

The Platforms' DNA: Drivers of Value Creation in Digital Two-Sided Platforms

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Abstract

With the advent of the digital economy, two-sided platforms have gained significant momentum over the last two decades. Contrary to traditional businesses, two-sided platforms do not have linear value creation; instead, they create value by enabling interactions or exchange between two different groups of customers. This configuration creates challenges as well as opportunities and calls for an in-depth investigation in the digital context. This research investigates how digital platforms create value in two-sided platforms.

The paper is based on a multiple-case study of four leading digital companies. The sampling is based on a theoretical and replication logic. Both primary and secondary sources are used for the research.

This paper indicates that the value created by those digital platforms is based not only on their ability to reduce transaction costs and resolve frictions between two sides, but also on four other drivers (trustworthy environment, data-driven expansions, personalized services, and engagement mechanisms). These drivers enhance and enrich the basic value proposition of matchmaking. The four drivers build upon one another, bringing together two matching value propositions and forming a structure that is represented as the two-sided DNA.

Keywords

Two-Sided Platforms; Digital Platforms; Two-Sided Market; Value creation; Value drivers; Business Model

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1. Introduction

With the advent of digital technology, two-sided platforms have become a popular business configuration over the last two decades (Gawer and Cusumano, 2014, Täuscher and Laudien, 2018, Trabucchi and Buganza, 2021). . In particular, digital platforms that enable two specific groups of participants such as hosts and guests (e.g., Airbnb), drivers and travelers (e.g., Uber) or buyers and sellers (e.g., eBay) have gained a huge momentum. Such platforms are based on the concept of indirect network externalities, which means that the value of joining the platform for one side depends on the number of participants on the other side and *vice versa* (Rochet and Tirone, 2006).

Digital technologies have changed the rules of the game, enabling collaborative mechanisms and different competitive dynamics (Nambisan et al., 2017). The way platforms create and capture value is fundamentally different from other digital businesses and needs a proper assessment (Cennamo, 2019; Correani et al., 2020).

Since Rochet and Tirole (2006) digital two-sided platforms have been under increasing academic and practitioner scrutiny in various disciplines. They have moved from economics to various management fields such as marketing (Muzellec et al., 2015) or strategy (Cennamo, 2019), thanks to the spread of supporting phenomena like the sharing economy (Sanasi et al., 2020). Yet, further exploration is needed, particularly for two-sided platforms, which mainly act as matchmakers (Evans and Schmalensee, 2016), often relying on a digital infrastructure (Täuscher and Laudien, 2018).

Hence, if previous studies explored the drivers of value creation in digital businesses (Amit and Zott, 2001), those results should now be updated in the specific context of two-sided platforms.

This paper shows that the value in two-sided platforms is based not just on their ability to reduce transaction costs and resolve frictions in the market (Parker et al., 2016; Trabucchi et al., 2020), which represent a combination of two basic and complementary value propositions associated with a match-making mechanism. This study contributes to the academic debate on the peculiarities of digital two-sided platforms, highlighting dedicated drivers of value creation (the role of trust, data-driven opportunities, personalization and the community feeling), differentiating them from previous studies mainly through their peculiarity of building one on the others to enhance the main value proposition of a two-sided platform: the match-making process, rather than becoming design themes as previous literature suggests (Amit and Zott, 2015). These four elements, along with the two basic and complementary value propositions, create a strong, stable, and meaningful link representing the constituents of the platform's DNA.

2. Literature Review

2.1 Two-Sided Platforms

The concept of two-sided platforms emerges in the economic literature through the notion of two-sided markets (Rochet and Tirole, 2006; Evans, 2003). Originally, it referred to industries where a central platform is required to act as an intermediary, in order to link two or more groups of customers influenced by cross-side network externalities (Rochet and Tirole, 2006; Katz and Shapiro, 1985).

The existence of the cross-side network (or indirect) externalities between the two sides represents the key element that defines this market structure. Initially, scholars investigated the pricing strategies of the two sides; if a platform provider should “*appropriately charge each side*” (Rochet and Tirole, 2006, p. 645), this structure also allows companies to offer free

goods, highlighting a monetary and a subsidy side through the cross-price elasticities (Parker and Van Alstyne, 2005).

The concept of two-sidedness began to be considered through the prism of the intrinsic characteristic of specific markets, becoming more of a design variable of business activities, expanding the label from two-sided markets to two-sided platforms (Hagiu and Wright, 2015). Equally, the platform provider's kind of relationships may vary across different pairs of sides (Evans, 2003). In some cases, the platform enables a direct transaction between the two groups of customers, pairing up players from either side (Parker et al., 2016).

Initially, the economic literature explored mainly physical services like credit cards, but over the years, management scholars started paying attention to the concept, often focusing on digital services (e.g., Amit and Zott, 2015, Muzellec et al., 2015) This research builds on these past contributions, with a narrower focus on the value creation dynamics of digital two-sided platforms.

Two-sided platforms differ greatly, depending on the kind of players involved (businesses or individuals), the channel (web or mobile), the price structure (fixed, set by the players on one or more sides), the transaction content (products or services), the kind of transaction (digital or physical) (Täuscher and Laudien, 2018), etc. In particular, the type of players involved has emerged as a clear defining variable in many studies. In recent years, our understanding of platforms has progressed by looking at individuals interacting with peers (e.g., Aryan et al., 2020; Presenza et al., 2020), or the relationship between business partners (e.g., Tian et al., 2021) or by focusing on both individuals and businesses (e.g., Schimdt et al., 2020; Park et al., 2020).

Regardless of the type of players involved, some concepts seem to intrinsically characterize most two-sided platforms. The match-making concept for example has often been considered the enabler of the entire system (Parker et al., 2016). A two-sided platform can exist when it

serves to reduce any sort of friction in the market, facilitating the meeting process of two different players searching for each other (Parker et al., 2016), thus reducing the transaction costs involved for the two sides to meet (Williamson, 1981). Over time, two-sided platforms tend to evolve into multi-sided platforms, scaling and exploiting several value-capturing opportunities (Schmidt et al., 2020; Trabucchi and Buganza, 2021; Presenza et al., 2020). Though this study focuses on two-sided platforms, the existence of this basic value proposition (i.e., matchmaking) that enables the overall system's existence presents a number of specific challenges from the managerial perspective. The so-called 'chicken and egg paradox' will come into play, as the system is worthless for both the sides, if one of the sides is not on board (Caillaud and Jullien, 2003), which is one of those challenges. To overcome this, different launch strategies are required for managing the relationship between the two sides in different ways and possibly bringing them on board at different moments (Stummer et al., 2018). Designing independent value propositions for each side may be a necessary sequential tactic, as the match-making value proposition may not be enough to attract and retain sides who may have specific motivations to join the platform (Muzellec et al., 2015).

2.2 Drivers of value creation

We refer to value creation as the mechanism by which a firm's products or services acquire worth that is relevant and that can be later captured (Chesborough, 2007). It has become one of the main elements of the business model of a firm (Rayna and Striukova, 2016). The concept has had a long theoretical evolution in the managerial literature over the last three decades.

At first, the resources, defined as tangible and intangible assets, were identified as the major competitive advantage source (Barney, 1991). This conception is called Resource-Based View (RBV), still the firm represents the foundation of several other theories. For example, the Network Collaboration Theory extends the parameter of resources to networks outside the

company and stresses the need for firms to focus on the creation of relationships (Lavie, 2006). This open view of the firms introduces the concept of network and the need for new dynamic capabilities to manage them (Helfat and Peteraf, 2003).

This evolution started to challenge the locus of value creation. There are scenarios in which parts of the value creation process for the entire system come from the customers or even partners, as the main resource providers were identified (Shah and Tripsas, 2007). The Resource Orchestration Framework emerges to show how the focal firm may gain a competitive advantage and create value by orchestrating and connecting its resources (Sirmon et al., 2007). Finally, the opportunities provided by digital technologies and the overall digitization process of businesses demand a shift from a firm-based perspective to a system view of the value creation process (Amit and Han, 2017) by considering the entire ecosystem as the locus of value creation (Adner and Kapoor, 2010). Indeed, the firm business model becomes the center of the value proposition, considering the value propositions for all the participants in the system (Amit and Zott, 2001, 2015).

In sum, the literature on the value creation process shows an evolution from RBV of the firm to players involved in a wider system of relationships. A firm behaves as the focal player.

For digital businesses in particular, Amit and Zott (2001) point out the critical roles of 'novelty', 'complementarity', 'lock-in,' and 'efficiency' as the four main dimensions that can enhance one another to create greater value for the parties.

These four drivers act as design themes that can be described through the related 'content', 'structure,' and 'governance' of the activities (Amit and Zott, 2015). In particular, 'novelty' refers to the adoption of new activities or new ways to link activities; 'lock-in' refers to the elements that attract and keep the players involved; 'complementarities' refer to the bundling of activities within the business model; and 'efficiency' focuses on the cost-reducing aspect (Amit and Zott, 2011).

2.3 Summary and research question

The theoretical frameworks discussed in the previous sub-sections suggest different dimensions in the study of the value creation dynamics. Recent literature shows how these theories have been updated as per the latest macro-change in the business environment – i.e., the impact of the digitization process. In the digital context, two-sided platforms have specific relationships in place between the parties involved, making the presence of the different sides indispensable for the existence of the system itself (cross-side network externalities). These dynamics challenge the existing views in terms of value drivers, since the customers involved in the system are, by definition, two with complementary demands (e.g., buyers and sellers). Building on the relevant but outdated model of Amit and Zott (2001), this research aims to further understand how digital two-sided platforms create and orchestrate value for the two sides.

3. Methodology

To achieve its aim, this study adopts a qualitative research method. The inductive case study approach is considered appropriate, as it aims to update previous theories, considering the changes in the overall resource configuration for the object of our study (Eisenhardt, 1989). Our research design is based on a multiple case-study with multiple investigators, allowing for a replication logic (Yin, 2013).

In order to answer the research question, the study needed to be rooted in an empirical setting in consonance with the type of businesses under observation. The increasing diffusion of two-sided platforms has often been linked with the diffusion of digital technologies (Parker et al., 2016), particularly with mobile apps diffusion (Trabucchi and Buganza, 2021).

The conditions to be considered for the inclusion in the sample are as follows: i) the existence of two groups of customers linked by cross-side network externalities, ii) the existence of a

platform provider that enables the link between the two sides, and iii) the existence of a service or product transaction directly enabled by the platform between the two sides, making it a Transactional Two-Sided Platform (Evans, 2003; Rochet and Tirole, 2006).

Using a theoretical replication strategy (Yin, 2013), we relied on purposeful sampling to select informant-rich cases, purposely selecting cases (Patton, 2002) that rely on the different kinds of players i.e., consumers or businesses, (Täuscher and Laudien, 2018). Indeed, we expect different drivers emerging on the type of players involved on the sides, coherently with the ecosystem view of the value creation process (Amit and Han, 2017). The companies selected are leading firms in their industries, all of them working at an international level. The unit of analysis of our research is the firm's business model, focusing in particular on what the platform provider does to create value for the different sides.

Table 1 shows the four companies included in the sample and the collected data. The interview protocol was based on three main parts: an overview of the company and its business model, a review of the value creation activities, and an analysis of the two sides' particularities. Each interview lasted between 45 and 100 minutes, equivalent to 168 double space pages of transcripts. In three cases out of four, we managed to have multiple respondents (see Table 1) to decrease the respondent bias. The secondary data used consisted of live speeches by the country managers or founders, newspaper articles, white papers and company documents or reports which allowed us to triangulate the data, increasing the robustness of our analysis and reducing the limits of the single sources (Eisenhardt, 1989; Yin, 2013).

	Alpha	Beta	Gamma	Delta
Brief description	People can take pictures to act as influencers for brands	People can give and/or receive rides through carpooling	End-users can order from several nearby restaurants and receive a home delivery	Companies can ask end-users to perceive simple tasks around the city (e.g., mystery clients)
Demand-side	Brands	Riders	End-users	Companies
Supply-side	End-users	Drivers	Restaurants	End-users
Type of Platform	B2C	C2C	C2B	B2C
Country	Italy	France	UK	Italy
Founding year	2015	2006	2013	2011
Number of interviews	5	2	4	2
	Founder, Community manager, Account manager.	Founder and Country manager.	Country manager and Local operations manager	Founder (2)
Public Speeches	2		2	1
Informal meetings	2		1	2
Other Secondary Sources	53 articles + 1 White Paper	22 articles + 3 White Papers	31 articles	19 articles

Table 1 – The sample

We adopted an inductive and iterative process to analyze the rich body of data collected (Corbin and Staruss, 2008), thus building and refining theory from the case study data (Eisenhardt, 1989). In particular, the gathered documents and transcribed interviews have been analyzed through three main phases: reading, coding, and interpreting (Saldaña, 2015), using Nvivo. As recommended by Corbin and Strauss (2008), we used an open coding process (identifying key sentences from the documents and sorting them into first-order categories), which was then combined with an axial coding process into higher-level categories, thus identifying the relationships between them and the analyzed literature (Figure 1). We discussed the data structure among all researchers involved to ensure data analysis reliability.

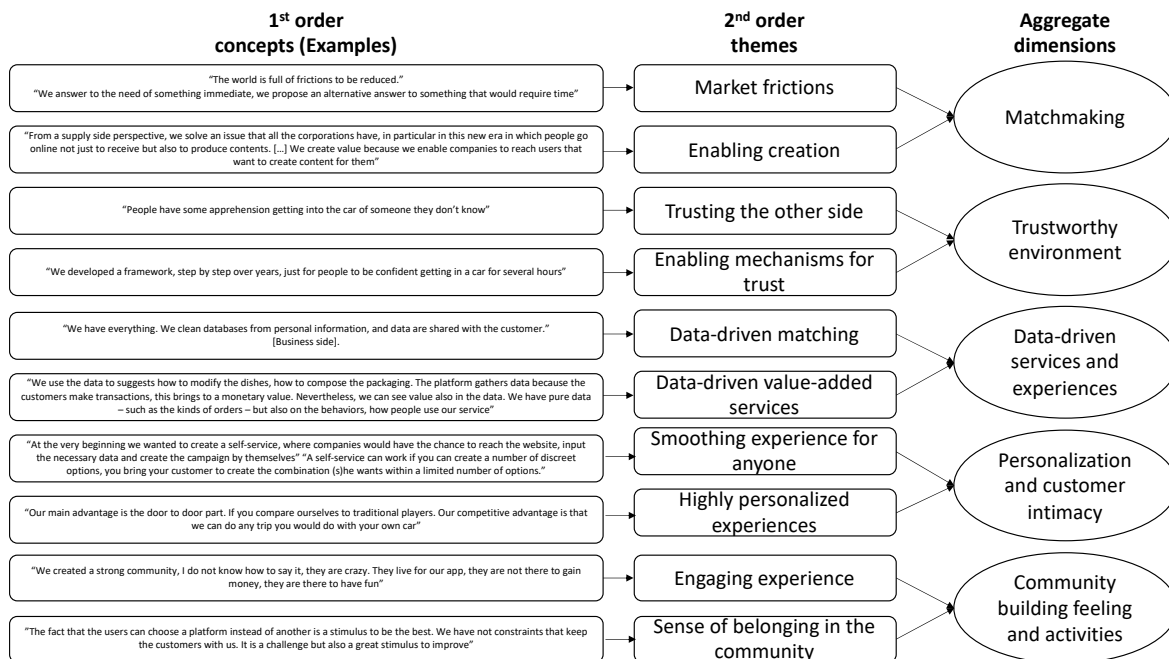


Figure 1 – The coding tree

4. Results

4.1 Matchmaking: the basic mechanisms

All the cases share a common attribute: two-sided platforms aim to match the demands and offers represented by the two sides. This may seem obvious or even tautological, but primarily, these companies create value by matching the two sides.

Two-sided platforms can exist when the platform provider identifies a friction in the market: as the *Delta* founder pointed out, "*The world is full of frictions to be reduced*". A proposition built around the chance of reducing these searching costs is the basic value proposition and therefore, the value creation driver for all the considered businesses.

According to Alpha, as per the words of the co-founder: "*From a supply-side perspective we solve an issue that all the corporations have, specifically in this new era, in which people go online not just to receive but also to produce contents. [...] We create value because we enable companies to reach users that want to create content for them.*" It demonstrates how the

demand side – the companies – are seeing value in Alpha, since it has given them access to a pool of end-users who are ready to act according to their needs, which, in this case, is taking the right picture at the right moment: “*We create value letting a number of things happen to have a community of users ready to answer, that’s our job.*” In other words, the job of these platforms is to make the transaction feasible and to enable users to create content.

Similar propositions have also been pointed out by C2C platforms. Indeed, our respondents highlighted the role of liquidity as the mechanism through which demand and supply constantly discover themselves.

4.2 The need of a trustworthy environment

“*People have some apprehension getting into the car of someone they don’t know*” (Founder of *Beta*). This is how one of the founders described one of the greatest issues they faced. Two-sided platforms act as intermediaries and link different sides who may be strangers to each other. Who should the customers trust? Two-sided platforms act as intermediaries and link different sides to create a new problem: who should the customers trust in?

Trust towards the platform is an issue *per se*, especially in the early phases, when both groups of customers need to be convinced to get on board, especially without the power and influence of a brand and without having a consolidated business model. Nevertheless, issues regarding trust go far beyond that. The platform links two sides, which means that having trust in the platform may not be enough. Who is it going to be on the other side? Would I let a stranger into my house? And so on.

Such questions appeared in the different development processes of the platforms we studied. The theme of trust emerges quite vividly from the data. One success factor common to all the platforms was their ability to create a trustworthy environment through specific mechanisms. *Beta* started by adopting safeguard measures, such as asking for IDs or other documents to identify the supply side customers and – for example – to show the riders’ photos to the

travelers: *“Everybody prefers reliable people. We built trust side by side. First, we built trust for the drivers through the rating system. Then we built trust or reliability of the engagement for the passengers through the payment system. So, it was two steps.”*

Hence, a trustworthy environment goes beyond the players. It is the service (platform) that needs to be trusted. The founder of Alpha continues: *“We implemented an entire system for those who try to cheat the system, such as posting pictures from the web. [...] We act as guarantor for everything that happens within the community towards the brands. [...] It is easier to get the trust from the brands’ side because they can see what we’ve done with the other companies we worked with, but still we need to corroborate that through an entire system we built to ensure quality in the entire system”*. Similarly, the managers from Gamma and Delta said, *“The choice of the second side [the restaurants] offers the greatest value at the beginning. When the end-user opens the app, it is what they see, they influence the perceived quality. After they use the service the relationship starts being more balanced, because the end-user realizes that the restaurants are actually all good and start trusting the platform”* (Gamma) and *“We created a system based on the Experience points to give the missions to different end-users; in this way, we can manage the trust issues towards the companies' side.”*

4.3 Data-driven services and experiences

All digital two-sided platforms aggregate and generate a huge amount of data. In some cases, the gathered data may enhance the match-making process, creating data-driven matching. For example, the founder of Alpha said, *“We have everything. We clean databases from personal information, and data are shared with the customer [Business side]. Nevertheless, we have them, and we can mix the data the users provide us through the questionnaires with all the other data we have from those users. In this way we can better propose the campaigns to the users.”* Moreover, data can be used to generate value-added services: at Gamma, they said, *“We use data to suggest how to modify the dishes, how to compose the packaging. The platform*

gathers data because the customers make transactions; this brings a monetary value. Nevertheless, we can see value also in the data. We have pure data – such as the kind of orders – but also on the behaviors, how people use our service.” The studied cases displayed a similar pattern, where the exploitation of data creates additional value, notably by enhancing the overall experience on the platform reactivity to continuously adjusting the value creation and improving the matchmaking mechanism: *“The greatest part of the value creation from data is for the restaurants; with all those data, we can become consultants. We can work on information such as the seasonality of the dishes and their relationships with revenues. We can also work on several KPIs in terms of time to prepare the dishes, average waiting time and so on. We can even understand the areas of the city where the restaurant owners may think of opening a new one because we know that there is a high demand, but a low supply.”*

4.4 Personalization and customer intimacy

Another aspect that emerged throughout the interviews is the opportunity to match the two sides in a "unique" way to smoothen the experience and to get something truly personalized to grow.

The founder of Delta explains how they tried to avoid a direct contact with the business side: *“At the very beginning we wanted to create a self-service, where companies would have the chance to reach the website, input the necessary data and create the campaign by themselves,”* but this vision never reached the market since they realized, *“A self-service can work if you can create a number of discreet options; you bring your customer to create the combination: (s)he wants within a limited number of options. [...] Our current system is totally managed; the customer tells us what (s)he needs, and we create the campaign.”* In this case, the personalization efforts are based on a human interaction between the platform provider and the demand side, while in other cases, the locus of personalization lies in the interaction between the two sides. For example, the founder of Beta told us, *“Our main advantage is the door-to-*

door part. If you compare us to traditional players, our competitive advantage is that we can do any trip you would do with your own car.”

Similarly, other cases allowed the emergence of the requirement of letting the customers feel valuable and special, by not only offering something that was tailored to their needs, but also exhibiting a certain degree of customer intimacy. The *Alpha* founder said, “*We invested a lot on the customer car. I am sure that if you want to engage the users, you need to pay them attention. We kept the Facebook page to test the service as a customer care center.*”

4.5 Community building feeling and activities

A strong sense of belonging, at least on one of the sides, constituted the last emerging driver for value creation, through the usage of engagement mechanisms. For example, “*We created a strong community, I do not know how to say it, they are crazy. They live for our app, they are not there to gain money, they are there to have fun,*” the founder of *Alpha* pointed out the strong development process they went through in particular: “*The app evolved; it was only an activities aggregator based on a gamification system. Now it is a social network, they talk, they know each other. Next week we are going to propose a new version with an embedded chat.*”

The sense of community is so strong that it can be even used to assure the previously mentioned trust mechanisms: “*The users tend to report bad behaviors in the system, such as posting pictures taken from the web. We proposed to pay them for this, but they stated that they want to do it for a sense of justice. In this way the community feeling is even greater.*”

This demonstrates the way the sense of belonging exceeds the traditional views on lock-in and seems more embedded in the values of the proposition itself, developing by repeated interactions and transactions over time. Accordingly, it aligns with the acquisition of a critical mass of transactions and enhances the need/opportunity for new control mechanisms/tools to emotionally lock-in both sides.

5. Discussion

Our findings confirm that digital two-sided platforms have a common method of creating value, directly relating to what defines them. According to Evans and Schmalensee (2016, p. 36), *“The opportunity for a multisided platform ordinarily arises when frictions keep market participants from dealing with each other easily and directly”*. All two-sided platforms create value by first offering a way for one side to search, find and engage with the other side and *vice versa*, through a double value proposition (Muzellec et al., 2015). Yet, this core match-making value proposition is articulated through two specific value propositions (one for each side). Hence, the first key element of the value creation process of a digital two-sided platform may be represented as the two DNA strands that link the two sides to create an intertwined chain that defines the essence of the platform (see **Figure 2**). This core value creation mechanism basic element somehow echoes the concept of “Efficiency” highlighted by Amit and Zott (2001). Still, the matching between the two sides needs some further specification. Indeed, “efficiency” refers to the fact that *“the greater the transaction efficiency gains that are enabled by a particular e-business, the lower the costs and hence the more valuable it will be”* (Amit and Zott, 2001, p. 22). In a two-sided perspective, efficiency is related to market efficiency in getting together two different sets of players that are searching for each other, acting a friction reducer. In other words, efficiency is not a characteristic of the internal transformation process, but an ability to match and manage external players.

The matchmaking mechanism through a double value proposition constitutes the essential driver of value creation. Hence, the other four drivers (Trustworthy environment, Data-driven extensions, personalized experience and Community Building) complement and enhance this initial value creation mechanism, but cannot exist without it. The match-making process of the two-value propositions– or the two strands of a DNA– creates one bigger filament that links the two sides, spawning the two-sided platform value.

5.1 Perspectives of the drivers and the (different) players

The intertwining of drivers of value creation constitutes the DNA of value creation for each studied case. Yet, each company had a different sequence of this DNA reflecting its specific process and identity.

The first element that emerges from the analysis is the role of trust in creating value in the system. Amit and Zott (2001) also highlighted the role of trust as a relevant construct for building lock-in mechanisms. More recently, other studies have also outlined the key role of trust in two-sided platforms (Ert et al., 2016). Our own investigation of two-sided platforms further demonstrated the criticality of trust as a fundamental value creation driver. Working with Professor Sundararajan, a leading two-sided digital platform such as BlablaCar has even created its own framework to explain how trust is the key driver of the value that the platform provides (Mazzella et al., 2016). Our analysis confirms the role of trust in enabling the transaction between the two parties involved in the system. Our study further reveals that the flow changes depending on the players involved. In C2C platforms, trust flows both ways and is a necessary condition to enable the transaction between the two sides. If a business is involved (B2C or C2B), it is slightly different. In this case, the trust from the consumer side is easier to obtain, while the platform provider needs to ensure that the work is completed by the end-users for the business side, pushing the concept of trust towards the concept of quality.

With regard to data, we already know that data gathered through digital services can play significant roles in the innovation process (Buganza et al., 2020). Our cases demonstrate that data gathered in digital Two-Sided Platforms further improve the ability of the platform to create value. For C2C platforms, data is used to facilitate the match-making process, increasing the likelihood of achieving a relevant match (Evans and Schmalansee, 2016). For B2C or C2B

platforms, the overall value created by the platform may be enhanced by developing value-added services – e.g., Value-Added Services (VAS) (as described by *Gamma*).

The considerations regarding use of data to increase the match-making efficiency and offer VAS to the business sides directly lead to the last two drivers.

Personalization improves the efficiency of the match-making mechanisms. As the number of players increases on both sides, users may have difficulty in finding their right match (Trabucchi et al., 2020). At some point, individual drivers based on personalized data may increase the system's overall value, which leads us to the last driver: community building. The community building driver emerges throughout the cases, thanks to additional Value-Added Services. Yet, it takes different forms depending on the type of participants: gamification elements when dealing with C-players (Deterding, 2012), while moving to the Business-kind of customers the community dimension is related to the opportunity to enjoy Value-Added Services based on data from the entire side. This is summarized in **Table 2**, showing the differences regarding the kinds of players involved in the sides.

	C-Sides	B-Sides
Trustworthy environment	Consumers search for trust on the other side - if it is a “C-side” as well - and towards the platform	Trust means assuring the quality of the supply side, especially when it is a C-side
Data-driven extensions	Mainly related to match-making efficiency	Mainly Value-Added Services
Personalized experience	Increasing match-making efficiency, perceived mainly on the demand side	
Community Building	Often related to gamification mechanisms	Mainly related to Value Added Services based on aggregated data

Table 2 – The relation between the kinds of customers and the drivers

5.2 A system perspective: the two-sided DNA

The four drivers of value creation of a digital two-sided platform are all inter-connected. They play a significant role in enhancing the basic value proposition of matching the two sides. Our

findings also demonstrate how the different drivers may not be considered as stand-alone elements. Indeed, results reveal that the drivers may be strictly correlated; for example, some of the quotes previously presented showed how the mechanisms to create a trustworthy environment (such as creating ratings) brings us to new data that enhance the second drivers, while others may be related to the community feeling and so on. It seems that their relevance and efficacy improve when working with each other. For example, trust allows for greater community feeling, which helps produce more data, leading to better personalization. Yet, the scenarios are not the same for all companies. Sometimes data seems to be the key element that can help build trust, leading to more community feeling and personalization. Hence, our study shows that if the DNA model is similar, the sequencing of the DNA may differ depending on cases.

The four drivers constitute a DNA base attached to the backbone, the DNA strands that link the two sides. The drivers act as the complementors that link the two strands of the DNA that link the two sides, building a single strand upon the others' work to create a meaningful connection between the demand and supply sides (**Figure 2**). The sequences are in different orders depending on the platform to make up the digital code of this company.

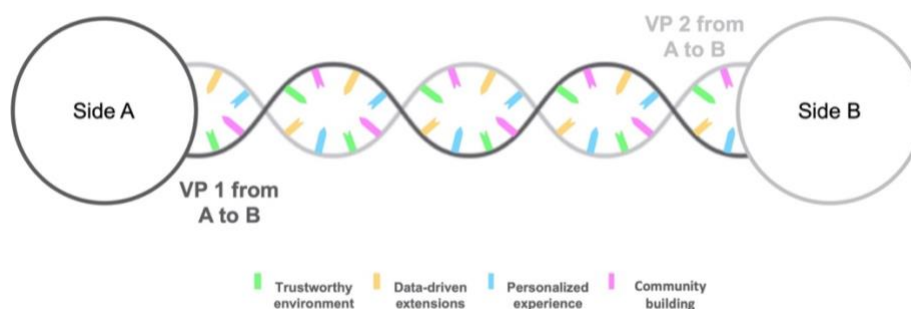


Figure 2– Value drivers as the DNA of a two-sided platform

While Amit and Zott pointed out how the four drivers may act as design themes (Amit and Zott, 2015), our outlook - considering digital two-sided platforms - is slightly different. The four elements are the enhancers of the basic connection between the two sides and let the system create and exploit value at the system level simultaneously.

As in DNA, the two strands are joined in a chain by covalent bonds through pairs of the four drivers, creating a double-stranded chain.

Two-sided platforms represent the fulfillment of the digitization process that brought the need for scholars to move from the firms' resource view to a system view (Amit and Han, 2017). The locus of value creation is moving outside the company's boundaries (Adner and Kapoor, 2000) by involving the two sides. The two sides have specific roles in the value creation process, even if they are not part of the focal firm (Priem et al., 2013). At the same time, the overall process of value creation relies on how the platform provider can add meaning to the connection between itself and its consumers.

The original model that inspired this research is worth mention. Amit and Zott (2001) point out four key elements that drive value in digital businesses, which are still relevant in the setting we are studying, but the idiosyncrasies of two-sided systems change the drivers' intrinsic characteristics, allowing peculiar aspects to emerge.

This research extends our knowledge on value creation in digital businesses in various ways. First, it updates the concept of efficiency for digital business (Amit and Zott, 2001) and in the specific context of two-sided digital platforms, narrows it to a match-making ability, which is enhanced by four complementary drivers. This research confirms the role of trust as a key driver of value creation in two-sided platforms, something already highlighted by previous studies (e.g., Amit and Zott, 2011; Ert et al., 2016). Yet, our study considers trust as a multi-perspective concept. Trust needs to be nurtured by the platforms, so that participants trust not only the platform itself, but also the participants on the other side. Platform providers need to

highlight concrete actions and mechanisms that go far beyond the traditional brand-building mechanism of trust. The other element of value creation drivers was considered in the literature. For example, data-driven extensions were recently considered a business model extension or a service delighter (Buganza et al., 2020). Similarly, personalization and community creation have also been identified as key features of digital platforms (e.g., Shah and Tripsas, 2007; Cennamo, 2019).

Still, this research's main contribution is to demonstrate how these various elements are not stand-alone design themes around a business model, but are all part of a complex system (the DNA metaphor) that strengthens the match-making mechanism of digital two-sided platforms.

6. Conclusion

This research contributes to previous literature in two different ways. It contributes to the two-sided platform literature, providing a more comprehensive view of the relevant dynamics of value creation. In particular, it outlines how four drivers can be identified to enhance the value creation process of digital two-sided platforms, showing how they build one on the others. It also delineates the critical role of players involved (customers *vs* businesses), showing relative differences in the drivers' role for the types of players on the sides.

From a managerial perspective, this research has two main takeaways for managers and entrepreneurs. First, business plans for digital two-sided platforms must include at least two very clear and compelling value propositions, one for each side. Then, it suggests the consideration of the four drivers in the definition of the mechanisms and dynamics that should transmit value to the sides, to create a system with a strong, sustainable, and meaningful double-value proposition linking the two sides.

This research is not free of limitations, and future research should consider a larger sample and/or a quantitative approach to test the robustness of the findings. Further, more research is

needed to investigate further the complementary role of the different drivers. It may be interesting to evaluate the evolution of the relative importance of the different drivers over time. As two-sided platforms tend to evolve into multi-sided platforms (Trabucchi and Buganza, 2021), it would be interesting to expand this study to explore whether and how the drivers' relative relevance may change when adding a third or fourth side and their respective role in designing a new value proposition.

8. References

- Adner R and Kapoor R (2010) Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal* 31(3):306-333.
- Amit R and Han X (2017) Value creation through novel resource configurations in a digitally enabled world. *Strategic Entrepreneurship Journal*.
- Amit R and Zott C (2001) Value creation in e-business. *Strategic Management Journal* 22(6-7):493-520.
- Amit R and Zott C (2015) Crafting business architecture: The antecedents of business model design. *Strategic Entrepreneurship Journal* 9(4):331-350.
- Aryan V Bertling J and Liedtke C (2020) Topology, typology, and dynamics of commons-based peer production: On platforms, actors, and innovation in the maker movement. *Creativity and Innovation Management*, doi:10.1111/claim.12392
- Barney J (1991) Firm resources and sustained competitive advantage. *Journal of Management* 17(1):99-120.
- Buganza T Trabucchi D and Pellizzoni E (2020) Limitless personalisation: the role of Big Data in unveiling service opportunities. *Technology Analysis & Strategic Management*,31(1):58-70.
- Caillaud B and Jullien B (2003) Chicken & egg: Competition among intermediation service providers. *RAND Journal of Economics*:309-328.
- Cennamo C (2019). Competing in digital markets: A platform-based perspective. *Academy of Management Perspectives*.
- Chesbrough H (2007) Business model innovation: It's not just about technology anymore. *Strategy & Leadership*,
- Corbin J and Strauss A (2008) Basics of qualitative research.
- Correa A De Massis A Frattini F Petruzzelli A and Natalicchio A (2020). Implementing a digital strategy: Learning from the experience of three digital transformation projects. *California Management Review*, 62(4), 37-56.
- Deterding S (2012) Gamification: designing for motivation. *Interactions* 19(4):14-17.
- Ert E Fleischer A and Magen N (2016) Trust and reputation in the sharing economy: The role of personal photos in Airbnb. *Tourism Management* 55:62-73.
- Evans DS (2003) The antitrust economics of multi-sided platform markets. *Yale Journal on Regulation* 20(2):325-381.

- Evans, DS and Schmalensee R (2016). Matchmakers: The new economics of multisided platforms. Harvard Business Review Press.
- Gawer A and Cusumano M (2014). Industry platforms and ecosystem innovation. *Journal of Product Innovation Management*, 31(3), 417-433.
- Hagiu A and Wright J (2015) Multi-sided platforms. *International Journal of Industrial Organization* 43:162-174.
- Helfat CE and Peteraf MA (2003) The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal* 24(10):997-1010.
- Katz ML and Shapiro C (1985) Network externalities, competition, and compatibility. *The American Economic Review* 75(3):424-440.
- Lavie D (2006) The competitive advantage of interconnected firms: An extension of the resource-based view. *Academy of Management Review* 31(3):638-658.
- Mazzella F Sundararajan A D'Espous VB and Möhlmann M (2016) How digital trust powers the sharing economy. *IESE Business Review*:24-31.
- Muzellec L Ronteau S and Lambkin M (2015) Two-sided Internet platforms: A business model lifecycle perspective. *Industrial Marketing Management* 45:139-150.
- Nambisan S Lyytinen K Majchrzak A and Song M (2017) Digital innovation management: Reinventing innovation management research in a digital world. *Mis Quarterly*, 41(1)
- Park H Kim S Jeong Y and Minshall T (2020). Customer entrepreneurship on digital platforms: Challenges and solutions for platform business models. *Creativity and Innovation Management*, doi:10.1111/claim.12404
- Parker GG and Van Alstyne MW (2005) Two-sided network effects: A theory of information product design. *Management Science* 51(10):1494-1504.
- Patton M (2002). Two decades of developments in qualitative inquiry: A personal, experiential perspective. *Qualitative Social Work*, 1(3), 261-283.
- Prezenza A Panniello U and Messeni Petruzzelli A (2020) Tourism multi-sided platforms and the social innovation trajectory: The case of Airbnb. *Creativity and Innovation Management*. <https://doi.org/10.1111/caim.12394>
- Rayna T and Striukova L (2016). 360° business model innovation. *Research-Technology Management*, 59(3), 21-28.
- Rochet J and Tirole J (2006) Two-sided markets: A progress report. *RAND Journal of Economics* 37(3):645-667.
- Saldaña J (2015) *The Coding Manual for Qualitative Researchers*.
- Sanasi S Ghezzi A Cavallo A and Rangone A (2020) Making sense of the sharing economy: a business model innovation perspective. *Technology Analysis & Strategic Management*.32(8):895-909.
- Schmidt, AL Petzold N Lahme-Hütig N and Tiemann F. (2020). Growing with others: A longitudinal study of an evolving multi-sided disruptive platform. *Creativity and Innovation Management*, doi:10.1111/claim.12401
- Shah SK and Tripsas M (2007) The accidental entrepreneur: The emergent and collective process of user entrepreneurship. *Strategic Entrepreneurship Journal* 1(1-2):123-140.
- Sirmon DG, Hitt MA and Ireland RD (2007) Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management Review* 32(1):273-292.
- Täuscher K and Laudien SM (2018) Understanding platform business models: A mixed-methods study of marketplaces. *European Management Journal* 36(3).
- Tian J Vanderstraeten J Matthyssens P and Shen L (2021) Developing and leveraging platforms in a traditional industry: An orchestration and co-creation perspective. *Industrial Marketing Management*, 92, 14-33.

- Trabucchi D and Buganza T (2020). Fostering digital platform innovation: From two to multi-sided platforms. *Creativity and Innovation Management*.29(2):345-358
- Trabucchi, D., & Buganza, T. (2021). Landlords with no lands: a systematic literature review on hybrid multi-sided platforms and platform thinking. *European Journal of Innovation Management*. <https://doi.org/10.1108/EJIM-11-2020-0467>
- Trabucchi D Buganza T and Verganti R (2020) Quantity or quality? Value creation in two-sided platforms. *Technology Analysis & Strategic Management*. <https://doi.org/10.1080/09537325.2020.1804057>
- Yin RK (2013) *Case Study Research: Design and Methods*: Sage publications.