SMEs were the main promoters, but the number of large companies and municipalities was not negligible. Table 1 provides an overview of the projects managed by size by the institutions surveyed. It clearly shows that projects over HUF 250 million were in the majority. This is probably also because projects with a larger investment are considered to be much less risky and have a higher higher returns are associated with them. They see less chance of failure of such a project than for projects requiring smaller investments.

**Table 1. Size and number of projects included in the research**

| Size of projects managed | Number of projects managed |
|---|---|
| 1 M Ft - 50 M Ft | 6 |
| 50 M Ft - 100 M Ft | 6 |
| 100 M Ft - 250 M Ft | 9 |
| 250Ft - 500 M Ft | 23 |
| 500 Ft Over | 39 |

Source: own editing based on RAIFFEISEN BANK & EUINOX 2011

Obviously. It is clear that banks have a much more conservative approach, as they have a minimal risk appetite for such projects due to many uncertain variables.

Solar investment is not a separate credit facility for banks, although it is subject to strict conditions and is implemented within the framework of project finance.

The demand side was also examined based on the main experiences of the investment, payback period and financing experience. This mainly involved project promoters who have already received grant aid, have the equity available to finance the project, have the expertise and background, and have similar projects on the pipeline.

Promoters said that they had already started the permitting process at the start of the preparation, running in parallel with negotiations on financing. It takes about 1-1.5 years to complete a project.

A very important factor was that the professionalism of the project promoters interviewed meant that they had no longer had to deal with any new unresolved issues and had thought of everything during the preparation phase. This is also an important factor in avoiding the need to fill in gaps and send in follow-up documents.

The most typical mix of financing during the investment is as follows:

- 10 - 20 % equity
- 40 - 50 % non-repayable grant
- 40 - 50 % external funding

It should be noted that in the case of having to rely on external funding, the value of the investment can increase by 10 - 12%, which increases the project budget (RAIFFEISEN BANK & EUINOX 2011).

**4. Results**

In my research, I have shed light on the framework for the establishment of a domestic solar park, which includes both constraints and opportunities. I am of the opinion that we need to make use of our natural resources in order to live in a cleaner environment. If the domestic support system encourages this, then we can also make a good economic decision. However, it is a fact that the administrative burden is currently high and it is also clear that any investment in this direction requires careful (expert, lengthy, costly) preparatory work. Despite this, a leap in solar capacity can be seen in the figures and the reason for this can be found in the price subsidy. My opinion is confirmed by the huge public or corporate solar panel investment figures. In my personal experience, finding the right financing is more likely to be successful if you have a personal relationship with your financing colleague at the bank. In my opinion, there is also an increased legal risk in Hungary at the moment, as the legislator can touch the

guaranteed purchase price at any time. As I expected at the beginning of the thesis, the planned database processing encountered difficulties due to the expected data access barriers. However, this still seems to confirm my assumption that banks are financing only a small number of such projects, according to their own statements.

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# Leadership Challenges with AI

Shivaan Munnisunker[1]

**Abstract**

Artificial Intelligence is disrupting every industry and fundamentally changed the way in which businesses operate in these industries. Traditional methods of leadership all had one thing in common: leading of people. However, with AI technologies dominating, new leadership challenges have risen and added to the complexity in which people are led. The implementation of AI will require a holistic approach to understanding business needs of AI. The leader will need to understand the dynamics of people and how they interact in the work environment. Once these two functions are understood, a compelling yet inspiring vision of the organization needs to be drawn which embeds the theme of trust between man and machine to accomplish organizational goals. The paper will delve deeper into challenges that will affect leaders. This includes a discussion of understanding the present workforce, developing a strategic vision of AI, leading the relationship between teams and AI, understanding the end user, ethics of AI, and protection against cyber-attacks. The methodology used is a qualitative study of various journals and media sources to present an understanding of the challenges. The findings indicate that while crucial to the successful use of AI is the relationship between the organization, leader and people which requires synergy.

Keywords: AI interaction, leadership, vision, cyber security & learning

JEL code: O33

## 1. Introduction

Scholars and business leaders agree that Artificial Intelligence (AI) is still in its infancy even though it has furthered its progress with technologies such as self-driving cars, medical diagnosis and facial recognition. With the arrival of AI products, the world progresses into a new era where machines start to behave differently. They not only perform consumers' orders, but they make decisions with algorithms. This will change how people react, how they behave and what they expect from these products. In many cases, people use AI and machine learning to dig deep into data and generate new and useful content for themselves. The OECD defines AI as "A machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments" (OECD 2021). AI in this context includes programs, software, big data (predictive) analytics, cloud

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computing, and other computer automation. In many cases it automates jobs and therefore makes humans redundant.

This paper aims to provide a full understand into why developing a strategy for AI, ethical AI and data security are the biggest challenges that leaders will face in the digital era which has already begun. The evidence will show that if leaders do not solve these challenges, the consequences that would occur to the organisations they lead.

## 2. Theoretical Background

Through history, historians have provided evidence of humans performing tasks for the purpose of a livelihood. In Europe, Welsh (2012) documents in her research that osteologists had discovered the genetics of preserved human remains located in Sweden and suggests that these early people moved from southern to northern Europe to spread agriculture. When they first arrived in Europe, they learnt to clear forests for farming. Then 3000 years later, archaeologists discovered the remains of tools and domesticated animals suggesting that people worked in order to survive. Of interesting fact is that between the year 1000 to 1300, Europe's population witnessed exponential population growth with the refinement of medieval farming technology. The employment of tools suggests that humans were the main source of input into agriculture (Spinny, 2020).

The industrial revolution witnessed the dawn of machines and shifting away from hand manufacturing. The introduction of steam power and electricity gave rise to the factory system and mass manufacturing. But in this era, it is worth noting that humans were considered disposable and easily replaceable and were required to work under unsafe and dangerous conditions alongside machinery. Women and children were considered cheap labour that operated the machines in factories. The lack of autonomy and ethics of management meant that labour was still an important factor in production (Neal and Williamson, 2015).

So far the information provided suggests that people were an important factor of production and the main activity was to convert the land into use for agriculture. Early technological advances required people to operate machines in hazardous conditions. In the present age, as the economy have risen and technological advances have improved, many new kinds of careers and industries have been formed. In every industry, there are laws and policies which protects the safety and rights of workers. Further, there are guidelines that show workers how to complete jobs and lead a successful career. In this era known as the digital era or Industry 4.0, humans no longer just interact with other humans but also interact with artificial intelligence to successfully complete their work.

The major advantage is that AI is capable to perform many tasks and process information more efficiently than humans. This gives decisions makers information quicker and can respond to threats or opportunities swiftly. Current literature and public media project the belief that

technological development always replaces and reduces labour capacity in all sectors, particularly labour-intensive sectors such as agriculture (Klenert et al. 2020). Bessen (2016)'s review of AI's impact (as computer automation) on labour indicates, however, that the opposite has been true in the past. In general, AI technologies uptake has allowed for the creation of new and more sophisticated job opportunities in specific industries, which also allows for labour absorption from the oversupply in other industries, e.g., the I.T., financial, and logistics sectors (PWC 2018).

## 3. Materials and Methods

A qualitative review was undertaken to identify the key challenges that leaders will face in the adoption of AI. There were many key challenges, but for the purposes of this paper the following are identified as the most concerning issues for leaders to solve. First, developing a sound strategy for AI which discusses strategies at the EU level (International), organizational and individual level. Second, the 4 areas of ethical AI that must be addressed by leaders to remain a credible and competitive player in the market and issues of data security. The reason for selecting these two are provided below.

Sending AI out into the mass of complexity, without knowing in advance what it will come back with, the CEO is embracing the discovery of original, unexpected, and breakthrough ideas. Without an effective strategy and roadmap, many companies find themselves at a technological dead end: the technologies they initially selected don't scale or support cutting-edge AI when it is developed. Bad strategy leads to siloed projects that don't build upon each other into a comprehensive AI program. An effective AI strategy will make sure that that information growth translates to business value. For instance, AI can used to: Segment customers and products into groups that have similar behaviors and needs, predict customer purchases and churn risk, estimate the lifetime value of a customer or product and optimize manufacturing supply chains and perform predictive maintenance to increase uptime (Joshi and Wade, 2020).

Typically, the data used by AI is based around market data, personal information, which better informs the decisions of leaders. This data if not secured well enough can be leaked and affect the organisation's credibility and reputation amongst its stakeholders and customers. The table below outlines some of the biggest data breaches and costs experienced by organisations.

**Table 1. Massive Enterprise Data Leak Incidents**

| Organisation | Records | Breach date | Type | Source | Estimated cost |
|---|---|---|---|---|---|
| Yahoo | 500 million | December 2014 | Account access | State sponsored | $350 million |
| JP Morgan Chase | 83 million | August 2014 | Identity theft | Malicious outsider | $13 billion |
| Adobe System | 152 million | September 2013 | Financial access | Malicious outsider | $714 million |

Source: Cheng, Liu and Yao, 2017.

## 4. Qualitative Analysis of Results

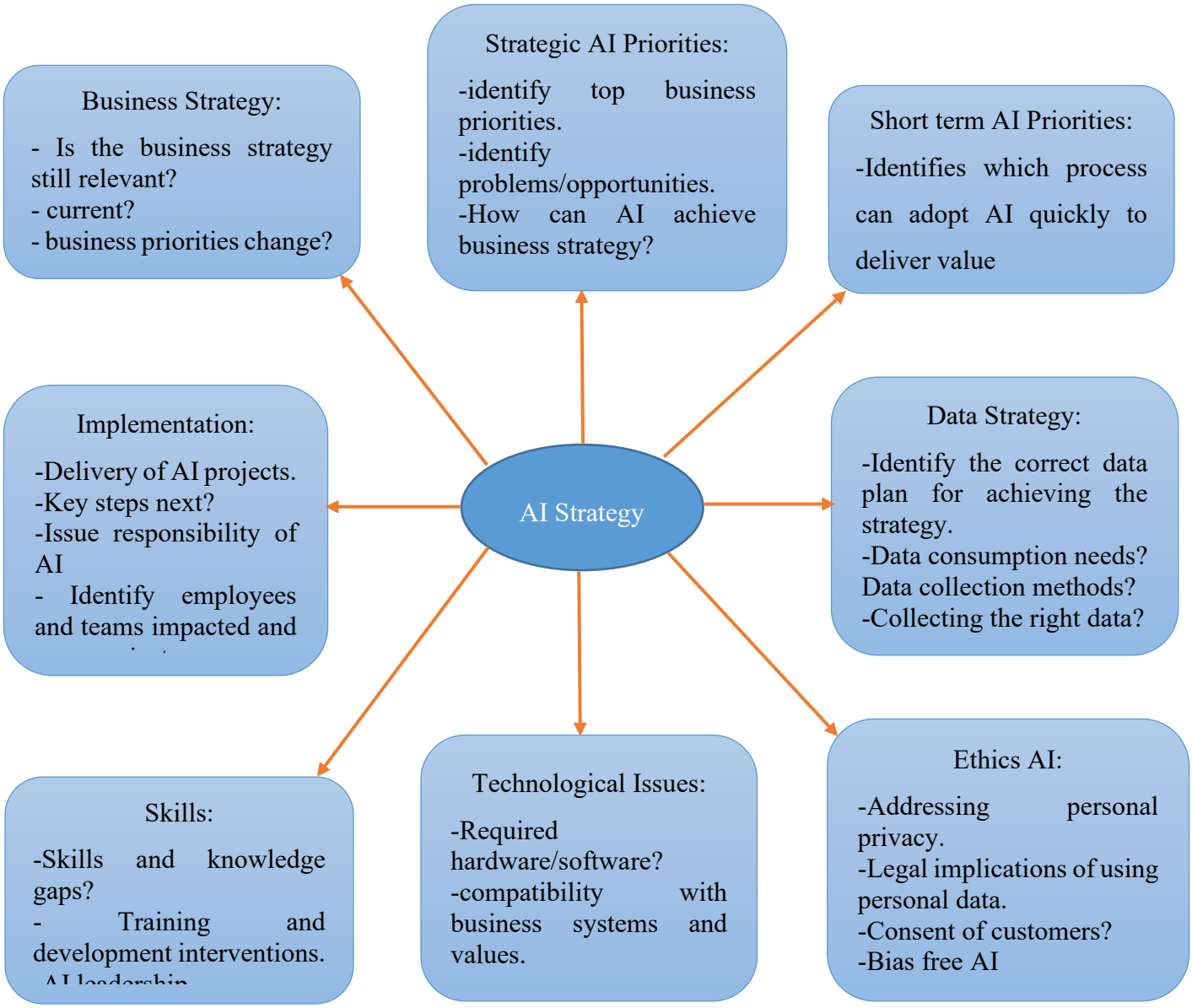
### *4.1. Developing a strategy for AI*

At a national level, the European Union (EU) aims to create a world class hub for AI while ensuring that AI is human centric and trustworthy in European values. In this instance, all member states signed a declaration of cooperation on Artificial intelligence which allows EU countries to cooperate on finding solutions to the opportunities and challenges that AI brings. It also addresses the key issue in increasing investment, data availability and nurturing talent. In support of the agreement the EU lauched the AI watch program which is responsible for the monitoring uptake and impact of AI in Europe. It has AI policies which cover the following national policy of each country:

- Human capital: includes policies to fast track the training and education of people using AI. It includes formal education and training (e.g. reforms of educational structures to be inclusive of AI courses), vocational learning and labour market needs.
- From the lab to market: these are policies that encourage research and innovation towards AI solutions in the private sector and increasing effieciencies in the public sector. It also includes instruments to test pilot systems.
- Networking: these policies are aimed at increasing the attractiveness of a country (e.g. attracting foreign AI talented individuals and firms).
- Regulation: covers policies for the development of ethical guidelines, legislative reforms and international standardisation;
- Infrastructure: covers initiatives to encourage data collection, use and sharing, and to foster the digital and telecommunication infrastructure (OECD, 2021).

At a organisational level, AI can transform and create value at every level. This is made possible by the internet of things where virtually everyone is connected to the internet. AI changes everything and failure to adopt AI as suggested by Marr (2021) can see firms being left behind. The adoption of AI strategy is crucial to the sucess of adopting AI. Figure 1 below shows the considerations of an AI strategy.

**Figure 1. AI Strategy**




Source: Marr, 2021

### *4.2. Ethics AI and Data Security*

The terms "ethics" and "morality" are often used hand in hand. Bartneck, Lütge, Wagner and Welsh (2021) define "morality" as a complex set of rules, values and norms that determine or are supposed to determine people's actions. Whereas ethics refers to the theory of morality. It could also be said that ethics is concerned more with principles, general judgements and norms than with subjective or personal judgements and values. The focus of ethical AI is around the concept of good that should work for the advancement of society and improve the standard of living for humans.

Increasingly as the adoption of AI by business continue to grow, there will be 4 main ethical questions that they will need to address. The 4 areas of ethical focus are bias, security, explainability and impact. Bias is defined as a tendency (known or unknown) to have a preference over one thing over another which lacks objectivity and influences an outcome (Bird & et al, 2020). Defining, detecting, measuring, and mitigating bias in AI systems is not an easy task and is an active area of research. Several efforts are being undertaken across governments, nonprofits, and industries, including enforcing regulations to address issues related to bias. AI biases should not discriminate people based on sensitive data including but not limited to any data that reveals a person's "racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, genetic data, biometric data, data concerning health or sex life or sexual orientation (Aysolmaz, Dau & Iren, 2020). A common pitfall that businesses face with AI is the lack of a data strategy or governance plan. Data used correctly can help businesses predict market trends and gain deeper insights in consumer spending habits. Typically, this kind of data is confidential and private. Safeguarding the privacy and confidentiality of large volumes of datasets is crucial for decision makers. This is especially important when the data is built right into the AI system itself. In this scenario, attackers may launch inconspicuous data extraction attacks which place the entire AI system at risk (IBE, 2018).

The adoption of an AI system would be successful if it can be explained, understood and trusted by customers and end users. AI has evolved to a stage where human increasingly interact with AI systems. In the workspace employees will have to develop skills to work and make decisions with AI (Pásztor, 2018). Before any business can decide to implement an AI system. They should investigate the following ethical questions around impact:

- What is my model intended to do?
- What impact will my model's creation have on my business, the people who build my model, my end users, society?
- What happens when my model makes the wrong decision?

These types of questions will drive a business to develop an AI model with a net positive impact on all relevant stakeholders (Appen, 2021).

## 5. Recommendation and Discussion

In summary, the history of the workforce shows two interesting trends when technology had been introduced. The first is that technology almost always replaces part of the workforce by reducing redundancy. Second, technology has also given rise to new careers and skills that are required for the workforce participation. The same holds true as research indicates that AI is also following the same trends. AI can generate content and take decisions that are unpredictable (biases and cyberattacks).These kinds of behaviours can prove to be

consequential in the sense that provides unpleasant user experiences and become disastrous when AI is used for important and strategic decisions. The business world is increasingly moving towards the adoption of AI, and while AI will not immediately replace all jobs, but people will increasing have to interact with AI. In the workplace, learning intervention will be required to upgrade worker's skills so that it becomes accessible and user friendly.

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# Development of the Ethereum Blockchain-Based Ecosystem

György Márk Ponácz [1]

**Abstract**

Ethereum is a decentralised, open-source blockchain with smart contract functionality, which operates since 2015. The platform allows the installation of permanent and unchangeable decentralised applications, which users may use to interact with each other in a variety of ways. The native coin of the platform is the Ethereum (ETH), which had the second-largest market capitalization after Bitcoin in 2021.The Ethereum Request for Comments 20 (ERC-20) token standard allows the creation of fungible tokens on the blockchain. Several cryptocurrencies use fungible tokens on this platform to create their own coin supply. Another type of the tokens, the non-fungible tokens (NFTs) are used for the representation of unique digital or physical objects, like a digital property or a work of art. NFTs revolutionized the gaming industry and established a new business segment in the collection of works of fine art. An open-source development to upgrade the Ethereum network is underway, which is expected to significantly increase the network's transmission speed, allowing tens of thousands of transactions per second to be processed. The Ethereum platform is suitable for efficiently run and manage decentalized finance (DeFi) applications, which created a comprehensive and quickly developing ecosystem. The paper aims to examine the technological, economic, and social challenges of the ecosystem, the regulatory issues of DeFi services, initial coin offerings (ICOs), smart contracts, and income taxation at the national and international levels.

Keywords: ethereum, blockchain, non-fungible token, initial coin offering

JEL code: O33

## 1. The technological background of the Ethereum blockchain-based ecosystem

Internet connection is ubiquitous in most parts of the world, with a cheap way of global information transmission. Cynthia Dwork and Moni Naor (1992) discovered that cryptographic proof of computational expenditure could be used as means of transmitting a value signal over the Internet. This method is called proof of work (PoW). Blockchain applications can utilize proof of work to maintain a digital ledger in which transactions are recorded chronologically and publicly. An unknown person or group, using the name Satoshi Nakamoto (2008) invented a cryptocurrency called Bitcoin (BTC) in a whitepaper. This electronic coin was defined as a chain of digital signatures. An owner can transfer a coin to the next owner by digitally signing

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a hash of the previous transaction and the public key of the next owner, and adding these to the end of the coin. The chain of ownership can be verified by verifying the signatures, and the verification process does not need a trusted central authority. Blocks of valid transactions are added to the blockchain in a wide, geographically spread network. Nodes in the network are strongly incentivized through the PoW method to accept only valid blocks, which makes the transactions technically irreversible, and excludes the possibility of double-spending. The Bitcoin network went live in 2009, and it became the most important decentralised electronic currency for a decade. Bitcoin represents the first generation of blockchain applications, due that its main feature is a cryptocurrency. On 1st January 2022. almost 19 million BTC was in circulation and the market capitalization exceeded 900 billion US Dollars, which was the largest among the cryptocurrencies. (CoinMarketCap, 2022.) Based on previous inventions, Vitalik Buterin (2014) published a whitepaper about Ethereum as a next-generation smart contract and decentralised application platform. Subsequently, the Ethereum Foundation (Stiftung Ethereum) was founded in Switzerland, which subsidized the development of the Ethereum protocol through crowdfunding. The Ethereum network's first prototype implementation on the Github platform was created on 24th December 2013. (Wood, 2013.), and the system went live on 30th July 2015. (Tual, 2015.)

Ethereum can be seen as a planetary-scale computer, powered by blockchain technology. Its decentralised blockchain system is maintained across several computers that are linked in a peer-to-peer network, and it records transactions in its ever-growing blockchain strains. The framework of Ethereum is a Turing-complete programming language. As a whole, it works as a transaction-based state machine. Its scripting language is robust and enables application development, mainly of smart contracts. Machine states can incorporate account balances, reputations, trust arrangements, or data pertaining to the information of the physical world. Transactions represent a validated path between two states. The proof of work method and network-wide accepted open-source computational rules ensure public agreement on the order and data content of transactions.

Ethereum Virtual Machine (EVM) is the product of the Ethereum protocol. It is running on thousands of client computers, but it can behave like a single entity. The Ethereum system possesses a large data structure, which includes accounts, balances, and machine states. The machine states can change from block to block, adapting a set of pre-defined rules. The EVM behaves like a mathematical function: from an old valid state and from valid transactions it creates a new valid state in a deterministic manner. The EVM is accessible through different open-source programming languages, which include usually a lot of blockchain-specific operations. In 2021, one of the original implementations of the Ethereum protocol, the Go Ethereum (Geth) was the most widespread client software with the biggest user base and a variety of tooling for users and developers. (Ethereum Mainnet Statistics, 2022.) Geth is written in the Go language, which is open-source and licensed under the GNU Lesser General Public License v3.0. (Github, 2022.)

The transactional token, which facilitates operations on the Ethereum network is called Ether (ETH). On 1st January 2022. almost 119 million ETH was in circulation and the market capitalization exceeded 448 billion US Dollars, which was the second-largest among the cryptocurrencies. (CoinMarketCap, 2022.) 1 ETH can be divided into 1 billion Gwei. Network participants, who want to execute operations, can use Ether as a form of payment. A gas fee refers to the fee required to execute a transaction on the Ethereum blockchain. Financial rewards go to the miners and the validators. Miners run miner nodes that are part of the network where the EVM is hosted. Miners collect all recent requested transactions from a transaction pool and create a new block from them. Validator nodes participate in the consensus of the Ethereum protocol by voting on valid blocks, which will be added to the blockchain. Other clients download and maintain a copy of the Ethereum blockchain or a part of it. They verify the validity of every block, and after that, they update it with new blocks and transactions. Running a node ensures the use of the EVM in a private, trustless manner and the operator of the node can check transactions independently. A diverse set of nodes makes the EVM also more secure and resilient.

The main technological challenge of the blockchain-based ecosystem is the effect on the environment. The Proof of Work computational mechanism requires a large amount of energy. Based on the Cambridge Bitcoin Electricity Consumption Index (2022) the electricity consumption of the Bitcoin network totaled 26.730 TWh in 2018., which accounts for 0,61% of the electricity consumption worldwide. The reduce environmental harm caused by excessive energy consumption, the Ethereum system will transit to another mechanism, called proof of stake (PoS). Proof of stake is a blockchain consensus model. Staking is the act of depositing a given amount of ETH to become a validator node. A validator node stores data, carries out transactions, and adds new blocks to the blockchain. After the so-called „merge event" the Ethereum platform will be full proof of stake. Along with this transition, „shard chains" will be created, which are branches, connected to the main blockchain. Shard chains divide the workload of the EVM, to improve the system's scalability and capacity. The first layer or consensus layer of the Ethereum will be conducted by the so-called Beacon Chain, which coordinates the expanded network of shards. After the merge event, the consensus layer clients will run the Beacon Chain and will provide a PoS consensus mechanism to execution clients. The poS mechanism will reduce energy consumption by more than 99% compared to PoW. This transition called the Merge -known as Ethereum 2.0, previously-, is a step-by-step process, planned to be completed by the end of 2022.

**2. Decentralised finance applications, built on the Ethereum blockchain**

Ethereum represents the second generation of blockchain applications, as it is an open and decentralised platform enabling a new paradigm of computing, the decentralised applications (dApps or dapps) running on top of the blockchain. The primary programming language for the implementation of smart contracts on the EVM is Solidity, which is an object-oriented

programming language. Smart contracts connect untrusted parties and execute, control, and document events and actions, according to the terms of a pre-defined agreement. Smart contracts also reduce transaction, intermediation, and enforcement costs, fraud losses and eliminate unplanned exceptions. The number of daily transactions on the Ethereum network ranged between 500k and 1500k from 2017 until 2021. (Etherscan, 2022.) The number of dApps running on the EVM totaled approximately 3 thousand. (State of the DApps, 2022.)

The Ethereum Request for Comments 20 (ERC-20) is the widely used technical standard on the EVM for smart contracts, which also allows creating of tokens. It was created in 2015. by Fabian Vogelsteller and Vitalik Buterin.This standard defines a common list of rules which has to be implemented by a token, and regulates the transfer of coins between addresses, and how to access the data contained in a token. In 2021. there were more than 188 million Ethereum-based tokens in circulation. (de Best, 2021.) ERC-20 tokens are fungible because all tokens have the same properties. ERC-721 is another open standard, which defines a minimum interface to allow the creation, ownership, management, and trade of unique, unfungible tokens. Each non-fungible token (NFT) is unique. NFTs are therefore suitable to represent any unique real-world asset, digital property right, works of art, etc. Smart contracts' capability to build irreversible agreements, without any supervisory authority, together with plenty of use-cases of fungible and unfungible tokens, contributed to the establishment of financial services, called decentralised finance (DeFi).

NFT's revolutionized the digital art market in 2021. This art medium did almost not exist in 2020., and the next year it generated sales of almost 25 billion USD. (Boyle, 2022.) Authors got a new medium and a new marketplace to monetize their works of art. Buyers found a new way to consume digital art and a new ownership model that provides digital scarcity. Collectors, traders, galleries, and auction houses quickly adapted to the new market and catalyzed its transformation. The gaming industry utilized the power of the NFTs, which can be linked with any item in online games, making the possession of the items transparent, authentic, and unforgeable, and also making them transferable between blockchains, or even decouple them from one gaming software and link to another one. The metaverse, which is the concept of an online 3D universe, combining multiple virtual spaces, also utilizes NFTs as means of digital proof of ownership, transfer of value, and implementation of fair governance. The so-called play-to-earn models provide income -mostly in form of vendible NFTs- for individuals, who undertake activities in designated virtual spaces.

DeFi covers a large variety of products and services, such as lending and borrowing markets (for example Aave, Compound, Oasis), decentralised exchanges (for example Uniswap, SushiSwap), tokenized physical assets (for example: Liquefy, Perth Mint's UXPAU tokens backed 1:1 in real gold), payment and insurance services (for example Etherisc, Tornado cash). A decentralised exchange (DEX) is functioning by smart contracts, which connect sellers and buyers, in most cases in full anonymity. Lending and borrowing markets can either directly

convey to the parties, or through pre-established pools of resources that ensure liquidity. Liquidity pools are a popular solution to earn yields by lending directly to the pool. DeFi space expanded to a large extent in 2020., with the total value of crypto assets locked in protocols rising from 0,65 billion USD to 16,05 billion USD in a year. (CoinDesk, 2022.)

Cryptocurrencies, tokens, and other types of digital assets which are not Bitcoin are considered as alternative cryptocurrencies (shortly: altcoins). Ethereum itself is an altcoin, and many other altcoins are issued and maintained using the Ethereum blockchain. The number of actively used cryptocurrencies worldwide was over 10 thousand in February 2022. (de Best, 2022.) Stablecoins form a separate class of cryptocurrencies that seek to offer price stability. They attempt to peg their market value to an external reference, for example, a currency like USD or a commodity like gold, and in most cases, they are partially or fully backed by a real reserve asset. Stablecoins control their targeted price through algorithmic mechanisms of buying and selling the reserve asset or via collateralization. The third-largest cryptocurrency in February 2022. was a stablecoin, called Tether (USDT), backed at a 1:1 ratio by USD with a market capitalization of over 78 billion USD at that time. Users can change their national currencies like EUR or USD -called fiat money- to cryptocurrencies and back at several crypto exchanges (for example Coinbase, Binance, or FTX).

The fundraising activity for a new cryptocurrency or digital ledger technology-based business venture is called an initial coin offering (ICO). Companies, individuals, and non-profit organizations create ICOs with the main goal to raise capital to fund a project or to establish a particular token of which application or protocol they are developing. Tokens are categorized as payment tokens, utility tokens, or asset tokens. Payment tokens or cryptocurrencies (such as Bitcoin Cash or Litecoin) are intended to be used as a means of payment for goods and services. Utility tokens are intended to be used to provide access to an application or a service connected to the distributed ledger infrastructure. Asset tokens are the digital asset representation of debt or equity claims. Tokenization allows physical assets to trade on the blockchain infrastructure.

The economic and social challenges of the Ethereum blockchain-based ecosystem are linked to its basic characteristics, like decentralization and democratization of investments and decisions; new market niches and disruption of present markets of goods and services; absence of a central authority; no governmental control over the EVM; diverse and often loose regulatory framework; and along with the above, the vulnerability of users to fraudulent services.

## 3. Regulatory and taxation issues, results, and recommendations

The rise of Bitcoin price in 2021. and the fast-growing market capitalization of the Ethereum blockchain-based cryptocurrencies and value locked in smart contract-related services generated governmental attention and a coercive demand for regulation. The scale of the

Ethereum-based ecosystem reached the size when regulatory mismanagement could lead to macroeconomic consequences. Hence there is no national-level control over the EVM, the regulation should occur in a globally coordinated manner, which was non-existent until the beginning of 2022. Only some legal aspects and some selected services of the Ethereum-based ecosystem have been clearly regulated in the large economic centers. Taxation of income, generated in the blockchain-based ecosystem, is regulated mostly at the national level, using bank information, data from regulated DeFi service providers, and the affected legal and private persons. The absence of relevant information on taxable income and regulatory loopholes in the relation to cross-border transactions are characteristic and often lead to tax evasion. There is no comprehensive and widely recognized international methodology for the taxation of income and wealth generated in the blockchain-based ecosystem.

ICOs are attractive for both issuers and investors, and the phenomenon is challenging the national and supranational regulatory systems. Some countries developed legal norms for ICOs and usually some basic regulations for the coins that circulate on the territories of their legal jurisdiction. Some other countries are intentionally waiting and let this new industry to develop untouched. United States of America has a very friendly attitude toward ICOs, the financial market is highly developed, and the regulation is clear. The US Securities Commission (SEC) applies the current legislation on securities and investment activities to tokens and ICOs. (Karpenko et al., 2021.) China banned ICOs in 2017. It also prohibits crypto mining and transactions in cryptocurrencies. In Russia only registered businesses are allowed to conduct an ICO, and the number of unqualified investors is limited, while general acceptance of crypto transactions is high. Japan's investors and crypto users benefit from the favorable social milieu and the robust technology sector of the country. Digital assets can be used as a legal payment method, as means of private capital, and for settlement. Restrictions apply although on cryptocurrencies that offer extensive privacy features, and domestic registration is mandatory for crypto exchanges and service providers, under the Payment Services Act and the Fund Settlement Law. Switzerland's jurisdiction is favorable for conducting ICOs and the creation of ledger-based securities. Cryptocurrencies, virtual currencies, and tokens are defined as crypto-based assets under the Law of Distributed Ledger Technologies which was approved by the Swiss Parliament on September 25, 2020. There are tax havens for ICOs like the Cayman Islands, which do not impose any restrictions on holding and trading such digital assets. Tokens are considered securities and ICOs are regulated by the Law on Securities and Exchanges, similar to the initial public offerings conducted on stock markets. Cayman Islands' Virtual Asset Service Provider (VASP) Bill regulates licensing and operation of cryptocurrency exchanges and custodial service providers. There are no income, inheritance, gift, capital gains, corporate, withholding, or other such direct taxes imposed. Instead of these, there are licensing fees for different business activities and allowed levels of capital. There is also a 1-year sandbox license for registered individuals or VASPs who deal with emerging cryptocurrency

and blockchain technologies, to encourage, foster, and incubate companies operating in this fast-moving sector.

Countries of the Europen Union have a diverse regulatory framework for crypto-assets, cryptocurrencies, tokens, stablecoins, NFTs, ICO's and the related services. European Parliament legislative resolution of 24 March 2022 on the proposal for a regulation of the European Parliament and the Council on a pilot regime for market infrastructures based on distributed ledger technology states that most crypto-assets fall outside the scope of the EU's financial services legislation and create challenges in terms of, among other things, investor protection, market integrity, energy consumption, and financial stability. The EU bodies are continuously working on new rules to exploit the potential of blockchain technology. The European Commission adopted a legislative package on 20 July 2021. (COM/2021/422 final) which includes anti-money laundering (AML) and countering the financing of terrorism (CFT) measures. Most measures extend the requirements on information accompanying transfers of funds with relation to the payer and the payee. This affects all payment service providers (PSPs) and intermediary PSPs, which are established in the European Union. Regarding the wire transfers, basic information on the originator and the beneficiary of wire transfers became immediately available to the authorities. The legislative package also includes regulation on distributed ledger technology (DLT) multilateral trading facilities (DLT MTF), DLT settlement systems (DLT SS), and DLT trading and settlement systems (DLT TSS). It enables pilot regimes where DLT market infrastructures could be able to cooperate with other market participants in order to test innovative solutions based on distributed ledger technology in different segments of the value chain for financial services. The ongoing EU legislation aims to applicate the rules of regulation to different DLT market entities, ensuring the rights of supervisory authorities, like the European Securities and Markets Authority (ESMA) and the National Competent Authorities (NCAs), to protect personal data under the General Data Protection Regulation (GDPR), prevent crime, especially money-laundering, market abuse, financing of terrorism and tax evasion, and enforce investor protection under the Markets in Financial Instruments Directive (MiFID II) and the Markets in Financial Instruments Regulation (MiFIR).

The investment tokens are qualified as transferable securities under the MiFID II. These kinds of tokens are distinguished and characterized by the features of standardization, tradability on capital markets, financial risk, and comparability with other forms of investment securities. ICOs may fall under the Prospectus Regulation (No. 2017/1129) which requires the approval and dissemination of a prospectus paper when securities are offered to the public or admitted to trading on a regulated market, situated or operating within an EU Member State. A prospectus is more than a white paper, it contains all relevant information, necessary for potential investors, including the financial situation of the issuer, the details of the issuance, rights attached to the securities, etc. Some ICOs with lending or capital raising purposes may fall under the Crowdfunding Regulation (No. 2020/1503), where typically the funding comes

from a large number of people who each contribute relatively small investment amounts, mostly through a publicly accessible internet-based information system. The provision of crowdfunding services generally involves three types of actors: the project owner who seeks funding, the investors who fund the proposed project, and an intermediating organization. The intermediating crowdfunding service provider brings together the other two parties through an online platform. The Crowdfunding Regulation aims to protect investors' rights at a high standard, handle cross-border business situations, while accelerating the potential of funding SMEs, innovative start-ups, and scale-ups. The deadline for implementing the regulation at the national level was November 10, 2021.

The global regulatory system of DeFi services is evolving at a fast speed. The large economic centers differ in the scope of their legislation and in the affected legal and private persons, which leaves many regulatory gaps and still makes regulatory arbitrage possible. The blockchain-based ecosystem has disruptive and transformative potential, and it can robustly contribute to the creation of value and wealth. Therefore, the legislative process must keep pace with the technological development of the DeFi ecosystem, by ensuring consumer rights, investor protection, private data protection, and prevention of crime.

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Regulation (EU) 2020/1503 of the European Parliament and of the Council of 7 October 2020 on European crowdfunding service providers for business, and amending Regulation (EU) 2017/1129 and Directive (EU) 2019/1937; On-line: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R1503&rid=4

# Alternative Trading Venues, and their competition with Stock Exchanges

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**Abstract**

Study finds market share of ATS are on the rise as technology advances, but it's not only competition, but also synergies between ATS and Stock Exchanges. We determine these systems are often beneficial to investors based on their effects on price development, spreads, and liquidity. ATS can also be categorized into direct competition to stock exchanges like ECNs or MTFs, or complementary services like Dark Pools or Crossing Networks. The presence of these services tend to result in enhanced market environment.

Keywords: alternative trading venues, stock exchanges, dark pools, crossing networkds, electronic trading systems

JEL code: E02

## 1. Introduction and overview of Electronic Trading Systems

In this paper we are going to examine the competition between stock exchanges and alternative trading venues. Over the past decades there's been a strong push for digitalization and further modernization of the financial systems, and stock exchanges have not been exempt. Before we go into all the details I want to note that this study he's going to detail the most frequently used alternative trading venues and compare them to stock exchanges to identify areas of competition. We are not going to discuss stock exchanges in detail as there are plenty of publications available on this topic separately.

Without further due, starting with the literature on the topic (Fleckner, 2006) already noted that there's been an increase in competition that closely ties to the regulation and technological advancements, and also made note that Stock Exchanges used to be organized as nonprofit organizations founded and owned by brokerages and dealers respectively. pricing mechanisms. This importance of data and the services that can be built on that eventually attracted companies with strong technological backgrounds. With that, the changing needs of the clientele and the changing regulation enhances the competition of this market that used to be valuing status quo more than anything.

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As highlighted in a study from the same age by (Khalifa & Davison, 2006), Electronic Trading Systems were made available to larger organizations only initially, since the 1970s. Some years later, following the rise of internet-conducted trading, the adoption of these systems started:

- in 2000, 13% of brokers used these systems, the study says
- by 2004, 20% of brokers.

The adoption seen by individual investors was even more prompt, with 7% in 2000 and 36% by 2004.

This is somewhat expected considering the regulative background of institutional trading compared to the more or less free and adaptive environment individual traders can enjoy compared to their larger peers.

With that, (Yuriy et al, 2019) concluded in a study much closer to our days, that many of the financial services are transferred to the virtual domain resulting in advanced developments in the alternative financial services across a variety of products.

In today's financial word stock exchanges are no longer in a monopole situation and the race for volume is ever on the increase. This is caused by a number of factors. One of the reasons is the growth of electronic communication networks building on the advancements of the internet and information technology, along with the other types of alternative trading venues. We'll discuss the major participants that are leading causes of this competition the stock exchanges are facing. We will also explore how these venues work and what they can bring to the table that is capable of attracting users from stock exchanges.

## 2. Literature overview and exploration of Alternative Trading Venues

In this section I'm going to focus on the major types off alternative trading venues, but before that let's explore on a high level why these systems are so attractive to many investors. As we are going to discuss later in the respective sections dedicated to the discussed types of alternative trading venues, these systems can be subject to a more relaxed regulatory environment(Collins, 2002) & (Gentzoglanis, 2006) or possess on advanced information technology framework that enhances execution speed, or they can simply be an asset to tap into additional liquidity to what the stock exchanges offer. Another important aspect to these systems is that they run on a separate system other than what the central Stock Exchange, which makes it possible for large institutional investors to either split the location of the transactions ask me to getting the risk of affecting the price, or simply to execute large scale transactions on a more confidential basis.

As a study conducted by (Tuttle, 2013) suggests, these alternative venues or somewhat similar to stock exchanges in terms of providing a common marketplace to bring together buyers and sellers but they are not obliged to provide public information on the best prices available to the

public or their traders due to the more relaxed reporting legal expectations towards these systems. With that said due, to the numerous advantages they offer being regulated as a broker-dealer, a study says 10 to 15% of equity trading volume goes through ATSs.

With a market that is so competitive and where the stakes of participants are so high every pip can represent hundreds of thousands or millions of dollars or euros, it's no wonder why these systems or so popular. In the following sections we are going to take a look at the major trading venue types for alternative trading.

### *2.1. Multilateral Trading Facilities or Electronic Communication Networks*

First of all as these two expressions from our chapter title are often used interchangeably, so I want to clarify that the difference is that Multilateral Trading Facility (MTF) is a regulatory status or title in the European Union, while electronic communication network(ECN) is a regulatory term in the United States. In this study we will not make a significant differentiation between these two due to their similarities in nature and what they or for two traders. They both display the best available bid and ask price for their participants. For instance, the most significant MTFs are Chi X-Europe, Liquidnet Europe, Currenex MTF, and UBS MTF.

MTFs are electronic trading systems that alone participants to trade securities or even contracts (CFDs f.e.) that are otherwise not available on a public market. Traders would submit orders electronically here and those orders are matched using a software algorithm. With that said MTF's are very similar to ECNs and they provide on the alternative trading platform next to the more traditional stock exchanges.

To emphasize the incredible volume that can go through these networks, (Conrad et al, 2003) emphasized in an earlier study, nine currently operating ECNs account for almost 40% of the USD volume of Nasdaq securities, based on a SEC report published in 2000. Similarly, trading volume on POSIT, the most prominent crossing system, grew at a annual growth rate of over 45% between 1988 and 1999, and recorded a total trading volume.

This is somewhat contradicting with our earlier reference from a study conducted in 2016 very alternative trading systems were highlighted and systems that our accounting for roughly 15% of Nasdaq’s volume. With that, what's the volume of NASDAQ is multi-billion in terms of shares traded per day, we can still imagine the huge volumes these electronic trading systems conduct.

Also, as recent study highlights (Suhajda & Csesznik, 2021), these electronic trading systems are usually offering a narrower spread for traders to execute their orders. Spread being one of the primarily volume driven cost trading institutions have to deal with, next to the additional liquidity, this is only very significant advantage these platforms can offer.

### *2.2 Dark Pools*

A dark pool is essentially an alternative trading system that enables traders to place orders without actually having visibility on any sort of order book. This results in investors placing bid or ask prices into the system without actually having on a understanding of the other parties and their asking or offering prices. Significant dark pools are, arguably Chi-X, POSIT and Liquidnet amongst others.

As (Shorter & Miller, 2014) put, dark pools are electronic stock trading platforms where bids and offers are completely invisible at least until the trade is concluded. they often publish the information about the trade was closed. Dark pools are often used by institutional investors trying to access liquidity in a way that is not going to result in significant price developments. As they note in the research, the usage of dark pools shows an increasing trend. In 2008 4% of the overall stock trading volume what's conducted via dark pools compared to 15% in 2013. Dark pools of course are not just a place where trades can be made with more discretion. as they are more loosely regulated there was so risks in terms of control when it comes to ensuring or participants are treated equally.

(Kwan al, 2015) examined what affects the minimum tick size had on competitiveness of exchanges relative to dark venues. Using a regression based approach they concluded that the tick size constraint weakens the competitiveness of exchanges. the focus of their studies was to explore competition between traditional stock exchanges and the relatively newer dark trading pools, these being subject to a very different regulatory environment. one of the very important differences that can be observed in practice, the study says, is the ability of some traders to bypass existing regulatory needs on order sizes causing only minimal improvements in the asset's price.

### *2.3 Crossing Networks*

Crossing networks are often confused with dark pools due to their increased confidentiality compared to regular exchanges, however the base methodology of execution is different. Simply put, crossing networks are a unique type of alternative trading systems where each order gets matched directly without having it routed to on a orderbook or any sort of intermediate party such us or broker dealer or a Stock Exchange. Due to cutting out the middle party crossing networks tend to be very cheap from a executional point of view.

There are several studies looking into the characteristics of crossing networks. As (Mao, 2010) finds, These alternative trading systems would typically have lower effective spreads along with a minimal price impact of any trades, but due to the nature of these markets work the risk of a trade not being executed is also higher than usual on other systems. They also conclude that most frequently shares with low volatility and high volume are traded these markets.

(Degryse et al, 2006) already examined crossing networks and their relationship with stock exchanges and concluded that alternative trading systems are definitely in a competition for the past decades with their more traditional counterparts, crossing networks not being exempt.

One can easily see how the direct crossing orders and not having on order book cuts out some complexity resulting in a more effective market structure from a cost perspective. this along with the higher probability of an order not being executed boost crossing networks as a handy addition to a trader's toolbox

**3. Methods and comparison of Trading Venues**

In this section we are going to cover some additional comparative literature and define our methodology for comparison to conclude meaningful insights. One of the key areas in competition that can be seen manifesting between multilateral trading facilities and stock exchanges is the quality of prices.

As (Buckle et al, 2018) says, the intra-day price contributions of some MTFs - BATS and Torquoise in the stufy - are higher than those of LSE, especially during the first and last periods of the day. The estimated average daily price contributions are consistent with this result – the story notes, which definitely puts MTFs in a good position for price quality next to stock exchanges.

On the other hand, research conducted by (Bielagk et al, 2019) also suggests it's not only a competition between alternative venues but more of a synergy. they denote that dealer markets require a certain degree of reporting about portfolios, which is not necessarily the case for ATS. focusing on crossing networks they find that the presence for crossing network next to an exchange often reduces spread therefore benefiting traders.

In order to be able to visually summarize some of the key highlights from the scientific literature overviewed, we are going to use a simple table with below detailed logic:

- we are going to construct a table to be able to highlight strengths and shortcomings
- The features that we are going to rate will be the followings: quality of price, commissions, execution speed, confidentiality and the regulatory framework
- each of these features are going to be rated on a scale from one to three: good, mediocre, poor, with good being 3 points and poor being 1.

In the following section we are going to build and analyze this information. This will help us to identify strengths and weaknesses, areas of competition but to also emphasize synergies.

## 4. Findings

Finally, I strive to summarize findings from the earlier studies and see synergize to conclude areas of competition. Using the methodology we defined in the earlier section, below the reader can find a summarized view on how competitive these venues are in a few major categories, those being the quality of prices, commission, confidentiality, the regulatory framework, and finally a summary column with the total points scored.

**Table 1. score of competitiveness of trading venues by operating areas**

| Trading Venue | Quality of Price | Commissions | Execution speed | Confidentiality | Regulatory framework | Total Points |
|---|---|---|---|---|---|---|
| MTFs | 3 | 2 | 3 | 1 | 2 | 11 |
| Dark Pools | 1 | 3 | 1 | 3 | 2 | 10 |
| Crossing Networks | 1 | 3 | 1 | 2 | 2 | 9 |
| Stock Exchanges | 3 | 1 | 3 | 1 | 3 | 11 |

Source: own source (2022)

Based on this scoring, stock exchanges are still the best option overall when it comes to trading large volumes with the best intersection between security, reliability, and prices, with a score of 11. They fell a little short on the price component being typically more expensive than the rest, but due to the excellent regulatory framework and they're overall reliability when executing orders on a trusted price these are still on top of the list. MTFs are at the same score as stock exchanges in this list, and the very same score of 11 can likely be dedicated to the overall similar methodology and services they offer to investors. They lose a little bit of traction when it comes to the regulatory framework Compared to stock exchanges but they make up with better spreads usually observed on these markets. Dark pools closely follow MTFs with a score of 10, even though their regulations are more on the loose side compared to stock exchanges and multilateral trading facilities, but based on the literature reveal they don't really compete with MTFs or stock exchanges, it's more like their presence and hances the overall market efficiency and environment for investors. Crossing networks follow dark pools with a point of nine, offering somewhat similar services but with the ability of being directly connected with the other participant of the trade. This is very useful to not influence the price even when executing larger volumes, but they come with less confidentiality and with a high probability of an order not being executed

## 5. Conclusions

This study allows for the conclusion stock exchanges and multilateral trading facilities are in an extremely close competition with each other offering similar services and attributes for investors. Based on the literature we reviewed it is transparent that alternative trading systems in general, and as such multilateral trading facilities too have a little bit looser regulations that comes with a couple of advantages when it comes to speed of execution and commissions to be charged. On the other hand this looseness also comes with a couple of cons when establishing trust with market participants. That said, the findings suggest that MTF's and stock exchanges are where is similar to each other when it comes to services offered to investors.

Dark pools and crossing networks are a slightly different piece of cake. Seemingly they don't strive to compete with the services stock exchanges offer, rather address those shortcomings that these more strictly regulated institutions cannot. We discussed how dark pools enable anonymized execution therefore excelling in confidentiality, why crossing networks cut out the middleman hence and enhancing the commission structure on the cost of lover execution probability of the trade.

On the other hand it is not just about competition, but the synergies too that matters on the market. Looking at the scientific literature that provided an example how the presence of a crossing network decreases spread under given market conditions it's easy to conclude how ATS in general or beneficial in terms of liquidity and pricing on a institutional level. Using the same logic it's easy to see how the presence of MTFs are actually resulting in better commissions for investors as stock exchanges have to compete too.

In a nutshell, it can be concluded based on the findings that alternative trading systems can be split into two major categories when it comes to competitiveness. The first category being electronic communication networks or multilateral trading facilities tend to compete with stock exchanges and benefit market participants by the additional competition putting pressure on these large institutions to keep their spread and commissions structures up to speed. The other category consists of dark pools and crossing networks, which ones are not offering an extremely similar set of services, but still largely benefit investors through the extension of accessible liquidity. The larger a network gets the more synergies and complementary services it can offer, therefore it would be interesting to conduct further studies on future merger opportunities between these institutions.

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„AZ INNOVÁCIÓS ÉS TECHNOLÓGIAI MINISZTÉRIUM ÚNKP-21-3. KÓDSZÁMÚ ÚJ NEMZETI KIVÁLÓSÁG PROGRAMJÁNAK A NEMZETI KUTATÁSI, FEJLESZTÉSI ÉS INNOVÁCIÓS ALAPBÓL FINANSZÍROZOTT SZAKMAI TÁMOGATÁSÁVAL KÉSZÜLT.”

# Problems with installing a self-driving system on motorcycles

Patrik Viktor[1]

**Abstract**

The scientific work is concerned with the definition of the threat posed by self-driving engines. First, I have reviewed the literature to describe the concepts and criteria related to self-driving. Then I will discuss information security and its aspects. In the research part I will examine networking and IT threats and draw conclusions based on these.

Keywords: self-driving system, IT, motorcycles

JEL code: O33

## 1. Introduction

In my research, I am investigating self-driving systems for engines, especially from the point of view of information security. This is a very new area of this research. There is no level 3 self-driving engine officially on the market. Thus this study is also concerned with lower level self-driving engines. My research was conducted with experts working in the self-driving departments of various large companies. I have directly interviewed experts in other systems development to avoid system level installation answers. Researching the threat is another cornerstone of this discussion. Today, self-driving technology is developing at record speed. new companies are emerging to develop these activities.

## 2. Secondary research

In these lines I will describe the degrees of automation, which will be important to know later. There are several different classifications, but I consider the SEA (Society of Automotive Engineers) scale to be the most credible and well thought out, and I will describe it below.

The first, or logical level zero, is no automation at all. The vehicle is entirely under human control. At level one, the vehicle is still under human control, but they are able to take over operations related to either steering or gear shifting. At level two, partial automation appears. The braking-acceleration and steering processes can be coordinated simultaneously, but control remains in the hands of the driver.

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At level three, the system is able to take over the control of the dynamic driving operations, but the human driver can intervene if necessary and must be able to take back the steering. This level of automation is already available and widely available on the market. The aim is to support the driver's decision making and to perform simple interventions such as electronic stability control, lane-keeping automatics or pedestrian detection. More complex tasks are left to the driver. (Szeghegyi & Viktor ,2021) Stage 4 implies a high level of automation, monitoring the driving environment, complex dynamic driving operations, steering, acceleration and deceleration. The automatic system is also in control when the driver reacts inappropriately or not at all to a request for intervention. Level five is the level of full automation, the structure is able to handle all road and environmental conditions and can drive without human presence (Lukovics et al., 2018, p. 953).

After a general overview of the economic, social conditions and impacts, I will report on an area where conflicting principles prevail and many moral dilemmas arise. This is the subject of responsibility and ethical decision-making. The most controversial and widely debated question is who is responsible for the decisions of these self-driving vehicles and how. It is an issue that concerns ordinary people and professionals alike, as anyone can have an opinion, and it is an area that does not require technical or economic knowledge, but which raises a number of legal and ethical questions.

In general, we like to be aware of our rights, but we feel more comfortable when the responsibility is not ours. What happens when we have to rely on a machine and we do not know exactly who is liable for any faults? Most of us feel anxious at the thought of not being able to defend our interests against something or someone if necessary. As the subject is a widely discussed and popular one among philosophers and lawyers, several ideas about liability have emerged.

The simplest idea is that in all situations, regardless of the circumstances, it is always the individual who is liable. In fact, anyone who comes into contact with these. The manufacturer, the vendor, the programmer, the software developer or the user himself could be held responsible for an accident. In reality, however, the answer is much more complex and far from clear-cut. In the event of a system failure, is the programmer to blame for having produced poor quality work, the distributor for not checking the quality of the goods he sold, or perhaps the user for not ensuring that timely updates were installed?

Self-driving technologies are based on artificial intelligence, capable of self-learning on the fly, using previous experience. The designers, programmers or installers of these entities develop a well-thought-out baseline, but often cannot anticipate the changes that will occur in the system during the self-improvement process (Hu& Appleton,2005). This raises the question of whether individuals can be held accountable for events over which they have no control. Or,

to take this further, can they be held accountable for what they have lost control over? This suggestion suggests that there are situations where humans are not to blame for machine error.

Personally, I would rather join the ranks of those who reject the theory of machine accountability. Although there are organisations, such as insurance companies, which are also non-human entities that can be held accountable, there are human decisions behind their operations and decisions. It is also more worthwhile to advocate human responsibility for the common good and for the resolution of legal issues. In this way, developers' and manufacturers' demand for quality and users' more prudent behaviour can be maintained. (Csercsa et al., 2021)

While ideas and arguments differ, everyone agrees that it is important that machines make ethical decisions based on human judgement, and that it is essential that they are programmed according to ethical standards. However, accepted norms can vary from community to community, so it is necessary to lay down a single set of rules. However, even so, objectionable decisions can still be made, since properly programmed machines can be more ethical than humans in certain situations. They are unencumbered by the motivation to preserve their identity, they can use more information from more sources, more quickly, and they do not have feelings that can cloud their judgement (Greeblatt,2016). It is precisely these abilities or, if you like, deficits that can lead to contentious situations.

A number of questionnaires have been developed to explore the moral dilemmas of decision making, in which imaginary situations have to be solved and each answer entail negative consequences. The results of the questionnaires suggest that the moral choice is to minimise the loss of life, e.g. to sacrifice fewer people to save more lives. In the case of personal involvement, however, the principle of global utility did not apply, with respondents mostly preferring the safety of themselves and their loved ones (Banerjee et al,, 2017). In my opinion, in situations that cannot have a positive outcome - personal injury is definitely involved - there is no template to follow, every situation is a unique case. Machines can be programmed to prioritise, for example, the life of a child over that of an adult, or the safety of a pregnant woman over that of a man, but I feel this is an imposition of moral values into a logical framework. In such cases, I still consider the emotional factor to be important, and those elements of human judgement that are not yet programmable. Until we have a fully developed, generally acceptable answer to the above questions, the subject will continue to be of interest and will give rise to new theories. I will conclude this section with a quote that reflects the complexity of the present situation, in that we are creating in a human-dominated world devices that are in some respects more perfect than humans, leading to the complicated situations discussed so far: "Robotization goes beyond copying humans, walking, talking androids...the machines of the future will have superhuman capabilities in both physical and digital terms. They will be embedded in our physical world, but they will go where we cannot and will have a mind of their own thanks to artificial intelligence. They are fully connected to the digital

world and are far more effective than humans at performing online tasks.( Rassolkin et al.,2018)

### *2.1. IT security*

Even in the last century, public, municipal, business and non-profit organisations information assets (partner data, technology and information assets) have been a major challenge for specifications, investment plans, personal data, etc.). Confidential and organisational and operational rules on information protection also governed the management processes from an information security point of view. (Michelberger&Kemendi,2020) Information technology and the indispensability of information technology has brought new, hitherto unknown unprecedented risks. There is therefore a need to ensure that all information and data management details (human resources, information technology, organisation, process).( Michelberger& Fehér-Polgár,2020)

## 3. Primer research

As part of the primary research, I conducted interviews with 14 specialist teachers. I wanted to assess the threats to self-driving motorcycles in terms of information security, for which I created a Muhai-Bodka threat map.

**Table 1. Specialists**

| Company | work experience | schedule |
|---|---|---|
| Knorr-Bremse | 5-10 | Expert |
| MAGE | 2-5 | Expert |
| University of Győr | 5-10 | Teacher |
| Bosch | 5-10 | Manager |
| Knor-Bremse | 30-40 | Expert |
| TATA consulting | 30+ | Manager |
| TRW | 15-25 | expert |
| Denso | 30+ | Expert |
| Audi Hungary | 40+ | Manager |
| Lear | 2-5 | Expert |
| Hyundai Mobis | 5-10 | Expert |
| Valeo | 15-20 | Manager |
| Yazaki | 20-25 | Expert |
| Adient | 30+ | Expert |
| Thyssenkrup | 2-5 | Manager |

Source: Own research

As a basis for my research, I identified the most important threats based on interviews with experts, where several similar threat points were identified. Experts were almost unanimous that self-driving motorcyclecycles are more easily attacked than self-driving cars physically.

Experts say that networking will be a potential problem in the self-driving car field. Because self-driving motorcycles- Experts say motorcycles are so highly regarded by 70-80% of users who use them for the pleasure of it. This is a hindrance in V2V communication and accident-free driving aspects. Experts find that modular self-driving systems are difficult to install on motorcyclecycles as they believe there are 5 categories of hindrance.

- Readability
- lack of space
- Lack of internet
- Resonance
- Weather exposure.

The experts ruled out my next question as being used for an act of terrorism, but it was an 80%/20% split, which the experts ruled out because of the terms in the following figure. They believe that vehicles are more suitable for this type of act.

**Table 2. Expert opinion on the terrorist attack on self-driving cars**

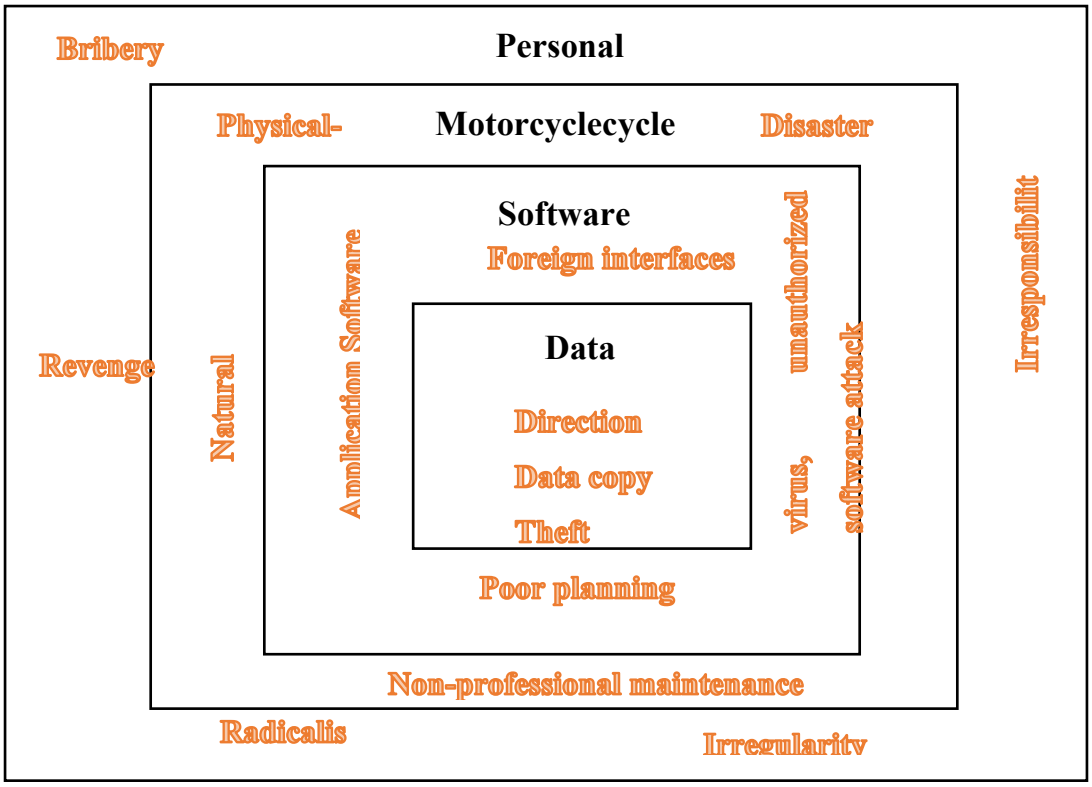
| 80% not possible | 20% possible |
|---|---|
| Cannot be started independently | Group attack |
| Would be ineffective | Linking |
| driving modification can be modified | Watch |
| Not suitable for Personal Attack | |

Source: Own research

In the following, I analyse the key issue of my research, the information security-based threat. Experts were divided on this issue in several respects. I have divided these opinions into three groups.

- According to physical threat
- Software intrusion
- Data intrusion
- The these are the impacts identified by the experts:

**Table 3: IT Security**




Source: Muha-Bodlaki, 2003 based on own research

They are based on 3 groups of experts for different threats. Those experts who emphasized physical attacks tended to emphasize terrorist attacks, unprofessional operation and bribery. While those who preferred the software threat, V2V communication, control. While respondents who preferred data threats preferred data loss, property damage, malware.

## 4. Results

Based on my research, I found out that V2V communication, i.e. networking and safer driving of self-driving vehicles, will not spread as fast as experts think because motorcycleing gives a flow experience that many users want to experience. As well as the fact that self-driving motorcyclecycles are less likely to commit terrorist acts on their own. Experts say that group attacks are very likely and the effectiveness of V2V communication is even greater. The experts were divided into 3 threat categories and different threat levels were identified. Which are described in 3 tables. There was also a strong focus on data security, which is an important milestone and one of the most fundamental concerns for self-driving cars.

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# The differences between the Hungarian and international accounting standards on the basis of financial statement's notes of the listed companies on the Budapest Stock Exchange

Viktor Vágner[1] – Anita Tangl[2]

**Abstract**

The purpose of the study is to determine whether, as a result of the mandatory IFRS (International Financial Reporting Standards) adoption in 2017, companies listed on the Budapest Stock Exchange disclose the reconciliations to the total comprehensive income in accordance with IFRS for the latest period in the entity's most recent financial statements, and to reveal the extent to which these reconciliations appear in the statements. The subject of the examination is the reconciliations and explanatory notes of the comparative period of the IFRS annual financial statements of listed companies, for which the transition to IFRS was mandatory in 2017 for individual reporting purposes. A document and content analysis followed by a frequency analysis, has been applied to identify the reconciliations.

We found that companies trading in premium shares mostly provided comprehensive and balanced information about the reconciliations, while companies in the lower share category published such information on a limited scale. The most common reconciliations include changes in deferred tax, income tax, depreciation and amortization, finance leases, dividends, fair value, accumulated vacation and interests in subsidiaries, associates or joint ventures.

Keywords: IFRS adoption, International Financial Reporting Standards, Notes, accounting, listed companies

JEL code: M41

## 1. Introduction

The revival of international capital investment, the acceleration of cross-border commercial transactions, the continuous development of financial markets and the emergence of multinational corporate networks, in a word, the globalization of economic processes in recent decades have contributed to the harmonization of accounting regulations. The information

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needs of economic actors have crossed national borders, so it has become especially necessary to develop a single set of harmonized rules where similar transactions and deals are treated and evaluated in the same way (Gulyás – Wickert, 2013). This process of harmonization can be observed by approximating the accounting systems used in each country and eventually replacing them with a unified, single international (global) accounting system. In order to make the financial statements of companies operating in different countries comparable, it was necessary to develop a uniform accounting regulation. The application of International Financial Reporting Standards (IFRS, formerly IAS) serves this purpose.

Global efforts to harmonize accounting have recently intensified in Hungary as well. After the accession to the European Union in 2004, harmonization efforts have begun. Regulation No. 1606/2002 of the European Commission has required the application of IFRS from 2005 in the preparation of consolidated financial statements of listed companies. Hungary complies with this Regulation (Beke, 2010). The 1387/2015 (VI. 12.) Government Regulation to adopt IFRS for individual purposes proved to be a significant milestone. To prepare for this, a number of amendments have been made to our Accounting Act (C of 2000) to better comply with IFRS. In 2016 the Accounting Act came into force in order to achieve the best possible compliance with international directives, and the possibility of applying IFRS for individual reporting purposes was opened. From 2017 an entity that trades its securities on a regulated market in any state of the European Economic Area has been required to transition from the Hungarian Accounting Standards to IFRS for its individual financial statements. In light of this, the 2017 business year is the first IFRS financial statement, while the previous year, 2016 is the IFRS comparative period, which was prepared in accordance with the old Hungarian standards, but it must also be prepared in accordance with IFRS. It is also necessary to derive a reconciliation of equity and profit between the two systems in accordance with IFRS 1 (First-time Adoption), which must be provided with interpretive notes and explanations. Under IFRS 1 an entity shall explain how the transition from previous GAAP/Low to IFRS affected its reported financial position and performance, thereby complying with the reconciliation requirements.

In view of all this, the main goal of the study is to explore the differences between Hungarian Accounting Standards (HAS) and IFRS in connection with the mandatory transition to individual reporting under IFRS from 2017 with the help of reconciliation items in the financial statements.

## 2. Theoretical background

The adoption of IFRS has placed a significant burden on listed companies, as there are strict regulations and clearly defined legal frameworks for the preparation of IFRS financial statements, for example by stock exchange regulators and supervisory authorities. Accounting under IFRS is quite resource-intensive and imposes a similar administrative burden on companies regardless of size (Gulyás – Wickert, 2013). According to the 2004 assessment of

the World Bank's accounting and auditing practices, Hungarian Accounting Standards differ from International Financial Reporting Standards despite significant harmonization efforts (Beke, 2010). In Hungary, the tax-driven nature of national accounting requirements is considered as an obstacle to convergence (Larson – Street, 2004). Other countries could be cited here, for example, when the Common Law accounting systems of the USA and the UK are compared with Code Law-based systems of many Continental European countries, we can see that the level of the capital market orientation of the financial environment also follows the differences in accounting systems internationally (Csebfalvi, 2012). A survey conducted by KPMG experts found that most of the problems among listed Hungarian companies were in the more complex areas, and where the requirements differed significantly from Hungarian Accounting Standards, while companies where the two regulatory systems are closer to each other in terms of the evaluation procedures and methods used, performed better than the others (Gulyás – Wickert, 2013). Differences may often be due to the fair value measurement of certain assets because companies use fair value more frequently in their financial statements under IFRS than under local GAAP, so the impacts could cause a significant difference in the pre-tax profits of the two accounting systems. (Strouhal et al. 2017; Fehér – Karai, 2020). Other differences have been identified between HAS and IFRS, such as the capitalization of foreign exchange losses, the capitalization of intangible assets or the deferral of similar costs, the recognition of provisions for contingent liabilities, future liabilities and possible losses, the recognition of special provisions or allowances by banks, insurance companies and other financial institutions, the non-recognition of deferred taxes with respect to taxable and deductible temporary differences, the non-reporting business segments and geographical segments, furthermore, treasury stock is recorded as an investment, recognition of revenue and costs on services and construction contracts based on invoiced amounts rather than the stage of completion, the definition of extraordinary items is broader, and disclosures are limited to related-parties (Takáts, 2014).

We can see that despite the harmonization efforts, due to the different regulatory criteria and evaluation methods of IFRS, a number of items can be listed, which lead to significant differences in the value of IFRS financial data compared to the same income statement or balance sheet data reported in accordance with Hungarian standards.

## 3. Materials and Methods

The subject of the analysis was companies trading in shares on the Budapest Stock Exchange (40 in total), with the exception of credit institutions and insurers (4), as the latter provide accounting data in a different reporting structure from the other joint stock companies, and it would have been difficult to ensure comparability due to the specifics of the accounting system in the financial sector. 3 companies did not disclose IFRS reports. Thus, excluding these exceptions, 33 listed companies were included in the analysis (18 Premium and 15 lower share classes (Standard; T) at the time of writing this study). The research material is derived from

the individual annual IFRS financial statements disclosed by listed companies typically for the year 2017 (except 1 company for 2016 - due to early adoption, and other 1 firm for 2020 - due to later establishment), namely the notes and interpretations explaining the reconciliation of the income statement for the period prior to the first IFRS report (that is the comparative period) regarding the different accounting procedures and valuations.

The aim of the study is a textual comparative analysis of the reconciliation items presenting the profit and loss statements of companies according to IFRS and Hungarian accounting. Further purpose of the study is to determine whether companies listed on the Budapest Stock Exchange disclose the reconciliations to the total comprehensive income in accordance with IFRS for the latest period in the entity's most recent financial statements, and to reveal the extent to which these reconciliations appear in the statements. Also, to describe the most common textual interpretive reconciliations of accounting differences in IFRS statements, thereby identifying the factors that most determine value differences. In this way, the factors that cause the differences can be identified, by which the main causes of the differences can be explained. Finally, our aim is to explore the different accounting and valuation procedures between the Hungarian and international systems. In the framework of this comparative study, we analyse the notes of the reconciliations explaining the value differences of the comprehensive income statements according to IFRS and the Hungarian Accounting Standards. In the research, we used a qualitative method through the Notes to the financial statements, which explains in text the changes in the value of the income statement items, that is the reconciliations. To evaluate these, we used a content analysis method, and then a frequency analysis to measure the extent to which these reconciliations appear in the statements. When analysing the content of the texts, we chose manual (human) coding, that is the actual reading, because we found this more reliable for the qualitative evaluation compared to the computer version, and in our opinion, it is better to judge the meaning of words and phrases in the text. We used the coding in the text to identify the basic concepts, and the coding unit was the word expressions. We grouped the concepts according to topics, including categories and attributes, and finally arranged them in a table. Thus, it makes the findings comparable and is suitable for exploring the relationships, correlations, and causes between different concepts.

## 4. Results

The main results of the frequency analysis are shown in Table 1. below, where the most common reconciliation items are listed to explain the differences between the IFRS and Hungarian income statements during the transition to IFRS (typically for 2017).

**Table 1. Frequency of reconciliations**

| Reconciliation | Total | |
|---|---|---|
| **Number of documents** | **33** | **100%** |
| Deferred tax | **26** | **78,79%** |
| Dividend and interest income | **12** | **36,36%** |
| Depreciation or amortization of assets | **10** | **30,30%** |
| Income tax reclassification | **8** | **24,24%** |
| Fair value adjustment | **7** | **21,21%** |
| Provisions (accumulated vacation) | **7** | **21,21%** |
| Impairment loss | **7** | **21,21%** |
| Finance leases | **6** | **18,18%** |
| Interests in subsidiaries, associates or joint ventures | **4** | **12,12%** |
| Research costs | **3** | **9,10%** |
| Reacquired own shares | **3** | **9,10%** |
| Cost of establishment and restructuring | **2** | **6,06%** |
| Amortisation of goodwill | **2** | **6,06%** |
| Activation of interest rates | **2** | **6,06%** |
| Other (18 other different items) | **1** | **3,03%** |

Source: own editing based on the notes to the financial statements

The most common reconciliation is the change in deferred tax, occurring in a total of 26 cases. The accounting and recognition of deferred tax is not required by the Hungarian standards, but in IFRS, deferred tax is recognized in the income statement as revenue or expense. IFRS take into account the nature of the difference between accounting profit and profit under tax law. Deferred tax is recognized in the income statement as part of the net income for the period. This is followed in 12 cases by dividend and interest income. Before 2016, the dividend was realized differently by the Hungarian standard than by IFRS. Under IFRS, dividends must be presented at the earliest period in which the decision is made. Therefore, the dividend received should be reclassified to income in accordance with IFRS. Depreciation or amortisation of assets occurred in 10 documents. The differences are due to different measurement bases, for example due to a different cost of that asset or depreciation rate determined in accordance with IFRS. Because IFRS uses a component approach to account for depreciation. The further items already appear in less than 10 documents, but the impact of these is not negligible either. We note that the impact of the current income tax reclassification is mentioned by only 8 companies, although the local business tax affects all firms that have sales revenue and should be reclassified from other expenses as current tax expenditures. Also, the fair value method is mentioned by only a few companies, in just 7.

The textual explanation of the reconciliation items was examined using the content analysis method to determine the textual correlations and interpretive notes behind the value differences, and we included these items in Table 2 below.

**Table 2. Interpretation of value changes in comprehensive income**

| Reconciliations | Categories | Features |
|---|---|---|
| Entitlement to compensation | Recognition | Increase in other revenues |
| Cost of establishment and restructuring<br>Amortisation of goodwill | Derecognition | Change in the amount of depreciation |
| Fair valuation of investment properties | Revaluation | Revaluation increase or decrease through profit or loss |
| Dividends on employee shares<br>Reclassification of expenses arising from income taxes<br>Call options<br>Reversal of investment impairment loss<br>Dividends on investments<br>Reclassification of deposit packages | Reclassification | Change in personnel expenses<br>Change in other operating expenses<br>Change in other income<br>Change in other income<br>Reduction of material costs |

*Source*: own editing based on the notes to the financial statements

In the first column, we listed 10 common concepts, while in the second column, the terms are presented in different categories, which are the recognition, derecognition, revaluation and reclassification categories in accordance with IFRS. In the third column we present the features of the categories. Thus, for example, in IFRS, the factors that increase the profit include the entitlement to compensation, the derecognition of the cost of establishment and restructuring and the derecognition of goodwill depreciation. Profits are reduced by dividends on employee shares. While in the case of fair valuation, the direction of the change in profit depends on the revaluation or devaluation. There are further differences in the reclassification of income items, as the Hungarian classification is more structured, more detailed, but according to IFRS there are more consolidated categories, so no significant differences can be revealed here.

## 5. Recommendations and Discussion

In conclusion, the application of IFRS at the individual reporting level has a significant impact on the profits of the examined companies, as each of the documents contains reconciliations. This indicates that there are differences in the financial data according to IFRS and the Hungarian Accounting Standards. But it also indicates that the standards are being complied with by managers as they disclose these items, thus ensuring compliance with IFRS. The most common reconciliations include changes in deferred tax, dividends and interest income, depreciation and amortization, which have a significant impact on net income. We found that companies trading in premium shares mostly provided comprehensive and balanced information about the reconciliations, while companies in the lower share category published

such information on a limited scale. However, these notes should reveal the accounting and valuation principles of the comprehensive income statement as well as other relevant positions. Thus, the latter have a lower level of quality in the presentation of financial information. As the adoption of IFRS has resulted in a change in the financial data of the companies concerned, management should also take into account these changes in its internal valuation procedures. As IFRS require a higher level of reporting in the disclosure of financial statements, users of the statements may benefit from a variety of textual reports and interpretative notes for strategic, investment or other business decision-making purposes. Therefore, the quality of disclosure and compliance with IFRS has a great importance. Textual information on financial data may also be of interest to external investors, so a higher willingness to invest can be achieved by the transition to IFRS.

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# The research of end-to-end logistic model and theory development

Fu Yingjie[1] - Tímea Kozma[2]

**Abstract**

Today, the supply chain (SC) operation of enterprises has undergone great changes and is still changing, and it is an important topic to study the development theory of modern supply chain (end-to-end supply chain). The main purpose of this paper is to study whether the current end-to-end operation theoretical model meets the current end-to-end supply chain operation requirements. By using the method of literature review, this paper sorts out the characteristics of supply chain models in different periods and divides supply chain models into traditional supply chain models and modern end-to-end supply chain models. The study found that the e-commerce economy has played an important role in the emergence of end-to-end supply chains, but the current end-to-end operating model of supply chains still has limitations.

Keywords: supply chain, end to end, operation management, supply chain KPI, SC operation management metrics

JEL code: M1

## 1. Introduction

Traditional supply chain organizations-or simple functional supply chains were common in the 1950s and 1970s, and the integrated supply chain organization which brewed in the 1980s and formed in the 1990s, while suggesting that end-to-end management is now the new model for supply chain development. However, Supply chain management indicators in the traditional sense tend to focus on one area of the supply chain, which causes the overall supply chain to operate inefficiently. Today's supply chain demand is growing exponentially as companies continue to introduce personalized products and services, seeking to meet consumer demands for accurate on-time, on-location delivery at the original low cost. These differences all show the research necessitation of end-to-end supply chain operation theory.

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## 2. Theoretical Background of the supply chain model

### *2.1. Traditional supply chain model*

In 1994, the definition of supply chain management was be defined by members of ICFCE: "Supply chain management is the integration of business process from end users through original suppliers that provides products, service, and information that add value for the customer." (Burgess, 1998, pp. 15-23). When it first shows as a literature verb is in middle of the 1980s (Cooper M.C.a, 1997, pp. 1-14). In the literature on supply chains during the years when the definition of supply chains was unclear (1950s-1990s), the development model of supply chains can be broadly categorized from Simple functional supply chain organization to integrated supply chain organization.

Simple functional supply chain: Traditional supply chain organizations-or simple functional supply chains were common in the 1950s and 1970s. Supply chain responsibilities were mainly distributed in the three fields of finance, manufacturing, and marketing (Cooper M.C.a, 1997, pp. 1-14) . With the intensified market competition and the gradual growth of the small-batch and multi-batch model, the original supply chain model gradually became inadequate, so the supply chain is in the distribution and lean production and other fields have gradually begun to develop.

The integrated supply chain: The integrated supply chain organization was brewed in the 1980s and formed in the 1990s. Houlihan mentions the planning and controlling structure, information flow, and organizational culture (Houlihan, 1987, pp. 51-66). It has basically formed the embryonic form of today's end-to-end supply chain. Most companies separate procurement, manufacturing execution, lean production, and other responsibilities in many cases, and have put forward more classic measurement systems and management theories. However, it is more limited to the production links and inventory management within the enterprise.

### *2.2. Modern supply chain End to end supply chain model*

Then ICFCE wide the definition of the supply chain to global in 2000, the main difference between the definition that they post in 1994 is, they pointed out supply chain management is a management philosophy, Core companies need to work with cooperative companies in the supply chain to achieve common optimization and efficiency goals. (Ronchi, 2018). Today, the challenge for business organizations is how to mitigate risks by creating a more resilient supply chain, under the background of global competition, technological changes, and the constant struggle for competitive advantage, many companies need to transform their supply chains.

The end-to-end supply chain is a holistic view of the supply chain that integrates all supply chain functions. It breaks down the relatively siloed management aspects of the traditional supply chain and avoids the inefficiencies caused by such silos, providing a better customer

experience and process efficiency through visibility into the entire supply chain. (Lu Hongyan, 2019).

### *2.3. The theoretical model of end-to-end supply chain*

In order to achieve end-to-end supply chain management, academia and industry have combined practical developments and cutting-edge information to propose several new supply chain management theories, which will be mentioned below, and which have likewise been enriched and innovated as the end-to-end supply chain has evolved

*Supply-Chain Operations Reference-model (SCOR)*

SCOR is the product of the Supply-Chain Council (SCC) in 1996, It provides a unique framework that links business processes, metrics, best practices, and technologies into a unified structure to support communication among supply chain partners and improve the effectiveness of supply chain management and related supply chain improvement activities. This model consists of three major entities and five major functions. The three entities are the supplier, the enterprise, and the customer; the five major functions include plan, source, make, deliver, and return. The main two purposes of SCOR: first, to unify supply chain processes and terminology; and second, to establish a relatively complete set of performance measurement indicators. The main functions of the model are: to assess the performance of the supply chain; analyze and optimize it through the entire supply chain of partners; and use the software at the right point and function (G.Poluha, 2007, pp. 1-48). Therefore, many companies also rely on the model to manage, analyze, and optimize their end-to-end supply chains.

*DDVN (Demand-Driven Value Network)-Gartner*

By the definition from Gartner, “DDVN is a business environment holistically designed to maximize the value of and optimize risk ……based on a near-zero-latency demand signal across multiple networks of corporate stakeholders and trading partners.” (Gartner). In recent years, Gartner has promoted DDVN, which divides supply chain maturity into 7 dimensions (strategic management, performance enablement, supply network, full lifecycle management, demand management, order fulfillment, supply management) and 5 stages (reaction, anticipation, integration, collaboration, ecology), and ranks the global supply chain operations of better companies in operations for industry reference.

DDVN is a globally designed business network that, as its definition states, aims to maximize value and minimize risk, but companies in different countries and industries have different perspectives on their own asset utilization, cost optimization, and departmental process efficiency, and many companies have become very fragmented internally and externally. It is a business support strategy that builds on the company's own processes and those of its

upstream and downstream networks to improve integration capabilities and enable optimal supply chain planning and execution. (Jennifer Loveland, 2014)

*Sales and Operations Planning, S&OP*

The concept of S&OP was systematically described in Orchestrating Success, subtitled Improve Control of Business with Sales & Operation Planning (Coldrick, A., Ling, D., & Turner, C.W., 2003). Here is the main process of SO&P： Business Leaders, focuses on revenue and goal attainment, Cyclical forecasting and planning, there is a sequence from planning to execution.

## 3. Materials and Methods

The following research will summarize the main influencing factors of the end-to-end supply chain through the literature research method. The second half is a theoretical comparison study, which will compare the existing supply chain operation management models based on these factors.

### *3.1. The typical factors of end-to-end supply chain development*

The global economy has entered the era of supply chain collaboration, digitalization and wisdom have become the distinctive features of the modern supply chain, the Internet platform has become the new form of modern supply chain development, and supply chain service has become an emerging service industry. IBM proposed three characteristics of an intelligent supply chain: advanced, interconnected, intelligent. This article finds that technology E-commercial and globalization could be the main reasons for this hope, they are not only the characters but also the requirement.

*Industry 4.0 and digital*

Industry 4.0 is the natural product of the third industrial revolution, which revolutionized the commercial nature of the second half of the 20th century through a series of computerization and IT advances (Dutzler, 2016). Asthana gives these three questions to the technology transformation of the supply chain: Demand uncertainty and the inability to accurately forecast demand, Production uncertainties leading to changes in supply, Lack of synchronization among supply chain partners (Asthana, 2018), which pointed to uncertain demand, uncertain supply, the uncertain partner. And industry 4.0's implementation in the supply chain almost gives the technology basement for these problems. Technological innovation opens possibilities for the development of modern supply chains, and the realization of end-to-end supply chains also requires the application of new technologies.

*E-commercial and globalization*

Traditional supply chain patterns no longer meet demand: In the context of globalized markets and diversified channels, traditional supply chain firms are struggling to manage profits-supply chain be defined as profit maximization, (Patil, 2015)) and collaborate efficiently. The collective intelligence, capabilities, technology, resources, and scale of most supply chains are no longer sufficient to meet these demands and scale is no longer sufficient to meet these expectations (Mike Burnette, 2019). As the challenges of supply chain globalization, causing exponential growth in complexity is arguably the biggest challenge facing supply chains today; the rapid growth in channels, regulations, and the speed and complexity of new product introductions have all contributed to the proliferation of complexity. In today's highly competitive and uncertain market, the fragility of the supply chain has become an important issue for many organizations.

The traditional theory is difficult to serve the complex supply chain needs: In the consumer goods industry, for example, 17 percent of new products were introduced in 2006 - twice as many as in 2005 - and product mix rationalization is eliminating SKUs at the same rate (IBM, 2018). In inventory management, Economic Order Quantity (EOQ) is one of the most classic production planning and inventory management models. This model was first proposed by Ford Harris in 1913. But Mark said that the EOQ model might be outdated in today’s background: In the context of e-commerce, as customer demand has been changing, this has led to the constant change of holding costs. Suppliers will offer discounts during large-scale purchases, which overturns the assumption that unit purchases remain unchanged (Mark, 2021).

## 4. The comparison analysis of the supply chain theory

This comparison is mainly made from the application of technology brought by Industry 4.0, e-commerce, and globalization. Among them, the more important basic points are divided for detailed measurement, and then the differences between these three concepts are analyzed. Table 1 this the comparison structure made by the author, it includes three main parts from the typical factors of end-to-end supply chain development research from the above chapter and several detail characters of the factors:

**Table 1. The comparison structure of the three theories**

| Measuring and solving end-to-end problems by SO&P | | |
|---|---|---|
| Industry 4.0 and digital | E-commercial and globalization | Overall SC assessment |
| Information interaction (linkage of hardware and software)<br>Information sharing (suppleness of SC links)<br>Information forecasting (Responsiveness of the SC) | Product diversification (related to procurement, production)<br>Diversification of distribution channels (related to warehousing, logistics)<br>Supply chain services (related to order closing, Reverse logistics-related) | Evaluate overall supply chain operations regardless of details |

**Table 2. SCOR metrics in E-commercial and globalization aspect**

| **E-commercial and globalization** | | |
|---|---|---|
| Product diversification | Diversification of distribution channels | Supply chain services |
| Supplier's/Customer's/ Total Supply Chain<br>……<br>Release Finished Product to Deliver Cycle Time<br>Activities Cycle Time | transfer Product Cycle Time<br>Delivery Cycle Time<br>Build Loads Cycle Time<br>……<br>Select Carriers & Rate<br>Checkout Cycle Time | Delivery Item Accuracy<br>Delivery Quantity Accuracy<br>Delivery Performance to<br>……<br>Supplier's/Customer's/ Total Supply Chain Management |

*Source:* SCOR (2013), Introducing the Five-Stage Demand-Driven Maturity Model for Supply Chain Leaders,

For SCOR, there are no metrics related to industry 4.0 and digital, only the metrics related to E-commercial and globalization such as Table 2. In the field of Overall supply chain assessment, SCOR show a better evaluation metrics (SCOR, 2013):Delivery Performance/Fill Rates/Perfect Order Fulfilment……Order Fulfilment Lead Times/Supply Chain Response Time/Production Cash-to-Cash Cycle Time/Inventory Days of Supply.

The DDVN model is based on the company's internal self-assessment of supply chain improvement and classifies companies into five types according to their different states: react/anticipate/integrate/collaborate/orchestrate. According to the pain points of supply chain development of different types of companies which appear in the introduction of DDVN theory, the current stage of the company is enhanced through the five aspects of outcome/metrics/process focus/technology/organization (Noha Tohamy, 2013).

Table 3 shows what SO&P metrics are used in the current end-to-end supply chain, in Industry 4.0 and digital aspects there is no metric found to measure the performance. and for E-commercial and globalization parts there is no case showing that medically based on Product

diversification, Diversification of distribution, Supply chain services. These metrics are more a measure of whether the process in this segment is working perfectly, focusing on the process rather than the supply chain itself.

**Table 3. Measuring and solving end-to-end problems by SO&P**

| Measuring and solving end-to-end problems by SO&P | |
|---|---|
| Industry 4.0 and digital | NONE |
| E-commercial and globalization | Orders loaded within Leadtime<br>Number of demand changes in the period<br>……<br>Supplier on time in full %<br>Capacity utilization<br>Inventory Unallocated stock |
| overall supply chain assessment | order on-time delivery rate, production plan accuracy rate, demand forecast accuracy, order completion cycle time, capacity planning, and actual comparison. |

*Source:* Overall supply chain assessment: Jesse Kelber (2019), 5 KEY S&OP METRICS TO TRACK IN 2021, E-commercial and globalization： blog (supply chain-mechanic), Which S&OP Metrics to use? Improving SIOP – 5 key actions to help your S&OP process,

## 5. Conclusion

The comparison of these three theories shows that all three theories have measures for supply chain operations, but these three theories do not explore the degree of integration of Industry 4.0 digital and supply chain. Moreover, the indicators of these theories are more from the supply chain subject to monitor the indicators and focus on how to assess the overall completion of the supply chain, rather than detailed to each specific link. In addition, the indicators do not reflect the indicators from the perspective of e-commerce and globalization, which are external to the main body of the supply chain, and how the main body in the supply chain should face the three new consumer demands: Product diversification, Diversification of distribution channels, and Supply chain services.

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