Chapter 8

The Role of Spin-Off Companies in the Technology Transfer and IS Management Potential in Developing a Sharing Economy

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Additional information is available at the end of the chapter

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Abstract

The development of all dimensions of digitization, in particular the global Internet penetration into most business areas, creates a better condition for sharing technology. Start-up and spin-off companies, supported by university centres, directly support the transfer of the latest technology into practice. Using the model of economic management, the effectiveness of such economics will be researched. Practices and recommendations that should eliminate barriers to successful spin-offs and start-ups as well as SMEs doing business in competitive area will also be proposed. The assessment of the views of 189 managers of Slovak SMEs and 26 managers of IT companies creates the opportunity to assess the extent to which companies want to apply innovation opportunities and IT potential in practice as a driver of changes. These results will be compared with the results of similar research in the EU. The verification of the mutual dependencies of selected indicators using statistical methods and validation tools that are part of the SPSS program will be provided. Based on the synthesis of all knowledge and experience, it will be suggested to managers the ways how to apply technology transfer and regulatory treatment of sharing economy in practice as effectively as possible.

Keywords: sharing economy, start-up and spin-off company, transfer of information and communication technology, innovations, online platform

1. Introduction

The advantages lie in their current technological background and scientific innovation support. In this chapter, we will evaluate the conditions for the development of the sharing economy from the point of view of management of technology transfer. The development of sharing economy depends on the possibility of enhancing the sharing of different surplus services, products, or solutions between providers and consumers by using nontraditional forms of exchange using the latest information and communication technologies (ICTs), as well as Internet as a space for interconnection with various information platforms or other intelligent devices. People are closer to each other due to professional Internet applications. The better the conditions for sharing technology, the more effective the levels of sharing. The basic assumptions are created using the development of all dimensions of digitization, in particular the dimension of global Internet expansion, its penetration into most business, public and private activities, or modifying expansion. New solutions should be available from different environments using unified solutions for different applications. However, their development and application into the practice will not succeed without the need, willingness, and ability of people to offer, develop, and exploit their potential, accessed through the necessary services or products using simple and unpretentious solutions. Therefore, nowadays, more attention should be paid to research the conditions for setting up and supporting the business doing of spin-off companies in such regions [1]. In this chapter, we also will evaluate the conditions for the development of the sharing economy from the point of view of IT transfer as a tool for sharing products or services in that ways of doing business regarding potential of such regions. We will also examine the possibilities of economic model for management of environment for sharing technologies.

2. Theoretical background of sharing economy and the role of electronic business support

If we want to formulate principles of sharing economy as an alternative model of traditional economy, we can find many different approaches to their evaluation. In addition, some authors did not agree with the notion of "sharing economy" and introduce other concepts, in identical or similar terms.

2.1. Approaches to evaluation of the sharing economy principles

The sharing economy can be defined as an economy that is based on the principle of accessing services and goods, which are owned by another person, but they are surplus and are available, and it is possible to provide them to another user (either because their total capacity is not being used or there exists the intention to use them just in such way), depending on the creation of conditions for a sharing economy. The principles of "sharing and sharing the economy" lie in the existence of a certain good (or potential of free service capacity). On the other hand, the existence of an entity (e.g. a natural person) interested in using such good or service, even for a fee, is assumed.

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The definition of the sharing economy varies according to the approaches to assessing the principles of its functioning. Many authors argue that the model of a sharing economy is a competing model for a classic system of product and service delivery.

Some authors point out that consumers buy the traditional market products (which they own then) and services, while in the case of a sharing economy, suppliers temporarily share their goods and services with customers either for free or for financial or nonfinancial remuneration [2].

Eckhardt and Bardhi [3] state that the "access economy" is a more precise term for a sharing economy. "Sharing is perceived as a form of social exchange that takes place among people (e.g. family, neighbors, friends) without any profit." They say the advantage of an "access economy" lies in two key success factors:

- Competition between the providers will not depend on whether the provider offers greater social interactions and community ownership, but acceptable comfort at a lower cost.
- Consumers will be driven more by their benefits and experiences than marketing oriented to communicate brand and its ownership [4]; if they can try, for example, to taste more identities directly, they will feel better in their decision-making.

These statements confirm the benefits of sharing economy, which offers the opportunity to assess the quality of products offered within the EU, without being a restriction on the place of purchase or the place of origin of the product, respecting the importance and role of marketing.

"Circular economy" is an alternative expression for a sharing economy that emphasizes the reuse of product features more than sharing them. At the same time, it points out that reuse has a beneficial effect on the environment, better use of materials, and energy embodied in products [5]. Reuse may be:

- parallel (good may use more people—the term nonlife consumption is usually used in economics in this sense—for example, road use by many drivers at the same time, but also more people transport by the same car);
- serial (for example, you can use more individuals not at the same time but gradually over time—for example, accommodation in a private apartment).

The sharing economy was also evaluated as a "swarm economy" by Rick Falkvinge [6], which is considered as an economy based on a weakening power of large entities. The existence and exploitation of the benefits of electronic communications reduces the need to have only classical deals. "Swarm economy" is based on massive decentralization and overcoming traditional economic models. He also states:

- for contact of the seller and the buyer, an Internet platform is sufficient;
- goods or services are also provided using supplementary platforms;

- it is not the unusual phenomenon that the traditional model of employment will be overcome, one will perform several jobs simultaneously, one or two to subsistence and existence, another for fun;
- customer can listen to the music or watch the movie again at the current time and he/she will not wait for what television or radio will offer him;
- it will probably have to change advertising, the individual will not be dependent on buying everything, and if he will be more in control of the advice of price and price comparators than the advertisement;
- even class distributors will have to change if a number of stone shops now offer goods through e-shops in parallel, perhaps they will have to go to the principles of a shared economy.

In [7], it was stated that the term "sharing economy" was in the year 2015 introduced into the Oxford English Dictionary but draws attention to the fact that a number of other terms are used in the same or similar terms: "peer economy," "collaborative economy," "gig economy," and "on-demand economy." For completeness, let us add that the abovementioned dictionary defines a sharing economy as an "economic system in which assets or services are shared between private individuals, either free of charge or for a fee, usually via the Internet."

The integral part of sharing economy is also a sharing city, where the goal is to "connect forces of technology, citizens, data, and design to the most effective interconnection of people, products, and services" [8]. Their provision must reach a certain level with additional support to be part of the range of services and product consumption. An important role is also played by "e-government." It represents "the use of information technology by public institutions for the exchange of information with citizens, private organizations, and other public institutions in order to increase the efficiency of internal functioning and providing fast, affordable, and high-quality information services" [9]. It is clear that, besides the elements that integrate commercial platforms, like in the case of a sharing city, in a sharing economy, public data and citizens of the cities should also be involved in order to simplify and make the use of public services more efficient. It increases the role of Internet and new technologies used as a support for electronic ways of communication.

2.2. Specific aspects of the sharing economy

From a macroeconomic point of view, the sharing economy does not create a new market; the goal is only to take over a certain part of the existing market, not to generate new customers. It means that it only takes over traditional distribution channels and service providers and provides them with the use of nontraditional ways. People can switch from being only consumers of classically supplied goods or services to those who drive new services enriched with new experiences or events. They can become even designers as we can see in community housing (cohousing, respectively, baugruppe), in multifunctional use of former buildings and spaces, or in sharing cultural activities. To develop a sharing economy, some assumptions should be created. As we can see, for many people, it is more acceptable to have operational access to

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products or services when they need it, which is a move away from owner rights to user rights [10]. Especially, young people prefer the dynamics of the availability of products and services provided in nontraditional ways, where they prefer something unexpected, unpredictable, or different in comparison with the traditional ways of their availability or consumption. This fact is confirmed by the results of recent studies [11], where about two-thirds of respondents said they are heading toward a less materialistic lifestyle and four-fifths of respondents believe that rent has greater advantages than ownership. It is due to opportunities that the sharing economy allows:

- sharing services and goods between unknown entities, over long distances, outside closed family or neighboring communities, where the reason is also partly the need to discover something new, to gain experience in a nontraditional way, or perhaps as an effort to give up the traditional models to meet their own needs;
- changes in lifestyle, value, especially preferred by younger generations, which is far less associated with property ownership, product gathering, etc., and more preferring to survive something new.

The common practice is that many people increase your own revenue through a business that is a part of the sharing economy. As stated in [11], about 11% of UK residents receive revenue based on running applications that are part of the sharing economy. Of course, there will be a lot of people (the first surveys show about 50%) who will hold the opinion that their stuff will never be shared with others.

The sharing economy can also support the growth of employment and enterprise performance. In the key sectors of sharing economy, such as finance, accommodation, transport, small domestic services, and professional services, the number of operations is expected to increase up to 20 times in comparison with the situation in 2015 [12]. It is due to the opportunity of employing people in productive age, post- as well as preproductive age, as they are not only consumers but also providers or intermediaries of the various products or services. In accordance with nontraditional ways of doing business, the disadvantages associated with sharing economy are also occurring. There are situations where the circumvention of valid business regulation arises and tax payments are not strictly compliant on the part of providers. It is the case that a certain market group operates under certain regulatory conditions (qualifications, insurance, hygiene, etc.), and the other group is not required to formally await their confirmation. It means that conditions for doing business are different, which is why an unequal competitive environment is formed [13]. In order to increase the benefits of the sharing economy, it is necessary to deal with various specific issues such as regulatory treatments and conditions for sharing or easily disposing with nontraditional means of accessing products or services.

2.3. The basic conditions for sharing economy development

In a sharing economy, the common discussion is focused on the problem, how to create a platform for sharing the involved elements and how to support their accessibility.

If companies want to benefit from sharing economy, the basic conditions must be respected. It is necessary to provide the broader accessibility of:

- modern information and communication technologies;
- modern information platforms and Internet;
- large databases accessing, where their disposability allows, for example, sharing of public goods (products and services) created from public funds intended for the public or private institutions (see, e.g., databases arising in connection with the implementation of e-government) as well as for private property;
- technological solutions, as well as smart devices—smart phones that connect people to each other and create an opportunity to access to professional Internet applications much closer;
- availability of the online payment systems.

To do it, in particular, it is very important to bring innovations to traditional areas and sectors as well. It is necessary to deal with the issue of technology transfer and make them accessible to a wide range of users. The creation of a modern online platform and the availability of many different tools should be realized with the most effective combination of new technologies and relevant resources.

As follows, providers and intermediaries, who are involved in sharing economic transactions, gain new experiences and benefits associated with engaging in sharing transactions [14]. In connection with this, there is a new service sector formed, which can also play the role as an employer. The provider sector where operators, who develop, improve, and operate products and services sharing platforms, are included is formed. It is applied to both the new product or service providers and their intermediaries, where:

- on the side of providers, most operators are already trying to push the style of communication so that both partners feel at the same level, which means that the provider does not restrict the applicant,
- on the side of intermediaries, they dispose with new opportunities: to try the role of a taxi driver, accommodation provider, courier, risk borrowing money at higher interest rates, and also attract, seek for unusual leisure time, to enter the liberal working style model, etc.

The B2B platform acquires its importance in such services or products delivering.

2.4. Microeconomic and macroeconomic conditions of sharing economy

The use of information and communication technology brings the macroeconomic advantages of sharing economy that lies in the fact that a new model of interconnection should be observed between supply and demand from the point of view

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- of customers, where it is the comfort associated with the fact that information and communication are mediated through the computer screen or mobile display, the tool of connectivity support is continuously updated and has its online support as well as its own transaction support;
- of the information platform, where it is possible to reach a much wider range of customers; the modern communication platform minimizes the level of information asymmetry, where both parties dispose with high-quality information for their transactional decision-making. It should also lead to savings on transaction costs [14], as follows:
- search and information costs—platforms offer fast and often clear and comparative product and service information to help reduce loss due to lack of information or knowledge of the product or service,
- negotiation costs—communication and contract costs,
- implementation costs—shipping agreement, payments, insurance, guarantees, etc.

It is also necessary to address the microeconomic problem where the modern sharing economy combines two unfamiliar partners. In the case of private transactions, the success of cooperation between the partners strongly depends on the degree of fairness and responsible behavior toward each other based on mutual personal relationships. The trust among partners is affected by the degree of personal acquaintance, which is why it is necessary to be respectful and anticipate the behavior of its partner. As business support as well as communication between partners and providers is based on the electronic business support that is fully utilized, it is also possible to exploit the application as a service quality regulator. Many applications offer the ability to perform backup control by which platform providers try to map the dissatisfaction of their clients. In such developed applications, there is a possibility that unsatisfied clients can report their negative experiences, record incidents, and so on. This option addresses problems associated with poor quality of service or product properties that may occur due to the ways of their provision. In such situations, it is important to build on the support of a single electronic platform and to develop an area where electronically supported applications or other means will be easily accessed. Very often, it is necessary to quickly adapt to new technologies and apply them to business practice. In these processes, the importance of the role of spin-offs, start-ups, and also small and medium-sized enterprises is growing because they are more flexible in nontraditional ways of delivering services or products. They are able to quickly respond to market needs, both in terms of developing and using new applications supported by ICT.

3. The ways of new technologies and knowledge transfer into the practice

At present, the university research and scientific departments and their staff, which devote considerable resources and capacity to research and development activities, represent a progress in the field of technological development and delivery. As the research and development

sector is not continuously linked to business practice, it is difficult to create the right conditions for technology and knowledge transfer to practice. Many universities are collaborating with practice (e.g. Oxford University Innovation (OUI) [15]), but the problem is the commercialization of technology potential. The goal is to convert technology and knowledge potential into usable products or services. Both sides of this relationship (both, university, enterprise) dispose with a variety of resources: research and human resources, skills, experience, and know-how, as well as intellectual property (IP), certification capacities, permits, production facilities, supply relationships and chains, the possibility of marketing, distribution, etc. In order to achieve successful interconnection between the transfer of technology and knowledge, the following options are available:

- licensing an existing company;
- creating new company and its licensing (spin-off company);
- transformation for further use within the institution;
- moving business to the incubator to establish a start-up firm;
- commercialization of the mutual research results between the research institution and the partner from the commercial sphere (joint venture).

Despite the fact that it is difficult to create the conceptual definition of the establishment of new companies, such as spin-offs and start-ups, their innovative, scientific, and technological potential is a guarantee for future success of such companies. Therefore, we have tried to define spin-offs and start-ups and their role in sharing economy.

3.1. The role, categorization, and typology of spin-offs and start-ups

As stated in [16], the small companies—the so-called spin-offs—play the special role, which consists in research and knowledge transfer. Spin-off is a newly founded company cofounded by a university or research laboratory that owns the licensed technology and applies it to the market with the aim to leverage available academic knowledge for commercialization (firstly established by McQueen and Walmark [17]). This company is a profit-oriented entity. This fact is confirmed by many authors [1, 18–20] who state that spin-off founding helps to create an innovative company that guarantees collaboration with universities and transfer knowledge and technology from universities to practice. The classic university spin-off examples include the Stanford University in Silicon Valley (USA), Google, Hewlett-Packard, Sun Microsystems, Cisco Systems or Silicon Graphics, all established by former university students. Both factors, the founding of spin-off companies and technology licensing, are the basic assumptions for successful technology transfer into real practice.

Certain universities, however, do not use the term spin-off but rather use the term start-up or the term employee's enterprises designed to commercialize IP. Spin-out is also often used instead of spin-off; however, upon closer analysis, both of these terms have a similar meaning.

Many authors have tried to identify common aspects in different spin-off definitions. In [21], spin-offs were divided into two categories:

- spin-offs where the inventor takes part in the business position (active commercialization of proprietary inventions);
- spin-offs where entrepreneurs are not inventors but hold rights for the use of university inventions (position of inventor from the university is replaced by a manager from the practice).

Another important feature is that the university still remains as a co-owner in a given spin-off company but that company can flexibly and freely create your own unique intellectual property (IP). This is confirmed by the authors in [22], who define the university spin-offs as "companies established by one or several university employees who left the university in order to establish legally and technically independent entity which is supported by the university at least in the initial phase of development." The term spin-off is also described as an innovative company established for the use and further development of academic IP. They state that the definition of spin-off within academic conditions reflects various differences in the perception of requirements related to IP commercialization as well as differences in maturity of business environment in different countries. As we have found, in order to define the concept of spin-offs, it is possible to find many different criteria and approaches to their categorization. As stated in [15], it is possible to identify 14 common elements or categorization criteria of different definition and 46 spin-offs categories. In **Table 1**, we assume the results of conceptual categorization of spin-offs based on the ways of establishment of spin-off with relation to the founders or networking creation.

Conceptual framework for new spin-off categories typology		
Criteria, methods, and tools	Research fields	New spin-off categories
• The concept of spin-offs establishment • The ways of spin-off categorization	• Subjects of cooperation • The ways of cooperation • Rate of linkage between spin-offs and employees • Kind of relationship with regard to the founders • Type of subject in the context of networking with external environments • Stage of spin-off	Established in cooperation: • with the university, • by the employee, who remains at the university, • by the employee who leaves the university after its establishment or reduces his/her working time; Established as a result of: • Technology transfer without the involvement of university employees (inventors)—a manager from the practice is hired Connection between the spin-off and • venture capital • business partners (e.g. suppliers) • spin-off and customers • spin-off and competitors

Table 1. Conceptual framework for spin-offs typology.

These fundamentally mentioned categorizations could be extended with new categorization criteria with respect to the industry sector in which the spin-off company operates its business or in terms of company size according to the total number of employees, etc.

Next factor that is more important in terms of properties of spin-offs is the region. The region where the academic institution is located determines the access to the rights of the various parties, also the IP rights, the type and definition of spin-off and start-up companies. We can state that the intellectual property of academic institutions can be viewed as public, private, and social resources. Many spin-off definitions are usually incorporated into internal directions, regulating IP protection and the ways of commercialization at a particular university. At the end, we can summarize that it is more important to pay attention to the regulatory framework, as well as to create acceptable legal or technical conditions for doing business in sharing economy.

4. Actual trends in the area of sharing economy

The European Union (EU) has its own legal system, whose main rules and principles are laid down in the founding treaties [23]. The EU can adopt legislative acts, which member states must comply with and apply. As we have seen, neither the EU nor its own countries have yet defined a single legislative framework that would govern the area of the sharing economy as a whole. In this area, divided into two parts, the platforms of the sharing economy and users of platforms; however, regulatory measures can be found to help producers create better conditions for the operation and support of business activities in the electronic virtual space. In the study [24], the authors summarized a set of measures concerning the legal and regulatory framework for the European Economic Area (EEA) as follows: Directive for E-commerce 2000/31/EC, Services Directive 2006/123/EC, Rights Directive 2011/83/EC, and The Unfair Commercial Practices Directive 2005/29/EC. In 2013, Proposal for a Regulation of the European parliament and for the council laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives 2002/20/EC, 2002/21/EC and 2002/22/EC and Regulations (EC) No 1211/2009 and (EU) No 531/2012, was introduced [23]. In 2015, the European Commission launched the digital single market (DSM) strategy. According to this strategy, DSM is a comprehensive market in which people and businesses can trade, innovate, and cooperate legally, safely, and at an affordable price. This sector covers areas such as digital marketing, e-commerce, and telecommunications. The single digital market seeks to maintain the rules of fair competition, consumer protection, and the removal of geographic and copyright issues [25].

The DSM is built on three pillars:

- Better access for consumers and businesses to online goods—turning the EU digital world into a single market with the same conditions for sale and purchase.
- An environment in which digital networks and services can be successfully developed—design the rules that respond to the rate of technology and infrastructure development.
- Digitization as a driving force for growth—its role is to ensure that the European economy, industry, and jobs make the conditions for full use of the benefits of digitization.

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The DSM strategy, which has been implemented so far, has produced several key and priority legislative proposals addressing e-commerce, copyright, audio-visual and media services, telecommunications services, ePrivacy, harmonization of digital rules, and harmonization of rules on the admission and functioning of value added tax.

In 2016, the European Commission presented also a single market strategy (SMS), where the main objective was to unlock the full potential of the single market for the European Economic Community established by the states of the European Union [26].

There were also presented policy recommendations that should lead to a reduction of barriers that prevent the growth of the sharing economy in the European Union [27].

Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing a Horizon 2020—the Framework Program for Research and Development—has been adopted to regulate the creation of a framework for research and innovation and Innovation (2014–2020) and repealing Decision No 1982/2006/EC [28].

5. Discussion and methods of research

As Henna Virkkunen, who is responsible for steering plans regarding online platforms and the digital single market modified by the Parliament of the EU [29], states, "the global nature of digital economy increases choices for consumers and boosts price competition." She added that "it offers workers chances to decide how much and where they want to work. Workers should also be able to transfer and accumulate users' electronic ratings and reviews, which constitute their "digital market value" as an equivalent to the traditional market value." In these processes, the question is What is more important?—What is the role of the Internet and traditional business doing? What is the role of their relationship to innovations? and What is the role of spin-off companies in sharing economy?. We tried to find answers to these questions. As the basis for the creation of the conclusions, we provide an evaluation of the research results obtained by performing various economic analyses of indicators of sharing economy, spin-off company functioning, and also the assessment of attitudes of small and medium enterprises to innovations and IT adaptation. These research activities were carried out in the framework of partial research activities of research institutes of the partner universities (University of Žilina, Prague and Institute of Management Systems in Poprad, Matej Bel University, Banska Bystrica) between 2015 and 2017.

6. Research results

Next, we review the current state of the sharing economy and predict its future development. We analyze the available indicators and propose suitable recommendations.

6.1. Revision of the share indicators estimation of sharing economy

An analysis of the amount of unregistered entrepreneurs from the small and microenterprises sector is provided. In the revision of the estimates, their share in the labor market is estimated

comparing the outputs of the labor sample survey based on data from the Czech Statistical Office and the Labor Office statistics. The aim of this analysis is to review the ways in which the share of producers deliberately not registered on the labor market is estimated and to assess their verity. The evaluation and comparison of the variety of indicators of sharing economy were provided by using the statistical methods and validation tools that are part of the SPSS program.

As outlined in [13], if we want to identify the database for the analysis of the sharing economy, it is necessary to build on the revisions of national accounts statements[1]. This document describes the impact of changes in methods and changes in data sources within the so-called "major revision of annual national accounts." In the context of revisions, the search and identification of leakages in the form of so-called gray economy. Although the sharing economy is not exactly the same as the gray economy, these two sets overlap in many ways.

It is recommended to follow the estimates of:

- the impact of accommodation services on GDP in the form of dwelling services—imputed rent. In this case, it is necessary to use the stratification method of the imputed rent estimation rather than the unit cost method (UCM). The size of the imputed rent according to (a) the size of the municipality, (b) the type of the building, (c) the size of the apartment, and (d) the equipment is determined;
- producers deliberately not registering—The estimated values are obtained using the analysis of data collection obtained from the pilot study "Exhaustiveness of Czech National Accounts"—from the mutual project of Eurostat and the Czech Statistical Office. The calculation of the values of the indicators is done in two steps (using the old method). First, the percentages obtained by the industry sector are calculated. Secondly, the amount of unofficial unemployment on the basis of the labor market disparity (according to the average labor productivity in the sector) is estimated. In 2010, the estimated value of the variance was 2.8% (employees in full-time equivalents) in CZK 78.513 million, in Euro 2.606 million.

The results of the new method are also obtained in two phases. First, a comparison of generic productivity with productivity that businesses achieve by using credibly leading accounting is provided. Secondly, the estimated value is calculated according to labor market disparities.

The results of the second method are surprising. The deviation is 35.5% (CZK 103.689 million, in Euro 3.442 million €) for employers and 13.4% (CZK 110.846 million, in Euro 3.679 million €) for self-employed persons. As pointed out, the new method allows for more accurate estimates of differences in monitored parameters.

[1] This basic revision was published by the Czech Statistical Office on 30 September 2011 and preceded the main revision in 2014. The main reasons for the revisions were to ensure greater comparability of macro-aggregates in the Czech Republic with respect to the transition to NACE classification. The most important conclusion is the underestimation of the performance of the Czech economy (2–3% absolute in GDP) in the past.

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6.2. An analysis of supply and demand in a sharing economy

If we want to assess the situation in terms of demand and supply in the sharing economy, what services or products are preferred, it should be realized using the survey analysis of respondents' opinions that are involved in providing the related services or products.

The aim of the survey should be to find out what is the real state and what is the dynamics of changes in supply and demand in the sharing of the economy by sector, including an estimate of the size of individual markets. On the basis of the survey, target groups should be identified precisely, offering both demand and supply in sharing economic services, according to the age, level of education, personal attitudes, preferred values by them, etc. Survey should be performed anonymously between the population aged above 15 years. Design of data collection for the quantitative sample survey of the sharing economy, we propose to ensure the following methodological parameters, which will ensure a sufficiently precise description of respondents:

- Number of respondents: 3000 respondents.
- The research should be stratified with the same probability of selection in the four main stratums according to the size of the municipality (less than 1000, 1000–9999, 10,000–99,999, and 100,000 and more).
- Selection method: random selection.
- First of all, a face-to-face interview, where recording respondents' views in the paper questionnaire should be captured.
- Estimated cost of the survey: 1,000,000 CZK without VAT, which means approximately 333,33 € without VAT

In the future, we suggest to use the alternative data collection provided by computer-assisted telephone interviewing or by electronic survey.

6.3. The analysis of regulatory indicators

Using the Conceptual Sharing Economy Model (CSEM) [13], the effectiveness of sharing economy should be researched. It is the basic model that allows to point out the behavior and relationships of economic entities. It is based on the theory of economic subjects and describes the relations of these entities in the environment of sharing the economy. It should also be used to provide recommendations for regulatory measures in the context of public interest theory and enforcement of socially effective behavior (including the limitation of negative externalities). Its basic schema is shown in **Figure 1**. The basis of the model is the largest concentric circle—a true sharing economy. It means that it is an economic model based on the sharing or leasing of products, as opposed to their exclusive and indivisible ownership. The basic interaction in the model is interaction between households and businesses. On the left side of the graph, the impact of households dominates, and in the right part, the impact of the behavior of the enterprise and the business environment prevails.

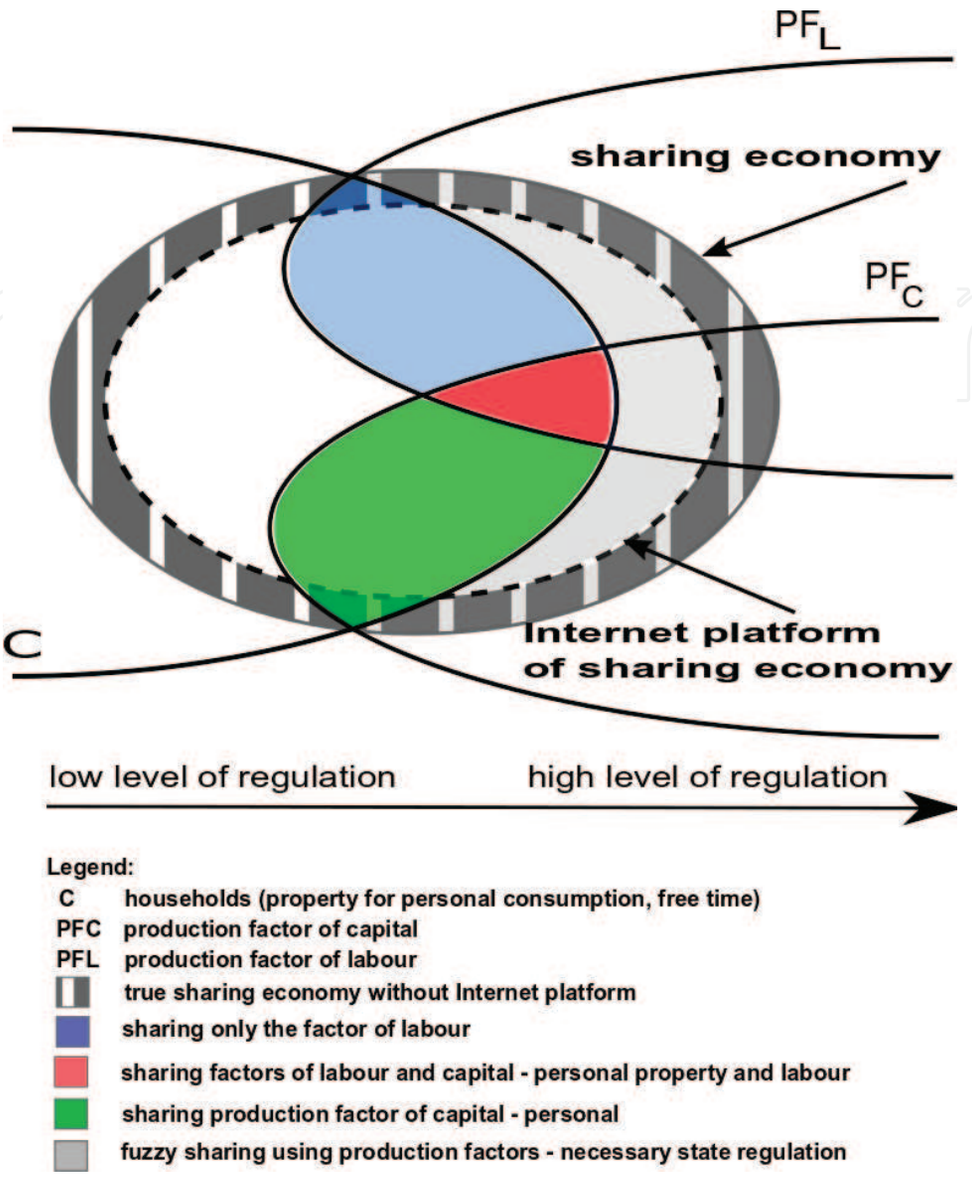

Figure 1. Conceptual Sharing Economy Model—CSEM.

In the description of the model, we can deduce two possible approaches of Internet platform operators (context model) to create support for their delivering. The first approach is to optimize shopping behavior and social efficiency. There are open platforms where information is not hidden for any reason; it is not necessary to share it with other market participants, including state institutions. There are preferred innovation processes, product innovations, as well as helping in a social order to support innovative business activities.

The second approach plays the role as a tool for controlling market activities. From the theory of public interest, there is a significant constraint due to the fact that these platforms produce negative externalities. While, for example, extra charges received in the form of a local tax on accommodation in traditional hotels are returned to the municipal budget, which generally subsidizes local public activities, it contributes to the increase in attractiveness, interest, and it contributes to the increase in attractiveness, interest, and quality of accommodation; in case

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of sharing, this will not happen. The sharing of accommodation provided by the private sector cannot be taken into account as a driver of progress because it does not contribute to the attractiveness of the service in these ways. It is necessary to assess the need for regulation and choose what is more appropriate—to support traditional business or activities provided by sharing economy. From a control point of view, the most important gray area is the area to the right of the C curve. This "fuzzy sharing" area is a gray zone, an area of social interest in regulation. It is a gray economy that is not socially effective.

6.4. An analysis of the role of science park

The support of spin-off companies also provides science parks. Science parks play a very important role when setting up university and nonuniversity spin-off companies.

The result of such cooperation [30] creates a basis for suggestions formulating, based on best practices (prepared by experts from Taiwan who have been familiar with the situation regarding the already mentioned Bilateral Agreement, for example, the University of Zilina and Broker Center of Air Transport visit), as follows:

- State support, regional, and local autonomy is essential when building science parks, which should be built according to the situation in state development.
- It is important to provide infrastructure and management of high quality while building science parks.
- It is necessary to find qualified experts for effective communication. Experts who will be able to discuss park's business interests suggest examples of "best experience" either from the science park environment or abroad.

This should also be applied to the Broker Center of Air Transport for knowledge and technology transfer with the aim of developing transport and transport infrastructure.

- Autonomy is very important for a science park (in Taiwan, this autonomy is created by companies that are located directly in a science park).
- Ideal equipment should include high-quality, fast Internet connections, free zones, hot links available 24 hours a day, restaurant, coffee shop, shopping area, relaxation center, etc.
- It is advised and effective to learn from the experienced ones when it comes to knowledge transfer and a spin-off company setup. Many people are still expected to "learn from the experienced ones." For service or product providers, it should be a challenge in order to progress and successfully deal with the problems and obstacles we are experiencing.

6.5. Evaluation of the conditions of technology transfer and their commercialization

Next, we also evaluate the possibilities of technology transfer and their commercialization, implemented through spin-off or start-up companies based on the evaluation of experiences from examples of best practices. To assess the current situation in the attitude of SMEs to

implement or innovate IT as a basic support of their IS management, we evaluated the opinions of 189 SME managers and of 29 representatives of IT companies (data collection realized by electronic survey and by structured interviews), and data analysis was provided using validation of hypotheses, where we used the statistical methods and validation tools as a part of the SPSS program.

Although many surveys are mostly oriented toward developed and innovative regions, our research activities have been oriented to spin-off companies in economically less developed regions or those with lower innovation activities. While such regions are mostly characterized by the absence of excellent research, the influence of spin-off companies is not only symbolic but instead helps to improve the flow of knowledge within the region. Nevertheless, the number of university-related spin-offs is relatively low, but its interconnection with universities demonstrates that universities can be considered as catalyst for the business sector within the region. Many spin-offs are oriented toward providing consulting services, which in turn could help develop specialized expert services or groups offering knowledge-intensive services within the region. It also supports network creation with other companies and expanding personal contacts between specialists and practitioners. Newly established spin-offs could help develop a second generation of technologically advanced spin-offs in the future.

The worse situation is in the area of other small and medium-sized enterprises (SMEs), which play a significant role in the sharing economy, especially in less developed regions. According to our previous research (realized in 2015 with managers of SMEs), only a small part of SME was interested in the new technologies. We tried to find the key barriers, which prevent companies to utilize the potential of new technologies and innovations. In [31], dealt with a similar issue, they stated that managers of SMEs (representatives of 50 small and medium-sized enterprises located in Lower Silesia) declare lack of financial resources and infrastructure for the comprehensive implementation of integrated information systems to facilitate interpersonal communication in plants. They use only traditional tools, their level of skills is low, and their awareness of staff production facilities in the field of information security, especially when working on the computer and using traditional media, is low, too.

We analyzed respondents' answers to the question if companies have enough information about technologies and innovations. The result is that in two of the abovementioned companies, companies see the low level of satisfaction with the rate of their awareness. Using the Wilcoxon signed rank nonparametric test, we considered a mutual relationship between awareness of new technologies and innovations. As we found, $\alpha = 0.127 > 0.05$, we want to state that they feel better informed about technologies than about innovations. Then, we reviewed the frequency of seeking information about technologies and innovations. We considered the answers to the question "How often do you search for information about technologies or innovations?" We tried to find out if they often seek information daily, weekly, or monthly or prefer to seek information once a year or never. By Wilcoxon signed rank, we tested the frequency of seeking information. We calculated that $\alpha = 0.827 > 0.05$. We found out that they are mostly seeking information about innovation or technologies (approximately monthly, 29%, or half yearly, 20.5%). That is why we can state that if companies are interested in new technologies and innovations, they will be more interested in new information about them.

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We have also examined the barriers that restrict the widespread use of IT, system integration of IS, and tools supporting business process automation based on arguments of respondents—company managers and representatives of IT companies. We can state that most of SMEs (93.7%) use basic software support for business doing. This creates conditions that increase the importance of implementing electronic business models also in the small and medium sector as a basic tool for data processing and information search and for their distribution and sharing. This is important when they want to provide their services effectively in strong competition.

Before implementing software for business support, it is necessary to acquire adequate information about the company. We classify this information in the following order: finding functionality to use software support, the level of integration with other tools, identifying areas of corporate activities, and the price they are willing to invest in ICT support, technical requirements, existing IT support, and other requirements included—bottlenecks in business processes, knowledge of work practices, current processes, and planned changes, as well as application to be integrated. If companies have this information, they also create the conditions for the transfer and dissemination of knowledge across the enterprise. In the sharing economy, it is more important, as SMEs are the initiators of changes. It is due to the ability to look for suitable solutions at low cost to the innovation and implementation of electronic ways of connectivity and communication.

7. Conclusion

The digital economy creates not only new opportunities but also new challenges for sharing economy. Companies have developed online platforms (such as Uber and Deliveroo) that other people can use to fill their needs sharing some products or services. These products are then shared between these companies as well as providers. These companies gain an advantage over traditional companies as they benefit from providing their own equipment or service. This reduces costs for them and creates opportunities for providing some "on-demand" services. Their own interest is their technical support and online accessibility.

Evaluating the research findings allows us to define the procedures and conditions that lead to full professional support of sharing. The newest developed technologies are often not fully functional, and related problems with their cooperability need to be solved in practice. Licensed technology addresses these issues and is also a guarantee of their functionality. However, it is well known that companies are not willing to pay for such licenses.

The spin-off companies are the best way to realize the complex development of a functional product that can be later evaluated on the market and offered to a wide range of business partners. The license provides the contractual relationship between the university and the spin-off company, which enables them to further develop and thus contribute to the maintenance and development of the local or regional innovation ecosystem. Managers get the opportunity to understand how to set up and develop an innovative business and what kind of relationships

between the university and the spin-off company (especially in the legal and financial field) can arise in transferring knowledge from the university environment into practice. It builds and also strengthens the mutual nonfinancial relationships between the university and the spin-off, where the effect of applying science to business marketing and improving the quality and scope of practical education is done.

According to the OECD Recommendation [32], we can state that a sharing economy is a reality, which makes no sense to distinguish between classical and online activities, but it is necessary to focus on predicting and preparing for digitization, looking for ways to take advantages of digital economy, boosting trust across sectors in a network, complex and global ecosystem. Furthermore, it is necessary to move forward in the digital agenda, in four key policies, as to be opened toward the Internet and innovation, confidence in the digital economy, the construction of a global interconnection, and creating jobs and skills.

Some areas of the sharing economy can impact that they can be positively rated from a certain point of view, from another negative one. It is given by the following aspects:

- Because of offering lower transaction costs and a desire to reach out to the young generation in particular, the prices fall in comparison with payments for traditionally provided services; it can be positively rated by consumers, but it evokes a deflationary impact.
- Platform operators require a lower level of regulation of selected activities, especially services, which may be positively perceived by the service provider, but it creates a negative impact on consumer protection or fiscal interests.

The importance and the need to dispose with regulatory tools and regulatory measures is growing. In this way, the use of the Conceptual Sharing Economy Model (CSEM) plays its role. Managers get a tool for evaluating their own business, where the use of IT offers sophisticated ways of decision-making. They can better decide which regulatory measures or innovations are to be preferred. The result is the ability to get up-to-date information that actually informs about the current business situation.

As a result of our research activities, we recommend the managers to realize:

1. population research aimed at the supply and demand for a sharing economy by sectors, including an estimate of the size of individual markets
2. analysis of trends in individual sectors of the sharing economy (e.g., Airbnb), which would provide an estimation of the size of these segments on an annual basis, which will provide an overview of ongoing service offerings, including occupancy analysis
3. Market sensitivity analysis, including spatial elasticity, based on data obtained from regions, enables partial analyses as a basis for assessing the impacts of the sharing economy on specific entities, including the worsening of their economic results

The statistical evaluation of the practical experience allows for better conditions for the commercialization of technology and also for identifying and making recommendations for the regulatory treatment of the sharing economy.

Sharing economy is not only an alternative distribution and user model but also a competitive alternative to entities offering distribution and use of products, services, time, skills, or competencies. It is due to the fact that some online applications allow feedback and flexible evaluation of the quality of the product or service provided. Based on this information, they may affect the quality of the provider or exclude poor-quality products or service providers from the offer. Even this element of self-regulation could be used to support the limitation of regulatory measures.

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