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Platform economy in the retail sector

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Abstract
Traditional bricks and mortar or omnichannel retailers compete with online marketplaces, but digital connectivity is essential in all cases. The internet has been the biggest and most significant change in retailing in recent history, impacting the way businesses interact with and serve customers. While the average business traditionally operated a single, physical sales channel, many now support multiple digital and physical sales and marketing channels, including, for example, in-store and e-commerce websites and marketplaces. A blended digital retail presence that helps to offer consistently across all channels would be called an "omnichannel". The focus of the research is not on physical spaces, but on how e-commerce platforms are evolving in the digital world as the marketplace business model has transformed the way retailers operate. They explore how and why the role of the internet is a key enabler of digital connectivity. Today, sharing information and moving digital goods from one corner of the world to another is virtually free. The number of catalogues and online newspapers is almost unlimited. For thousands of years, our ancestors had great difficulty finding trading partners; today, the problem is how to choose from millions of partners the one that best suits our needs. Today, the problem is one of too wide, not too narrow, a choice that fundamentally determines our purchasing decisions and how we allocate our time and attention among this multitude of possible activities, business acts and relationships. The economy of attention fundamentally changes our behaviour and interactions, with convenience and speed coming to the fore in purchasing preferences. The most important transaction cost is therefore no longer delivery, but assessing what we have to offer and how to choose who we want to do business with, and sending the right signals and information to convince potential business partners of our trustworthiness. The unlimited availability of information and the limited time available are largely the reasons why platforms have become central to the economic process. This research explores the causes and effects that help us understand platform-based economic models and business strategies. In this context, the research focuses on asymmetric pricing and network effects and their impact on managerial decisions and calculation of RFM model to illustrate the drivers of platform growing..

Keywords: platform, trade, marketplaces, digitalisation, network effects, omnichannel

Introduction

The analysis of the shape of the omnichannel business model includes the shift from independent retail stores to the concept of chains; the emergence of extended chain concepts (so-called multi-format retailing, including suburban stores and convenience stores), e-commerce and the emergence of digital marketplaces; and finally, the recent harmonisation of

pure players and physical retailers. Consumer behaviour has changed dramatically in recent years and today's reality is unique: shoppers have become channel-agnostic and want a frictionless shopping experience where quality, price and service are consistent, whether they shop online, on mobile or in-store. This has given way to the era of 'all-play platforms' (Ismail, Salim et al 2014). The concept of a retail platform has been defined differently by retailers. After all, there is no 'one size fits all' approach to innovation, nor is there a single form of retail platform. However, there were some central themes that illustrated the direction of analysis in this new era. The platform aims to keep the consumer within the ecosystem, targeting multiple offerings to maximise the customer's lifetime value. The future of the platform is likely to include an increasing number of products and services along consumer value chains, such as banking and utilities, as well as travel and education offerings, meaning an infinite number of offers that can be added to an end-to-end subscription model. One key question is whether retailers build their own "ecosystem" or partner with other retailers to create the platform. In the future, retail and wholesale parts of other industries will be combined, and there are examples of retailers looking for a combined effect. Bricks-and-mortar businesses are capitalising on the true value of the digital relationship with each customer in a way that offers reliable competitive value. But it is clearly useless for personalisation and direct marketing. The natural requirement is to inform targeted consumers about what retailers have done, knowing who the customers are in this channel?

Purely e-commerce businesses are opening up this non-paying, personalised, digital marketing channel as part of their business model; at the same time, their online operations give them a real-time picture of who their customers are and what they are actually doing when they shop online. This insight gives them the advantage of putting the customer at the centre of everything they do. The customer can control demand, determine choice and get a built-in, personalised shopping experience that responds on the fly to their preferences and every click and scroll; and this is only made possible through a one-to-one digital relationship with each customer. Brick-and-mortar businesses must strive to achieve the same level of insight and agility from their digital customer interactions to level the playing field if they are ever to achieve truly customer-centric and driven omnichannel growth.

The customer is not only one of the key drivers of the new era, but also the key beneficiary, the balance of power is now very much on the customer's side, and the platform era will only reinforce this Schwab, Klaus (2017). If retailers successfully transition to platform play, we will see the cultivation of relationships that go beyond the transaction and instead create emotional connections that deliver solutions and experiences that have deeper meaning for customers.

We can expect alliances and data sharing across multiple industries and platforms, all supporting the integration of common sets of supply chain, sales, media, customer and financial data across the retail system. The age of platforms will also open up space for non-platform retailers, such as independent retailers, whose complete displacement is doubtful as they can address niche areas (Pearson, 2020). Traditional retailers will seek to expand their online offerings, and online retailers will expand their online offerings This is finally good news for consumers, who will indeed have more choice when it comes to shopping. The platform era should increase competition, this new environment will be more vulnerable to disruption and new entrants will have no problem gaining access because of the low barriers to entry enabled by the technology (Armstrong, Mark 2006). Conversely, the disruptive potential of such technologies may also require greater regulatory scrutiny if platforms become so dominant that they restrict competition. Both technology and consumer behaviour are driving forces behind

much of this change, and it is therefore applicable to argue that industry players need to monitor carefully the evolution of these drivers.

Asymmetric pricing policies of platform economies

The economics of two-sided markets provides a theory of how users influence their own and each other's decisions, what factors enable actors on different platforms to interact and cooperate. All bilateral platforms face a chicken and egg dilemma. Marketplace developers, for example, have to live with the assumption that business models under development are only viable if they can attract both sellers and buyers. Payment systems such as American Express, PayPal and Visa are trying to attract consumers, but they also need merchants to accept their payment systems. To do this, both groups of customers are needed so that the platform can take advantage of the opportunities offered by the interests of these groups.

The economics of bilateral markets provides a theory that explains the behaviour of firms in these seemingly very different markets. These platforms have two user communities and the challenge is to develop a workable economic model that allows both parties to participate. The economic model is based on demand elasticities and externalities between different sides of the market. First, the reasons for asymmetric pricing policies need to be understood. For each market player, the elasticity of demand indicates how many consumers the platform loses if, for example, it raises the connection tariff. A high price elasticity suggests a cautious pricing policy, while a low-price elasticity encourages price increases, since in the latter case the rate of change in demand is below the level of price change, so that target maturity can be reached or exceeded despite a decrease in traffic. This is a theoretical concept, but it is supported by everyday business experience, as it explains where price increases cause a firm to lose customers and when operators switch to competitors. The price elasticity of demand also depends on the type of good and the extent of the price change. If the platform provider wants to make changes, it is advisable to consider the expected supply and the direction and extent of consumer reaction. In addition to price elasticity, it is important to consider income elasticity of demand (how the volume of sales changes in response to changes in customers' income) and cross-elasticity (how the change in the price of one product relates to changes in demand for another product, in the case of substitute products). In two-sided markets, users benefit from those on the other side of the market, i.e. there are externalities between the two groups. If those on one side benefit more than those on the other side, the platform may decide to set a higher price for the first group and a lower price for the second group to attract more of the latter to the platform. The platform therefore needs to know which side of the market is more interested in its service (the side whose demand is least elastic and therefore willing to accept the higher price without leaving) and which side creates more value for the other. Platforms often grow by operating at very low prices on one side of the market, which attracts consumers to one side of the market and thus indirectly generates higher revenues on the other side of the market. The pricing policies of marketplaces and media platforms often involve the use of a so-called freemium pricing model to entice customers or news consumers to join the platform for a fee. This pricing structure is perfectly in line with the externalities between the two sides of the market. The basic idea is very simple: the real cost of serving the consumer is not what the consumer pays. The presence of the consumer creates benefits on the other side of the market.

Google users receive a range of free services (search, email, maps, YouTube, etc.) The existence of users (and the information they get from searches, emails and other activities on the Google platform, information collected from other sites or data bought from data brokers) is attractive to advertisers, who can then target their products. This model is imitated by many

platforms in other sectors. For example, OpenTable, the online table booking company, brokers twelve million table bookings a month without customers paying for them, but restaurants do: a dollar for each guest. The card business is particularly interesting. When the consumer pays with an American Express card, American Express makes a profit on the commission charged to the taxpayer, say around 2-3%. This commission, also known as the "merchant commission", is deducted from the purchase price (the bank, if it is a member of the Visa or Mastercard network, also receives a commission, called the interchange commission, which is paid by the merchant's bank to the cardholder's bank.

The role of network effects in the platform economy

The key to understanding and classifying platforms is to characterise the different network effects they handle, and in the following we analyse the different forms of network effects. Since a network effect is an external effect, it is important to identify the economic actors that create it ('initiator') and the party affected ('recipient'). If the initiator and the recipient belong to the same group of economic agents, we speak of 'intra-group' network effects; if they belong to different groups, we speak of 'inter-group' network effects (Belleflamme & Peitz 2022). In both cases, it is crucial to identify whether network effects are positive or negative. Moving beyond the two dimensions (within-group and positive versus negative), we obtain several typical situations. In the case of within-group network effects, we focus partly on network effects within a particular group of users when they generate a self-reinforcing process, a phenomenon we call "attraction loops".

In many market contexts, consumers or other market actors derive utility not only, and sometimes not even primarily, from the product or service, but from interactions with other consumers or other market actors. Users form a network that connects them to each other, and as the network changes, so does the value that each user attributes to the interaction. That is, when a new user joins the network, it affects the 'welfare' of other users. This effect is called the network effect, because one user (e.g., consumption of a product) directly affects the welfare of other users. If the additional user and the other users are consumers of the same product or service, or if they play the same role in some interaction, they are considered to belong to a common network. They belong to a 'group'. Network effects between them are called intra-group effects, and if users belong to the same group, they are called intra-group or direct network effects.

For example, interests, social norms, languages, and communication tools generate positive intra-group (direct) network effects: the more people adopt them, the more useful they are for users, and all users "benefit" from the higher activity level of the group. In the case of an online game, for example, the more people join the platform, the more likely a player is to find an opponent with the right skill level, and the more diverse the choice of challengers, so that network effects are attractive to members.

There are also circumstances that lead to negative direct network effects. Typical examples of negative network effects are road congestion and traffic jams. The more drivers choosing a particular road at a given moment, the slower the traffic on that road at that moment and therefore the lower the benefit for each driver. The source of network effects is generally considered to be the size of the network, the larger the network capacity, the greater the value and the greater the benefit to users.

Whether the network effect is positive or negative may depend on the individuals in the group. Think of the followers of intensive fashion. These generate a positive network effect for individuals whose utility increases when they are in line with the choices of others. However,

the opposite is true for snobs, who appreciate that they have different tastes from the "masses": for them, it generates a negative network effect if someone chooses to imitate them.

In some cases, the level of participation also matters. For example, in the case of a social network or marketplace, it is not only the number of users that contributes to the network effect, but also the frequency and intensity with which users participate in the network. To analyse customer value, the so-called "Recency-Frequency-Monetary" (RFM) model is used, in which customers are ranked according to their frequency of return, frequency of purchase and amount spent (Pearson, 2020). One method may be to assign points to the analysis of customer value on a scale of 1 to 10, where 10 is the maximum value.

Table 1: RFM calculation

	"A"		"B"	
RFM components	Input	Value	Input	Value
Last purchase	4 months ago	6	2 months ago	8
Frequency	Every 2 months	6	Every 3 months	4
Value	20 thousand EUR	2	10 thousand EUR	1
Total		14		13

Own editing

For example, for a marketplace, the following calculation can be accomplished. The number of months since the customer's last purchase, the shorter the time elapsed, the more favourable the value, so we use the data of 10 minus elapsed months (weeks, etc.) (Table 1). Frequency, number of purchases in the last 12 months. Ratio expressing the monetary value of the highest order from a given customer (with a benchmark value of USD 10 000). Based on the aggregated point values, customer “A” scores higher.

Alternatively, categories can be defined to assign points to each attribute. For example, the "Recency" attribute could be broken down into three categories: purchases within the last 90 days, worth 3 points; purchases between 91 and 365 days, worth 2 points; and purchases over 365 days, worth 1 point. For frequency, the number of purchases within a year can be used. For the value of the purchase, we calculate a point based on 0.5 thousandths of the last year's expenditure. On this basis, the following calculation can be made (Table 2).

Table 2: RFM calculation by categorisation

Customer	Last purchase	"R" érték	Frequency	"F" value	Purchase value	"M" value	RFM value
A	4 months ago	**2**	every 2 months	**6**	20 thousand EUR	**10**	**120**

B	2 months ago	**3**	every 3 months	**4**	8 thousand EUR	**8**	**96**

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The RFM value calculated based on RxFxM determines the valuation of customer "A" at a higher level.

Once appropriate categories have been defined for each attribute, the segments can be broken down into sub-segments. Proponents of this method point out that it has the advantage of simplicity; no special statistical software is required, and the results are easy to understand. The data can also be used to increase the response rate of promotions.

Summary

In recent years, the platform economy business model has gained ground in the business models of retailers selling through traditional distribution channels. Thus, omnichannel models have seen the emergence of retailer-operated marketplaces alongside brick-and-mortar, in-store and e-commerce stores. In the latter cases, the company as platform provider does not wish to directly control the business conditions, but can influence the behaviour of the platform users, for example by providing information or quality control.

In the business world, there are also examples of a "classic" platform provider (e.g. Amazon) moving towards in-store sales and enriching its sales infrastructure by opening its own stores or making acquisitions.

A hybrid solution is a business model in which an entrepreneur develops and markets a vendor-less, AI-based business infrastructure. In these businesses, the infrastructure provider is therefore a quasi-platform provider and does not necessarily seek to influence the pricing strategies, quality policies or inventory management decisions of the sellers.

This paper examines business models in which users receive benefits that depend on the decisions of other users (i.e., users are exposed to network effects) and the company operating the "platform" makes decisions that partly determine the size of these benefits and who benefits from them.

These platforms permeate our daily lives and contribute to an increasing share of economic activity; they also raise important societal issues through their innovative activities and practices. Of particular interest are 'two-sided platforms', where a company provides services to heterogeneous users with different needs or interests (think for example of an intermediary operating an e-commerce platform where buyers and sellers interact). Intermediaries operating a bilateral platform determine which products to show to consumers and what product information to publish; they also manage the collection of information from consumers and often control or regulate the information published by sellers; they may also determine the terms on which the transaction is conducted, for example by setting the price that sellers can charge for the purchase or by fixing the non-price elements of the contract between buyer and seller (e.g. withdrawal terms, dispute resolution on the platform).

The way platforms work challenges many traditional approaches to how markets work. Firstly, the functioning of markets depends on the operator, which monitors and controls the interaction between users. The platform provides services and "taxes" operators by charging a price, a fee to at least some of its users, or by providing its service in combination with other services. In a market context, consumers or other market players often have an impact on other players in

the platform, for example consumers in another market. Users (as they are usually called) form a network that connects them to each other. As the network changes, so does the value that each user places on the interaction, i.e. when a new user joins the network, it affects the welfare of other users. This external effect is called the network effect. If the additional user and the other users are consumers of the same product or service, or if they play the same role in some interaction, they are considered to belong to a common 'group'. The network effects between them are then called intra-group effects. The rise of online commerce is unquestionable and competition between online platforms is becoming increasingly fierce. Not only traditional in-store, business-to-business retailers, but also a significant number of manufacturers have introduced or are planning to introduce online sales channels (Dunne - Lusch, 2008). Although the market for 'pure' online stores is dominated by a few large players, a growing number of players are emerging as platform providers with 'niche' strategies and specific customer needs. Competition between platforms can no longer be based solely on price advantage or lower transaction costs. The shortening of supply chains and the emergence of direct-to-consumer business models require new sources of competitive advantage to be identified and exploited. Barriers to information flow have virtually disappeared, distributors and retailers have a huge repository of data based on analysis of consumers' purchasing patterns, and consumers have real-time information on potential sellers, the route of the product they have ordered or the current prices of competing products. Shoppers can discuss and exchange views through a variety of social media channels. A business decision or transaction can not only influence the behaviour of economic actors and competitors at the same level of the supply chain, but can also have a direct impact on potential customers. An entrepreneur cannot develop a successful marketing or sales strategy if he does not understand the dynamics of customer behaviour or if he does not have sufficient information about his actual or potential customers. The emphasis here is on understanding, as in the online space it is increasingly difficult to directly control the behaviour of market actors at different levels of the supply chain or on different "sides" of the market or market. It is possible to influence, but to do so you need to understand the mindset of sellers, suppliers, buyers, the algorithm of market reactions. In the platform economy it is no longer enough to understand what happened in the past, it is not enough to answer why. The rapidly changing market, the need to adapt, has brought to the fore the need for agile business thinking, business planning and adaptability. Increasing amounts of data enable more accurate predictions, and the accuracy of planning enables algorithmic and automated business decisions (Croll - Yoskovitz, 2018). The ability to identify and understand network effects can help business actors optimise their decisions. Artificial intelligence can reveal patterns of behaviour and interdependencies that can be analysed to make decisions not only at a local or isolated level, but also with supply chain or even regional implications. This can be achieved by understanding network effects based on the functioning of platform economies, as analysed in this paper, and incorporating them into everyday business decisions (Chopra, -Meindl 2018).

References

1. Armstrong, Mark (2006) Competition in Two-Sided Markets, The RAND Journal of Economics, Vol. 37, No. 3 (Autumn,), pp. 668-670.
2. Belleflamme, Paul & Peitz, Martin (2022) The Economics of Platforms : Concepts and Strategy, Cambridge University Press, pp. 10-11.
3. Chopra, Sunil -Meindl, Peter (2018) Supply chain management. Pearson, Mason, OH, 45040, USA,. p. 72.
4. Croll, Alistair- Yoskovitz, Benjamin (2018).

5. Diamandis, Peter H. - Kotler, Steven: The relationship between corporate governance and corporate management and between corporate governance and corporate management: in Abundance (2014) The future is better than you think. N.Y., Free Press, 53.
6. Gilbert, David (2003) Retail marketing management. Prentice Hall, Harlow, Essex, England, p. 278.
7. Ismail, Salim et al (2014) Exponential Organisation, Singularity Iniversity, pp 19-19.
8. Tamás Kozák - Iván György Neszmélyi (2018) JURA, University of Pécs, Faculty of Law and Political Sciences, 24; 475.
9. Evans, Peter - Gawer, Annabelle (2016).
10. Fisman, Ray, Sullivan, Tim (2016) Everything we know about the platform we learned from medieval France. Harvard Business Review, 24 March 2016.
11. Pearson, W. Andrew (Pearson, W. Andrew) (2020), The A.I. retailer. Published and edited by Andrew Person. 149. o.
12. Paolo, Francisco (2018), Exponential transformation. 116. New York, Diversion Books. p. 25.
13. Reagan, James R. - Madhusudan Singh (2020): Springer, p. 8.
14. Rysman, M. (2019) The reflection problem in network effect estimation Journal of Econom ics and Management Strategy 28, 153-158.
15. Schwab, Klaus (2017) The Fourth Industrial Revolution, Portfolio Penguin, p. 14.
16. Sundararajan, Arun (2016), The Sharing Economy: The MIT Press, pp. 65-66.
17. György Tilesch - Hatamleh, Omar (2021).
18. Verhoef, P. C., Kannan, P. & Inman, J. J., (2015) From Multi-Channel Retailing to Omni-Channel Retailing Introduction to the Special Issue on Multi-Channel Retailing. Journal of Retailing, 91(2), pp. 174-181.