

PACKAGING DESIGN IN THE DIGITAL AGE

A systemic approach to e-commerce

Silvia Barbero, Amina Pereno



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A systemic approach to e-commerce



Silvia Barbero, Amina Pereno

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This book is the result of a joint research carried out by the two authors. Both authors read, revised and equally contributed to the book writing. However, Silvia Barbero mainly focused on chapters 3 and 4, while Amina Pereno focused on chapters 1 and 2.

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Introduction

The e-commerce represents a rapidly growing phenomenon, which interests almost all production sectors, and has substantial impacts at the global level. On-demand economy is booming and continues to expand into new businesses: although the future of this sector is still clouded, it will definitely change consumption patterns, supply chains, competitiveness, as well as local and global regulations. The design of products, packaging, services and systems in the era of e-commerce has to face pressing challenges resulting from a different logistic organisation and a radically different mode of interaction between sellers and customers. At the same time, the increasing and widespread interests in sustainable development are bringing new requirements of sustainability of the e-commerce sector.

In this multifaceted context, the packaging represents a crucial design issue to address: its protective function deals with the logistic evolution of e-businesses, the unboxing experience is an important marketing and communication strategy, the quality and quantity of packaging deeply affect the sustainability of the system. However, the complexity of e-commerce requires Packaging Design to evolve by moving from a product perspective to a system mindset, that keeps into account the evolutionary potentials of packaging in a radically new scenario.

This awareness has given rise to the dual research that is the foundation of this book. On the one hand, the investigation of the design strategies that designers are implementing to address the evolution of packaging in this sector, considering not only the current state but also the multiple possible scenarios that e-commerce will face in the future. On the other hand, the complex and wicked nature of the e-commerce system makes it an interesting field of application for Systemic Design, through the analysis of current systems, their critical points and their possible evolutions.

The book is therefore divided into four chapters that introduce the topic, present the aspects related to the world of Packaging Design, those related to Systemic Design and, finally, outline the salient issues for a sustainable evolution of the sector from a design perspective.

The first chapter of the book introduces the world of e-commerce and the peculiarities of this global phenomenon. In particular, the concepts of on-demand economy and social commerce are explored in detail to then get to define the role of designers in the digital evolution of buying patterns. Therefore, the chapter addresses, on the one hand, the overall topic, and, on the other hand, the specific design approach to the sector.

The second chapter of the book focuses on the emerging trends that Packaging Design should address to pursue an innovative approach to e-commerce, by taking into account the environmental, economic and social impact of packaging. Six main trends are explored, and practical case studies are showed to translate the concepts into reality: flexibility; lifecycle and reuse; management and recycle; customisation; communication; awareness. For each of them, the design features that need more attention are examined in detail.

The third chapter of the book further explores the threads showed in the previous chapter by investigating the possible evolutions of the context in which designers act. Working on Packaging Design can reduce some environmental impact, but design can have a significant role in changing the entire system in order to decrease the huge environmental impact generated by global logistics. The methodology of Systemic Design can help to define innovative future scenarios for the logistic management of the e-commerce system. Three main types of e-businesses have been considered: horizontal marketplaces; vertical marketplaces; small-scale retailers.

The final chapter provides an overview of the next steps to be taken for actually moving towards greater sustainability of the e-commerce systems. Indeed, the evolution of the consumption patterns in e-commerce demands new paradigms of production and distribution, new ways of communication and new concepts of packaging but also of product and services. Systemic Design can provide a significant contribution to the innovation of the sector, by managing the transition at different levels and taking into account the many variables linked to the relation between real and virtual.

1. Design challenges in the era of e-commerce

ABSTRACT

The advent of e-commerce has revolutionised and is still going to change our consumer habits profoundly. This not only includes the way we buy a product but also how we interact with the seller, the manufacturer and the other users.

The e-commerce world is affected by “on-demand economy”, a phenomenon that is fostering the shift from the possession of products to the fruition of services. Similarly, the “social commerce” modifies the ways of buying online, enhancing the collective exchange within a community of users who live in a dimension of “augmented reality” where real and virtual are in deep connection and consistency.

The evolution of e-commerce poses important new challenges, not only to the main players in the sector (producers, retailers, distributors) but also to the designers who, in many ways, deal with e-commerce. Therefore, this chapter presents the dual role of design for e-commerce and the strategies needed: on the one hand, the systemic perspective (Data Visualisation for e-commerce strategies and Systemic Design for multi-stakeholder systems) and, on the other hand, the product perspective (products for new digital scenarios of consumption and packaging towards a Physical Internet). Finally, design challenges are connected to what is the key to reading the whole book, that is the possibilities to promote the sustainable development of e-commerce. This major objective requires everyone’s commitment, but design plays an important role, as well as packaging is not only a small element of the system but an item that mediates between system and product.

1.1 On-demand economy and the evolution of e-commerce

E-commerce represents a rapidly growing phenomenon that has revolutionised the way the world does business: it has enabled people to purchase what they want, whenever and wherever they need, by increasing the affordability and the choice of goods. (Long, 2019). The e-commerce revolution has impacted almost all production sectors; it has created new opportunities for companies and retailers, but it has also generated new challenges due to its substantial impacts at the global level.

The impressive growth performance of the e-commerce sector will continue to rise: according to Digital Commerce 360 (2019), global web sales grew 18% in 2018, neared \$3 trillion. The United States and China are leading global online retailing, accounting for more than half of global e-commerce sales of physical goods, but e-commerce is expanding worldwide and changing the way people do shopping, both online and in-store. The recent report of Ecommerce Foundation (2019) shows how e-commerce is prompting traditional retail to rethink the way it does business, by curating product selection and creating events that keep the shopping experience more dynamic and personalised, in close relation to mobile and social contents.

At the same time, an on-demand economy – *«a digital marketplace offering immediate access to goods and services often delivered by contract, or gig, workers»* (Kerrigan, 2018, para. 1) – is booming and expanding in new businesses. This phenomenon is shifting e-commerce businesses from the online sale of goods to the provision of services. In this case, web technologies are used to connect suppliers with consumers, satisfying the users' needs in a cost-effective, scalable, and efficient way. Also, in this regard, online habits are changing traditional services, re-shaping the way people dine, travel, and interact.

Although the future of e-commerce is still clouded, it will definitely change consumption patterns, supply chains, competitiveness, as well as local and global regulations (Netcomm, 2018). These areas represent the emerging challenges of e-commerce that are affecting the development of the whole system but also of the products and services that are moving within it.

CONSUMPTION PATTERNS. According to the EU 2018 Survey on Information and Communication Technology (Eurostat, 2018), 69% of internet users in the EU shopped online in 2018. The growth of online shoppers means a radical change in purchasing habits: shopping becomes available anywhere, anytime of the day. In particular, the rise of mobile devices has blurred the line between the physical store and the online experience. Rather than having two distinct and separate realities, both channels are used

concurrently to improve the shopping experience. The survey of Accenture Interactive (2018) showed that more than 90% of e-shoppers are more likely to shop with brands who recognise, remember, and provide them with customised offers and recommendations. This personal brand-user relationship is not limited to virtual shopping but involves different digital platforms – primarily social media – and physical environments, from temporary stores to brick-and-mortar shops. This trend can be summarised in the concept of *omnichannel experience*: the relationship between producers and users takes place between different channels and modalities, which are efficiently integrated with each other and allow a consistent and personalised interaction anywhere and any-time.

SUPPLY CHAINS. Traditional Supply Chain Management (SCM) is proving to be unfit to manage e-commerce logistics: current systems are still based on manual processes, and warehouse management is not fully integrated with the logistics channels. As Kayikci (2019) stated: «*the new e-commerce technologies have the potential to offer greater efficiencies and transparency and have led to significant changes within supply chains, with alternative ways of doing business, improved visibility and changes to distribution channels, including new intermediaries*» (p. 5368). The rise of e-commerce has brought new requirements: from a shift to Direct To Consumer (DTC) channels, to the need for reverse logistics, to the automation of orders. Even in this case, the adoption of an omnichannel approach is needed to move towards new supply systems. Logistics must be able to integrate the different strategies and channels: Internet of Things, Artificial Intelligence, big data analysis, and digital automation are innovations that the supply chain is adopting to better answer the need for faster replenishment and quicker delivery. The challenge of “last-mile logistics” is crucial for e-commerce SCM: retailers are leaning toward smaller, fulfilment-focused facilities to improve demand proximity, aiming at getting closer to customers (Auburn University CSCI, 2018).

COMPETITIVENESS. Leading retailers – such as Amazon – have been frontrunners in online sales and are still changing the rules of the market: e-users are becoming used to one- or two-day shipping and think this should be normal in e-commerce. First of all, this is leading to new logistical challenges that could also bring important innovations at the local level. Again, the report of Auburn University CSCI (2018) highlights how «*the expanded fulfilment network includes cross-docks, stores doubling as local fulfilment centers, and transfer hubs. With this localized footprint, same-day and next-day service become feasible. To remain competitive in a Prime Now world,*

this kind of transformative change is exactly what retailers need» (p. 8). If on the one hand e-commerce is creating new local stakeholders, on the other hand, it has definitely open local markets to global competition. Not only brands are competing directly with other brands, but thousands of new sellers populate marketplaces. To be competitive, retailers not only need to create a relationship with their users but have to establish a reliable supply chain, by finding a balance between convenience, quality and reliability.

REGULATIONS. In recent years, the internet has been inducing structural shifts in our economies, widening national markets to a global level. But, at the same time, there are still many obstacles to remove before actually freeing online cross-border trade among countries (Van Cleynenbreugel, 2017). The complexity of e-commerce systems and the delicate relationship between free market innovation and local legislation requires new changes in current regulations. However, *«regulators may find it more and more difficult to keep up with the pace of technological innovation and market changes. When they do get a handle on it, it is likely that they will have lagged effects to slow down the pace of technology evolution and innovation.»* (Liu, Kauffman, & Ma, 2015, p. 376). Regulations are trying to facilitate e-trades while protecting local economies and ensuring cybersecurity. In particular, “peer-to-peer markets” – such as eBay, Uber, and Airbnb – enable small suppliers to compete with bigger providers of goods or services but also create important legislative challenges, such as tax evasion, licensing and certification, data management, and employment regulation (Einav, Farronato, & Levin, 2016). The implementation of national legislations in a borderless internet market is a crucial issue to solve, and will affect the design of future services and systems for e-commerce.

1.2 Social commerce: the close link between environment and society

The Digital Age is reshaping our way of living and interacting. Information technologies changed the rules of worldwide communications, but the advent of social media has altered the modes of human interaction forever. As the digital sociologist Alexia Maddox (2016) noted:

one of the most significant challenges faced by researchers when conducting community studies in contemporary societies is the imbrication of digital networked technologies with sociality. This digitally enhanced social connectivity has both opened up new spaces for the experience of community and created a

schism in research methods and theory for how to characterize the movement of social engagement across online and offline environments. (p. 9).

In the advent of the Digital Age, many sociologists began to consider the virtual world and the real world as if they were a binary composed of two separate and distinct realms: the online self was considered as false and constructed, while the in-person self was spontaneous and genuine (Suler, 2016). However, many researchers soon realised how this approach, called “digital dualism”, oversimplified people’s behaviours and the same reality they analysed. Rather than a dichotomy, the online and the offline world are two distinct realities that are inseparably linked. Jurgenson (2012) called it a new “augmented reality” in which *«our selves are not separated across these two spheres as some dualistic “first” and “second” self, but is instead an augmented self»* (Jurgenson, 2011, para. 7). This leads to many consequences that we do not intend to address here. From a design perspective, what we are concerned with is the importance of analysing the digital and physical implications of e-commerce interactions to better understand the potentialities of the e-commerce system in terms of social empowerment and environmental sustainability.

As seen in the previous paragraph, e-commerce stores are not virtual platforms wholly disconnected from reality; conversely, the trend is to build connections with physical stores to offer a consistent shopping experience. Online marketplaces can offer product ranges broader than any store could offer by providing real-time information and added value services to sellers and buyers (Kestenbaum, 2017). However, empirical experiences are not replaced by the virtual ones, on the contrary, new and innovative relationships are sought, such as the “unboxing experience”, the parcel collection points, and so on. We could say that we are moving towards new “augmented” marketplaces in which online and offline trades interact to allow businesses getting closer to their consumers. As a result, e-commerce is allowing people to come together through the use of information technology (Leonard & Jones, 2015). Both in Business To Consumer (B2C) and Consumer To Consumer (C2C) marketplaces, the relationship between sellers and buyers is mediated by digital infrastructures and aimed at buying and selling goods and services.

However, the interaction with web 2.0 tools often brought a more social and collaborative approach to the online marketplace (Parise & Guinan, 2008) enhancing it with users adding value by generating and sharing content. This integration of social media with traditional e-commerce sites resulted in what is commonly defined as “social commerce” (Wang, Lin, & Spencer, 2019). As Huang and Benyoucef (2013) stated:

The rapid development of social media and Web 2.0 has provided a huge potential to transform e-commerce from a product-oriented environment to a social and customer-centred one. In essence, social media refers to Internet-based applications built on Web 2.0, while Web 2.0 refers to a concept as well as a platform for harnessing collective intelligence. Within this environment, customers have access to social knowledge and experiences to support them in better understanding their online purchase purposes, and in making more informed and accurate purchase decisions. (p. 246).

The goods we buy, wear and use always had a strong social value in representing ourselves in relation to others. However, in social commerce the act of searching and purchasing becomes a social phenomenon amplified by the web: users actively seek for online social support, i.e. the «*online actions that individuals carry out by collaborating with peers through social media*» (Hajli & Sims, 2015, p. 352). This creative and, often, unpredictable connection between purchasing and social sharing represents a fresh social challenge, that affects not only marketing but also the design of products and services for e-commerce.

The way people interact with each other involves the social sphere, giving rise to several issues, such as the involvement and empowerment of users in the offline and online systems. However, the social impact of e-commerce is also related to its environmental implications: the sustainability of e-commerce systems is deeply affected by how users behave and how they create new relations and new information concerning each other and the supply chain environmental issues. Jack Ma, co-founder of Alibaba Group – the largest e-commerce marketplace in the world –, said that «*pure eCommerce will be reduced to a traditional business and replaced by the concept of New Retail - the integration of online, offline, logistics and data across a single value chain.*» (Ecommerce Foundation, 2019, p. 22). Aside from differences of definition, we can discover a shared vision of future e-commerce, based on a holistic perception of the system that aims at addressing the systemic complexity of the sector. This complexity includes social and environmental impacts that are caused by the close connection between the virtual and the real world.

E-commerce has the opportunity to influence individual behaviour towards sustainability through awareness-raising. On the web, we have the opportunity to provide a lot of information in an interactive and personalised way; this also means being able to guide the user towards more informed purchasing choices. That may encourage new concerns about e-commerce sustainability, as the type and speed of shipping, which may have different impacts on the environment and can be determined by the user. At the same

time, supply chain design should act to mitigate the adverse effects of the logistics system: from transport and packaging optimisation to more sustainable last-mile logistics. Digital behaviours and environmental awareness are thus closely related and should be considered by the designer as a *unicum* in which to develop new design strategies.

1.3 The role of designers in the digital evolution of buying patterns

The complex physical-digital system of e-commerce brings new ways of interacting between people, producers and sellers, as well as new roles that emerge, such as last-mile couriers. It is undeniable that the world of e-commerce marked a paradigm shift in the logistic organisation and the relations between stakeholders. Both aspects are inevitably leading to a changed perception of products and services purchased or provided through the web. If the evolution of digital services is more tangible and fast-growing, the world of physical goods is slowly moving towards new and different approaches to the products bought online.

In this new and complex scenario, designers are called upon to play an innovative and challenging role: on the one hand, they act in the existing context, which has already established its own rules and has had to undergo strong technical and logistical boundaries; on the other hand, they have to envisage and contribute to the evolution of a scenario whose future is still unclear. Indeed, the creative and, at the same time, methodological approach of design to manage user-focused problems can make a significant contribution to design a sustainable path of e-commerce evolution. All design disciplines, despite any differences in the topics addressed and the tools used, aim at understanding people's problems and creating solutions that fit the users' needs according to their social and cultural background. Furthermore, the knowledge of design for managing complexity is an attractive skill for complex sectors such as e-commerce. As Dorst (2011) underlines,

designers have been dealing with open, complex problems for many years, and the designing disciplines have developed elaborate professional practices to do this. The challenge of dealing with these open, complex problems leads to a particular interest in the ways designers create 'frames', and the way design organisations deal with frames in their field of practice. (p. 522).

What is commonly known as “design thinking”, i.e. «*a method of meeting people's needs and desires in a technologically feasible and strategically*

viable way» (Brown, 2008, p. 84), represents a systematic innovation process that aims to deeply understand users desires and needs to design inclusive and effective solutions to answer their real problems. The role of design includes the creation of artefacts, which remains an essential task, but, in a complex system, it has to go further, by addressing design activities from a systemic point of view. Designers are called upon to bring clarity to the system, sharpening their focus not only on artefacts they are designing but on the system in which artefacts and users are included.

In e-commerce, the capability to address a design problem from a systemic perspective is crucial. The complexity of this field of investigation requires a multi-level approach that can move from a global to a local scale, considering all the factors entailed. As seen in the previous paragraphs, e-commerce has already been working with international supply chains, and the regulatory frameworks, primarily the European one, are striving to open up digital markets, facilitating cross-border trades. At the same time, the widespread presence of e-commerce stakeholders on a local scale is necessary to enable new logistics to speed up the last mile stage. Moreover, the liberalisation of digital markets cannot simplify the vast cultural and behavioural differences of users from all over the world. The designers' approach to managing user-focused problems within complex and multi-stakeholder systems is, therefore, an essential expertise for e-commerce.

Designers are required to deal with different facets of e-commerce, addressing the challenges of product storage, delivery and management, while defining the information flows and communication strategies to make systems more effective and user-centred. Therefore, a dual perspective is needed when designers come to collaborate with digital service-systems and e-marketplaces: the systemic and the product perspective.

SYSTEMIC PERSPECTIVE. In the literature, much research has been carried out into the design factors that influence the success of a web platform, starting with Amazon and other global giants. These studies mainly focused on the interactive features and user experience of online services, i.e. how to design a service that can make the internet business transaction process easy, effective and attractive. At the dawn of the advent of e-commerce, the interesting work of Jinwoo and Jungwon (2002) relates the phases of a transaction system (information, agreement, settlement) with the design factors that affect an e-commerce platform (content, structure, interaction, presentation) to define the users' perception and expectation of service quality. As a result, they stated that *«the overall service quality can be divided into five dimensions representing various service attributes: tangibility, reliability, responsiveness, assurance and empathy»* (p. 188).

This model, in its general form, is still applicable: in particular, concepts such as the empathy of the e-commerce system, meaning the caring and individualised attention that the system gives its users, represents a crucial factor in the design of current systems. However, the scale of the “service” as a whole has been radically changing: service effectiveness cannot consider the web platform only, which is just the digital part of a broader e-commerce system. If in the early 2000s, it was somewhat difficult to think of a radically new physical system dedicated to e-commerce, today the digital system has revolutionised the physical one, and it is not possible to conceive of e-commerce as a purely digital service. For example, the “tangibility” of an e-commerce service is no longer only a matter of visual aspect of the web platform but is also determined by the delivery system, by the packaging that allows the unboxing of the purchased product and, often, is closely linked to the corresponding brick-and-mortar stores. Moreover, the physical-digital system is aimed at physical-digital users: in the last 20 years, users have radically changed the way of communicating, interacting and living, within a society where the physical and digital worlds come together (see para. 1.2).

Design has always contributed to the concept of e-commerce platforms, facing important challenges of usability, communication effectiveness and information management. Over the years, designers have created platforms that are increasingly intuitive and easy to use, where users can search for information and browse the full range of products, to make the purchasing process quicker, easier and more reliable, right up to Amazon’s “Buy now with 1-Click”. Today, the ability of designers to think systemically opens up two system-wide challenges:

- ***Data Visualisation for e-commerce strategies***: the growing number of e-commerce users is leading to an exponential increase in the data available, which describes users’ needs, choices and ways of interacting with each other and with the system. Furthermore, the traceability of the logistics phases is also generating complex flows of information that describe the stakeholders, the timescale, and the impacts of the system. Data visualisation enables humans to conceptualise and grasp large amounts of data, turning complex analytics into graphs, charts, and tables that managers and communication strategists can easily read and share. Managing information flows and making the complexity of the system understandable is the competence of designers that can help to improve the effectiveness and sustainability of an e-commerce system;
- ***Systemic Design for multi-stakeholder systems***: the evolution of logistics systems has been changing the type of professions involved in the