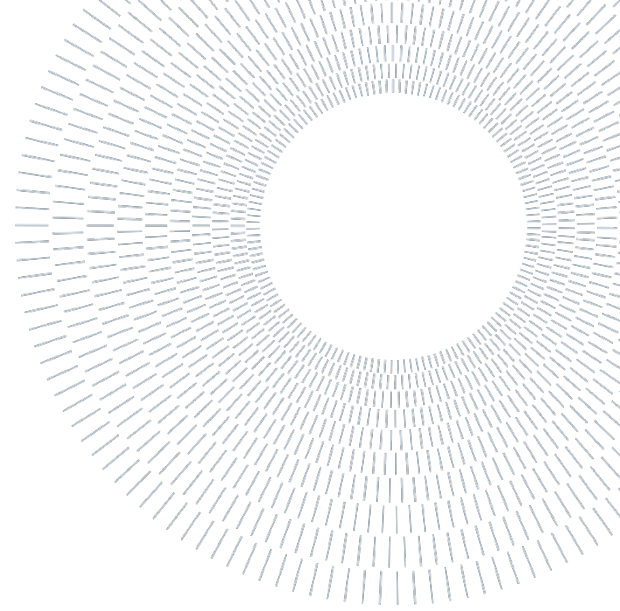




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EXECUTIVE SUMMARY OF THE THESIS

# Innovation in the eCommerce B2c value-chain: analysis of latest trends and innovative start-ups fundings

TESI MAGISTRALE IN MANAGEMENT ENGINEERING – INGEGNERIA GESTIONALE

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## 1. Introduction

The rapid technological advancements, in combination with events as the Covid-19 pandemic and the inflation crisis, have characterized recent years with unprecedented transformations in the global economic context. One of the most affected areas is the one of eCommerce, that is profoundly redefining the preparation and execution of commercial transactions in every sector, through the use of internet technologies.

Historically, two main configurations of eCommerce are identified, the Business-to-consumer model and the Business-to-Business model. In the first one, the commercial activity occurs between a business, also identified as a retailer or merchant, and the final customer. In the other case, two business entities exchange goods and services with an electronic medium [1].

In the context of the B2c model, the diffusion of electronic commerce enabled both retailers and customers to advantage from the digitalization of commercial activities [2]. In fact, buyers can access

a wider range of products and services, compare prices and additional information, independently from the location and the time of the access. These factors create a time convenience, increased knowledge and choice availability, that translate in an overall better experience for the customer, if compared to the traditional brick and mortar purchase process.

From the retailer perspective, eCommerce adoption can eliminate geographical boundaries related to physical store presence, reducing infrastructural costs, increasing the potential customer base, the number of orders and consequently the revenues. Furthermore, customers can be tracked in a punctual manner, obtaining useful insights for strategic decisions and customer behaviour understanding.

To effectively set and manage their eCommerce, retailers must obtain all the resources, competences and technical infrastructures required in the sector; but not only, to remain competitive in an ever-evolving environment, with more and more new players entering in it, retailers must pursue innovations all along the value-chain, both technological and organizational [3]. Retailers

and various external service providers are continuously searching for new opportunities to increase the effectiveness and efficiency of the above-mentioned advantages, investing financial and intellectual resources in the development of new solutions.

Research is necessary to be able to understand how retailers can pursue innovations, what are the main factors affecting it, and what innovative trends can enhance or disrupt the business models of these actors. A structured method is necessary to examine and understand all the different variables that influence the dynamics of the innovative B2c eCommerce landscape and understand possible future directions of the industry.

## 2. Objectives and research questions

This thesis aims to reach different purposes, in the first place, to address the topic of innovation in the eCommerce B2c industry, trying to identify what are the different variables that plays a role in the definition of innovation choices and strategies of retailers, and the identification of a gap in the literature. Also, the role of service providers and technology, and their impact on retailers' innovation was researched. Then, the research focused on the identification and understanding of the main innovative trends that are currently impacting on the eCommerce value-chain, what will be the emerging solutions that will shape the future developments of the industry, highlighting the differences between the sectors. Finally, the role of start-ups in providing innovative solutions to the industry was investigated, and the current global environment was analysed to understand the most attractive areas for investors and entrepreneurs.

The following questions are formulated to elaborate the study in a structured way:

1. What are the current factors and dimensions that influence innovation in the eCommerce B2c industry?
2. What are the main innovative solutions that characterize the industry and what impact they have on the value-chain?
3. In which geographical areas start-ups, that provides services and technologies to eCommerce B2c merchants, are more present?
4. What is the current situation in terms of investments in innovative start-ups?
5. What are the most addressed activities of the value-chain by start-ups and which specific solutions attract the most interest?

## 3. Methodology

In order to answer to the first two questions, a comprehensive review of the present literature was conducted. In fact, it is fundamental to explore, if and how, the academic research has identified the different topics related to the eCommerce B2c innovation, and which are the most common factors that affect the innovativeness of retailers.

To conduct the review in the most structured and objective way, an organized procedure to collect, select and analyse the different papers was followed. Firstly, the online library of the Politecnico di Milano, the Scopus library and Google Scholar were used to search the most relevant papers. A series of keywords related to the mentioned topics were used in order to limit the research scope, and only papers published after 2018 were selected to provide an overview of the most recent developments. After having read all the identified articles, the ones that were specific for a single innovative application were eliminated, in order to have the broadest possible view on the topic. After an iterative process of research and selection, a total 41 papers were selected for the study.

The literature was then inserted in an Excel spreadsheet to be classified and analysed following a structured evaluation framework.

The framework was composed by 11 main dimensions, the first two related to paper general characteristics of the papers, namely the descriptive information of the publishing and the methodology applied by the authors in conducting the study. The next eight categories analyse the different factors that must be considered when talking about innovation in the eCommerce context:

- Market, to understand if considerations were related to specific situations and environments.
- Industry, to determine authors' interest in industry-specific innovations.
- Merchant type, with the aim of distinguish between generally valid considerations and the ones specific for some type of merchants.
- Theme, highlighting which innovation's themes are covered in the paper.
- Performance, to explores how researchers analyse the introduction and impact of technological and business innovations in the eCommerce context.
- Customer experience, to understand which considerations related to the customer experience are provided by authors.
- Channels, to classify the literature looking at the different online channel strategy considered.
- Businesses changes, to understand what changes in the business are required or are created, with the introduction of new solutions.

The last dimension classifies papers by the specific service or technology innovations that are recognized as impacting the eCommerce B2c value-chain. The value-chain is composed by five main categories:

- Marketing: in which are present all the activities related to the creation, communication, advertising and promotion of products or services in markets.
- Customer care: all the activities focused on engage, provide support and assistance to customers, providing additional services, all along the customer journey.
- Platforms: the category includes the systems that enable the retailer to manage the flow of data and information and the integration with third party providers.
- Payments: in which are involved all the activities and systems that enable the effective financial transaction between the seller and the buyer.
- Operations & logistics: in which are included all the processes of inbound movement of materials, and finished

inventory from suppliers to warehouses, their elaboration and customization and the delivery to the final customer.

In total, the framework was composed by 87 different classification parameters, from which useful insights can be derived.

After having analysed the current literature, in order to answer to the last three research questions, a quantitative analysis of the start-ups, that are service provider of the eCommerce B2c industry, was carried out.

Again, a structured methodology was used in order to obtain reliable results, that can be verified and updated by other researchers. The first phase of the process was to gather all the available information about the current start-up landscape. In the study, data were acquired on Crunchbase, the leading provider of private company prospecting and research solutions. The database must include all the businesses that are recognized as innovative start-ups serving the e-tailers of the eCommerce B2c industry. These indications were translated in a series of research filters: the legal entity must be founded in the last five years, must have received at least one funding in the latest two and is active on the market. In addition, a combination of different keywords and tags, related to the innovations anticipated by the literature, were included to limit the starting database.

After the criteria definition, 3775 start-ups were identified as potentially in the scope of the analysis. A one-by-one check of each business was done, looking at online websites and other information sources, to include only companies that provide innovative solutions to the industry. The final selection resulted in an Excel database of 1036 start-ups. For all of them different profile data were extracted, and each business was through the use of a structured framework.

The framework comprises five main dimensions:

- Company profile: are included the information related to the founding date, the headquarter location, the number of funders and employees.
- Funding: are included all the available information related to the total

investments received and the single funding rounds.

- Industry served: refers to the sector in which the start-up's customers operate.
- Channel: start-ups are categorized according to the channels in which their innovations and services are used or on which they impact.
- Ecommerce B2c value-chain: start-ups are categorized according to value-chain activities that they impact with their innovative solutions.

In addition, to improve the classification of start-ups, a total of 40 specific recurrent innovative solutions were identified and related to the value-chain activities that they impact.

#### 4. Research findings

In this paragraph the research questions previously presented are addressed. Following the methodological order shown in the previous section, the main results are detailed in depth.

*RQ1. What are the current factors and dimensions that influence innovation in the eCommerce B2c industry?*

The performed literature review allowed a comprehensive understanding of the different interrelated factors that define the innovative environment of the industry.

Firstly, scientific studies are geographically well distributed around the globe, highlighting the high relevance and interest of the topic all around the world. At the same time, the geographical market is an important factor in determining the future developments of a market, with 32% of the papers focusing on specific markets dynamics, of which more than half of Asian countries.

63% of the researchers analyse the innovative context of eCommerce B2c, from a cross-industry perspective, highlighting how many considerations are independent from the specific sector, but are strictly related to the nature of eCommerce. Fashion & accessories, Grocery & food and Travel & tourism are the three industries with most unique elements, mainly for two different reasons. In the Fashion & accessories, in particular in the luxury segment, customers

research unique experiences and more technologies are specific to it. In the Grocery & food sector, the rapid growth on eCommerce in combination with the diffusion of delivery platform is affecting the innovative landscape. Travel & tourism is a service sector, so many of the considerations differ from the product ones.

Also, for what regard merchant type, most of the researchers make generally valid considerations, with only 15% focusing on large companies and 10% on small and medium enterprises.

Three key themes are identified by researchers as impacting on the innovative dynamics of the industry: the role of service provider, in 71% of the papers they are seen as fundamental for retailers to quickly adopt new solutions, outsource knowledge-intensive processes and after-sale services. In particular, is underlined the importance and diffusion of managed services business model, thanks to the use of API software services. The second most addressed theme is related to start-ups, seen by 44% of the papers as a fundamental player in the industry in both the role of eCommerce disruptors and first provider of frontier technologies, thanks to their capability to quickly adapt to emerging innovations.

The third theme, addressed by 24% of researchers, is related to global economy, in particular the effects of the Covid-19 pandemic on the supply chain network and on the customer behaviour and preferences. More recently, also the events of the Ukraine war and inflation crisis have an impact on the industry developments.

Three different types of performance improvements can be the aim and consequence of the adoption of new innovations in the industry: effectiveness, efficiency and new value stream. The first two are the most studied in the literature with very similar levels of interest (76% and 73% of the papers). In many cases the adoption of new technologies or business model, can offer new opportunities to create totally new services or products, that previously were not even in the consideration of retailers and customers.

Innovation can affect different phases of the customer experience: in the awareness (59%), solutions aim to increase the degree of consciousness of potential customers; in the



knowledge (68%), innovations objective is to educate customers and address any additional concern and doubt, in personalized manner; in the engagement & loyalty (78%), businesses aim to create connections and relationships with their customers, creating loyal communities of supporters.

Many different types of online channels are used by modern businesses and innovative trends can be related to one or more of them. .com websites are the leading channel (93%), but mobile (75%) and social commerce (59%) have seen and incredible growth in the latest years, affecting how retailers design their strategies and systems. Marketplaces are a constant presence in the landscape (61%) and in Asian countries they are the dominant channel. Retailers must consider integrating all their channels, also physical ones (46%), under a unique and consistent omnichannel strategy, through the use of new tools and connectivity. In the end, metaverse platforms are in their infancy stage to become a relevant factor in the eCommerce B2c.

The last consideration is related to business changes that are required to effectively implement and manage new solutions. Changes in the IT architecture and network are the most addressed (85%) with software and data governance as key elements of attention. Then follow organizational changes (71%), innovation resources can be acquired through M&A activities, at the same time new internal structure can be created to promote or implement new solutions, finally open innovation models and external collaboration can boost the effectiveness of research and developments efforts. Furthermore, looking at innovation type (61%) incremental innovations are simpler to develop and implement and often are provided by dominant players of the industry. Instead, other innovation types, like disruptive and radical, require a great effort from businesses and can radically change the standard way of doing things, creating a network effect on the entire industry. Finally, competence changes are a crucial dimension, retailers need to consider both new technical skills to sustainably run the solutions, but also managerial competences must be addressed to promote innovation and remain competitive.

*RQ2. What are the main innovative solutions that characterize the industry and what impact they have on the value-chain?*

The literature identifies a series of innovative technologies or services that improve the performances of the different activities of the value chain. The new solutions are the result of a combination between established applications and emerging technologies. In particular, six emerging clusters are identified: Artificial intelligence, Internet of things, Cloud computing, Next generation connections, XR, Blockchain. In the Chart 1 is represented the literature interest over the innovative solutions by impacted activities of the value-chain.

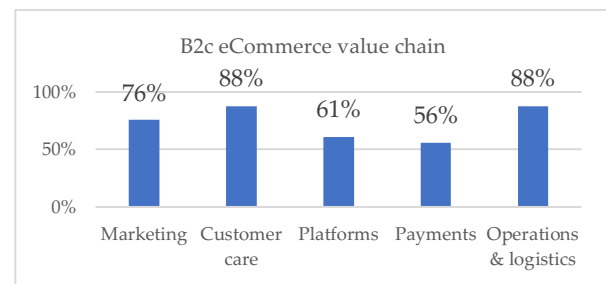


Chart 1: Distribution of papers based on activities of the eCommerce B2c value-chain (sample size: 41 papers)

Authors identify in the marketing field many innovations, grouped in the study in five categories: omnichannel marketing management, price optimization systems, influencer marketing platforms, location-based marketing, web3 activations. Customer care activities are enhanced with multiple innovative applications: immersive services, personalized recommendation systems, customer data platform and customer relationship management systems, automated customer service and chatbots, product and service personalization systems, loyalty programs and reviews system, voice interaction system. For what regards platforms, two main innovation categories are defined, systems that enables the creation and development of internal platforms and solutions that enable to do business directly inside social networks and livestreaming platforms. Payments activities are transformed with new security systems, the introduction of crypto-payments, digital wallets, recipes and invoices, buy-now pay-later options and subscription purchase for products and services. The area of operations & logistics is the one with the highest variety of solutions identified. Most present topics are related

to warehouse innovations, through the use of AI-enabled software to manage inventories and operations, and physical hardware, like robots and drones to automate the movement of products. Also order & delivery management systems are changing the traditional processes, enabling retailers to provide an endless-aisle over inventory and customers to manage an order with an omnichannel view. Many solutions related to last-mile logistics are addressed by the literature, as quick delivery, click-and collect systems, parcel locker adoption, autonomous vehicles delivery and home and trunk access systems. Other solutions related to supply-chain transparency, sustainable and interactive packaging and returns management systems are described as future attention point of the industry.

*RQ3. In which geographical areas start-ups, that provides services and technologies to eCommerce B2c merchants, are more present?*

The geographical distribution of new ventures is heterogeneous around the world, this for many reasons, as the entrepreneurial culture, the regulatory environment, financial and infrastructural availability, and the education level of the different countries. Over the 1036 start-ups analysed in the study, North America is the dominant area, in particular thanks 329 start-up headquartered in the USA, the main entrepreneurial market in the world. Then there is Europe, with 28% of the total. Main contributors are UK and Germany, with 54 and 44 start-ups respectively. Then, Asia counts a total of 278 businesses, with the leadership of the technological Indian hubs (73 start-ups), followed by Singapore (36 start-ups), that has a regulatory and fiscal system that incentivize innovators, and Saudi Arabia (30 start-ups) that has great financial availabilities. The remaining continents combined count as the 11% of the total. In South America the reference country is Brazil with 20 service providers of the eCommerce B2c industry, with 55% of them providing solutions to the marketplace channel, compared to the world average of 36%. Nigeria is the most represented African country, with a total of 16 start-ups. Oceania is represented only by Australia, with 18 new ventures.

Summary results of the analysis are reported in the Chart 2.

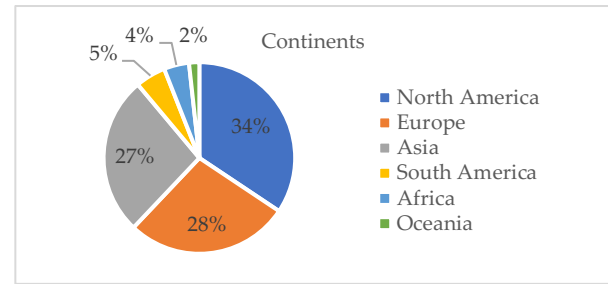


Chart 2: Distribution of start-ups by headquarter location (sample size: 41 papers)

*RQ4. What is the current situation in terms of investments in innovative start-ups?*

Looking at the investments in the sector, 927 start-ups provided financial information related to their total fundings, 854 about their last investment round. The total provided amount in US \$ corresponded to \$ 9.64 billion, highlighting high interest in these businesses. 45% of the new ventures received a single funding round and 71% of the start-ups last fundings were identified as pre-seed or seed. These two elements highlight how the sector is very young and active in provide money to new entrepreneurs. Looking at the distribution of money, it can be seen how most investments go to a very restricted group of businesses, as can be seen from the pareto analysis in the Chart 3. The 20% most financed companies, account for 86% of the total invested money, instead the last 20% received less than the 0.32% of the total fundings amount. This is strictly related to the low maturity level of most of the start-ups and the related failure risks in which investors incur when financing them. Also, another factor that must be considered is the signalling effect of investments, in which most financed start-ups are more likely to receive additional fundings independently from the validity of a solution.

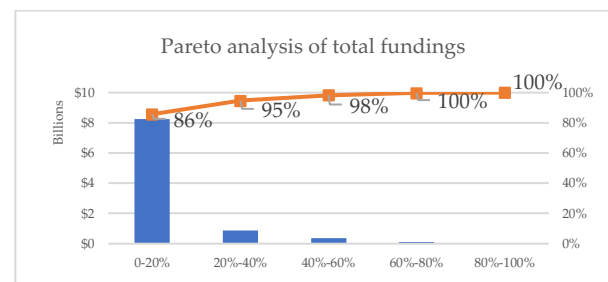


Chart 3: Pareto analysis of total fundings

Another interesting result is related to the fact that most of the start-up (339) were financed with a

total investment between 1 and 5 million dollars, followed by 198 ventures in the range between 100 and 500 thousand dollars. This double spike highlights the difference in required money to pass from a first minimum viable product and to start actively operating in the market.

*RQ5. What are the most addressed activities of the value-chain by start-ups and which specific solutions attract the most interest?*

The 1036 start-ups provide a wide range of solutions and technologies, each of them operating with different value propositions and technical features. From a value-chain perspective 64 start-ups offer end-to-end solutions, that impact all the five areas of the value-chain, with an average funding of \$6.3 million. Looking at the general landscape, the most addressed area by start-ups is marketing, with 44% of new ventures offering at least one solution in the category. 177 start-ups operate only in this sector, making it the second most specific one, with an average total funding of \$4.5 million. Then, there is customer care, with 36% of start-ups and 118 specific to the area, with an average investment of \$5.93 million. In third place there is operations & logistics, with 30% of start-ups, but it is the first segment for area-specific start-ups with 186 businesses and an average investment of \$16.18 million, highlighting the need for high investments to finance physical infrastructures and advanced technologies. In fourth place there is platforms, with 18% of companies related to it, of which only 52 are specific to the area, with the lowest average total funding of \$4.34 million. Finally, payments category is the lowest in term of start-ups, with a presence corresponding to 17%, but the 101 specific start-ups receive the highest average amount of money, equalling to \$17.3 million, that underlines how the financial services requires a very high amount of money. The Chart 4 shows the distribution of start-ups, previously described.

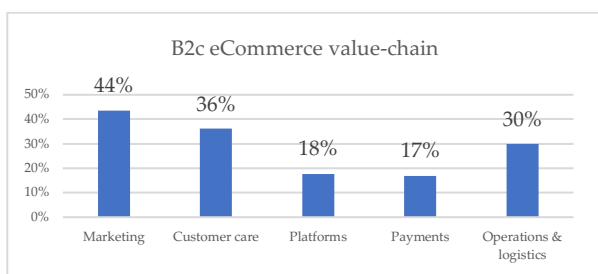


Chart 4: Distribution of start-ups by impacted value-chain category (sample size: 1036 start-ups)

Finally, in the Chart 5, are represented the geographical differences related to the entrepreneurial interest in the different areas of the eCommerce B2c value-chain.

	Marketing	Customer care	Platforms	Payments	Operations & logistics	End-to-end
Africa	23%	20%	32%	20%	32%	7%
Asia	43%	21%	19%	31%	29%	6%
Europe	41%	13%	15%	37%	29%	5%
North America	45%	15%	12%	37%	26%	6%
Oceania	33%	11%	28%	22%	22%	0%
South America	19%	25%	15%	25%	30%	11%

Chart 5: distribution of start-ups by continent and impacted value-chain category

## 5. Conclusions

In conclusion, multiple innovation trends will characterize the future developments of the eCommerce B2c sector. Retailers must be able to quickly identify the new directions that the industry can take, being constantly searching for new opportunities and understanding the potential impact on the whole organization of emerging technologies and changes in the customer behaviour. The analysis highlighted how many possible new applications can be used to increase and extract more value from the different activities involved in the electronic commerce. Retailers can find in external service providers a thriving ground for innovation, as confirmed by the huge amount of money. Therefore, it is useful for them to identify the best investment opportunities and to set up an organisation capable of dynamically integrating new solutions brought by start-ups in the existing ecosystem.

However, some limitations must be discussed to have an objective evaluation of the results.

The first limitation is related to the subjectivity in the definitions of start-up and innovation. In fact, changing the research parameters and identifying less or more solutions as innovative, can lead to different quantitative results.

The second limitation regard the data source, in fact Crunchbase, can present differences in data quality and availability between USA and European countries with rest of the world. This can have impacted, for example, the low result of China and Japan, countries in which both emerging technologies and eCommerce have great importance.

The third limitation is related to the nature of start-ups, in fact these businesses can change their focus, industry and products in a much quicker way than established companies, resulting in different environments in different observations.

Furthermore, different research directions can be developed starting from the results of this study.

A keyword analysis of all the literature's papers, related to the presented topics, can be developed, to understand most relevant topics and correlations between dimensions. Also, the number of framework dimensions can be increased and updated following new developments.

Finally, the scope of the study can be extended to service providers of B2B eCommerce, understanding the innovative trends of the sector and conducting a comparison analysis between the two industries, to understand common points and main differences.

## References

- [1] OECD, "Electronic Commerce - IDC Definitions & Methodologies," 21 April 1999. [Online]. Available: <https://www.oecd.org/digital/ieconomy/1893649.pdf>. [Accessed 27 August 2023].
- [2] R. K. Š. B. R. Fedorko, "Artificial Intelligence in E-commerce: A Literature Review," *Lecture Notes on Data Engineering and Communications Technologies*, vol. 111, p. 677–689, 2022.
- [3] A. R. T. Putri, Y. Priyandari and E. Liquiddanu, "Design of E-commerce Competency Improvement Program for Batik SMEs in Surakarta," *IOP conference series. Materials Science and Engineering*, vol. 598, no. 1, p. 12067, 2019.