

Relational Structure of Digital Platforms

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Abstract: *Digital platforms have become an integral part of everyday life, enabling individuals and businesses to connect, interact and exchange goods and services faster than ever before. Platforms are defined as digital systems that facilitate the exchange of goods, services or information between individuals and businesses. They have transformed the way people interact with each other and have created new business models that have disrupted entire industries. This article presents a contribution to the understanding of digital platforms, their types and their impact on various stakeholders. The article presents a typology of platforms based on their characteristics and functions, highlighting the variety of platforms that exist in the digital landscape. Although this typology is not comprehensive, it provides a useful framework for understanding the core aspects of digital platforms. The article then proceeds to analyze the relationships between different stakeholders on the platform, including supply-side and demand-side users, advertisers, platform developers and other stakeholders. It describes how each of these actors interacts with the platform and how they contribute to its development and growth. The article proposes a relational model that captures the dynamics of these interactions, illustrating the complex web of relationships that exist on a digital platform. This article serves as a starting point for further research on digital platforms, providing a comprehensive overview of their nature and impact. The article highlights the need for more research in this area, particularly in relation to the regulation of digital platforms, their impact on traditional business models, and the implications for society at large.*

Key words: *platform, digital platform, relationships, relational structure*

JEL codes: *L14, D01, O12*

1. Introduction

Platforms have become an integral part of modern society, providing a means for individuals and businesses to connect, interact, and transact with one another. From social media and e-commerce platforms to ride-sharing and food delivery services, these digital marketplaces have revolutionized the way we communicate, consume, and engage with the world around us. As the use of platforms continues to grow and evolve, understanding the relationships that occur within them and their impact on various aspects of society is important.

Platforms, both virtual and physical, have greatly facilitated various aspects of daily life. One way of understanding a word “platform” is: “a way of telling the public about your opinions” or: “a raised surface for people to stand on, especially when they are speaking to a lot of people” (www1). In their basic form, prior to being digitized to some extent, platforms have always functioned as meeting places. For instance, clubs and bars have served as venues for social gatherings. Also, advertisements in newspapers have enabled buyers and sellers to connect with each other. With the advent of digitalization, providers of computer operating systems have been able to offer software that can be used by application users, developers, and hardware providers to establish various types of relationships (Evans, 2003). It is worth noting that prior to the intense development of platforms facilitating daily functioning, many matters had to be handled in a traditional way - usually by personally visiting the relevant institution or calling them. For example, when wanting to reserve a table at a restaurant, one had to call the restaurant and negotiate with an employee. Such situation was troublesome for both the caller, as there was a chance no one would answer the phone at the restaurant, and for the employee, who could incorrectly record the obtained information or inform that there were no tables available at the given time (necessitating calling another restaurant). These conditions led to a situation where customers would give up on going out, preferring to spend time at home rather than trying to reach the restaurant and make a reservation. Conversely, the restaurants were empty due to a lack of customers (Evans, Schmalensee, 2016). That problem was somehow solved by introducing OpenTable platform in 2008. The platform brings together both large and small restaurants from all over the world. On the one hand it provides basic information about restaurants e.g., car park, prices, atmosphere, payment methods, cuisine, service or recommended attire. On the other hand, it enables users to share experience of given restaurant (www2).

Platforms have not only facilitated everyday functioning, but also changed daily habits. The situation with ordering a table can also be applied to other sectors such as transportation,

ordering food, booking accommodations, listening to music or watching movies. However, the above examples also demonstrate how deeply these changes have taken place. Ordering food delivery is easier than ever. Instead of calling a restaurant, we can find our preferred cuisine on an application that aggregates many restaurants. The option to pay through the application also speeds up the entire process. On the other hand, restaurants no longer need to rely on their own transportation since the delivery persons work for the application and not the restaurant (Surendhranatha, Basava, 2020). In the case of music, instead of buying entire albums of a particular artist, with streaming, there is an option to listen to music anywhere, anytime, and in any configuration of favorite songs (Swanson, 2013). Streaming movies and TV shows have proven to be a significant revolution, enabling the creation of a home theater. The ability to watch the same film multiple times for a one-time fee, as well as access to many productions, has also become attractive to users (Gaustad, 2019). Travel has also become much easier through access to platforms that enable ticket booking (e.g., for planes, trains, etc.) and accommodation (Janiak, Kozłowska-Adamczak, 2018).

Depending on the field in which digital platforms are being studied, emphasis is placed on different aspects, which may result in different definitions. In the field of economics focuses on identifying the digital platform as a hybrid structure composed of organizations, systems and technologies that are oriented toward value creation. This is achieved by strengthening direct interactions and exchanges between two or more groups of external users within a single digital ecosystem or algorithmic relationship. These platforms enable the integration of people, devices and cyber-physical systems into a single intellectual and informational space. Possibility of discrete transactions without the need to involve other participants at the same time could contribute to the increasing popularity of platforms. (Geliskhanov, Yudina, 2018). Discrete transactions means that parties wishing to interact with each other do not need to be available at the same time for such a relationship to occur - one can purchase products from a store after its opening hours, reserve a service when the service provider is currently unavailable (they receive a notification), or consume content when the demand side has time regardless of the presence of content makers.

Platforms can be described as markets – two-sided or multisided markets. Two-sided markets or two-sided platforms are businesses that connect two sets of customers, such as Airbnb or Uber, which connect hosts/drivers with end-users (Bermstein, Decroix, Keskin, 2020). They create a model that ensures a positive experience for both sides and may even have more than two sets of customers, becoming multi-sided platforms. It is worth mentioning that

there are different kinds of platforms. They differ in forms of interaction, collaborations, subjects and objects within them. It is worth mentioning that there is no one typology of platforms but such big diversity may be divided into many categories. One such typology includes two types of platforms:

1. matchmaking platforms – act as intermediary for groups of users that seek each other to communicate, purchase, find accommodation or find romantic partners,
2. advertising platforms – provide various services to consumers such as news, videos, music or user-generated content. They also offer search capabilities, advertising and recommendations. They enable advertising solutions to companies that look for a way to promote their products or services to targeted customer (OECD, 2019a).

Another typology divides platforms into three categories:

- transaction platforms – they offer physical services and accessibility for users anywhere anytime to them; they allow to communicate between buyers and sellers,
- data-centric platforms – services that focus on data analysis and the ability to make predictions; analyses help to improve performance for platform users; mainly used in B2B sector,
- innovation platforms – services that provide problem-solving solutions through research and development; characterized by an open-source approach; participants may exchange knowledge and the creation of intellectual property (Rix et. al. 2020).

There are also more detailed typologies, that divides platforms into many categories and subcategories. According to Moazed and Johnson (2016), the basic platform split is into exchange platforms (which divides into service marketplace, product marketplace, payment platform, investment platform, social networking platform and social gaming platform) and maker platforms (content platform, closed development platform, controlled development platform and open development platform). Another concept, proposed by Organisation for Economic Co-operation and Development (OECD) suggests that platforms can be divided into up to 8 categories:

- social media,
- app store,
- online market place,
- payment services,
- gig economy,
- search engines,

- communication services,
- streaming service (OECD, 2019b).

The proposed classifications are also not comprehensive and still pose a challenge in unambiguously assigning specific platforms to given categories. However, it is worth noting that these classifications facilitate understanding of the platform concept and the relationships that occur within them.

Despite the numerous and diverse definitions of platforms, both from an economic and technical perspective, the common point is the exchange that takes place between two interested parties. This may involve the purchase of goods or services, both in digital and physical form, but it may also involve the exchange of content or information. They enable reaching the appropriate audience group and, thanks to their real-time functioning, building an appropriate relationship more quickly.

All these definitions indicate the presence of multiple actors participating both on and off the platform. Relationships between these participants can influence the behaviour of other parties and the functioning of the platform itself. The purpose of this article is to identify stakeholders participating in the platform environment and to indicate the relationships that occur. This article is contributory in nature and is intended as a foundation for further research (Zieliński, 2012). However, such relational model can help to define the roles of individual stakeholder and serve as a direction for further research on these relationships. The wide range of industries in which platforms operate causes significant simplification in the presented model, but it could be adapted to a specific domain.

2. Methodology and Data

This paper is focused on developing a relational model for platforms. The study employed a literature review, analysis of definitions, and observation of stakeholders and relationships occurring in platforms. A comprehensive literature was conducted to understand the current state of knowledge regarding platforms. The literature review helped to identify the key concepts and definitions related to platforms and the various perspectives of platform stakeholders. The use of platforms in different industries, their economic implications, and the role they play in fostering innovation and competition was searched. Different definitions of platforms helped to understand their concept and to identify the commonalities and differences among various platform definitions and stakeholders participating in them. The methodology used in this study helped to develop a comprehensive understanding of platforms and their

dynamics. This approach enabled to develop a model of the relational structure for platforms that captures the complex interactions between different platform stakeholders. The present article is a component of research related to a PhD dissertation, and the conclusions drawn here are also a part of the findings of this research.

3. Results and Discussion

This chapter presents the results of conducted research. It is worth noting that although the focus was on stakeholders operating on the platform, the identified entities also operate outside of the platform. Platforms do not operate detached but are connected to the environment and stakeholders who may not currently be on the platform but can influence both the platform and the entities operating on it (Hanusik, 2021).

Although people from all over the world use various platforms on a daily basis, it is worth paying attention to how stakeholders using them operate (as well as why a given platform gains greater popularity than another despite potentially offering similar features, although this may be a topic for further research). Depending on the type of platform, the object that becomes the axis of relations between stakeholders on the platform may differ. On transactional platforms, this can be a product or service that is sold between seller and buyer, while on social platforms, the object will be establishing relationships and communication with another user (or group of users). Such an object can also be data or created content. Therefore, the subject matter of platforms is very broad and can differ significantly depending on the type of platform.

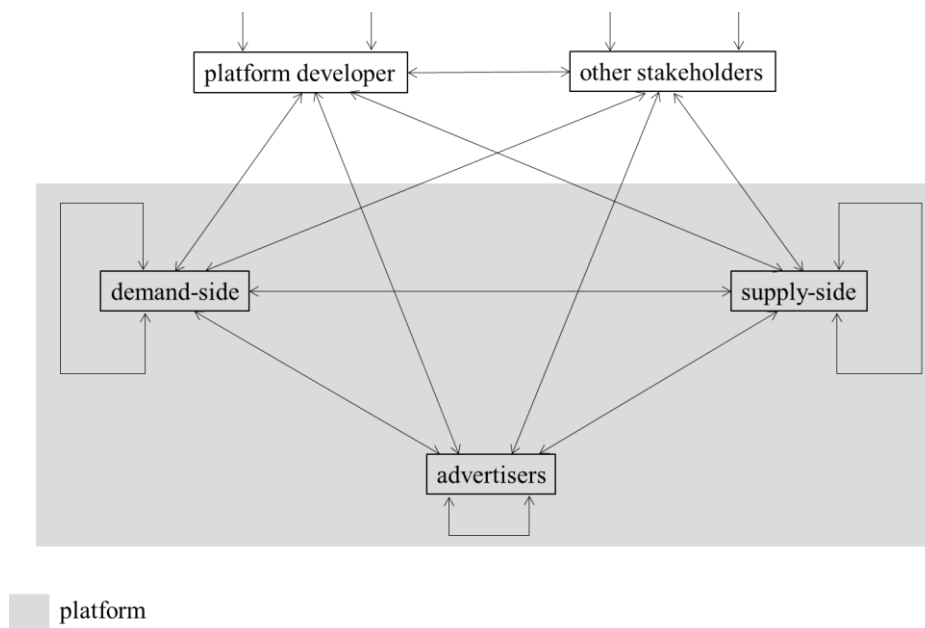
The organizational structure of platforms is also complex due to the diversity of platforms, the subject of relations and the networked nature of these relationships. However, considering the functions performed by stakeholders operating on the platform, it is possible to distinguish five types of them:

- the supply side – refers to participants offering products that are the axis of the relationship with the customers,
- the demand side – refers to customers who are the recipients of these products or objects,
- advertisers – participants operating on a platform and aiming to reach their target audience with their products, their presence on the platform helps them to better reach their target customers and supports the platform's operation and generates profits for another group, namely the platform developers,
- platform developers – a group responsible for designing and implementing software or platforms to meet the requirements of customers,

- other stakeholders – a very broad and diverse group, it can include potential platform users, other institutions that affect the platform's operation in the market, and even other platforms that are a kind of competition for others.

However, it should be noted that an unambiguous assignment of participants to a particular group is also difficult. Sometimes one participant can perform different functions and simultaneously offer a given service and be a recipient on a given platform. On social media platforms, it is not easy to clearly distinguish who is a supplier and who is a recipient (everything depends on who is communicating and in what form – private messages or groups, with a company, a known person or a friend). Similarly, advertisers can also be a supply side on the platform while advertising their products. Therefore, an unambiguous definition of the object and division of subjects present on the platform may be impossible. However, for the purpose of presenting a model of the relational structure present on the platforms, the division of stakeholders into five groups seems sufficient to represent their relationships.

Fig. 1 Model of the relational structure of stakeholders in platforms



Source: based on own elaboration

Figure 1 presents the proposed model of the relational structure of stakeholders functioning on the platform. The relationships between them are indicated. It is worth noting that these relationships occur between each group and within a given group, and in all cases, they are bilateral relationships. However, it should be noted that the strength of such

relationship may not always be the same in both directions (determining such strength may also be the direction of further research).

The fundamental relationship that occurs is between the demand and the supply side, which also forms the basis and purpose of the functioning of platforms – to establish relationships between these two sides. These relationships can be related to the purchase and sale of specific products and services, as well as between creators of content on video or music platforms or forming connections on social networking sites. Both the demand and supply side can provide feedback about the other, which can influence the decisions of other users to use a particular service or even the platform (Bracci, et. al., 2022).

Another relationship that occurs within the platform is between the demand side and advertisers, as well as between the supply side and advertisers. Advertisers promote their services on the platform, encouraging customers to establish a relationship with them. This situation can be analogous, *mutatis mutandis*, to traditional consumption of advertising content on various internet portals, newspapers or billboards.

The first relationship that occurs outside the platform is between the demand-side and platform developers, as well as between the supply-side and platform developers. Such relationship may concern a very basic aspect of contacting support in case of problems on the platform. In a broader sense, it relates to researching user feedback and adapting platform functionality to the reported needs.

The relationships between the platform developer and advertisers primarily involve entering into agreements that allow for advertising of products on the platform. Advertising fees support the maintenance and further development of the platform. In turn, advertisers gain access to a larger number of users tailored to their product. Reaching the user is also related to HTTP cookies, making it easier to acquire a customers based on the search terms and application traffic (Heyman, De Wolf, Pierson, 2014).

The relationships between the demand side and other stakeholders, as well as the supply side and other stakeholders, can be very complex and varied. In the case of all types of legislation, these will be indirect relationships related to fulfilling various obligations related to platform usage (such as respecting intellectual property, honesty in transactions, etc.). In the case where this group consists of potential platform users, relationships may involve a system of recommendations (or discouragements) to use a particular platform. Other platforms may engage in activities to encourage users to switch to their ecosystem.

The relationships between advertisers and other stakeholders primarily involve restrictions on advertised content and requirements for which ads can appear on specific platforms. The influence in the opposite direction still mainly involves advertising their own products or the desire to find new audiences.

4. Conclusions

The article presents a definition of platforms and explains how they have changed and facilitated everyday functioning. The purpose of platforms is to connect parties that want to interact with each other. This interaction can involve physical products and services (such as buying, selling, renting, or leasing), communicating with other people, or consuming content available on the platform (such as movies or music).

Due to the diversity of platforms, they can be grouped into categories, but categorizing platforms and assigning them to a specific category is also impossible due to the multitude of possible relationships on the platforms and the variety of offered items that can become the core of the relationship on the platform.

The article also proposes a model of the relational arrangement of stakeholders participating on the platform. Five types of stakeholders are distinguished: demand side, supply side, and advertisers operating directly on the platform, platform developers, and a broad group of other stakeholders who are not directly on the platform but may affect its operation or the operation of others on the platform. The relationships between all groups are described, paying attention to the object of the relationship, and emphasizing that these are two-way relationships.

This article constitutes the basis for further research on the relationships occurring on the platform, their direction and strength. It should be noted that the reciprocity of these relationships does not always have the same strength in both directions. The impact of one group, or the relationship on one side, may be stronger than the impact on the other side. Such situation may result from the nature of both groups (e.g. the legislative side has stronger influence on advertisers through its regulations than advertisers on the platform have on the legislative side in this case). Research may also concern the multiplicity of relationships when another stakeholder enters as a kind of intermediary at a given moment. The diversity and multitude of platforms, as well as the appropriate matching of users to a particular group of entities, may also be a limitation of further research. As well as dynamically changing platforms (increasing or decreasing the number of users, interest in the platform, expanding functionality).

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