Building a digital business ecosystem in a food industry

Authors: Tamara Naumović [1], Petar Lukovac [2], Vukašin Despotović [3], Dušan Barać [4]*

[1] University of Belgrade – Faculty of organizational sciences, tamara.naumovic@fon.bg.ac.rs, [2] University of Belgrade – Faculty of organizational sciences, petar.lukovac@fon.bg.ac.rs, [3] University of Belgrade – Faculty of organizational sciences, vukasin.despotovic@fon.bg.ac.rs, [4] University of Belgrade – Faculty of organizational sciences, dusan.barac@fon.bg.ac.rs,

*Corresponding author, e-mail: dusan.barac@fon.bg.ac.rs,

Purpose of the paper

This paper discusses challenges and opportunities in building a modern digital business ecosystem. We analyze different approaches and models with particular focus on the implementation of a platform business model. The paper explores these topics through a practical example – one of the leading Serbian B2C ecommerce portal in category of healthy food products "Tastes from nature" that brings together small-scale premium food producers. The main idea of the portal was to foster small producer's business by employing digital channels.

Based on the results from "Tastes from nature" ecommerce portal, we provide practical takeaways and answers on: how to design a digital business ecosystem, which role to take, how to establish the system, evolve and further develop the system. We explored the main KPIs in an ecommerce ecosystem. In addition, we discuss the impact and possibilities that the technologies have within an ecommerce ecosystem.

Methodology

The paper included comprehensive analysis of the current state and perspectives in ecommerce business ecosystems from different industries and locations. In the practical part of the paper, huge set of data was analyzed in order to draw conclusions: purchases, abandoned carts, user related data, etc.

Main findings

Building a business ecosystem that grows in the modern digital world is necessity. Digital business ecosystems have to be adaptive, automated and customer centric. Transforming a company into a data driven organization is among the key factors for success. Technologies can bring significant value and establish an environment for pivoting the business model.

Research implications/limitations

The paper tries to make an impact on the practitioners. Further, the findings of the paper can serve as a basis for a broad spectrum of the experts that play different roles in digital business ecosystems. Both the portal and the model can be used as a best practice pattern for other industries.

Originality/Value

The paper describes a novel model of a digital ecosystem in the field of food production. The model has been implemented in the real-world environment, i.e. ecommerce web portal.

Type of paper: Research paper

Keywords: digital business ecosystem, e-commerce, digital transformation, data analytics.

1. Introduction

Changes in the digital environment have been profound over the past few years, impacting various aspects of society, business, and personal life. These changes reflect a dynamic and rapidly evolving digital environment that continues to shape the future of technology and society. [1] Digital Darwinism describes the phenomenon where technology and society evolve more rapidly than businesses can naturally adapt [2]. This concept highlights the necessity for companies, institutions, and even governments to constantly adjust to the evolving digital environment or face the risk of becoming obsolete. Organizations that fail to recognize and respond to these shifts may find themselves outpaced by more agile and technologically adept competitors. [2]. For instance, The largest provider of accommodation services – no properties for rent owned (Airbnb); The largest company in the field of taxi services – they don't have their own vehicles (Uber); The most significant media company – they don't have a studio, newspapers, portals, etc. (Meta).

Digital transformation is the process of using digital technologies to create new — or modify existing — business processes, culture, and customer experiences to meet changing business and market requirements [3]. Digital technologies are reshaping the traditional relationships between businesses. As a result, managers are increasingly recognizing their business environments as digital ecosystems.

2. Digital business ecosystems

2.1. Definition

A business ecosystem is typically a domain of mutual complementarities and interdependencies where a company functions. It generally encompasses suppliers, clients, rivals, and collaborators from various sectors. Ecosystems foster interdependencies, networks, and partnerships [5][6].

The ecosystem as a metaphor approach provides managers with a mental model that can be used to better understand the complex competitive landscape [7].

An ecosystem forms when independently operating yet interdependent firms collaborate to create a value proposition aimed at a specific audience. When firms from one ecosystem partner with those from another ecosystem to develop such a value proposition, and their primary offerings do not compete with each other, a meta-ecosystem emerges.[8]

Key properties in an digital business ecosystem include: servitization, network effects shift of value-creation, winner-takes-all effects, openness, collaboration, use of idle assets [9].

By understanding and embracing digital ecosystems, firms can reposition themselves strategically, optimize their organizational designs, and thrive in the digital era [10]. On the other hand, participation in the ecosystems is a cumbersome effort.

2.2. Approaches and concepts

Customer centric

Customer orientation signifies a company's strategic approach and decisions regarding its customer market. It involves the choice to actively engage in information gathering, dissemination, and response to more effectively serve their customers [11]. The customer should be at the center of all decisions related to delivering products, services and experiences to create customer satisfaction, loyalty and advocacy [12].

In the latest research a concept of partnership with a customer is discussed as well. By presenting an interaction framework, companies can establish an effective knowledge partnership that capitalizes on customers' motivational foundations. This approach allows them to leverage diverse contributions and strategic values that customers are prepared to offer [13].

Omnichannel and online/offline integration

"New Retail," by Alibaba, refers to the seamless blending of online and offline commerce. The goal is to create a more consumer-focused retail experience by utilizing big data, artificial intelligence, and advanced logistics [14]. In essence, brick-and-mortar stores aid online retailers in collecting additional data and enhancing their comprehension of customer behaviors within the store, thus bolstering the impact of the platform ecosystem they belong to. In the paper [14], the authors highlight Chinese food retail industry is increasingly being transformed by the attempts of online retailers to create a seamless consumer experience across online and store-based channels.

Omnichannel implies that a company can exploit integrated processes and information systems for realizing a seamless and consistent consumer experience across a plenitude of digital and physical channels [15]. The authors highlight three perspectives of the omnichannel approach: technologies, organization and market. Further, they emphasize the much stronger impact of the full omnichannel approach in comparison to multi or cross-channel.

Data driven approach

Transforming a company into a data driven organization is among the key factors for success. Business must be based on quantitative information, while everything is measured. Analytics have to be employed from operational to strategic topics. platforms are digital technologies that act as intermediaries between various user groups, such as advertisers, customers, producers, and suppliers. This intermediary role enables platforms to gather and analyze vast amounts of data about interactions among users. [14.] This data enables platforms to generate and benefit from what are known as 'network effects' meaning that as more users join a platform, the quality of the data improves, leading to enhancements in the service provided. KPIs are being used in almost

every type of business. KPIs can be at an ecosystem's component level as well as at a level of the whole ecosystem.

Adaptability

Adaptability refers to the ability to change and adjust to external conditions to maintain the overall system. An ecosystem can integrate new members whose roles evolve over time to ensure sustainability. The ecosystem's structure is flexible, allowing for continuous adjustments through interactions among its members. Ecosystems can vary in form based on the number of members, whose interactions typically revolve around complementing goods, technologies, and services [16].

2.3. Phases in the development of a digital business ecosystem

Although, there are different opinions and classifications in the literature related to the digital business system development, we highlight the following from the [17]:

1) *Ecosystem formation*
    a. *initiating the ecosystem vision*,
    b. *mapping appropriate partnerships*, and
    c. *incentivizing joint engagement in the ecosystem*.
2) Ecosystem orchestration
    a. *defining the governance principles*,
    b. *distributing ecosystem roles*, and
    c. *ensuring value creation and capture alignment of the actors*.
3) Ecosystem expansion
    a. *continuous ecosystem evaluation and adaptation*,
    b. *revitalizing ecosystem collaboration*, and
    c. *strengthening ecosystem bonds*.

2.4.Governance of a digital business ecosystem

Main roles in a digital platform business ecosystem are: suppliers, orchestrators, complementors and customers. [18].

Digital platform ecosystem governance involves the decisions and mechanisms employed by a platform owner to guide and encourage complementors and users in building and maintaining the ecosystem [19].

These are main building blocks:

- Governance structure **.**
- Governance mechanisms
- Governance scope

- Contingency factors
- Outcomes

2.5. Role of the technologies

Overall, technologies serve as foundational elements that drive efficiency, innovation, collaboration, and growth within digital business ecosystems, enabling them to thrive in dynamic and competitive environments. Main technologies in modern digital business ecosystems are: AI apps and services, blockchain, pervasive computing, social media, AR, VR and others.

3. The Ecommerce ecosystem of "Tastes from nature"

Tastes from nature an online store that brings together high-quality small producers from Serbia. All the products in are fresh, healthy, natural, and free from additives and other chemicals [20].

Further the portal brands itself as a gathering place for everyone who considers a healthy lifestyle and quality nutrition one of their life priorities. The idea behind the portal is to value small producers, the effort they invest to survive in the market, and the fact that they give their best every day so that end consumers can enjoy the fruits of their labor. As a rule, they start their production by making food for themselves and their families. On the other hand, the goal of mass industrial production is profit from the very beginning, which always prioritizes additives, preservatives, and pesticides at the expense of natural ingredients, quality, and health.

The portal aims to provide additional services related to sales, distribution, storage, and promotion. At the moment, the portal offers over 500 different high-quality products and more than 40 small producers, with thousands of satisfied customers and several hundred regular buyers. Additionally, in October 2023, Tastes from nature opened a physical store to foster better connections and allow our customers and partners to see, feel, taste, and purchase products directly. Key values are support to local communities, transparency, quality of the products, social responsibility.

The following image depicts components and participants of the Tastes from nature' ecommerce ecosystem.

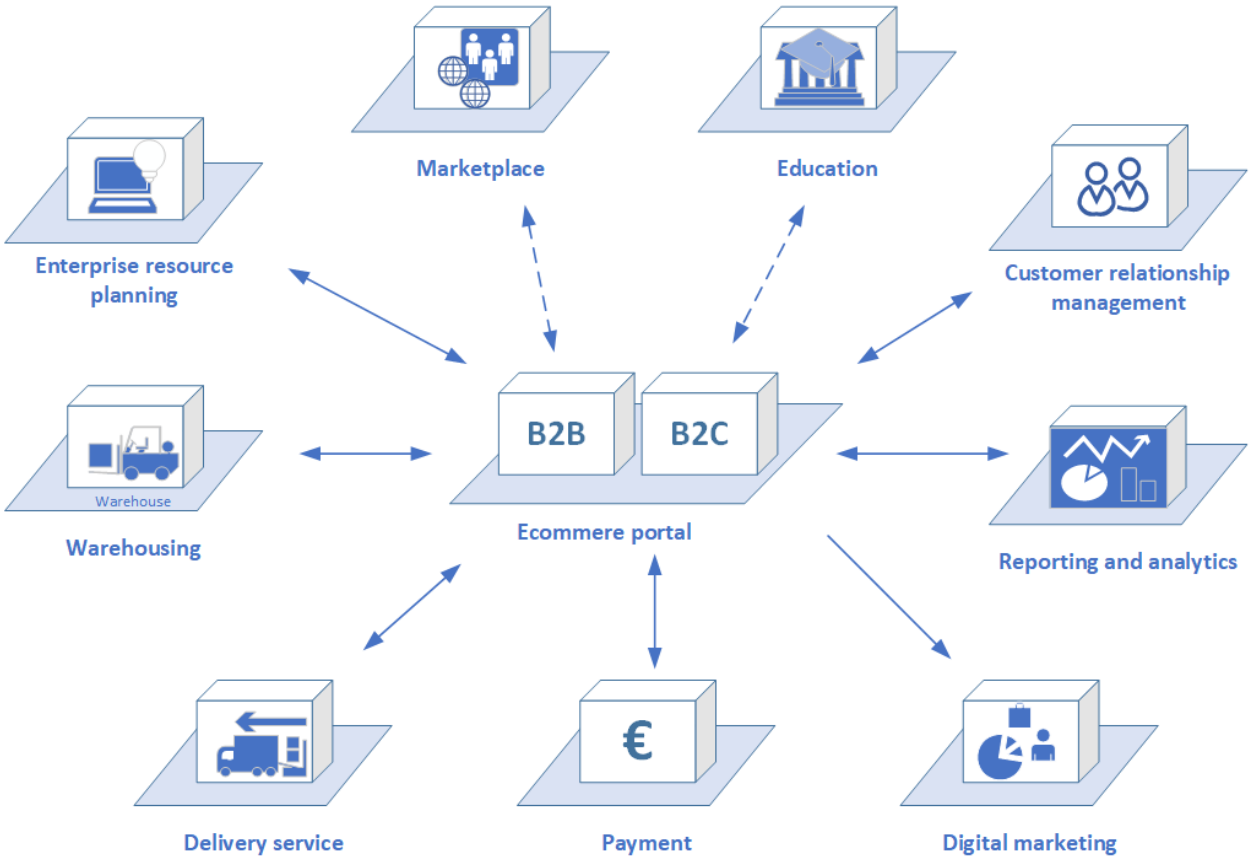

Figure 1. E-commerce ecosystem Tastes from nature

Architecture in this context refers to the blueprint of the ecosystem, detailing its components and their interrelationships. It includes the central platform, interfaces that facilitate interactions between the platform and its complements, and the complements themselves [19].

Ecommerce web portal

This is the most important segment of the whole ecosystem. This is the place where customers, both B2B and B2C segments buy the products. The portal itself offers a variety of the options from common to the advanced ones, such as:

- Advanced search filters
- Suggestions system
- Product recommendations
- Infinite scroll
- Recurring purchases
- Loyalty program related features
- Pick up at store
- Ratings, comments
- Pricing lists
- Producers' pages

- Blog posts
- Integrations with external services
- Etc.

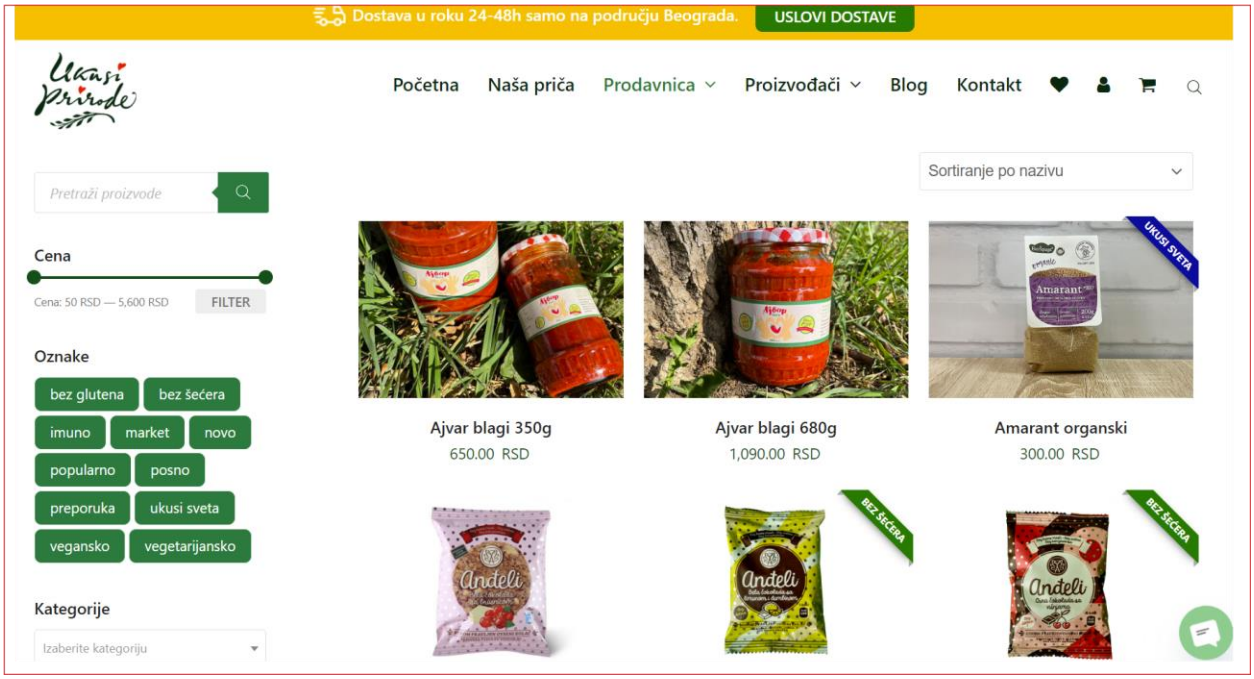

Figure 2. E-commerce website Tastes from nature

Customer relationship management

CRM includes a plethora of features: such as contact management and unified customer profiles, customer support and communication integration (several channels), personalized offers for the B2B sectors, customer care, etc.

Reporting and analytics

These are the main objects of interest in reporting analytics part:

- Abandoned carts analytics
- Search analytics
- Product analysis
- Customers analysis
- Purchases analysis

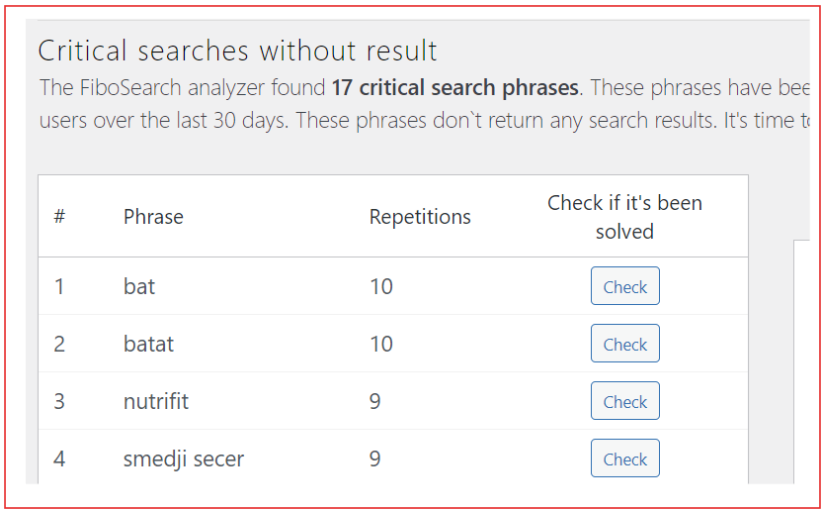

Figure 3. Searches without result

Furthermore, the portal integrates external services in order to 1) have more detailed analysis and 2) create recommendations. These solutions are Google Analytics and a local startup's advanced tools for recommendations.

Figure 4. Recommended products

The most important KPIs are: average cart value, conversion rate, churn, LTV, number of new/old buyers, total revenue, number of purchases, etc.

Digital marketing

The digital marketing is fully based on the omnichannel concept. In the practice, it implies many different channels that have to be synchronized and coordinated. The most intensively used channels and tools are: social networks, Viber and Whatsapp groups, newsletters and email campaigns, loyalty programs, SEO, testimonials, influencers, etc.

Marketplace and partnerships

Tastes of nature not only builds and orchestrates its own business ecosystem, but also participates in several others in the role of the supplies, i.e. merchant. These are the portals that offer price comparison to B2C users or special portal for HR people from the companies. Further, for instance,

a couple of companies from the banking sector are both the B2B customers and partners in offering special services to small businesses.

Delivery service

There are two types of delivery service partner: 1) partner company and 2) single deliverers. Products are delivered on certain dates if they are from the fresh food category. Other products are delivered on a daily basis.

Warehousing

The physical store is integrated with warehouse, so the process can be optimized and coordinated smoothly.

Enterprise resource planning

This function is performed using software that integrates and communicates with the majority of the other components. ERP solutions is the heart of the system.

Payment

Customers are offered a common set of payment channels. Further, the web shop is integrated

with the B2G services.

Education

The educational component of the e-commerce ecosystem encompasses a variety of elements designed to enhance the knowledge and skills of both consumers and small producers.

It is directed in two different ways. First, considering the fact that a vast majority of the products are in premium categories and bring many benefits and values to the consumers, educational activities are aimed to the end customers.

The list of the actual activities and employed channels are: Video content, Blog, posts on social networks, detailed product description, receipts, reviews and testimonials, FAQs, support channels

The main participants of this stream are:

- people from the university, field of agriculture
- experts from practice
- small producers

The second target group are small producers. In this education stream the main educators are quite similar to the first one, but with different focus – how to organize, plan and perform the production in order to get high quality products. Further, the special trainings, workshops, webinars and seminars are organized as well as providing industry insights

By incorporating these educational elements, the e-commerce ecosystem can support the growth and success of both businesses and consumers, fostering a more informed and dynamic online marketplace.

4. Conclusion and discussion

Building a business ecosystem that grows in the modern digital world is a necessity. Digital business ecosystems have to be adaptive, automated and customer centric. The paper tries to make an impact on the practitioners. Further, the findings of the paper can serve as a basis for a broad spectrum of the experts that play different roles in digital business ecosystems. Both the portal and the model can be used as a best practice pattern for other industries

Despite their competitive positions, ecosystem participants also align on common interests, goals, and values. Together, they strive to evolve and meet the demands of dynamic market trends.

To fully realize the potential of digital business ecosystems and avoid the service and digital paradox, technology leaders should integrate their businesses with other ecosystem members. Operating in isolation and maintaining information silos among ecosystem members will ultimately pose a risk to their own businesses [21].

It is fundamental to identify suitable mechanisms of value co-creation for all the set of business partners involved [22].

Transforming a company into a data driven organization is among the key factors for success. Continuous data analysis allows organizations to make timely adjustments to their operations, marketing strategies, and customer interactions based on current trends and market conditions. Data-driven insights uncover opportunities for innovation and new product development, aligning with market demands and staying ahead of competitors.

Technologies can bring significant value and establish an environment for pivoting the business model. However, the technology itself should be positioned as a facilitator and underlying infrastructure, but not a purpose or goal of the system.

Planing, designing, development, maintenance and further improvements of a digital business ecosystem is a long-time run. In the case of Tastes from nature, e-commerce ecosystem needed almost four years to become profitable for the majority of the participants. However, it still has many challenges and obstacles that have to be solved in the following period.

For Taste from nature e-commerce ecosystem future research will be directed toward improvement and establishing deeper bonds among the components, as well as harnessing newest technologies and modern concepts in digital world. From the practical perspective, the business will try to be intensify B2B customers.

References

1. P. Senyo, K. Liu, J. Effah, 2019, Digital business ecosystem: Literature review and a framework for future research, International Journal of Information Management, Volume 47, Pages 52-64, ISSN 0268-4012,

2. T. Goodwin, 2018, Digital Darwinism: Survival of the Fittest in the Age of Business Disruption (Kogan Page Inspire) 1st Edition
3. SalesForce, https://www.salesforce.com/eu/products/platform/what-is-digital-transformation/
4. M. Subramaniam, B.Iyer, V.Venkatraman, 2019, Competing in digital ecosystems, Business Horizons, Volume 62, Issue 1, Pages 83-94, ISSN 0007-6813
5. J.F. Moore, 1993, Predators and prey: A new ecology of competition, Harvard Business Review, 71 (3) , pp. 75-86
6. A. Cozzolino, L. Corbo, P. Aversa, 2021, Digital platform-based ecosystems: The evolution of collaboration and competition between incumbent producers and entrant platforms, Journal of Business Research, Volume 126, Pages 385-400, ISSN 0148-2963.
7. D. B. Arnett, M. Dass, K. Bhoumik, 2021, Re-examining Market Structures: Resource-Advantage Theory and the Market Offering Ecosystem Perspective, Journal of Global Scholars of Marketing Science.
8. M. Palmié, L. Miehé, P. Oghazi, V. Parida, J. Wincent, 2022, The evolution of the digital service ecosystem and digital business model innovation in retail: The emergence of meta-ecosystems and the value of physical interactions, Technological Forecasting and Social Change, Volume 177.
9. M. Koch, D. Krohmer, M. Naab, D. Rost, M. Trapp, 2022, A matter of definition: Criteria for digital ecosystems, Digital Business, Volume 2, Issue 2.
10. A. Priyono, A. Hidayat, 2024, Fostering innovation through learning from digital business ecosystem: A dynamic capability perspective, Journal of Open Innovation: Technology, Market, and Complexity, Volume 10, Issue 1.
11. X. Sun, Q. Zhang, 2021, Building digital incentives for digital customer orientation in platform ecosystems, Journal of Business Research,Volume 137,2021,Pages 555-566.
12. Forbes 2022, https://www.forbes.com/sites/forbesagencycouncil/2022/01/20/what-is-customer-centricity/
13. N. Lettner, S. Wilhelm, S.Güldenberg, W.Güttel, 2022, Customers as knowledge partners in a digital business ecosystem: From customer analytics towards knowledge partnerships, Journal of Digital Economy, Volume 1, Issue 2.
14. Y. Wang, N. M. Coe, 2021, Platform ecosystems and digital innovation in food retailing: Exploring the rise of Hema in China, Geoforum, Volume 126, Pages 310-321.
15. L. Christiane & T. Manuel. (2022). Omnichannel Business. Electronic Markets. 32.
16. S. Yevgenievich Barykin, et al., 2020, Economics of Digital Ecosystems, Journal of Open Innovation: Technology, Market, and Complexity, Volume 6, Issue 4.
17. M. Kolagar, V. Parida, D. Sjödin, 2022, Ecosystem transformation for digital servitization: A systematic review, integrative framework, and future research agenda, Journal of Business Research, Volume 146, 2022, Pages 176-200.
18. BCG, 2022, https://www.bcg.com/publications/2022/what-is-your-business-ecosystem-strategy]
19. C.Costabile, 2024, Digital platform ecosystem governance of private companies: Building blocks and a research agenda based on a multidisciplinary, systematic literature review, Data and Information Management, Volume 8, Issue 1.

20. D. Barać, V. Despotović, T.t Embaye, 2022, Reinforcing small-scale producers via innovative business models: A case of natural food and drinks products in Serbia, International conference, Symorg 2022, Book of abstracts
21. S. Suuronen, J. Ukko, R. Eskola, R. S. Semken, Hannu Rantanen, 2022, A systematic literature review for digital business ecosystems in the manufacturing industry: Prerequisites, challenges, and benefits, CIRP Journal of Manufacturing Science and Technology, Volume 37, Pages 414-426.
22. F. Schiavone, D. Mancini, D. Leone, D. Lavorato, 2021, Digital business models and ridesharing for value co-creation in healthcare: A multi-stakeholder ecosystem analysis, Technological Forecasting and Social Change, Volume 166.