

# THESIS OF THE DOCTORAL (PhD) DISSERTATION

## AN EVALUATION OF PLATFORM-BASED DEMAND-DRIVEN BUSINESS MODELS ACTIVITIES

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# **1. BACKGROUND, OBJECTIVES AND HYPOTHESES OF THE RESEARCH**

Traditionally, businesses operated according to a well-defined pattern, known as traditional pipeline businesses, where value is created along a linear sequence of activities, with value moving from left to right with the company's cost on the left and the business's revenue on the right.

However, in 2022, seven of the world's top ten companies with the largest market capitalization operated on a digital platform base: Apple, Amazon, Microsoft, Alphabet (formerly Google), Alibaba, Meta and Tesla (VENTURA, 2022). Platform-based operations represent a holistic approach to the platform as a business model, focusing on networking, thus facilitating interaction between two or more groups.

In 2020, the World Economic Forum's annual conference highlighted the transformation of business models and the governance of the technologies driving the 4IR to benefit businesses and society and reduce the associated risks to them, i.e., inequality, cyber security risks, core industries disruptions, ethical issues etc. (SDG KNOWLEDGE HUB, 2020). The ongoing structural transformations and changes in business models challenge value chain-based companies' use of digital platforms and ecosystem models. It would be essential to understand platform-based business models to find their place in the following industry structure, as it is estimated that more than 30% of global economic activity - around \$60 billion - could be mediated by platforms in 2025 (ROSENFELD, BORRUSO, és SIMCOCK, 2018).

This research focuses on digital platform-based business models, particularly platform-based and demand-driven (PbDd for short) businesses, also known as the *sharing economy*, as a dominant segment. The sharing economy has revolutionized entire industries by allowing simple or average consumers to become service providers, venturing into a field previously the exclusive domain of professional sellers.

## **Main objectives of the research**

Platforms, including the sharing economy, are social and economic systems that refer to sharing of human and physical resources. These platforms can refer to the joint creation, production, trade, distribution and consumption of goods and services by organizations and individuals (HAGIU, 2009; PARKER, VAN ALSTYNE, és CHOUDARY, 2016). The term

covers diverse business structures where exchanges between economic actors can occur through peer-to-peer (p2p), peer-to-business (p2b), business-to-peer (b2p) and business-to-business (b2b) marketplaces, sharing and reuse, making surplus capacity of goods and services available.

In the international literature, various alternative terms are frequently used for the sharing economy (Table 1); this impedes understanding the phenomenon, as they often overlap and interchange arbitrarily (MARTIN, 2016), recommending adjacent notions.

**Table 1: The various terms of the sharing economy**

<b>Terms</b>	<b>Literature source</b>
<i>sharing economy</i>	BENKLER (2004), BOTSMAN és ROGERS (2010b), HEINRICHS (2013)
<i>collaborative consumption</i>	BOTSMAN és ROGERS (2010a), HAMARI, SJÖKLINT és UKKONEN (2016), REISCH, THØGERSEN, SCHOR és FITZMAURICE (2015)
<i>peer-to-peer based sharing</i>	SCHOR (2015)
<i>crowd-based capitalism</i>	SUNDARARAJAN (2016)
<i>gig-economy</i>	FRIEDMAN (2014), GYULAVÁRI (2019)
<i>connected consumption</i>	REISCH et al. (2015)
<i>access economy</i>	ECKHARDT és BARDHI (2015)
<i>on-demand economy</i>	COCKAYNE (2016), SELLONI (2017)
<i>gift-economy</i>	EISENSTEIN (2011)

*Source: Own editing*

My first objective (O<sub>1</sub>) is to develop a unified conceptual framework by reviewing and systematizing the literature. This conceptual framework will allow for a more differentiated understanding of the research results of the "platform-based sharing economy".

*Hypothesis 1. (H<sub>1</sub>): The marketplaces, for instance, p2p, p2b, b2p and b2b, provide an opportunity to define the conceptual scope of platform-based, demand-driven (PbDd) business models in the context of exchanges between economic agents.*

The adjectival structure "demand-driven" indicates that the supply side is weaker than the demand side for the platforms. While this statement may be true for most offline market structures, a further characteristic of platforms is that the demand and supply sides are subordinate to the platform operator. The platform connects providers and users and shapes it through algorithms and other mechanisms.

Although diverse and overlapping, the conceptual scope of sharing economy-type (SE-type) business models is somewhat limited based on currently available data. The historical background of the platform-based demand-driven SE-type business models goes back over a decade and a half. Narrowing the focus of the study, now concentrating on the EU Member States, including Hungary and Romania, my second objective (O<sub>2</sub>) is to investigate the awareness of PbDd business models from both sides (user and provider).

At the European Commission's (EC) request, DG Communications in Brussels has conducted three surveys on using the SE in the EU Member States since 2016 (2016, 2018 and 2021). The surveys aim to assess the awareness of SE-type business models in the EU Member States, both on the user and the service provider side. I used the open-access databases from the questionnaires commissioned by the EC as a secondary research source to conduct a primary analysis to determine the changes in the awareness of SE-type business models, from the demand and supply side, for Hungary and Romania. Following a country-by-country evaluation, I will compare respondents' opinions from the two countries, looking for similarities.

*Hypothesis 2. (H<sub>2</sub>): The awareness of PbDd businesses in Hungary and Romania will increase steadily, based on 2016, 2018 and 2021.*

*Hypothesis 3. (H<sub>3</sub>): The perception of PbDd businesses in Hungary and Romania is homogeneous, based on 2016, 2018 and 2021.*

Current definitions used by EC are ambiguous and unclear on what attributes are needed to classify businesses as SE-type businesses. Each of the three surveys mentioned previously defines the SE-type business phenomenon in different ways. The 2016 questionnaire was still quite rudimentary and could be viewed as a preliminary examination, as it contained only four questions without demographic questions. In 2018, a more comprehensive questionnaire (12 questions + demographic questions) was created to assess the types of collaborative platforms, their awareness, frequency of use and proliferation in all EU Member States. In 2022, post-Covid-19, a cardinal difference was observed. The EC had almost ignored the versatility of the SE-type businesses, which covered nearly the entire range of services (confirmed by the survey in 2018) and only considered short-term rentals

as a SE-type business activity (the survey only collects experiences in this area from the provider and user side, at least).

Based on the 2018 EC database, as one of the most detailed surveys to date on the use of the collaborative economy, my third objective (O<sub>3</sub>) was to investigate how respondents' age, gender and employment status affect their willingness to provide services and the use of platform-based services in Hungary and Romania.

*Hypothesis 4. (H<sub>4</sub>): There is a significant relationship between the willingness to provide platform-based services and the age, gender and employment status of respondents in Hungary and Romania.*

*Hypothesis 5. (H<sub>5</sub>): There is a significant correlation between the use of services offered on a platform basis and the age, gender and employment status of respondents in Hungary and Romania.*

A knowledge-based economy and support for research and development (R&D) are vital to the competitiveness of the European economy. While the former is closely linked to human capital development and qualitative improvement, R&D activities presuppose integrating and developing information and communication technology (ICT) (BASSANINI, SCARPETTA, és VISCO, 2000). Digital technology is a critical element of platform-based operations, and its conscious development is the key to competitiveness. At the EU level, the *Lisbon Strategy* was the first to address the digital competitiveness issue in 2000, followed in 2010 by the *EU 2020 Strategy*, reaffirming the need to compete digitally globally. (EUROPEAN COMMISSION, 2010). The *Digital Agenda for Europe* is a flagship initiative of the latter. The proposed governance framework for achieving all the digital targets is based on the enhanced Digital Economy and Society Index (DESI), tracking Member States' digital progress since 2014 (BÁNHIDI és DOBOS, 2020). The revision was necessitated by two policy initiatives that will impact the digital transformation of the EU in subsequent years: the *Recovery and Resilience Facility* (RRF), adopted in February 2021, and the *Digital Agenda for Europe's Digital Decade*, adopted in March of the same year. In September 2021, the EC proposed the *Path to the Digital Decade*, a blueprint for the digital transformation of the European economy and society (EUROPEAN COMMISSION, 2021b).

The DESI index includes four principal policy areas, ten sub-dimensions and 33 individual indicator scores (Table 2). It ranks EU Member States and monitors their progress according to a weighting system for digital performance based on the Organisation for Economic Cooperation and Development (OECD) guidelines and recommendations (EUROPEAN COMMISSION, 2021a). The evaluation published in a given year includes data from the previous year, so it always shows the year's results already closed. For this reason, the DESI index values for 2016-2021 reflect the situation for 2015-2020. The EC collected the data included in the index from the competent authorities in the Member States and from various studies prepared for the Commission.

**Table 2: Principal policy areas, sub-dimensions and individual indicators that constitute the DESI index**

DESI2021 main dimensions	Number of sub-dimensions and individual indicators in DESI2021
1. Human Capital (desi_1)	Internet user skills and advanced digital skills (two sub-dimensions and seven individual indicators)
2. Connectivity (desi_2)	Fixed broadband take-up, fixed broadband coverage, mobile broadband and broadband prices (four sub-dimensions and ten individual indicators)
3. Integration of digital technology (desi_3)	Business digitalization and e-commerce (three sub-dimensions és 11 individual indicators)
4. Digital public services (desi_4)	e-government (one sub-dimensions and five individual indicators)

*Source: Own editing based on (EUROPEAN COMMISSION, 2021a)*

The value of the DESI index per country is defined as the simple weighted arithmetic average of the DESI principal dimensions:

$$DESI = desi\_1*0,25 + desi\_2*0,25 + desi\_3*0,25 + desi\_4*0,25$$

The PbDd is a distinct group of digital (platform) based businesses, which can be promoted by measures to support the integration of digital technologies, as each of the individual indicators listed in Table 2 is a potential component of the PbDd. My fourth objective (O<sub>4</sub>) is to use mathematical-statistical methods to find evidence of digital development across the Member States, aggregated and benchmarked against each other, given that PbDd businesses are organized and operate digitally. The catching-up of the economic, social and digital development of the Member States that joined the EU during the Eastern European enlargements (2004, 2007 and 2013) with that of the older members is vitally important, as this convergence should result from accession.

My sixth null hypothesis on convergence is the following:

*Hypothesis 6. (H<sub>6</sub>): Based on the change in the DESI index, I assume there is no convergence between Member States.*

I used correlation and principal component analyses (PCA) to further analyse the DESI index. The advantage of PCA is that it reduces the data to a more transparent and more accessible to interpret thanks to the aggregated information (DE SOLLA PRICE, 1967; MERTON, 1988). An additional benefit of the analysis is that the contribution of variables to the overall DESI index is determined along with principal component(s) (PC) rather than along DESI indicators (weights given by EC). My fifth objective (O<sub>5</sub>) is to investigate the weights of the four main indicators constituting the DESI index. Currently, the contribution of the main indicators is the same, based on the one-quarter weighting used by EC. Accordingly, my seventh null hypothesis is as follows:

*Hypothesis 7. (H<sub>7</sub>): The contribution of the components (variables) of the first dimension obtained in the PCA analysis is equal to the weights used by EC.*

MERTON (1968, 1988) refers to the following part of Matthew's Gospel as the "Matthew effect", and DE SOLLA PRICE (1967) as "cumulative advantage": "*For whoever has will be given more, and they will have an abundance. Whoever does not have, even what they have will be taken from them*" (MATTHEW (25:29), 2020). In explaining the discrepancies in recognition of scientific work, both asserted that "the richer only get richer". The term is used nowadays to describe a self-reinforcing general pattern of inequality linked to economic wealth, political power, prestige, knowledge or any other scarce or valuable resource (PERC, 2014; RIGNEY, 2010). By grouping the EU Member States according to different criteria, e.g. period of EU accession and real GDP per capita, and plotting them on the principal components plane, it was clear that individual Member States are not normally distributed around the mean of the EU Member States; thus providing support in rejecting the null hypothesis.

Moreover, comparing the years under consideration, the gaps between some developed and some underdeveloped countries widened slightly, so I suspected the Matthew effect mentioned above, despite the convergence. In this study, I examined, through the change in the DESI index, whether the Matthew effect can be justified in the EU Member States in the

context of my sixth objective (O<sub>6</sub>). Accordingly, I formulated my next, eighth null hypothesis as follows:

*Hypothesis 8. (H<sub>8</sub>): The mean and the variance of the latent variables of the DESI index over the period 2016-2021 do not confirm the existence of a Matthew effect.*

Digital developments and innovations have profoundly rewritten relationships, whether social or business. A business relationship, which is also a social relationship, is an exchange between the stakeholders of two organizations/companies, essentially for economic purposes (MANDJÁK és SZÁNTÓ, 2011). The purpose of cooperation, as a dimension of business relationships, is to achieve the goals that the parties have jointly set and agreed upon, i.e. the seller sells his product/service, and the buyer satisfies a need. However, cooperation is only one of the dimensions of business relationships, followed by the time factor, the willingness to assert interests, the way of connections and the extent of interaction.

Platform economies satisfy consumer needs on the one hand. On the other, the creation, development and circular emerging of the platform infrastructure and ecosystem is part of the value-creation process (KENNEY és ZYSMAN, 2016).

Industry 4.0 does not only mean a complete reorganization of production processes, so it does not only challenge companies from a technological point of view but also requires a reorganization of the corporate structure. Hence the companies must consider the data they acquire/collect and the ways of analyzing it as a key resource, as the information they can draw from it will enable them to reach out, find the right partners, and increase market share, sales and profits (PWC, 2018).

My seventh objective (O<sub>7</sub>) is to use the database from primary research to assess the extent to which businesses in Hungary and Romania are discovering evidence of the digital revolution of our time, where and to what extent digital technology is playing a role in the business value chain, and whether businesses have started to network.

*Hypothesis 9 (H<sub>9</sub>): Businesses in Hungary and Romania are digitally empowered.*

## **2. DATABASE AND METHODS**

Primary and secondary data were collected to achieve the objectives and verify the hypotheses. During the secondary data collection, international and national literature and databases closely related to the research area were analysed.

### **2.1. Literature review methodology**

For the literature review, the Web of Science Core Collection - Clarivate Analytics (WoS) database was utilized to conduct an algorithm-based scientometric review, allowing for a holistic representation of the field under study (TRANFIELD, DENYER, és SMART, 2003). The scientometric analysis provides robustness of research in three ways. First, the VOSviewer clustering software algorithms visualize the most common terms used in publications through a map, identifying keywords to indicate the dynamics of the field. Second, the algorithm sorts terms by citation counts and the most prominent terms within clusters. The clusters overview the terms and topics most frequently used in database studies. Third, the algorithm categorizes terms that are strongly related to each other, placing them in the same cluster. Then, different clusters containing publications that use closely related terms can be examined. In this way, it is possible to analyze the convergence and divergence of studies within the literature on the community economy.

I have determined four major clusters of publications: (1) publications related to *types of platform-based business models*, (2) publications discussing the *characteristics of platform-based business models* from a consumer perspective, (3) studies related to the *study of platform-based tourism and hospitality*, and (4) a cluster of papers *discussing changes in consumer behaviour and intrinsic motivations*.

### **2.2. Developing the taxonomy of the PbDd business model**

For the definition of the taxonomy of the PbDd business model, I also analyzed primarily the international literature, using the TCM framework of PAUL, PARTHASARATHY és GUPTA (2017) for a transparent and systematic overview, with the elements **T** - theory, **C** - context and **M** - method. Literature sources include publications and studies from January 2010 to October 2022. The systematic overview was followed by riddling the selected literature, where studies that did not evaluate collaborative economy enterprises according

to the following set(s) of criteria: (1) type of activity in the collaborative economy, (2) market structure, i.e., quality of the provider; (3) type of transaction (renting or selling) and (4) business model used, were excluded. The development of the new classification criteria proceeded along the following steps: (1) the type of activity performed; (2) the quality of the provider of the good/service (business or individual); (3) the type of transaction (sale or renting); and (4) naming the activities under each type.

### **2.3. PbDd businesses in Hungary and Romania**

At the request of the EC, DG Communications in Brussels has carried out three surveys on the use of the collaborative economy in the EU Member States since 2016. The surveys aim to understand people's perceptions and attitudes towards using the platform economy. In my thesis, after conducting primary mathematical-statistical analyses, the results of these three surveys as a secondary database were used to assess the prevalence of PbDd business models in Hungary and Romania. The questionnaire surveys were conducted in 2016, 2018 and 2021, and various definitions of PbDd businesses and differences in the content of the questions were found.

The 2016 questionnaire was quite rudimentary, containing only four questions; as a starting point, I looked for the equivalent of these questions in the subsequent questionnaires and conducted a quasi-longitudinal analysis. Descriptive statistic techniques in absolute and relative frequencies were used to evaluate the questions' answers (Table 3), and a homogeneity test with a Chi-square test was used to compare the two countries results.

**Table 3: Questions of the quasi-longitudinal study (Hungary and Romania)**

	2016	2018	2022*
<b>q1</b>	Which of the following matches your experience regarding this type of platform?	Have you ever used a service offered via a collaborative platform?	Have you ever booked a room in a private residence (not a hotel room) or an apartment or house via a collaborative economy platform?
<b>q2</b>	Have you ever provided services on these platforms?	Have you ever offered a service via a collaborative platform?	Have you ever offered a room, apartment or house as a short-term rental via a collaborative economy platform?
<b>q3</b>	Compared to the traditional commerce of goods and services, what do you think are the main benefits of this type of platform for its users?	In your personal experience, what are the advantages of using collaborative platforms compared with traditional channels, if any?	Why did you choose a short-term rental instead of other types of accommodation, such as a hotel?
<b>q4</b>	Compared to the traditional commerce of goods and services, what are the main problems for the people using the services offered on these platforms?	In your personal experience, what are the disadvantages of using collaborative platforms compared with traditional channels, if any?	And what, in your view, are the disadvantages of short-term rentals offered via collaborative economy platforms?

\* Services offered on social platforms are now limited to short-term housing rental services

*Source: Own editing based on EC questionnaires*

A multivariate probit analysis based on the 2018 EC questionnaire for PbDd business models was also administered as the most complex survey in this field. The method was suitable to investigate how the age, gender and employment status of respondents influence the willingness to provide services and the use of platform-based services in Hungary and Romania.

#### **2.4. Digital technology integration in the EU**

Using the DESI index, which monitors the digital progress of EU Member States, as a secondary database, Evidence of digital progress in the Member States, aggregated and relative to each other, using mathematical-statistical methods, was researched.

First, I calculated  $\sigma$ -convergence, which is the average relative deviation - expressed as a percentage - of the DESI index values from the mean. To the extent that the dispersion of development levels decreases over time,  $\sigma$ -convergence exists. Another well-known convergence indicator is the  $\beta$ -convergence introduced in the empirical growth literature by

BARRO és SALA-I-MARTIN (1992) and BARRO, SALA-I-MARTIN, BLANCHARD és HALL (1991).  $\sigma$ -convergence refers to the reduction over time of differences between regions, in this case between Member States, while  $\beta$ -convergence focuses on identifying a possible catching-up process.

The annual convergence rate to define the half-life of convergence, i.e., the time required to cover half of the path to full convergence within the study area if the convergence rate remains unchanged (OBLÁTH és SZÖRFI, 2008) was examined.

Correlation and principal component analyses (PCA) were used to analyze the DESI index further. The advantage of PCA is that it makes the data more transparent and more accessible to interpret thanks to the aggregated information (DE SOLLA PRICE, 1967; MERTON, 1988)). An additional advantage of the analysis is that the contribution of the variables to the DESI index is determined along principal component(s) (PC) instead of the main dimensions of the DESI (weights given by EB). The procedure consists of taking a large number of correlated variables and creating a small number of artificial (latent) uncorrelated variables, called principal components, with maximum variance. Because principal components are uncorrelated variables does not necessarily mean that they are independent of each other. Principal component analysis can best be compared to a shadow game, where you try to project the shadow image of a complex spatial shape onto a planar surface while losing as little of the shape's characteristic properties as possible. First, I defined the correlation matrix and plotted the most distinct values.

The PCA analysis is a multivariate system built on the eigenvalue calculation, allowing us to simultaneously see all variables' correlation. The variables' correlation matrix ( $R$ ) is a starting point. Spectral decomposition of this matrix is used to obtain the eigenvectors and eigenvalues. These were used to determine the principal component variables and principal component weights. The observed variables can be grouped according to their correlation and combined into an equal number of principal component variables. The principal component variables can be calculated from the standardized values of the original variables according to the following relationship:

$$C_j = \sum_{i=1}^p a_{ij} Z_i$$

$C_j = j^{\text{th}}$  standardized principal component variable;  $a_{ij}$  = elements of the eigenvector matrix;  $Z_i$  = column vectors of standardized values.

The eigenvector matrix is orthonormal in a row and column direction, i.e. independent pairwise in a row and column direction, and their sum of squares gives 1. Standardized variables are unmeasured data formed by dividing the variance of the variables from their mean by the standard deviation. The expected value of principal component variables is zero; their variance equals  $\lambda$ . The principal component (PC) variables are independent of each other.

Subsequently, as many of the PCs as are sufficient to describe the original variables are used. The first principal component ( $PC_1$ ) contains the most significant fraction of the variances, represented by the eigenvalue ( $\lambda_1$ ). The  $PC_1$  is constructed in our model as follows:

$$PC_1 = a_1 desi\_1 + a_2 desi\_2 + a_3 desi\_3 + a_4 desi\_4,$$

where  $a_i$  denotes the contribution of the variable to the  $PC_1$ .

I only considered principal components with eigenvalues greater than or equal to one or which explained at least 80% of the total variance. The principal components are used to identify background variables.

Principal component weights express how closely the relationship between a given principal component variable (e.g.  $C_1$ ) and the variables under investigation is related. They range from -1 to +1 and should be interpreted in the same way as Pearson correlation coefficients. The closer their absolute value is to 1, the closer the correlation. Their practical definition is given by the formula below:

$$pc_{ij} = a_{ij} \sqrt{\lambda_j},$$

Where,  $pc_{ij}$  = the weights of the  $j$ th principal component;  $a_{ij}$  = the elements of the eigenvector matrix;  $\lambda_j$  = eigenvalues.

The square sum of principal component weights per row gives 1. The columns are orthogonal, and the sum of squares per column equals the eigenvalue. I have then plotted the location of the EU Member States in the coordinate system of the two principal

components in two dimensions. The groupings are based on the EU entry date and real GDP per capita.

## **2.5. Digital readiness of businesses in Hungary and Romania**

In January 2021, I launched a questionnaire survey targeting entrepreneurs/businesses. One aim of the questionnaire was to assess the use of the opportunities offered by digital developments. The data collection process lasted four months, during which time the entrepreneurs were approached in person (by phone and/or e-mail) and asked to forward the questionnaire to their partners, following a snowball approach. One hundred thirty-four entrepreneurs from Hungary and Romania completed the questionnaire. Responses from other countries were not included, as the responses from a few entrepreneurs from Asia would have distorted my data. This survey, therefore, reflects the opinions of the 134 respondents in both Hungary and Romania.

The resulting quantitative database was conducted using univariate analyses, with the variables being assessed independently, followed by descriptive statistics, mean and frequency analyses, cross-tabulation analyses and Tamhane's multiple comparison test.

All the methods and databases used in the present dissertation and their application areas are summarised in Table 4.

I used VOSviewer clustering software, Microsoft Excel 21 spreadsheet, SPSS 25 statistical software and R statistics software package version 4.0.2 to conduct the analyses.

**Table 4: Summary of the methods and databases used in the research work**

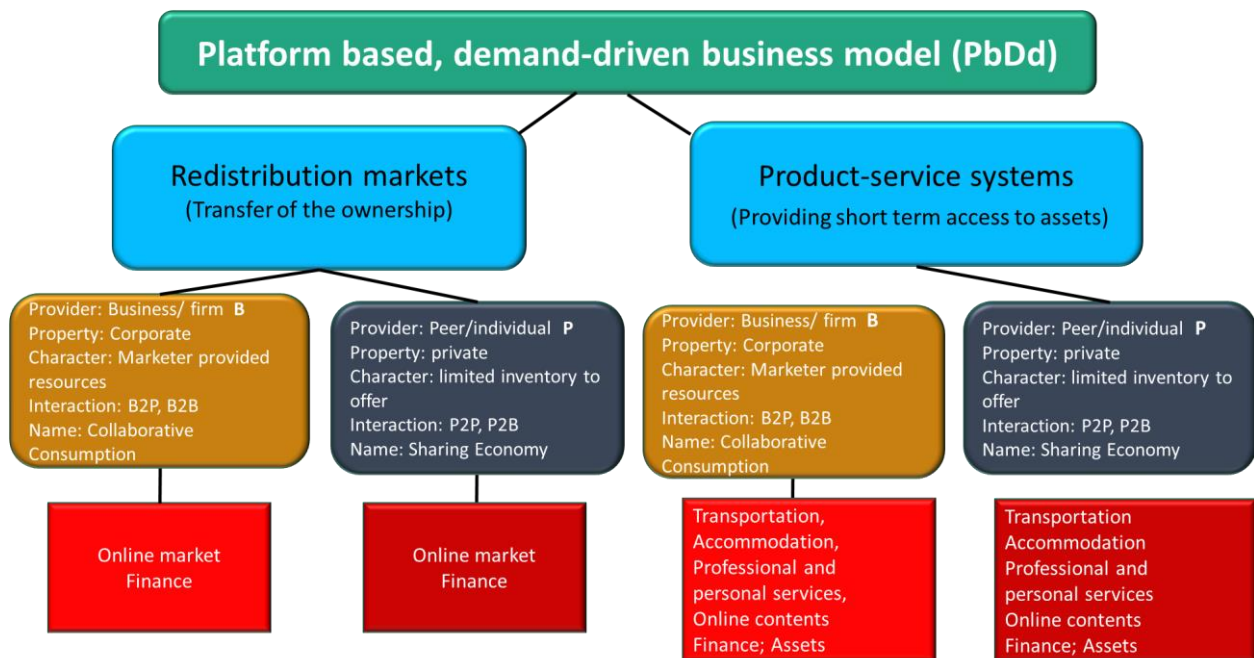
Methods	Databases	Area of application
Algorithm-based scientometric review of the literature	WoS Core Collection (2010 – 2022)	Systematic review and systematization of the literature on the sharing economy
Literature review – TCM method		To develop a common conceptual framework (taxonomy) in the field of the sharing economy, which will allow a more differentiated interpretation of the research results on the "platform-based sharing economy".
Quasi-longitudinal study	EC's collaborative economy surveys (2016, 2018, 2021)	Survey on the awareness, penetration and application of PbDd business models in Hungary and Romania
Homogeneity test		Comparison between Hungary and Romania, homogeneity of respondents' opinions
Probit analysis		The influence of age, gender and employment status on the willingness to participate or provide services in the PbDd business model.
Convergence analysis	Based on the DESI index (2016-2021)	To demonstrate changes/progress in the digital empowerment of EU Member States.
Correlation analysis		Examining the correlations between the four main indicators that make up the DESI index
PCA analysis		Examining the weighting of the four main indicators of the DESI index; justification for methodological changes.
Descriptive statistical analysis, cross-tabulation, Tamhane test	Own survey (2021)	Hungarian and Romanian entrepreneurs' reflections on digitalization. Use of digitalization tools and opportunities.

Source: Own editing

### **3. MAIN FINDINGS OF THE THESIS**

The PbDd business model has been part of our everyday lives for over a decade, taking many forms. The names used to refer to the PbDd business model are not universal, and overlaps often occur. Accordingly, my first objective was to organize their grouping aspects after a thorough, transparent and systematic review of the literature on PbDd business models over the last ten years and then explore their forms, defining their concept and main characteristics based on a new, unified classification principle.

The PbDd business model has two essential characteristics: (1) it is platform-based, and (2) it is demand-driven. This business model involves unlocking commercial value by lending or reusing temporarily or permanently underused assets and selling new products on online marketplaces. I have narrowed the PbDd business model to the redistribution and product-service systems market. The difference between the two groups is the transfer of ownership or the lack of transfer of ownership. The redistribution market and the group of product-service systems can be further subdivided into two subgroups, depending on who is responsible for the service provision: a company (business) or a private individual (peer). At this point, two subcategories of PbDd were introduced: the sharing economy (SE) and the collaborative consumption (CC). In SE, the provider is a private individual and transactions are carried out in p2p and p2b configurations. In contrast, in CC, the provider is a business with profit-oriented activities, and transactions are in b2p and b2b configurations. However, the way the transaction takes place is the same: a group organizes around a business opportunity using digital platforms.



**Figure 1: Classification of the platform-based, demand-driven business model**

Source: Own editing based on (KOVACS, DAVID, NAGY, SZUCS, és NABRADI, 2021)

By constructing a taxonomy of a transparent and non-overlapping PbDd business model (Figure 1), **Hypothesis 1 (H<sub>1</sub>) is confirmed**, which states:

*The marketplaces, for instance, p2p, p2b, b2p and b2b, provide an opportunity to define the conceptual scope of platform-based, demand-driven (PbDd) enterprises in the context of exchanges between economic agents.*

Based on the 2016 EC questionnaire and mapping according to the questions from the 2018 and 2021 questionnaires (Table 3), signs of awareness of collaborative platforms based on the buyers' side were identified. The increase is not significant, but the upward trend is visible. After 2016, the number of people with a service provider page increased in 2018, with a fourfold increase in Hungary in the proportion of people who participated as a service provider on a collaborative platform. However, the proportion of service providers dropped sharply in 2021, presumably because the EC has narrowed the scope of cooperation platforms to short-term rentals (in the questionnaire).

Among the benefits of the services offered on the collaborative platforms, the most valued by consumers in all three survey years, regardless of country, is the bargain pricing. Regarding the diversity of available services, Hungarian users show a constant increase of almost 4% compared to a baseline of 8% in 2016. In Romania, the initial rate was 10%, with

a 10% increase in each subsequent survey. The possibility of evaluating services is also of growing importance for both countries.

The convenience of accessing services provided by collaborative platforms is also gaining popularity. However, exceptionally Hungarian users prefer to see this as an advantage. For all other factors, Romanian users are the most enthusiastic. Looking at the drawbacks of services, I found that the initial scepticism of Hungarian users decreased over the years, in contrast to Romanian users, where the opposite was true; the proportion of "complaining" users was lower in the first survey and increased in subsequent surveys.

Considering all these findings, **Hypothesis 2 (H<sub>2</sub>) is partially confirmed from the consumer side**, i.e., *the awareness of PbDd businesses is steadily increasing in Hungary and Romania, based on the user's opinion in all three survey years.*

Based on the cultural similarities between Hungary and Romania, I assumed there would be no significant difference between the two countries using PbDd businesses; thus, I assumed homogeneity. I performed homogeneity tests for all four question items (uses, provides, advantages and disadvantages) and drew the following conclusions:

- Based on the homogeneity test on the customer opinion, it can be inferred that the two countries are not homogeneous, which is statistically significantly different. The awareness of platform-based services was higher in Hungary in all three years under study. However, regular use was more characteristic of Romanian users. Although a smaller proportion of Romanian users are more likely to be repeat customers than their Hungarian neighbours.
- The result of the homogeneity analysis based on the data reflecting the service provider side opinion is that the two countries are not homogeneous in any of the years under study, with significant differences in the distribution of responses. Hungarian users are less inclined to occasional service and more willing to experiment and try new things than Romanian users.

As for the benefits of platform-based services, it was also found that the two countries are not homogeneous in any of the years studied, so there is a significant difference in the distribution of responses. Based on the three years studied, it can be determined that Romanian users are more open to new things and willing to try new things.

In terms of perceived disadvantages, I could detect homogeneity in 2016. Incidentally, this was the only case where the opinions of respondents from the two countries, i.e. the distribution of answers, were identical. I obtained the same results in the other two years (2018 and 2021): the two countries are not homogeneous, and the difference is significant. Hungarian consumers have less experience (positive and negative) with platform-based services, and more experienced customers are more informed and less likely to feel that disputes are insurmountable problems, so there is less complaining. The negative impacts of platform-based accommodation services are significant in the opinion of Romanian respondents, who were significantly more likely to identify adverse effects than their Hungarian neighbours.

Based on all these findings, **Hypothesis 3 (H<sub>3</sub>) was rejected**, i.e. that *the perception of PbDd businesses in Hungary and Romania is homogeneous*, based on all three years of the study.

Based on the EC's 2018 survey on the collaborative economy, I tested the service and consumer sides in Hungary and Romania related to digital platforms.

My analyses found that on the service provider side, young people aged 16-25 who are self-employed or employed are most likely to be present (15-20%). The likelihood of platform-based service provision decreases with age. There is no significant difference between genders in Hungary. The service willingness of women in Romania is significantly different from that of men, and the negative coefficient is in the downward direction. However, there is a significant difference between the categories of manual workers and self-employees/employees, with manual workers showing the most significant decrease in the likelihood of participation with age.

Offering services on a platform implies some digital literacy, which explains the differences in employment status, as does age, suggesting that younger people are more at home in digital networks.

On this basis, **Hypothesis 4. (H<sub>4</sub>) confirms** *a significant correlation between the willingness to provide services and the age, gender and employment status of respondents in Hungary and Romania.*

On the demand side, young people aged 16-25, self-employed or employed, are the most likely consumers (45-60%) in both countries, followed by a decreasing trend in the likelihood of using platform-based services. There are no significant differences between genders, so they behave similarly. However, the categories of manual workers and without a professional activity are significantly different from the other two employment groups, with manual workers showing the most significant decrease in the likelihood of participation with age.

On this basis, **Hypothesis 5 (H<sub>5</sub>) is confirmed.** *There is a significant correlation between the use of platform-based services and the age, gender and employment status of respondents in Hungary and Romania.*

According to the sixth hypothesis (H<sub>60</sub>), no convergence between the Member States was assumed based on the change in the DESI indices. The  $\sigma$ -convergence was analyzed in three units: first, looking at all EU countries as a whole, then the EU-14 countries and finally, the group of countries that joined in 2004 and afterwards. Over the period 2016-2021, a convergence of EU countries is observed in all three units of analysis. However, the convergence rate is different across EU Member States, ranging from 5.16% to 9.65%. Greece has developed the fastest, while Latvia is on the opposite side. Among the countries that joined during the enlargement of Eastern Europe, Poland shows the highest average rate of development (9.34%). Between 2016–2021, the EU Member States were characterized by  $\beta$ -convergence, a negative correlation between initial development levels and the average volume growth rate of the DESI overall index. The correlation is quite strong ( $R^2 = 0.5$ ). The regression equation shows that the annual average rate of development gap shrinkage for the EU was 3.45%, based on a coefficient of the initial development of around -0.0317. The regression coefficient is significant as the p-value ( $3.69 \cdot 10^{-5}$ ) is less than  $\alpha$  (0.05). On this basis, the half-life of catching up can be determined, i.e., how many years it would take to cover half of the road towards the whole catching up within the region if the convergence rate remained unchanged. A constant catching-up rate of 3.45% implies a half-life of approximately 20 years. Other authors have not addressed this problem, and no forecasts or data have been published.

The  $\sigma$ - and  $\beta$ -convergence studies have shown convergence in the DESI index between EU Member States, i.e. Supporting **rejecting the null hypothesis of H<sub>6</sub>.**

According to Hypothesis 7 (H7<sub>0</sub>), I assumed that the contributions of the components (variables) of the first dimension obtained by PCA analysis are equal to the weights given by EC. My calculations showed that the contribution of the variables to the component is slightly different from the procedure currently used for calculating the DESI index but still close enough to the one-quarter weighting used by EC. Both studies (2016, 2021) confirm that the first component, i.e. Human Capital, is weighted higher than the originally applied 25%. **The seventh (H7) null hypothesis** was also **rejected** based on these data. At the same time, I suggest a modification of the one-quarter weighting in the calculation of the DESI index, i.e., to give Human Capital a higher weight.

The next step is to prove Hypothesis 8. The mean and variance of the latent variables of the DESI index over the period 2016-2021 do not support the Matthew effect. Analyzing the growth rate of the DESI indices and their variance, I found that the variance increased by 10% more than the DESI index. After six years, the same countries are at the top of the ranking and the same at the bottom, so the gap has not only not been closed but has continued to grow. However, the significance of the difference was not confirmed by conducting the F test. Although not significantly established, the suggestion of a Matthew effect over 2016-2021 suggests its possible existence, i.e., **Hypothesis 8. (H<sub>8</sub>) is confirmed**. However, the conjecture still holds, which is worth confirming with deeper investigations. A statistical examination and analysis of the main indicators of the DESI index, one by one, is proposed.

The digital readiness of enterprises in Hungary and Romania was measured by analyzing a primary survey. My research is not representative, and the conclusions drawn are valid only for the database under study. The vast majority of the responding enterprises are more than ten years old and are micro-enterprises registered as SMEs in the tertiary sector. They are more satisfied with their current market position and believe their industry is characterized by growth. Digital technology plays an essential role in the daily life of the company. However, the responses received suggest that this is more related to process management than to production/service activities. Half of the Romanian companies surveyed and two out of three of the Hungarian companies have a website. All large enterprises, regardless of their activity, have a website. Only 15% of enterprises have a webshop, most of which (70%) operate a B2C business model, selling directly to the end user.

The use of digital tools is considered important by over 65% of entrepreneurs, as is the development of the Internet network. However, a significant correlation was not found between company size and the sector.

Information as a resource essential for growth is only the third of the options listed for the tertiary sector, with digital data analytics (as a growth enabler) barely featuring. In the primary and secondary sectors, the importance of resources is valued somewhat differently. While in the primary sector, owned physical assets, owned natural resources, and partnerships are the most important, in the latter case, accumulated human capital, partnerships, and unique production technology are the most important, according to the entrepreneurs surveyed.

The online marketplace is important for the tertiary sector, while its importance is negligible for the other sectors. PbDd business model, as a type of platform-based business, is largely unknown to the majority of respondents (65%), who have not heard of it, nor do they feel that it is a particular threat to their position in the market. On this basis, **Hypothesis 9 was rejected (H<sub>0</sub>)** that businesses in Hungary and Romania are digitally empowered.

#### 4. NEW OR NOVEL RESULTS OF THE THESIS

Among the new and novel findings of my dissertation are the following activities and findings:

1. Based on the primary processing of a secondary database, a chief conclusion is that the awareness of enterprises operating according to the PbDd business model is steadily increasing in Hungary and Romania, based on user opinions in all three study years. At the same time, I have demonstrated that the two countries are not homogeneous, i.e. there is a significant difference in the opinions about PbDd businesses.

2. Using the EB database, after further primary processing, I found a significant correlation between Hungary and Romania:

- Willingness to provide services on a platform basis and respondents' age, gender and employment status;
- The use of services offered on a platform basis and the age, gender and employment status of respondents.

3. Based on the DESI index,  $\sigma$ - and  $\beta$ -convergence is found for the EU as a whole, i.e. convergence between the Member States can be detected and, simultaneously, the extent of the narrowing of the development gap. Suppose the value of  $\beta$ -convergence of 3.45% is considered constant. In that case, the catching-up rate requires a half-life of approximately 20 years. Analyzing the rate of increase of the DESI indices and their variance, I found that the variance increased by 10% more than the DESI index. However, the significance of the variance was not confirmed by the F test, and the suggestion of a Matthew effect over the period 2016-2021 tends to suggest its existence.

The primary research determined that the practical use of digital technologies is not significant for Hungarian and Romanian firms, with most respondents preferring and practising traditional business models. As a result, most respondents do not see the potential of digitalization as a threat or a potential competitive advantage. At the same time, they identified partnerships and human resources as the key to their growth. Among respondents, digital technology-based developments are still a long way off, and no significant changes are expected in the use/application of digital technology, which only scratches the surface.

## **5. PRACTICAL UTILITY OF THE RESULTS**

One of the main objectives of the present research was to define the concept and categories of the platform-based sharing economy as a business model by comparing the many conceptual definitions presented in the dissertation and adding my conclusions. A practical implication of defining and developing a taxonomy of the PbDd business model free of overlaps is that it would enable legislators to better ensure that SEs and CCs, as subcategories of PbDd, operate within a fair market framework. The grouping principles will make it possible to clarify the forms, characteristics and types of specific features of the PbDd. These types could provide an opportunity for rethinking tax and support policies for the various platform-based sharing services and for preparing national and international discussions. Most p2p and p2b transactions require a different approach than b2b and b2p transactions. The former involves the sale/sharing of goods or services already used and taxed, unlike b2b and b2p transactions. P2p and p2b transactions are more deserving of support, preferential treatment, so to speak, in several respects, whereas b2b or b2p transactions are primarily taxable. In the case of p2p and p2b transactions, the seller or lessor is an individual. The product being exchanged has been taxed several times in the past, e.g. in the form of personal income tax, sales tax, tax paid to the municipality, etc. Of course, much further research is needed to explore all this rigorously.

In the analysis of the EC's survey on the use of the sharing economy, it has been shown that there is a significant correlation between the willingness to provide platform-based services and the age, gender and employment status of respondents in Hungary and Romania. A similar correlation was also found between the willingness to use platform-based services and the age, gender and employment status of respondents in the two countries. Regardless of employment status, it can be stated that the likelihood of offering and using platform-based services decreases with age. In Hungary, there is no significant difference between genders, while in Romania, a significant difference was found in one case: willingness to provide services. This difference may be explained by the fact that in Romania, the entrepreneurial sector is more male-dominated, with only 1/3 of women entrepreneurs. It is probably correct to conclude that PbDd services, both provision and use, are more popular among young entrepreneurs and employees in the two countries under study. Suppose a government or municipality wants to support the area for some reason (reducing

unemployment, promoting the circular economy, etc.). In that case, targeting programs and subsidies at them is worthwhile.

The DESI index, commissioned by the EC, has been tracking the digital progress of EU Member States since 2014. The DESI index shows a convergence between Member States, i.e. digital progress indicators are converging. My calculations on convergence are now also included in the 2022 evaluation of the EC DESI index. Before this, the EC did not measure convergence between the Member States.

Based on a principal component analysis of the DESI index, I have revealed that the EC's 25% weighting per principal indicator proposed and used is not the most appropriate! My calculations indicate that 'human capital' should not be weighted at 25% but higher when calculating the value of the aggregate indicator. Despite convergence, the same countries are at the top of the ranking and the same at the bottom, and the gap has not really been closed but has slightly increased. The suggestion of a Matthew effect, whereby *the poor get poorer, and the rich get richer*, although not significantly confirmed over the 2016-2021 period, tends to suggest its existence. However, the conjecture still holds and is worthy of deeper investigation.

After evaluating the questionnaires, it can be said that the sampled businesses in Hungary and Romania are unaware of the threat that the platform-based alternative offered in their territory could pose to their operations and, conversely, of the factual possibilities of this alternative. Although these businesses filled in the questionnaire online, i.e., entrepreneurs and businesses using digital technology, are far from having a broader spectrum of digitalization and a more profound application in their business operations. Integrating digital technology into business processes makes it possible for entrepreneurs and employees to take action even remotely. By incorporating digital technology, the organization can be agile, with customer satisfaction at its core.

Overall, the PbDd business model is not yet a focus of interest from a national government or national economic (EU) perspective, at least not at a level where it can be decided whether to support or discourage it. I have already indicated that PbDd business models are a very novel, fast-growing segment of the economy. My opinion is that, based on the definition

and grouping I have established, it would be possible to decide on clear support for them and the tax regime for them.

## 6. LIST OF PUBLICATIONS



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Subject: PhD Publication List

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Doctoral School: Károly Ihrig Doctoral School of Management and Business  
MTMT ID: 10071312

### List of publications related to the dissertation

#### Articles, studies (12)

1. **Kovács, T. Z.**, Bittner, B.: A közösségi gazdaság jellemzői és Debrecenben elérhető formái.  
*Debreceni Szemle.* 30 (1), 34-43, 2022. ISSN: 1218-022X.
2. **Kovács, T. Z.**, Bittner, B., Huzsvai, L., Nábrádi, A.: Convergence and the Matthew Effect in the European Union Based on the DESI Index.  
*Mathematics.* 10 (4), 1-23, 2022. EISSN: 2227-7390.  
DOI: <http://dx.doi.org/10.3390/math10040613>  
IF: 2.4
3. **Kovács, T. Z.**, Bittner, B., Nagy, A. S., Nábrádi, A.: Digital Transformation of Human Capital in the EU According to the DESI Index.  
*Issues In Information Systems.* 23 (4), 293-311, 2022. ISSN: 1529-7314.  
DOI: [http://dx.doi.org/10.48009/4\\_iis\\_2022\\_125](http://dx.doi.org/10.48009/4_iis_2022_125)
4. **Kovács, T. Z.**, Bittner, B.: Examination of the category of digitalisation of public services in the Digital Economy and Society Index among the Eastern Enlargement of EU.  
*Industry 4.0.* 7 (1), 30-32, 2022. ISSN: 2534-8582.
5. **Kovács, T. Z.**, Bittner, B., Nábrádi, A.: The Integration of Digital Technologies in the European Union based on the DESI Index.  
*ENTRENOVA : ENTERPRISE RESEARCH INNOVATION.* 8 (1), 337-349, 2022. ISSN: 2706-4735.  
DOI: <http://dx.doi.org/10.54820/entrenova-2022-0029>
6. **Kovács, T. Z.**, David, F. R., Nagy, A. S., Nábrádi, A.: An analysis of the demand-side, platform-based collaborative economy: Creation of a clear classification taxonomy.  
*Sustainability.* 13 (5), 1-20, 2021. ISSN: 2071-1050.  
DOI: <https://doi.org/10.3390/su13052817>  
IF: 3.889
7. **Kovács, T. Z.**, Bittner, B., David, F. R., Nábrádi, A.: Examination of digitalization in Hungarian and Romanian companies.  
*The Annals of the University of Oradea Economic Science.* 30 (1), 114-120, 2021. ISSN: 1222-569X.





8. **Kovács, T. Z.**, Bittner, B., Nábrádi, A.: Platform alapú gazdaság megítélése logisztikai vállalatok körében.  
*Logisztikai Trendek és Legjobb Gyakorlatok.* 7 (1), 37-39, 2021. ISSN: 2416-0555.  
DOI: <http://dx.doi.org/10.21405/logtrend.2021.7.1.37>
9. **Kovács, T. Z.**, Nábrádi, A.: A közösségi gazdaság az EU-28-ban és népszerűségük Magyarországon és Romániában.  
*Régiókutatás Szemle.* 5 (1), 84-99, 2020. EISSN: 2559-9941.  
DOI: <http://dx.doi.org/10.30716/RSZ/20/1>
10. **Kovács, T. Z.**, David, F. R., Kovács, K., Popovics, P. A., Nábrádi, A.: Collaborative economy and its awareness in Visegrad Group Countries and within the European Union.  
*Issues in Information Systems.* 21 (1), 153-166, 2020. ISSN: 1529-7314.
11. Nábrádi, A., **Kovács, T. Z.**: Sharing economy and its popularity in Hungary and Romania.  
*Oradea Journal of Business and Economics.* 5 (1), 60-71, 2020. ISSN: 2501-1596.  
DOI: <http://dx.doi.org/10.47535/1991ojbe089>
12. Nábrádi, A., **Kovács, T. Z.**: Types of platform based Collaborative economy and its potential areas in agribusiness.  
*Western Balkan Journal of Agricultural Economics and Rural Development.* 2 (1), 9-19, 2020.  
ISSN: 2683-4693.  
DOI: <http://dx.doi.org/10.5937/WBJAE2001009N>

Conference presentations (4)

13. **Kovács, T. Z.**, Bittner, B.: Examination of the category of digitalisation of public services in the Digital Economy and Society Index among the Eastern Enlargement of EU. Utánközlés másodközlés,  
In: High Technologies. Business. Society 2022 Proceedings. Ed.: Georgi Popov, SScientific Technical Union of Mechanical Engineering Industry-4.0, Sofia, 91-93, 2022, (ISSN 2535-0005, ISSN 2535-0013 ; 6.)
14. **Kovács, T. Z.**: A közösségi gazdaság mint az ipar 4.0 egyik kulcsfontosságú eleme.  
In: "A nemzeti összetartozás jegyében" Tanulmányok a doktori és posztdoktori képzésben résztvevő, külföldi magyar egyetemi hallgatók online PhD-konferencia előadásából / Fejős Sándor; Kanyári József, Ages Quod Agis Nonprofit Kft., Szeged, 97-110, 2021. ISBN: 9789638701015
15. David, F. R., **Kovács, T. Z.**: Introducing QSPM Analysis to Agribusiness Firms.  
In: 55th Croatian & 15th International Symposium on Agriculture : Proceedings, Ed.: Boro Mioč, Ivan Širić, University of Zagreb, Faculty of Agriculture, Zagreb, 158-161, 2020, (ISSN 2459-5543)





16. **Kovács, T. Z.**, Nábrádi, A.: Types of sharing economies and collaborative consumptions.  
In: Conference proceedings of the International Conference on the Economics of the Decoupling (ICED). Ed.: Gordan Družić, Tomislav Gelo, Croatian Academy of Sciences and Arts, Zagreb, 530-546, 2020. ISBN: 9789533473376

### List of other publications

#### Articles, studies (9)

17. Bittner, B., Marczin, T., **Kovács, T. Z.**: Strategic planning in agribusiness.  
*Agrártudományi közlemények = Acta agraria Debreceniensis*. 1, 23-27, 2023. ISSN: 1587-1282.  
DOI: <http://dx.doi.org/10.34101/ACTAAGRAR/1/12803>
18. Tóth, S., Bittner, B., **Kovács, T. Z.**, Nagy, A. S.: Digital Transformation Possibilities in Public Transportation in Debrecen.  
*Issues In Information Systems*. 22 (3), 305-319, 2022. ISSN: 1529-7314.  
DOI: [http://dx.doi.org/10.48009/3\\_iis\\_2022\\_125](http://dx.doi.org/10.48009/3_iis_2022_125)
19. Vida, V., **Kovács, T. Z.**, Nagy, A. S., Madai, H., Bittner, B.: Food waste in EU countries.  
*Apstract*. 16 (2), 1-10, 2022. ISSN: 1789-221X.  
DOI: <http://dx.doi.org/10.19041/APSTRACT/2022/2/2>
20. David, F. R., Bittner, B., **Kovács, T. Z.**, Madai, H., Nagy, A. S., Nábrádi, A.: Latest Trends and New Tools Being Used in Strategic Management.  
*International Journal of Engineering and Management Sciences*. 6 (1), 73-85, 2021. EISSN: 2498-700X.  
DOI: <http://dx.doi.org/10.21791/IJEMS.2021.1.7>
21. Madai, H., Bittner, B., David, F. R., **Kovács, T. Z.**, Nagy, A. S., Nábrádi, A.: Stratégiát megalapozó elemzések gyakorlati alkalmazása.  
*International Journal of Engineering and Management Sciences*. 6 (1), 59-72, 2021. EISSN: 2498-700X.  
DOI: <http://dx.doi.org/10.21791/IJEMS.2021.1.6>
22. David, F. R., **Kovács, T. Z.**: An Improved Approach for Strategic Planning for Small European Agribusinesses: Perform EFE, IFE, and SWOT Analyses Using AQCD Factors.  
In: Sustainable agriculture and rural development in terms of the Republic of Serbia strategic goals realization within the Danube region : Science and practice in the service of agriculture : Thematic proceedings. Ed.: Jonel Subić, Marko Jeločnik, Jean Vasile Andrei, Institute of Agricultural Economics, Belgrade, 209-226, 2020. ISBN: 9788662690821





23. David, F. R., David, F. R., **Kovács, T. Z.**, Nábrádi, A.: Emerging trends in strategic planning.  
*Apstract. 14* (1-2), 23-31, 2020. ISSN: 1789-221X.  
DOI: <http://dx.doi.org/10.19041/APSTRACT/2020/1-2/3>
24. Bittner, B., Nagy, A. S., **Kovács, T. Z.**, Madai, H.: Methodology of external environmental analysis as a part of strategy planning.  
*The Annals of the University of Oradea. Economic Sciences. 29* (1), 461-466, 2020. ISSN: 1222-569X.
25. Madai, H., Bittner, B., **Kovács, T. Z.**, Nagy, A. S.: Methodology of the internal environmental analysis as a part of strategy planning.  
*The Annals of the University of Oradea. Economic Sciences. 29* (1), 551-556, 2020. ISSN: 1222-569X.

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## 7. REFERENCES

1. Bánhidi, Z. – Dobos, I. (2020). Az Európai Unió digitális gazdaság és társadalom indexének statisztikai elemzése. *Statisztikai Szemle*, 98(2), 149-168.
2. Barro, R. J. – Sala-i-Martin, X. (1992). Convergence. *Journal of Political Economy*, 100(2), 223-251. doi:<https://doi.org/10.1086/261816>
3. Barro, R. J. – Sala-i-Martin, X. – Blanchard, O. J. – Hall, R. E. (1991). Convergence Across States and Regions. *Brookings Papers on Economic Activity*, 1991(1), 107-182. doi:<https://doi.org/10.2307/2534639>
4. Bassanini, A. – Scarpetta, S. – Visco, I. (2000). Knowledge, technology and economic growth: recent evidence from OECD countries. *OECD Economics Department Working Papers*, 259, 39. doi:<https://doi.org/10.2139/ssrn.246375>
5. Benkler, Y. (2004). Sharing nicely: On shareable goods and the emergence of sharing as a modality of economic production. *Yale LJ*, 114, 273.
6. Botsman, R. – Rogers, R. (2010a). Beyond Zipcar: Collaborative Consumption. *Business models*. <https://hbr.org/2010/10/beyond-zipcar-collaborative-consumption>
7. Botsman, R. – Rogers, R. (2010b). *What's mine is yours: the rise of collaborative consumption*. London: HarperCollins Publishers.
8. Cockayne, D. G. (2016). Sharing and neoliberal discourse: The economic function of sharing in the digital on-demand economy. *Geoforum*, 77, 73-82. doi:<https://doi.org/10.1016/j.geoforum.2016.10.005>
9. de Solla Price, D. (1967). Network of Scientific Papers. *Science*, 149, 510-515. doi:<https://doi.org/10.1126/science.149.3683.510>
10. Eckhardt, G. M. – Bardhi, F. (2015). The Sharing Economy Isn't About Sharing at All. *Harvard Business Review*. <https://hbr.org/2015/01/the-sharing-economy-isnt-about-sharing-at-all>
11. Eisenstein, C. (2011). *Sacred economics: Money, gift, and society in the age of transition*: North Atlantic Books.
12. European Commission. (2010). *Europe 2020 A Strategy for Smart, Sustainable and Inclusive Growth, Communication from the Commission*. Brussels Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Aem0028>
13. European Commission. (2021a). Digital Economy and Society Index 2021 Methodological Note. Retrieved from <https://digital-agenda-data.eu/datasets/desi/indicators> website: <https://www.juntadeandalucia.es/institutodeestadisticaycartografia/digitalizacion-sociedad-digital/metodologia/Notas-Metodologicas-DESI.pdf>
14. European Commission (2021b). State of the Union: Commission proposes a Path to the Digital Decade to deliver the EU's digital transformation by 2030 [Press release]. Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_4630](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_4630)
15. Friedman, G. (2014). Workers without employers: shadow corporations and the rise of the gig economy. *Review of Keynesian Economics*, 2(2), 171-188. doi:<https://doi.org/10.4337/roke.2014.02.03>
16. Gyulavári, T. (2019). Hakni gazdaság a láthatáron: Az internetes munka fogalma és sajátosságai. *Iustum aequum salutare*, 15(1), 25-51.
17. Hagiu, A. (2009). Two-Sided Platforms: Product Variety and Pricing Structures. *Journal of Economics & Management Strategy*, 18(4), 1011-1043. doi:<https://doi.org/10.1111/j.1530-9134.2009.00236.x>

18. Hamari, J. – Sjöklint, M. – Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. *Journal of the association for information science and technology*, 67(9), 2047-2059. doi:<https://doi.org/10.1002/asi.23552>
19. Heinrichs, H. (2013). Sharing economy: a potential new pathway to sustainability. *GAIA-Ecological Perspectives for Science and Society*, 22(4), 228-231. doi:<https://doi.org/10.14512/gaia.22.4.5>
20. Kenney, M. – Zysman, J. (2016). The rise of the platform economy. *Issues in science and technology*, 32(3), 61.
21. Kovacs, T. Z. – David, F. – Nagy, A. – Szucs, I. – Nabradi, A. (2021). An Analysis of the Demand-Side, Platform-Based Collaborative Economy: Creation of a Clear Classification Taxonomy. *Sustainability*, 13(5), 20. doi:<https://doi.org/10.3390/su13052817>
22. Mandják, T. – Szántó, Z. (2011). Az üzleti kapcsolatok menedzsmentjének gondolati modellje. És ez miért lehet fontos a vállalati vezetők számára?(The conceptual model of management of business relations—and why it may be important for the corporate executives?). *Vezetéstudomány - Budapest Management Review*, 42(1), 5-16.
23. Martin, C. J. (2016). The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecological economics*, 121, 149-159. doi:<https://doi.org/10.1016/j.ecolecon.2015.11.027>
24. Matthew (25:29). (2020). *Berean Study Bible*. Pittsburgh, PA 15045 USA Bible Hub
25. Merton, R. K. (1968). The Matthew effect in science: The reward and communication systems of science are considered. *Science*, 159(3810), 56-63.
26. Merton, R. K. (1988). The Matthew effect in science, II: Cumulative advantage and the symbolism of intellectual property. *Isis*, 79(4), 606-623.
27. Obláth, G. – Szörfi, B. (2008). Makrogazdasági konvergencia az EU új tagországokban. In T. Kolosi & I. G. Tóth (Eds.), *Társadalmi riport* (pp. 204-225). Budapest: Társi.
28. Parker, G. G. – Van Alstyne, M. W. – Choudary, S. P. (2016). *Platform revolution: How networked markets are transforming the economy and how to make them work for you*: WW Norton & Company.
29. Paul, J. – Parthasarathy, S. – Gupta, P. (2017). Exporting challenges of SMEs: A review and future research agenda. *Journal of world business*, 52(3), 327-342.
30. Perc, M. (2014). The Matthew effect in empirical data. *Journal of the Royal Society, Interface*, 11(98), 20140378-20140378. doi:<https://doi.org/10.1098/rsif.2014.0378>
31. PwC. (2018). A vállalatok kétharmadának nincs digitális stratégiája [Press release]. Retrieved from <https://ivsz.hu/pwc-a-vallalatok-ketharmadanak-nincs-digitalis-strategiaja/>
32. Reisch, L. A. – Thøgersen, J. – Schor, J. – Fitzmaurice, C. (2015). *Handbook of Research on Sustainable Consumption*: Edward Elgar Publishing.
33. Rigney, D. (2010). *The Matthew effect: How advantage begets further advantage*: Columbia University Press.
34. Rosenfield, J. – Borruso, M. – Simcock, V. (2018). Digital/McKinsey: Insights: Winning in digital ecosystems. In: McKinsey Practice Publications.
35. Schor, J. (2015). Getting sharing right. *Contexts*, 14(1), 14-15. doi:<https://doi.org/10.1177/1536504214567860>

36. SDG Knowledge Hub. (2020). World Economic Forum Annual Meeting 2020 [Press release]. Retrieved from <https://sdg.iisd.org/events/world-economic-forum-annual-meeting-2020/>
37. Selloni, D. (2017). New Forms of Economies: Sharing Economy, Collaborative Consumption, Peer-to-Peer Economy. In D. Selloni (Ed.), *CoDesign for Public-Interest Services* (pp. 15-26). Cham: Springer International Publishing.
38. Sundararajan, A. (2016). *The Sharing Economy: The End of Emploment and the Rise of Crowd-based Capitalism*. Cambridge, MA: The MIT Press.
39. Tranfield, D. – Denyer, D. – Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *British Journal of Management*, 14(3), 207-222. doi:<https://doi.org/10.1111/1467-8551.00375>
40. Ventura, L. (2022, 2023.01.30). World's Largest Companies 2022. *Global Finance Magazine*.