Available online at www.sciencedirect.com

ScienceDirect

Procedia Manufacturing 54 (2021) 45–51

Procedia MANUFACTURING

www.elsevier.com/locate/procedia

10th CIRP Sponsored Conference on Digital Enterprise Technologies (DET 2020) – Digital Technologies as Enablers of Industrial Competitiveness and Sustainability

The use of online business models

Roland Schmuck*

University of Pécs Faculty of Business and Economics, Rákóczi út 80., Pécs 7622, Hungary

* Corresponding author. Tel.: +36-72-501-599 ext: 23369. *E-mail address:* schmuck.roland@ktk.pte.hu

Abstract

The environmental challenges and the digital transformation processes require a complete review of the business models of companies. New technologies are transforming business operations causing the emergence of online business models alongside traditional business models. The research analyzes the use of online business models in practice. Classifications of online business models in the literature are shown. An appropriate, closed framework defining ten online business models is chosen for the analysis. The research is done by manual analysis of two databases which include websites and mobile applications. The sample size is 700 in total. The purpose is to show which types of online business models are used in practice and which are the most commonly used models of them. The results show that the Intellectual Property Landlord online business model is used in the majority in the databases of websites and mobile applications. The research highlights a difference in the use of online business models in the case of free and paid mobile applications. The results are useful for companies entering the online market and developing their own online business model.

Keywords: online business models, digital transformation, websites, mobile applications

1. Introduction

It has been known for a long time that information systems have strategic importance in organizations [1]. Due to the development of technology and the spread of the Internet, the use of information technology is no longer questionable for organizations. The importance of the Internet can be compared to those inventions which caused historical breakthroughs such as cheap steel, telephone, internal combustion engine, or electricity. Such so-called General Purpose Technologies (GPTs) usually appear in about every half-century, completely transforming the economy, including the goods produced, the way production is organized and managed, where it is produced and what knowledge is needed for it. GPT industries are starting to grow in a crude form and spread across the whole economy. Meanwhile, their cost levels are drastically decreasing and their performance is growing. They become an integral part of industries, products, process innovations, and business models. [2]

1.1. Digital transformation and business model innovation

Digital transformation already became a priority for the development of organizations [3,4,5,6]. Business model innovation is a central part of strategic management [7] and provides a strategic renewal mechanism [8]. The digital transformation transforms business processes, furthermore influences the company's strategy, organizational culture, and human resource management [4]. The pressure on businesses from their external environment leads to business model innovations [9,10,11]. The current economic problems caused

10.1016/j.promfg.2021.07.008

by the COVID-19 pandemic increase the online activities of companies rapidly.

The use of the Internet can lead to innovations. Companies that better understand the essence of digitalization in today's complex environment and can dive deeper into the ocean of growing opportunities. [12] The use of information technologies leads to an increasing number of companies to redesigning their business models [13].

Because of the Internet clearly simplifies access to information, coordination, and facilitates contracting, and reduces transaction costs, several new online business models have emerged which are different from traditional business models. Companies can easily find specialized business partners for outsourcing their support activities with low transaction costs. This makes it possible for companies to focus on their core competencies. The Internet can be used in endless ways, giving birth to many successful and failed companies with new, innovative online business models. [12]

Digitalization has several effects on organizations, but the innovation impact on the entire organization should be highlighted [14]. Digital transformation can take place externally focusing on the customer experience, internally by changing operational processes, decision support, and organizational structures, or holistically when the change spreads through the entire business bringing a new business model to the company [15,16]. According to a survey [17] of 2000 companies in 26 countries, companies typically digitize their internal operating processes and develop new business models using disruptive innovation, resulting in higher digital revenues. Digital products and services often cover complete solutions. [17] However, these do not necessarily result in new products. The integrative development of the company's business model and its products is needed at the same time [18]. Disruptive innovation is a revolutionary change in operation processes, such as the business models used [19].

Managing the digital transformation requires a complete review of organizations' business models, redesigning their entire processes from plans to implementation [6]. A change in almost all elements of the business model is needed [20]. This innovation-based transformation brings radical changes in the life of organizations, changing either the organizational structure or the deeper rooted organizational culture [21]. All of these can create "unprecedented things" by using new technologies [22]. During the transformation, the use of external knowledge is critical [23].

1.2. Research question and methodology

The purpose of this research is to examine how the "industrial Internet" affects business models and which online business models can be used in the digital world. The research question is the following: Are there one or a few online business models that provide the majority of online business models used?

The methodology of the research is a manual analysis of two databases. The sample size is 500 + 200 elements. The date of the sample is 6th June 2019 in both cases. Before doing the analysis online business model classifications are shown briefly and an appropriate online business model classification is chosen for the research.

The study is original in a way that it uses a specialized framework of online business models [27]. This is a closed framework which means that all business models can be classified without exceptions. Most previous research did not use a closed framework [28,34,35,36,37]. Similar research was done on a database of 2012 and 2014 previously [27]. The current research can be considered as an update to that research 5-7 years later. The research is worth to be done as this is a very long time in digitalization. Most companies use 1-3 years as a digitalization timeframe [53].

2. Online business models

2.1. What is an online business model?

All companies – including those that offer online order fulfillment operations – have offline operations and strategy execution processes as well. Online operations need offline operations, such as delivery or negotiations with their partners [24]. Therefore, a business model is considered to be digital when the digital technology causes fundamental changes in the operation of the company and its revenue stream [9,25]. The delivery channel can be the main distinguishing feature of online and offline business models [26]. In this research, we assume that companies using online business models are having their main activities inseparable from the Internet, or the majority of their revenue streams are coming from online operations [27].

An online business model can be used not only by a company but also by its business unit [28]. In the current research – as a simplification – the word "company" is used in any case of an entity using a specified business model, whether the entire company or only its business unit is using the model.

Traditional business models can be extended into the online space using digital technologies. Research of 50 companies shows that 36% of them extended their market segments, 40% extended their value proposition and 40% extended their customer relations in this way [29]. In digital technologies, websites and applications can be considered external technologies used to reach customers [30]. Virtual space can be an innovation platform supporting new business models [31]. The blue ocean strategy also suggests to extending the operations to new markets where there is no strong competition [32,33].

2.2. Classifications of online business models

Several researchers created classifications of online business models. Timmers [34] distinguishes ten online business models based on case studies. Weill & Vitale [35] shows possible online business models to help the traditional "brick and mortar" companies to enter the online market. Laudon & Traver [36] present twenty-one models of e-commerce business models. Rappa [37] describes forty types

of online business models of nine main business model categories. Eisenmann, Hallowell & Tripsas [38] show the most common online business models through twenty-three case studies identifying eight general online business models. Móricz [28] distinguishes four different online business models based on the value propositions provided by the organizations.

2.3. The classification used in this research

According to the theory of Malone et al [39] which is based on manual classification of the 1000 publicly traded US companies with the highest revenues between 1998-2002, the essence of companies can be described by what they offer to their customers. In legal words this can be for example ownership, when the company sells the asset, the buyer buys it and does whatever he/she wants to do with it in the future. Alternatively, the buyer can get a right to use an asset for a predefined period, such as to hire a car or have a hotel room. During this time, the asset can be used by the buyer, but its ownership remains at the company. There is also a third way when the goal of the company is to match potential sellers and buyers. An example of such a business can be a real estate agency.

Schmuck [27] developed an online business model framework based on the previously described non-online business model classification of Malone et al [39]. This classification is used in this research because it includes all main online business models types used in practice as proved by Schmuck [27].

The classification is based on what the company does with the assets involved in its operations: (1) Creators, (2) Distributors, (3) Landlords and (4) Brokers. The four variations of each of these are based on what type of assets are involved in the transaction: (1) Financial, (2) Physical, (3) Intangible and (4) Human [39]. As shown in Table 1 there could be 16 online business model types in theory, but only 10 of them can be implemented in practice.

Table 1. Classification of online business models. [27,39]

Basic model type	**What type of asset is involved?**			
	Financial	*Physical*	*Intangible*	*Human*
Creator	(not online operation)	(not online operation)	Intellectual Property Creator	(not allowed by law)
Distributor	Financial Transaction Provider	Online merchant	Intellectual Property Distributor	(not allowed by law)
Landlord	(not online operation)	(not online operation)	Intellectual Property Landlord	Online Service Provider
Broker	Financial Broker	Online Marketplace	Intellectual Property Broker	HR Broker

3. Most popular online business models

3.1. Sample

The research is done by the analysis of two databases. The first one is Alexa Top 500 [40], which contains the most visited websites in the world. The second one is the Apple AppStore top 100 free and 100 paid applications listed by iTunes Charts [41]. In the case of both databases, the date of the sample is 6th June 2019. Analyzing websites – such as the database of Alexa – assumes that the online business activity is done through a website. In reality, there are other technical solutions, such as today's very popular smartphone mobile applications which are analyzed by the applications in the iTunes Charts database.

3.2. Methodology

It is assumable that the business model used can be defined by the online footprint of the company, which in the current research can be its website or mobile application offered to its customers. The purpose of both is to present the company's products, services or make them available online. Seller and intermediary models use websites to reach potential partners [42]. Testing websites can be an experiment discovering business model possibilities [43]. Websites are special instances of the business model used [44] and are a useful information source for defining business models [45,46,47]. Next to websites, Kim [24] mentions apps as a source of examples of the products or services offered by companies. These can be considered as digital value-demonstration channels [48]. Analyzing websites and mobile applications reveal their underlying business models.

This research method has been used already by other researchers. Eisenmann & Pothen [49] focus on the website when deciding on the business models used. Nemeslaki et al [50] carried out a manual analysis of 125 web pages and analyzed 6800 web pages with robots by examining the terms on the website. From the 6800 websites, it was possible to identify the business model in 1409 cases, but 79.27% of the websites were not using any online business model: these were informative websites of "traditional" companies, individuals, or nonprofit organizations without the goal of making business. The robotic survey was confirmed by manual verification tests and showed 80% reliability. The research does not provide information that they have encountered any problems with the manual analysis. [50]

The current research uses manual analysis only, where the reliability of defining the online business models can be considered high. This is a common way of defining business models as online activities, such as websites are the clear footprints of the business model used [24,44,45,49,50]. Manual analysis was chosen as it has the best outcome in this case. A previous robotic study showed 80% reliability tested by secondary manual analysis [50]. As the sample elements are from all around the world in different languages, Google Chrome automatic translator was used to make each element

understandable. The steps of the manual analysis are the following:

1. The databases were cleaned out of duplications (58 duplicated websites, 0 duplicated apps), unidentifiable or unreachable elements (2 websites, 0 apps) manually. Different, non-duplicated websites or applications of a company can be interpreted as different business units of the same company which can use different business models.
2. Websites and applications were analyzed manually by visual checking to determine their online business model used. Based on the classification methodology shown in Table 1, it is first determined which asset is affected by the transaction on a given website or mobile application, which can be financial, physical, intangible, or human. In a second step, it is examined what the organization does with this asset: create, distribute, own (landlord), or work as an intermediary agent (broker). These steps clearly determine the business model used [27,39].
3. Non-online business models (52 websites, 3 free, and 2 paid apps) were identified during the manual checking process. These were removed from the database because they are out of the topic of the current research. At the end of the manual analysis, 388 websites and 195 applications remained in the databases, all of them with their business model identified according to the classification shown in Table 1.

3.3. Results

The research question is investigated using the Alexa [40] and the iTunes Charts [41] databases using the previously described methodology. The results are shown in Figure 1 and Figure 2.

In both samples, the most common online business model is the Intellectual Property Landlord (Alexa: 56.2%, iTunes Charts: 70.3%). The frequency of this business model in both databases exceeds 50%, so it gives the majority of online business models used. The second most common model is the Intellectual Property Broker in the Alexa database (27.8%) and the Intellectual Property Creator in the iTunes Charts database (11.3%). In both databases, the use of the second most common models does not even reach half of the use of the most common online business model. In the Alexa database, the third most used model is the Online Marketplace (7%), followed by the Intellectual Property Creator (2.3%). All other models are below 2%. The only online business model not found in this database is the Financial Broker. In the iTunes Charts, the third most used model is the Intellectual Property Broker (8.2%) followed by the Online Marketplace (6.2%). All other types are below 2%. In this database, three models cannot be found. These are the Intellectual Property Distributor, the Online Service Provider and the Financial Broker.

By examining the free and paid applications separately, we can see a difference in online business model types used as shown in Table 2. All Online Marketplaces, Online Merchants, Financial Transaction Providers, HR Brokers and most of the Intellectual Property Brokers are free apps, but the vast majority of Intellectual Property Creator applications are paid. The separation does not make a change in the most used online business model, which is the Intellectual Property Landlord in both cases (free apps: 61.9%, paid apps: 78.6%).

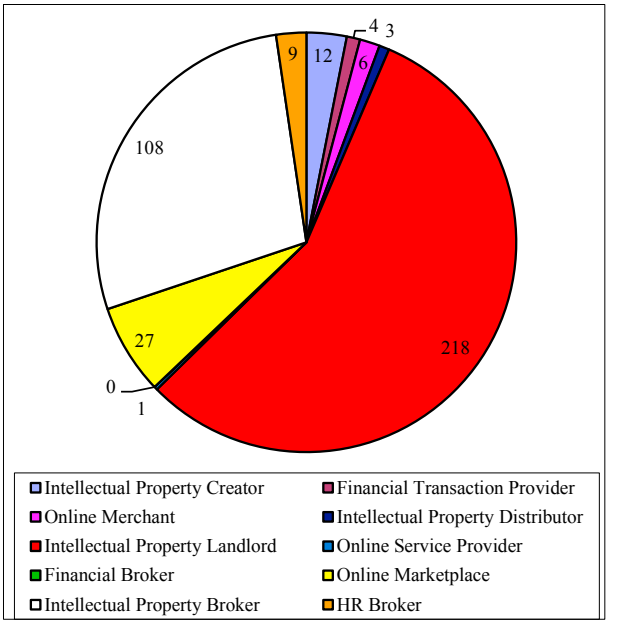

Fig. 1. Online business models in Alexa [40] database (number of websites, 2019)

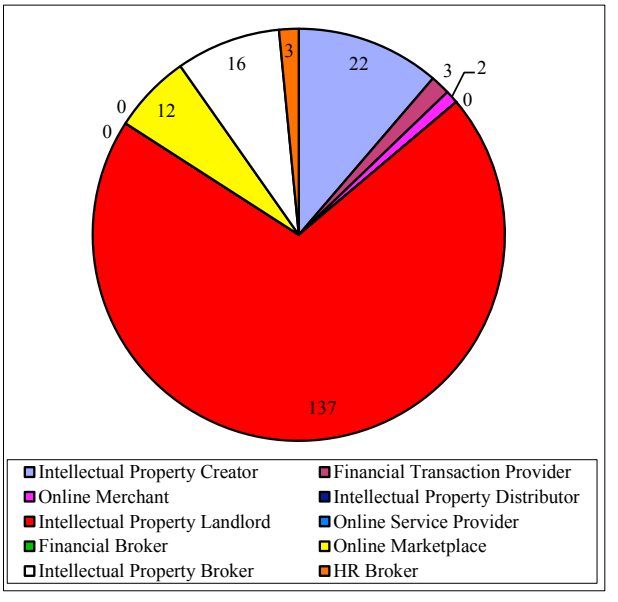

Fig. 2. Online business models in iTunes Charts [41] database (number of apps, 2019)

Table 2. Distribution of online business models in the iTunes Charts [41] top 100 free and top 100 paid apps.

	Ratio among free apps	Ratio among paid apps	Ratio among all apps
Intellectual Property Creator	3.1%	19.4%	11.3%
Financial Transaction Provider	3.1%	0.0%	1.5%
Online Merchant	2.1%	0.0%	1.0%
Intellectual Property Distributor	0.0%	0.0%	0.0%
Intellectual Property Landlord	61.9%	78.6%	70.3%
Online Service Provider	0.0%	0.0%	0.0%
Financial Broker	0.0%	0.0%	0.0%
Online Marketplace	12.4%	0.0%	6.2%
Intellectual Property Broker	14.4%	2.0%	8.2%
HR Broker	3.1%	0.0%	1.5%
Total	100.0%	100.0%	100.0%

3.4. Answering the research question

The research question of this study is the following, as mentioned earlier: "Are there one or a few online business models that provide the majority of online business models used?"

Based on the analysis of the two databases, the research question can be answered with yes. There is one online business model type that provides the majority of online business models used in practice. This model is the Intellectual Property Landlord model (Alexa: 56.2%, iTunes Charts: 70.3%).

3.5. Limitations of the study

The research analyzed the most visited websites and the most popular mobile applications based on two databases. Like most researches, this study makes use of the possibility of simplification. Online business models have been explored through websites and smartphone applications. It may be possible to explore other platforms, such as services that are not available through an Internet browser or smartphone. It is assumable that other more specialized software packages do not use absolutely new online business models, they just differ in their technological solutions. As the two technological solutions analyzed in this research are very popular and commonly used, the results of this research are appropriate to answer the research question.

There may be long-tail websites or applications that are not included in either samples because they do not have enough visitors or users to get listed in the databases analyzed [51]. These may be low-traffic websites or less often used applications. Based on the closed framework logic of the online business model classification used, the online business models of these companies should be classifiable as well. Examples for long-tail could be specialized blogs [52]. Their classification is Intellectual Property Landlord. Long-tail websites should also be classifiable in the given online business models framework.

4. Conclusions

The digitalization and the pressure from the external environment cause changes in business models. The purpose of this research was to analyze the use of online business models. The research question of this research was the following: "Are there one or a few online business models that provide the majority of online business models used?"

Several classifications of online business models exist in the literature. The most appropriate one was chosen for this research. This classification uses a framework by two dimensions: (1) what the company does with the assets involved, and (2) what the company does with these assets. Based on this, there can be 10 online business model types in practice. Using this classification, a 500 item sample of the Alexa [40] database containing websites and a 200 item sample of the iTunes Charts [41] database containing mobile applications were manually analyzed. In both samples, the most common online business model is the Intellectual Property Landlord (Alexa: 56.2%, iTunes Charts: 70.3%). The frequency of this business model in both databases exceeds 50%, so it gives the answer to the research question: the majority of online business models used is the Intellectual Property Landlord online business model. The research highlighted a difference in the use of online business models in the case of free and paid mobile applications. All Online Marketplaces, Online Merchants, Financial Transaction Providers, HR Brokers, and most of the Intellectual Property Brokers are free apps, but the vast majority of Intellectual Property Creator applications are paid.

The online space is particularly useful to deal with intangible assets with low costs because of technological reasons. Such asset is commonly information or media files. Owning such assets and making money from them is very common. Next to technological reasons, social reasons also appear here. People browsing the internet are commonly looking for information, and as a current trend, sharing it, which explains while the Intellectual Property Landlord and Intellectual Property Broker are the most popular online business model in case of websites. While the biggest companies in the website sample, like Google, Facebook or Baidu are information brokers, there are more landlords in total. Successful Intellectual Property Brokers tend to grow very big and attend a lot of visitors because of their nature based on sharing activity. The Intellectual Property Creator gets second place in the case of mobile applications, which, by technological features of smartphones allow the creation of intangible assets easily, such as media files.

In the current online space, these online business models are best suited to the circumstances. There are plenty of large companies present in these markets, which is a significant barrier to entry for smaller companies. There are also online business models that, due to the principle of economies of scale, only a few companies can successfully implement in the

market (e.g. online marketplace). That there are many smaller companies in the online space in addition to the large ones, just like in the offline traditional market. The concentration of the actors can also be observed on the one hand through acquisitions, and on the other hand through joining online platforms and common marketplaces. Companies using a similar business model can cluster into these huge online marketplaces, often losing their own brand name, virtually merging into the brand of a larger company. Just like malls in traditional markets, huge portals in online markets are attracting smaller companies. Concentration is expected to increase further in the future, making it even more difficult for smaller players to enter the market and operate successfully. An exception can be the long tail strategy serving a particular small segment of the market [54], but this is not the topic of the current research, and may be the subject of later research.

With the further spreading of digitalization, the growth of the online economy is expected to continue. The results of this research can be utilized in giving guidance to companies willing to enter the online market to understand which models are used in practice and how widely they are used. This can be particularly important nowadays in the dramatic increase of online activities caused by the COVID-19 pandemic.

References

[1] Porter ME, Millar VE. (1985). How Information Gives You Competitive Advantage. Harvard Business Review 1985;63(4):2-13.

[2] Atkinson RD, Ezell SJ, Andes SM, Castro DD, Bennett R. The Internet Economy 25 Years after .com. Transforming Commerce & Life. The Information Technology & Innovation Foundation 2010.

[3] Fitzgerald M, Kruschwitz N, Bonnet D, and Welch M. Embracing Digital Technology: A New Strategic Imperative. MIT Sloan Management Review 2013; Research Report

[4] Kane GC, Doug P, Phillips AN, Kiron D, Buckley N. Strategy, Not Technology, Driver Digital Transformation. MIT Sloan Management Review and Deloitte University Press 2015;July

[5] Leipzig von T, Gamp M, Manz D, Schöttle K, Ohlhausen P, Oosthuizen G, Palm D, Leipzig von K. Initialising Customer-Orientated Digital Transformation in Enterprises. Procedia Manufacturing 2017;8:517-524. DOI: 10.1016/j.promfg.2017.02.066

[6] Kaufman I, Horton C. Digital Transformation: Leveraging Digital Technology with Core Values to Achieve Sustainable Business Goals. European Financial Review 2015;Dec 2014-Jan 2015:63-67.

[7] Geissdoerfer M, Vladimirova D, Fossen van K, Evans S. Product, Service, and Business Model Innovation: A Discussion. Procedia Manufacturing 2018;21:165-172. DOI: 10.1016/j.promfg.2018.02.107

[8] Birkie S. Exploring Business Model Innovation for Sustainable Production: Lessons from Swedish Manufacturers. Procedia Manufacturing 2018;25:247-254. DOI: 10.1016/j.promfg.2018.06.080

[9] Veit D, Clemons E, Benlian A, Buxmann P, Hess T, Kundisch T, Spann N. Business Models. Business & Information Systems Engineering 2014;6(1):45-53.

[10] Prendeville S, Bocken N. Sustainable Business Models Through Service Design. Procedia Manufacturing 2017;8:292-299. DOI: 10.1016/j.promfg.2017.02.037

[11] Müller JM, Buliga O, Voigt KI. The Role of Absortive Capacity and Innovation Strategy in the Design of Industry 4.0 Business Models - A Comparison Between SMEs and Large Enterprises. European Management Journal 2020;February (in Press), DOI: doi.org/10.1016/j.emj.2020.01.002

[12] Tapscott D. Rethinking Strategy in a Networked World (or Why Michael Porter is Wrong about the Internet). Strategy+Business 2011;24:Q3

[13] Chen Y, Liu H, Chen M. Achieving Novelty and Efficiency in Business Model Design: Striking a Balance Between IT Exploration and Exploitation. Information & Management 2020;February (in Press), DOI: 10.1016/j.emj.2020.01.002

[14] Deloitte. Understanding Talent, Technology and Transformation: Digital Disruption Index 2017:November

[15] Ismail MH, Khater M, Zaki M. Digital Business Transformation and Strategy: What Do We Know So Far? University of Cambridge, Working paper 2018

[16] Deloitte. Industry 4.0: Challenges and Solutions for the Digital Transformation and Use of Exponential Technologies 2014.

[17] PricewaterhouseCoopers. Industry 4.0: Building the Digital Enterprise. 2016 Global Industry 4.0 Survey 2016.

[18] Stock T, Obenaus M, Slaymaker A, Selinger G. A Model for the Development of Sustainable Innovations for the Early Phase of the Innovation Process. Procedia Manufacturing 2017;8:215-222. DOI: 10.1016/j.promfg.2017.02.027

[19] Christensen CM, Raynor ME, McDonald R. What is Disruptive Innovation? Harvard Business Review 2015;93(12):44-53.

[20] Ibarra D, Ganzarain J, Igartua JI. Business Model Innovation Through Industry 4.0: A Review. Procedia Manufacturing 2018;22:4-10. DOI: 10.1016/j.promfg.2018.03.002

[21] Liu DY, Chen SW, Chou TC. Resource Fit in Digital Transformation: Lessons Learned from the CBC Bank Global e-Banking Project. Management Decision 2011;49(10):1728-1742.

[22] Brynjolfsson E, Mcafee A. The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies 2014. New York:W.W. Norton & Company, Inc.

[23] Haapalainen P, Kantola J. Taxonomy of Knowledge Management in Open Innovations. Procedia Manufacturing 2015;3:688-695. DOI: 10.1016/j.promfg.2015.07.307

[24] Kim W. A Practical Guide for Understanding Online Business Models. International Journal of Web Information Systems 2019;15(1):71-82. DOI: 10.1108/IJWIS-07-2018-0060

[25] Lambert S, Davidson R. What Do We Know About e-Business Models in Practice? The 8th International Conference on e-Business 2009

[26] Wiener M, Hoßbach N, Saunders C. Omnichannel Businesses in the Publishing and Retailing Industries: Synergies and Tensions Between Coexisting Online and Offline Business Models. Decision Support Systems 2018;109:15-26. DOI: 10.1016/j.dss.2018.01.008

[27] Schmuck R. Online üzleti modellek, PhD dissertation 2015. Pécs:University of Pécs Faculty of Business and Economics

[28] Móricz P. Élenjáró magyarországi internetes vállalkozások fejlődése az üzleti modell nézőpontjából, PhD dissertation 2009. Budapest:Corvinus University

[29] Li F. The Digital Transformation of Business Models in the Creative Industries: A Holistic Framework and Emerging Trends. Technovation 2018;102012 DOI: 10.1016/j.technovation.2017.12.004

[30] Sousa MJ, Rocha Á. Skills for Disruptive Digital Business. Journal of Business Research 2019;94:257-263. DOI: 10.1016/j.jbusres.2017.12.051

[31] Fossen van K, Morfin J, Evans S. A Local Learning Market to Explore Innovation Platforms. Procedia Manufacturing 2018;21:607-614. DOI: 10.1016/j.promfg.2018.02.162

[32] Kim WC, Mauborgne R. Blue Ocean Strategy. Harvard Business Review 2004;October:76-84.

[33] Lohtander M, Aolainen A, Volotinen J, Peltokoski M, Ratava J. Location Independent Manufacturing Case-Based Blue Ocean Strategy. Procedia Manufacturing 2017;11:2034-2041. DOI: 10.1016/j.promfg.2017.07.355

[34] Timmers P. Business Models for Electronic Markets. Electronic Markets 1998;8(2):3-8.

[35] Weill P, Vitale M. Place to Space - Migrating to eBusiness Models 2001. Boston:Harvard Business School Press

[36] Laudon KC, Traver CG. E-commerce. Business. Technology. Society. 2nd Edition 2004; USA:Pearson

[37] Rappa M. Managing the Digital Enterprise - Business Models on the Web 2002.

[38] Eisenmann TR, Hallowell R, Tripsas M. Internet Business Models. Text and Cases 2002. McGraw-Hill.

[39] Malone TW, Weill P, Lai RK, D'Urso VT, Herman G, Apel TG, Woerner SL. Do Some Business Models Perform Better than Others? MIT Sloan School of Management, MIT Sloan Working Paper 2006;4615-06
[40] Alexa. Alexa Top 500. http://www.alexa.com/topsites, date of the sample: 6th June 2019
[41] Apple. iTunes Charts, https://www.apple.com/itunes/charts/free-apps/ and https://www.apple.com/itunes/charts/paid-apps/, date of the sample: 6th June 2019
[42] Vuksic VB, Stemberger MI, Jaklic J. Simulation Modelling Towards E-Business Models Development. International Journal of Simulation 2001;2(2):16-29.
[43] Bocken N, Boons F, Baldassarre B. Sustainable Business Model Experimentation by Understanding Ecologies of Business Models. Journal of Cleaner Production 2019;208:1498-1512. DOI: 10.1016/j.jclepro.2018.10.159
[44] Damsgaard J, Horsti A, Nilson O. Sustainable Evolution of Business Models: Cases from Scandinavian Internet Portal Market. In: Essays on Electronic Business Models and Their Evaluation. Helsinki School of Economics 2007;160-182. ISBN 978-952-488-118-0
[45] Kuivalainen O, Ellonen HK, Sainio LM. An Online Success Story: The Role of an Online Service in a Magazine Publisher's Business Model. International Journal of E-Business Research 2007;3(3):40
[46] Deighton J, Quelsch J. Economic Value of the Advertising-Supported Internet Ecosystem. Hamilton Consultants Inc; 2009.
[47] Tsai MH, Lin YD, Su YH. A Grounded Theory Study on the Business Model Structure of Google. International Journal of Electronic Business Management 2011;9(3):231-241.
[48] Ritter T, Pedersen CL. Digitization Capability and the Digitalization of Business Models in Business-to-Business Firms: Past, Present and Future. Industrial Marketing Management 2020;April:180-190. DOI: 10.1016/j.indmarman.2019.11.019
[49] Eisenmann TR, Pothen ST. Online Portals. Teaching Case. Harvard Business School 2000;case number 9-801-305.
[50] Nemeslaki A, Szutorisz G, Szabó B, Orbán Zs. Az e-business-modellek második generációjának mozgatórugói és jellemzői. A web 2.0 nemzetközi és néhány magyarországi példája. Vezetéstudomány / Budapest Management Review 2008;39(12):27-38.
[51] Anderson C. The Long Tail: Why the Future of Business Is Selling Less of More. Revised Edition. Hachette Books 2008
[52] Nemeslaki A, Urbán Zs, Trestyén A. Alapvető e-business modellek működése és magyarországi elterjedtségük. Vezetéstudomány / Budapest Management Review 2008;39(12):4-15.
[53] Kane G.C. Predicting the Future: How to Engage in Really Long-Term Strategic Digital Planning. MIT Sloan Management Review 2016;May 3.
[54] Brynjolfsson E., Hu Y.J., Smith M.D. From Niches to Riches: Anatomy of the Long Tail. MIT Sloan Management Review 2006;July 1.