

# RETAIL TECHNOLOGY AS DRIVER OF STORE SPACE PRODUCTION: LAYOUT, SERVICES AND EXPERIENCE

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## Introduction

Digital technologies are dramatically reshaping the various aspects of the in-store experience, from information searching and product evaluation to interaction with other customers and employees (Shankar *et al.*, 2021). They also influence how customers orient, communicate and engage with the physical retail spaces at different levels (Hagberg, Sundstrom and Egels-Zandén, 2016; Ameen *et al.*, 2021). As a consequence, the physical space of the store changes according to the introduction of such technologies, which modify physical and sensorial elements of customer experience (Ameen *et al.*, 2020; Pantano, Pedeliento and Christodoulides, 2022).

For instance, fast fashion brands like Zara are introducing advanced checkout desks, positioned either near traditional tills or in the fitting room area, to speed and simplify the checkout process. Traditionally, customers had to wait in queue at the cash desk to pay for the items they want to buy, which were scanned one by one by store employees. With this new technology, customers position the items in a basket that automatically recognises them and calculates the total amount to be paid (due to the RFID tags associated with each item). Thus, digital technology further impacts the store (physical) space in terms of layout. Specifically, store layout is a key issue in retail literature, largely investigated by scholars (Newman and Foxall, 2003; Krasonikolakis *et al.*, 2018; Pantano *et al.*, 2021). However, recent studies call for more investigations on how the stores should be restructured to be more profitable or to improve the store experience (Ma, Seetharaman and Singh, 2021; Pantano *et al.*, 2021). Moreover, the transformation they produce is not limited to the layout, but also enhances and enriches the delivered services and the customer experience.

## **Purpose**

The introduction of new technologies in traditional (physical) points of sale largely reshapes the space and usage that consumers make of it. Therefore, store space can be perceived as a dynamic entity instead of a static one, whose production is strictly linked to the changing conditions of the environment. Accordingly, the present research aims at exploring how technologies influence store layout, and, more broadly, the concept of (retail) space production.

## **Conceptual framework**

Retail technologies occupy specific (physical) spaces in the store, modifying the layout, services, and consumers' experiences (Bäckström and Johansson, 2006; Ma, Seetharaman and Singh, 2021). Thus, also retail space can be produced. However, the concept of space production goes beyond the physical location of the technology and can be investigated through the lens of the "production of space" (Lefebvre, 1991). According to this lens, space can be produced at three main levels: perceived space, conceived space and lived space. They respectively refer to the (i) concrete physical arrangements produced by the practice performed by the users, (ii) abstract space produced by planners and political decision-makers that impose order through values, and (iii) space formed by the experience of the users in their everyday life. Drawing upon the concept of space production and its application in various disciplines (Karplus and Meir, 2014; Capener, 2020; Delaisse, Huot and Veronis, 2021; Strus *et al.*, 2023), this research develops the new concept of store space production, as a consequence of the introduction of retail technologies.

## **Methodology**

The research employs a qualitative approach based on direct observations of clothing brand stores. The adoption of this methodology, being non-intrusive, allows researchers to understand phenomena in the exact context in which they take place, preserving their authenticity (Bonoma, 1985; Grove and Fisk, 1992). Given the purpose of the present study, field observations result also particularly effective in reaching the intended objective, as they enable the recording of customers' space fruition within their natural setting.

In particular, the observations take place in London (UK) between March and April 2023, in Oxford Street, Regents Street and Sloane Street. Indeed, London Oxford Street has been named the most popular shopping street in Europe (BNP Paribas Real Estate, 2022), London's Regent is one of the most-visited retail destinations in Europe (BNP Paribas Real Estate, 2022), while Sloane Street is recognised as one of the best luxury destinations for shopping (Sells, 2021). Thus, the observation of those streets enables the collection of data from fashion brands encompassing fast, premium/high streets, luxury stores and sports brands. Overall, 111 stores were visited, 34 for each fashion store category (fast, premium, luxury) and 9 for sports one. Among them, only those having at least one technology installed were considered in the analysis, resulting in 23 fast fashion stores, 22 premium stores, 13 luxury stores and 8 sports stores (66 stores in total).

While visiting each store, each researcher independently took notes about the available technologies (if any), the space occupied, and the service delivered to consumers, and finally compared the outcomes of each observation. In order to limit the development of biases, the same structured observation protocol was built and adopted in the data collection process, based on the following variables: store typology, presence of digital technologies, type of digital technologies, physical space occupied by a retail technology, and modality of service provided; consumers' usage and experience. Each store included in the observation is a mono-brand and part of an international chain.

## Findings

Table 1 summarizes different technologies present in the visited stores, a brief description, and the category to which they belong, according to the classification provided by Pantano et al. (2017): (i) info/product display technologies; (ii) shopping experience technologies; (iii) information search technologies; (iv) payment technologies; and (v) others.

*Table 1: Digital technology typologies.*

Category	Technology	Description
Info/product display technologies	Display	Display that exhibits digital images, videos or texts, without allowing customer interaction
Information search technologies	Interactive display	Display that exhibits digital images, videos or texts and allows customer interaction (e.g., to search for products)
	Interactive display with RFID sensor	Display that exhibits digital images, videos or texts and allows customer interaction (e.g., to search for products). It is connected to a RFID sensor that recognises the products placed near it
Shopping experience technologies	Smart mirror	Two-way mirror with an inbuilt display behind the glass that can superpose things (clothing or make-up) on customers' image
	Robot	Machine that autonomously perform repetitive tasks
	Light regulation	Button that enables light intensity and color regulation within the fitting room
	Light and atmosphere regulation	Button that enables light intensity and atmosphere regulation within the fitting room
	Tool for shoes size measurement	Tool that measures customers foot size
Payment technologies	Self check-out RFID	Technological interface that allows customers to autonomously identify the items in the cart - through RFID sensors - and pay for them, without the involvement of the employee
	Self check-out	Technological interface that allows customers to autonomously scan the items and pay for them, without the involvement of the employee
Other	Photobooth	Small room that customers can enter to have their photograph taken
	Self-service collection technology	Secure storage system with integrated computers and sensor networks that allow customers to autonomously pick their packages

The analysis then breaks down three main dimensions associated with each technology: (i) the effective space of the store occupied, (ii) the service and functionalities offered and (iii) the experience delivered. Each of them finds a parallel in the Production of Space theory and contributes to the production of space.

### *Perceived space – store layout*

The perceived space is the concrete physical arrangement of space and the related characteristics of use patterns. It can be also defined as “spatial practice”, as the space is produced according to the usage made of it by the users (Lefebvre, 1991). In this perspective, the physical retail setting is constituted by shop windows, shelves and racks, fitting rooms, tills, and the goods sold by the retailer. However, without any interactions occurring within

that space, it could not be defined as a social space, as intended by Lefebvre. Indeed, the spatial practices, or in other words the activities executed within that space, determine its usage and embody the meaning of that place. Therefore, also a retail store, being a social space, acquires its meaning only in relation to the activities executed within it. They can be reconducted to all those activities occurring in the path to purchase, which ultimately ends with the purchase decision. The store space is designed to host all these activities, which are performed in different areas of the store itself, according to its layout. The installation of digital technologies generates an impact on the physical arrangement of the store, i.e., the layout, by either substituting some traditional elements or filling empty spaces. On top of that, technologies can also introduce new activities to be performed within the same space.

*Conceived space – services and functionalities*

Conceived space is the abstract space produced by planners and political decision-makers that impose order through values and ideologies. In the retail setting, they can be identified as the retailers and the retail planners that through their decision impose a specific message - associated with the brand image -, delivered to customers through different means, including the store setup. The introduction of digital technologies usually tends to reinforce the original image associated with the brand, and this is reflected in the enrichment of the services offered by the technologies, increasing the benefits for customers.

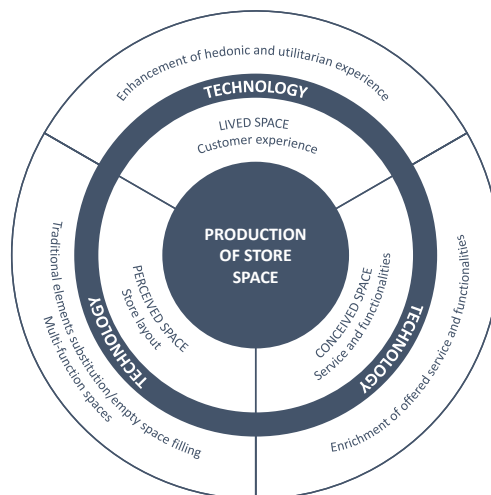
*Lived space – customer experience*

The lived space relates to the space formed by the experience of the users. The users of the retail store space are the customers. Thus, the lived space can be identified as the experience sensed by the customers when visiting the store, or in other words the customer experience. The introduction of digital technologies enhances the experience, either in hedonic or utilitarian terms, according to the kind of service offered.

Table 2 summarises the findings, by pointing out the retail space levels in accordance with the production of space theory, and the impact of technology adoption on each of them.

*Table 2: Space production, retail space levels and technology impact.*

<b>Space production levels</b>	<b>Retail space levels</b>	<b>Technology impact on retail space levels</b>
Perceived space	Store layout	Traditional elements substitution/empty space filling/multi-function spaces
Conceived space	Service and functionalities	Enrichment of offered service and functionalities
Lived space	Customer experience	Enhancement of hedonic and utilitarian experience



## Contributions

To the best of the authors' knowledge, this paper is the first one analysing store layout shift in relation to technology introduction with the space production lens. In this way, our research is the first to extend the concept of store space and layout, from the physical level to the level of service provided and experiences lived in that space as a consequence of the introduction of retail technologies for consumers.

## Practical implications

The present work provides a more comprehensive understanding of store space layout in the presence of digital technologies, pointing out the main aspects to be considered when deciding to introduce technologies in the store.

Indeed, the introduction and the positioning of digital technologies within the store space produce an impact not only on the physical level but also on the service and experience level, as these three concepts are strictly bounded. Thus, when retailers plan to add a new technology, a new service or a new experience should consider also the implications on the two related levels.

## Research limitations and outlook

This research is based on direct observations, additional studies embracing interviews with retailers might provide more corroborating evidence on the perceived space. Likewise, interviews or survey directed to customers could better explore their perception of the lived space. Indeed, in our analysis, we consider consumers' experience as an exogenous variable, defined as the way consumers might experience a certain technology, while it is traditionally endogenous, influenced by elements going beyond the technology. Thus, additional empirical studies with consumers are needed to enrich our analysis of experienced space by consumers. Ultimately, it would be interesting to evaluate the possible (mis)match between the space intended by retailers and the one experienced by customers.

Moreover, the present research focus on the fashion sector, as only the stores belonging to this industry were included in the observations. Therefore, also outcomes can be considered valid within the fast fashion sector. Future research could aim at findings evidence and extending the analysis to other sectors, such as the grocery or the beauty one.

## References

- Ameen, N., Tarhini, A., Shah, M., Madichie, N. O. (2020) 'Going with the flow: smart shopping malls and omnichannel retailing', *Journal of Services Marketing*, 35(3), pp. 325–348.
- Ameen, N. *et al.* (2020) 'Going with the flow: smart shopping malls and omnichannel retailing', *Journal of Services Marketing*, 35(3), pp. 325–348. Available at: <https://doi.org/10.1108/JSM-02-2020-0066>.
- Ameen, N. *et al.* (2021) 'Customer experiences in the age of artificial intelligence', *Computers in Human Behavior*, 114(August 2020), p. 106548. Available at: <https://doi.org/10.1016/j.chb.2020.106548>.
- Bäckström, K. and Johansson, U. (2006) 'Creating and consuming experiences in retail store environments: Comparing retailer and consumer perspectives', *Journal of Retailing and Consumer Services*, 13(6), pp. 417–430. Available at: <https://doi.org/10.1016/j.jretconser.2006.02.005>.
- Bonoma, T. V. (1985) 'Case Research in Marketing: Opportunities, Problems, and a Process', *Journal of Marketing Research*, 22(2), p. 199. Available at: <https://doi.org/10.2307/3151365>.
- Capener, D. (2020) 'The Magic and Metaphysics of Shit: The Production of Space and Digital Technology', *Architecture and Culture*, 8(3–4), pp. 636–652. Available at: <https://doi.org/10.1080/20507828.2020.1792106>.
- Delaisse, A.C., Huot, S. and Veronis, L. (2021) 'Conceptualizing the role of occupation in the production of space', *Journal of Occupational Science*, 28(4), pp. 550–560. Available at: <https://doi.org/10.1080/14427591.2020.1802326>.
- Grove, S.J. and Fisk, R.P. (1992) 'Observational data collection methods for services marketing: An overview', *Journal of the Academy of Marketing Science*, 20(3), pp. 217–224. Available at: <https://doi.org/10.1007/BF02723408>.
- Hagberg, J., Sundstrom, M. and Egels-Zandén, N. (2016) 'The digitalization of retailing: an exploratory framework', *International Journal of Retail and Distribution Management*, 44(7), pp. 694–712. Available at: <https://doi.org/10.1108/IJRDM-09-2015-0140>.
- Karplus, Y. and Meir, A. (2014) 'From congruent to non-congruent spaces: Dynamics of Bedouin production of space in Israel', *Geoforum*, 52, pp. 180–192. Available at: <https://doi.org/10.1016/j.geoforum.2014.01.005>.
- Krasonikolakis, I. *et al.* (2018) 'Store layout effects on consumer behavior in 3D online stores', *European Journal of Marketing*, 52(5–6), pp. 1223–1256. Available at: <https://doi.org/10.1108/EJM-03-2015-0183>.
- Lefebvre, H. (1991) *The production of space*. Oxford: Blackwell. Available at: <https://doi.org/10.4324/9780203132357-14>.
- Ma, Y., Seetharaman, P.B. (Seethu) and Singh, V. (2021) 'A multi-category demand model incorporating inter-product proximity', *Journal of Business Research*, 124(December 2020), pp. 152–162. Available at: <https://doi.org/10.1016/j.jbusres.2020.11.036>.
- Newman, A.J. and Foxall, G.R. (2003) 'In-store customer behaviour in the fashion sector: Some emerging methodological and theoretical directions', *International Journal of Retail &*

*Distribution Management*, 31(11), pp. 591–600. Available at: <https://doi.org/10.1108/09590550310503311>.

Pantano, E. *et al.* (2017) ‘Does innovation-orientation lead to retail industry growth? Empirical evidence from patent analysis’, *Journal of Retailing and Consumer Services*, 34, pp. 88–94. Available at: <https://doi.org/10.1016/j.jretconser.2016.10.001>.

Pantano, E. *et al.* (2021) ‘Enhancing store layout decision with agent-based simulations of consumers’ density’, *Expert Systems with Applications*, 182(January), pp. 0–1. Available at: <https://doi.org/10.1016/j.eswa.2021.115231>.

Pantano, E., Pedeliento, G. and Christodoulides, G. (2022) ‘A strategic framework for technological innovations in support of the customer experience: A focus on luxury retailers’, *Journal of Retailing and Consumer Services*, 66(March 2021), p. 102959. Available at: <https://doi.org/10.1016/j.jretconser.2022.102959>.

Shankar, V. *et al.* (2021) ‘How Technology is Changing Retail’, *Journal of Retailing*, 97(1), pp. 13–27. Available at: <https://doi.org/10.1016/j.jretai.2020.10.006>.

Strus, J.A. *et al.* (2023) ‘Lefebvre’s production of space: Implications for nursing’, *Nursing Philosophy* [Preprint], (February 2022). Available at: <https://doi.org/10.1111/nup.12420>.

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