



The phygital transformation: a systematic review and a research agenda

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Abstract

The label “phygital” (physical plus digital) has been proposed to describe how companies try to engage customers due to the exploitation of smart technologies. Although used mainly by practitioners, research into phygital’s theoretical development is lacking. We conduct a systematic literature review to obtain an overall vision of the phenomenon and to understand how the scientific debate uses the term. The in-depth analysis allows for the identification of four main aspects: (1) objects and applications, (2) context (space/place), (3) customer journey, and (4) shopping (retail) experience. Using the antecedents, decisions, and outcomes model, we offer an interpretation of the phenomenon in a more comprehensive framework. The development and use of physical and digital objects and applications (i.e., phygital resources) in a phygital context (i.e., spaces and places) affect the customer journey in a phygital manner to enable the development of new forms of phygital experience. We suggest specific research avenues to develop the phygital construct.

Keywords Phygital label · Systematic literature review · ADO framework · Phygital transformation

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1 Introduction

Digital transformation has changed customer expectations and behaviours, put pressure on traditional businesses, and disrupted numerous markets (Verhoef et al., 2021) with the rapid growth of online retailers, such as Alibaba and Amazon, and the failures of several former retail giants, such as ToysRUs and RadioShack. Technological and social innovations bring about new expressions whose *étymos* (i.e., intimate meaning) are unclear. Neologisms, foreignisms, or crases try to capture the essence of emerging phenomena. The last 20 years have introduced new terms such as Internet, web, cloud, big data, blockchain, and many others. Digital and cognitive technologies are changing how companies relate to their stakeholders, not only in terms of processes and content but also language. Words are the vehicle for these changes, and market players must speak with a new language. Knowing the meaning of expressions allows market actors to understand the representations of a phenomenon and be able to change behaviours and experiences. Practitioners emphasise that they need continuous “literacy” of terms and words related to digital transformation (Matzner et al., 2018; Nadkarni & Prügl, 2021; Priyono et al., 2020).

A new label—phygital (physical plus digital)—has been proposed to describe how companies try to engage customers through a combination of the virtual and real (Ballina et al., 2019; Clauzel et al., 2019) due to the exploitation of smart technologies (Mele & Russo Spena, 2022). Although used mainly by practitioners (Duhan & Singh, 2019), research into the theoretical development of this phenomenon is lacking (Neuburger et al., 2018; Klaus, 2021). The debate around the phygital concept began to emerge in a special issue of the *Journal of Strategic Management* (2021) and various conferences (Phygital transformation; Phygital Retail Conference; Marketing Transformation: Marketing Practice in an Ever-Changing World). The concept of “phygitality” as a new form of “hybrid consumption experience” has also been proposed (Klaus, 2021, p.1). Immersive technologies, such as augmented reality (AR) and virtual reality (VR), tech solutions based on artificial intelligence (AI), Internet of Thing (IoT), Internet of Everything (IoE), conversational agents (chatbot), and customer relationship management solutions, are just some of the digital applications that enable this transformation (Mele & Russo Spena, 2022). However, the term phygital lacks a clear definition and offers several interpretations. This conceptual vagueness complicates academic discourse on the opportunities and limits of the phygital phenomenon and its transformation.

To address these gaps, in this work we provide a systematic literature review to identify and explore the knowledge domain of phygital transformation and related constructs. A systematic literature review differs from traditional narrative reviews by adopting replicable and transparent procedures (Booth et al., 2016; Webster & Watson, 2002). It allowed us to examine the scholarly debate about the phygital label, its related meaning, and open issues. By following the advice of Paul and Benito (2018), we adopted the antecedents, decisions, and outcomes (ADO) model developed to offer an interpretation of the phygital items emanating

from the systematic literature review: (1) objects and applications, (2) context (space/place), (3) customer journey, and (4) shopping (retail) experience. Moving beyond single items, we envision a more comprehensive framework (MacInnis, 2011) for the ongoing phygital transformation. We complement this analysis with illustrative cases that offer a complementary view of the empirical adoption of the term. In particular, we state that the development and use of physical and digital objects and applications (i.e., phygital resources) in a phygital context (i.e., spaces and places) affects the phygital customer journey to enable new forms of phygital experience. We suggest specific research avenues to develop the conceptualisation of the theory based on our understanding.

2 Methodology

This paper is conceptual and adopts a systematic literature review (Booth et al., 2016; Kitchenham, 2004; Webster & Watson, 2002) to understand the ongoing debate in the literature. Such a method entails a thorough, transparent, and replicable process for literature search and analysis, providing a synthesis of the topic of interest. It allows for careful analysis of past and current papers without bias in the inclusion or exclusion of any literature. We researched documents about the term phygital in the Web of Science (WoS) database and found 74 results, most of them in the areas of business (27), economics (16), and management (12). Almost one-third were published in 2021. The adoption of the preferred reporting items for systematic reviews and meta-analyses (PRISMA) methodology guided the identification of the studies to be included in the review (Moher et al., 2010).

Figure 1 summarises the search process. To obtain relevant manuscripts, the systematic review included the following: original articles, review articles, book chapters, and proceedings papers only; articles in 12 WoS ISI categories; articles reporting any aspect of phygital; articles whose title, abstract, and/or keywords included the above-mentioned phygital term. Furthermore, we considered contributions published in the period between 2007 and 2022. Subsequently, to allow the replicability of review, the research was refined by limiting it only to documents written in the English language, resulting in 72 items. Based on the reading of these documents, we excluded 26 because they did not report any aspect of phygital. The resulting 46 articles were studied in-depth and synthesised. During the full-text screening stage, each author analysed the content of the papers and assessed its relevance based on the inclusion criteria highlighted above. Differences in assessing the documents and coding were intensively discussed until a joint decision was reached. Four of the papers analysed did not fit with the phygital topic, although the authors had used the term. The final selection criteria led to the inclusion of 42 papers. Appendix 1 provides several details of the 42 selected articles.

The review of the 42 articles allowed us to extract information about the difference in the meaning of the phygital label. Furthermore, the analysis of the papers demonstrated the existence of four different items associated with the phygital construct. Each article presented one or more items, as listed in Appendix 1. Following the advice of Paul and Benito (2018), we adopted the ADO model, which allowed us to interpret

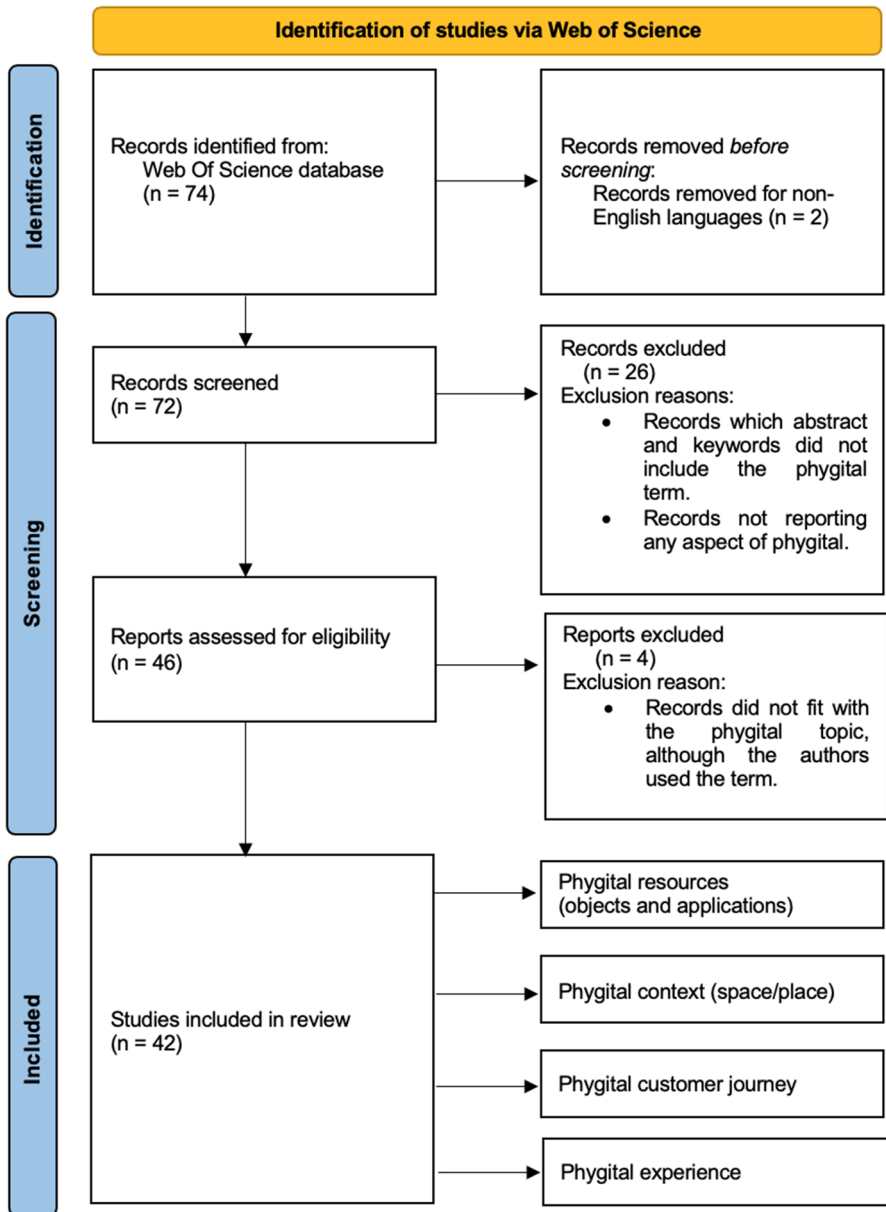


Fig. 1 Flowchart of systematic literature review PRISMA statement

the four items as antecedents of decisions and outcomes. Antecedents (A) clarify the reasons for engaging or not engaging in behaviour, decisions (D) explain the types of behavioural performance or non-performance, and outcomes (O) encapsulate the evaluations that emerge after behavioural performance or non-performance. This model was

applied to items resulting from a systematic review to envision a fresher contribution that adds to the process of discovery by identifying something new (MacInnis (2011, p.136). We supplemented the analysis with illustrative cases that offer a complementary view of the empirical adoption of the term.

3 Results

In this section, we first present an understanding of the meaning of the phygital construct, followed by outline of the framework based on the four items interpreted through the ADO model.

3.1 The meaning

Intuitively, the definitions of phygital are derived from the overlapping or “the integral wholeness” (Yüce et al., 2021, p. 1) of digital and physical worlds. However, not all the papers defined the term phygital; in some cases, the authors used the word without a clear explanation of its meaning in their discourses. It was always used as an adjective, and only one article used it as a noun with the expression phygitality (Klaus, 2021). Vagueness in using the term characterises most of the studies. Table 1 reports some definitions that we collected.

The first definition stressed the role of phygital in terms of connectivity (Lupetti, 2016). Objects in physical reality become interconnected and connected to the digital and virtual environments (Švec & Madleňák, 2017). Other authors stressed that this combination is not simply a mix but is integral to creating an ecosystem (Švec & Madleňák, 2017). Reilly and Dawson (2021) offered an insightful view that “Phygital is a neologism which refers to an increasingly apparent universe in which physical and digital artefacts intersect one another, holding out the promise of substantive new ways to (re)consider the materiality and ontology of objects” (p. 293). In line with this perspective, other authors defined the phygital construct as integrating digital technologies, including physical elements and social presence (Mele et al., 2021), and affecting personal and social behaviour (Ballina et al., 2019).

We detected the different nouns associated with a neologism. The label phygital was used in connection with context (Turco & Giovannini, 2020; Stankov & Gretzel, 2020; Klaus, 2021, Liu et al., 2022) or spaces (Bazzanella et al., 2014; Neuburger et al., 2018; Shalini et al., 2021), objects, applications (Andrade & Dias, 2020; Lupetti et al., 2016), shopping experience (Ballina et al., 2019; Due & Toft, 2021; Silva & Cachinho, 2021), customer journey (Mele et al., 2021; Mele & Russo Spena, 2022). The following sections describe the four items in-depth by offering an interpretative framework.

3.2 An interpretative framework of phygital transformation

Four main items related to the phygital label arose from the analysis: (1) objects and applications, (2) context (space/place), (3) customer journey, and (4) shopping (retail) experience (Table 2). First, objects and applications are solutions that

Table 1 Definitions of the term *phygital*

Source	Definitions	Research area
Lupetti et al. (2016)	Phygital concerns the overall connectivity phenomenon in which everyday objects are interlinked and connected to the environment, collecting information from it and adapting their performance	Gaming
Armstrong and Rutter (2017)	The phygital concept concerns shopping experiences in physical and virtual environments	Retail
Švec and Madleňák (2017)	The phygital concept is defined as a link between the use of Internet technologies or digital space and new (online) ways of using subjects. It is about creating an ecosystem between the brand and customer across physical and digital spaces	Law and legal systems
Batat (2019)	The phygital concept refers to the transformation of physical stores in the digital era	Retail
Ballina et al. (2019)	The phygital phenomenon represents a radical change in the personal and social behaviour of tourists, incorporating technological matters as a direct component in their decisions and actions	Tourism
Stankov and Gretzel (2020)	The phygital context is defined as a place where physical and virtual objects overlap, including the phygital experiences. Building on the momentum of Industry 4.0, the concept of Tourism 4.0 currently fuels visions of similar technology-based transformations towards highly interconnected and phygital systems	Tourism
Andrade and Dias (2020)	The concept of phygital is an alternative to conceptualising the real and the virtual as separate layers that may overlap or replace each other. The real and the virtual become entangled in a complex way, as we simultaneously move through physical and virtual realities. Actions on one of these layers affect the other, as they become facets of the same existence	Cultural heritage
Mele et al. (2021)	The concept of phygital is defined as the integration of digital technologies, social presence, and physical elements	Customer journey
Lawry (2021)	“The phygital concept is a physical and digital (phygital) channel shown through mobile devices” (p. 1)	Retail
Banik (2021)	Phygital retailing connects the physical and digital worlds and helps customers live in-store and online at the same time in the same place to achieve an amazing experience	Retail
Reilly and Dawson (2021)	“Phygital is a neologism that refers to an increasingly apparent universe in which <i>physical</i> and <i>digital</i> artefacts intersect, holding out the promise of substantive new ways to (re) consider the materiality and ontology of object” (p. 291)	Arts and archaeology
Liu et al. (2022)	“Phygital-social context is a complex context created by smartphones that trigger and supports the development of new travel plans, the re-examination of pre-trip plans, and the cancellation of pre-trip plans” (p. 47)	Tourism

Table 1 (continued)

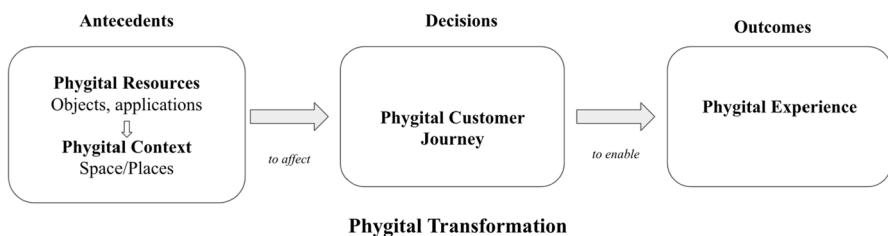
Source	Definitions	Research area
Batat (2022)	Physical is viewed as a comprehensive framework for better managing customer experiences (PH-CX). The framework comprises the fundamental driving forces, connectors, and pillars of the physical customer experience strategy to help managers design compelling customer experiences	Customer experience

Table 2 Definition of items

Items	Definition
Phygital objects and applications	Phygital objects and applications are defined as solutions that combine physical objects with digital interfaces and online content. They provide new resources for engaging customers and other actors, affecting their decision behaviour
Phygital context (space/place)	Phygital context (space/place) is defined as a setting or service encounter characterised by a set of one or more processes in which overlapping of physical and digital places or spaces occurs. They make bonds, bridges, and webs that enable interaction and sharing among many human and non-human actors
Phygital customer journey	The phygital customer journey is defined as the path in which technological solutions eliminate the boundaries between reality and virtuality, allowing customers to fully immerse themselves and take advantage of their desired level of connectivity wherever they are. It takes place within a synergistic online and offline context enabled by smart technologies
Phygital shopping (retail) experience	The phygital shopping experience is defined as an omnichannel customer perception that joins physical features and digital components involving customers' emotional, social, and behavioural responses. It takes place in a single space–time context

combine physical tools with digital interfaces and online content. Second, context (space/place) refers to a frame featured by a combination of one or more processes that cause physical and virtual spaces to overlap. Third, the customer journey is characterised by processes by which technological advances dissolve the distinction between reality and virtuality. Finally, the shopping (retail) experience refers to an omnichannel experience that integrates physical and digital elements and involves customers' emotional, social, and behavioural responses.

In addition, based on the ADO framework, we identified phygital resources (objects and applications) and phygital context (space/place) as antecedents, able to affect decisions during the phygital customer journey (D), which, in turn, enable phygital experience outcomes (O) (Fig. 2). The presentation of results based on ADO, first, allowed the elements to be viewed as pieces of a puzzle to envision a more complete picture of the ongoing transformation. Second, they identified a

**Fig. 2** Antecedents, decisions, and outcomes of phygital transformation

sound theoretical model that also lends itself to explaining the results and future research avenues.

3.2.1 Antecedents

3.2.1.1 Phygital resources (objects and applications) The increasing use of smart technologies is the first step (Lupetti et al., 2016) to enabling the emergence of phygital objects, that is, tools combining human cognition with phygital applications (Andrade & Dias, 2020; Veer & Dobele, 2021). These phygital objects can be created through multidirectional practices—“digital objects can become physical and conversely, material instantiations can be virtualized” (Reilly & Dawson, 2021, p. 292). They work as key resources for actors to interact in a new way and become engaged. With a specific focus on gaming, some studies (Lupetti et al., 2016; Mansilla et al., 2019) focused on technologies that combine physical objects with digital interfaces and online content. The result is smart resources capable of adapting to people’s requirements, preferences, and routines in a reactive way (Gelsomini et al., 2021).

Phygital applications also provide new resources for engaging customers and other actors, affecting their decision behaviour. Studies on cultural heritage point to the changes in infrastructure and processes that affect visitors’ behaviours (Andrade & Dias, 2020). The interactive analysis and management of data, enabled by the use of phygital objects and applications, intensify visits to cultural heritage sites, create social interaction layers, and personalise them (Stankov & Gretzel, 2020). Examples of these new resources come from Amiibo Toys-to-life (by Nintendo), a phygital application that offers the possibility of playing with physical figurines and action figures to enable users to interact with the digital games. The functionality of these figurines and cards is much more significant. Amiibo gamers play in all realities—virtual and physical dimensions. The gamer can use the phygital application for various platforms, check the data on mobile devices, play on computers, perform activities in VR and AR, and have some practical use for these physical figurines, such as playing a tabletop game with them. On the other hand, the providers can check and collect data and information and use this to design a highly immersive engagement.

3.2.1.2 Phygital context (space/place) Scholars use the phygital label in connection with a place or space where the overlapping of real and virtual occurs (Sustacha et al., 2022). A new, undivided perception of the phygital context is emerging through the diffusion of new smart technologies and applications (Liu et al., 2022). The amalgamation of physical and digital contexts and spaces shapes a phygital space featured by the development of bonds, bridges, and webs that enable interaction and sharing between different human and non-human actors (Nakazawa & Tokuda, 2007; Shalini et al., 2021; Sustacha et al., 2022; Tolstikova et al., 2021). The phygital context provides a new form to connect and engage customers and support a smooth customer behaviour path (Gelsomini et al., 2021; Tolstikova et al., 2021).

Banik (2021) argued that “phygital retail stores are investing tangible (e.g., physical and digital facilities) and intangible resources (e.g., information, status, pleasure) to receive favour from customers (e.g., engagement, patronage, referral)” (p. 8), influencing how a customer behaves along the journey. The phygital context affects a

customer journey that seamlessly integrates physical and digital experiences. Studies in tourism and hospitality have empirically investigated the role of the new phygital space (Liu et al., 2022; Sustacha et al., 2022) and its impact on transforming visitors' and tourists' behaviour processes. For example, a new smart destination proposal incorporates contactless interactive visiting, seamless digital reservation and payment systems, and AR into the visitors' experience (Sustacha et al., 2022). Mele and Russo Spina (2022) noted that a phygital context enables customers to have immersive augmented engagement, "these solutions blur the line between what reality is and how it can be envisioned for customers who move through different spaces and places" (p. 1). In this perspective, Silva and Cachinho (2021) contended that there is a need to reinvent management approaches to create shopping places in a balanced way, with assets from real and virtual worlds.

Examples come from Coderblock, an innovative platform, which offers the possibility of being engaged in a truly immersive environment. The company provides real phygital events with interactive virtual areas to host the speakers, exhibitors, and welcome visitors. Everyone has their own digital alter ego and can move between exhibitors and participate in webinars both face-to-face and remotely. This is innovative and original.

3.2.2 Decision: phygital customer journey

Digital applications and contexts become an integral part of the physical pattern of the customer journey. The new phygital context facilitates efficient customer decision-making (Liu et al., 2022). Specifically, the phygital customer journey erases the differences between reality and virtuality, enabling customers to immerse themselves in all senses and exploit any desired level of connectivity in any place (Mele et al., 2021). Digital technologies are imported into the physical context, helping to alleviate some of the most frustrating elements of the customer decision process, as well as the proliferation of touchpoints that offer opportunities to reduce information searching costs and open up a wider array of alternatives in the customers' decision-making process (Neuburger et al., 2018).

Along the phygital journey, the new experiential blueprint capturing the service interaction can be augmented through phygital resources or touchpoints (i.e., websites, apps, social networks, VR, products, packaging, etc.) (Jacob et al., 2021). The act of customer journey shaping comes from the firm's ability to match the interplay between the systems of insights (to collect data, emotion, etc.) and the systems of engagement (to connect and develop networking with and between customers) operated through the hybridisation of physical and digital touchpoints (Mele & Russo Spina, 2022).

Neuburger et al. (2018) addressed the customer journey as a circular sequence, characterised by the confluence between the physical world and the digital solutions that enrich the customer experience. By stressing this dynamic dimension, Mele and Russo Spina (2022, p.14) defined a phygital customer journey as "the path a customer takes by interacting with the company in a synergetic physical and digital context to have a seamless and personalised experience."

In a study of millennial customers, Mele et al. (2021) conceptualised the phygital journey as a fuzzy process or circular path of moments configuring microworlds of events, interactions, relationships, and emotions. The difference between the physical and digital realm does not exist for millennials as they move back and forth or jump from one touchpoint to another according to the levels of emotions and interactions they experience along the journey. An example is the IKEA Place app. In the online store, the customer can move along the visit path as if they were in a real store, pause on unique environments to find ideas and solutions, using the panoramic function and the 360-degree tour of the environments, which can also be used with a VR viewer. The customer can use their smartphone to check whether the furniture will fit with their rooms due to the integration of AR technology. Thus, they can view the products in the IKEA catalogue as live 3D holograms by projecting them directly into the rooms.

3.2.3 Outcome: phygital experience

Phygital has a strong connection with the shopping (retail) experience (Armstrong & Rutter, 2017; Samir & Soumia, 2020) in terms of emotional, social, and behavioural responses arising from the customer journey (Mele et al., 2021). According to Belghiti et al., (2017, p. 1) a phygital shopping experience consists of “hybridizing the physical (e.g., the point of sale, products, etc.) and digital components (e.g., touch screens, connected mirrors, NFT cards, etc.)” at the same time and in the same place. Studies in retail business show how phygital experience fosters a digital action that, in turn, triggers a physical reaction according to a recursive path that can be strengthened at each interaction (Banik, 2021; Batat, 2019, 2022; Nofal et al., 2017). The relationship between customers and retailers becomes robust because of the feeling of engagement and satisfaction (Belghiti et al., 2017). Customers meet their expectations and experience the deepest fulfilment by feeling safe, enthusiastic, and entertained (Banik, 2021; Lecointre-Erickson et al., 2021).

The phygital experience emerges as having unique value above and beyond what can be derived via a digital or physical journey alone. By seamlessly combining the two paths, customers can enhance their experiences (Mele et al., 2021). A crucial factor for companies is to provide access to and knowledge of online shopping at physical stores, and other ways of providing the experience of physical shopping through online interactions. According to Johnson and Barlow (2021), the phygital experience has to be characterised by the development of the customer’s perception of a shopping trip that is autonomous and independent but, above all, emotional and comfortable. Phygital experiences can be designed to provide a novel and seamless experience that customers enjoy, influencing their perceptions of value while generating trust and facilitating and reducing the so-called “pain of payment” (Johnson & Barlow, 2021). To obtain an authentically phygital experience, the technology promotes immediacy and immersion, and physical interaction is introduced to better engage the customer (Klaus, 2021; Lawry, 2021). Companies can design a compelling phygital customer experience that requires the fluidification of customers’ journeys from online to offline and, inversely, captures customers’ values and responds

to their tangible needs (e.g., their needs for quality) and their intangible needs (e.g., their emotional needs) (Batat, 2022; Hyun et al., 2022).

An example is Amazon, which reinvented the traditional physical supermarket with the formula of Amazon Go. This is a chain of food stores without cashiers. To use this phygital store, customers need to download the Amazon Go app, create an Amazon account, and use their smartphone to identify themselves at the entrance to the store. They can take products off the shelves and then leave the shop. The bill arrives directly on their phone without going through a cashier. Amazon Go and its “just walk out” technology promise a phygital shopping experience, exploiting a wide range of other tools, such as sensors, apps, QR codes, and AI. The company offers in-store “1-click ordering” thus reducing or eliminating the two main in-store retail pain points: out-of-stocks and long checkout lines.

4 Discussion

In this paper, we aim to contribute to filling research gap regarding the lack of development of the phygital construct. By conducting a systematic literature review and interpreting the findings through the ADO model, we present a conceptual framework to envision an emerging phenomenon.

The increasing use of smart technologies enables the development of phygital resources combining human cognition with phygital objects and applications (Andrade & Dias, 2020; Veer & Dobeles, 2021). In turn, such a combination fosters the creation of a phygital context, eliminating the boundaries between the real and virtual world and creating a bridge between disconnected space and place. The use of phygital resources and the development of the phygital context shape customers’ decision-making (i.e., the customer journey) and, as result, a new form of phygital experience emerges. Physical and digital experiences combine, and the intention is to tap into the best of both worlds. It is not just about opening a website or expanding online platforms, but also about offering customers as many options as possible (Mele & Russo Spena, 2022).

Although the phygital phenomenon is driven by smart technologies, it is a human-centred process (Stankov & Gretzel, 2020) that aims to create a network of interaction among people (Bazzanella et al., 2014), using digital tools to support activities (Batat, 2019) and to enhance the experience. In other words, the phygital transformation process is characterised by social relations change, moving towards two main trends: the rise of the individual and the enabling of communities (Bazzanella et al., 2014; Stankov & Gretzel, 2020). The interaction between physical and digital worlds has enabled the concentration and decentralisation of people in place and time, shaping the combination of place and network and creating a new socio-technical reality in the phygital era. In this sense, the phygital label must be more comprehensive and multi-faceted to fill gaps in the opportunities and limits of the phygital phenomenon and the transformation it brings about (Batat, 2022).

In summary, we see phygital not simply as the combination of physical and digital, but as a nexus, assemblage, or hybrid. In contrast, materiality, temporality, and location meet immateriality, dislocation, and timelessness. Such an assemblage is still an ontological “mess” (Reilly & Dawson, 2021) as the construct is not developed and emerges from scant empirical and theoretical research.

5 Limitations and directions for future research

This paper has some limitations that could offer a basis for further research. First, we acknowledge the risk of adopting a systematic literature review in terms of the limitations of the evidence (e.g., risk of bias, publication bias, inconsistency, imprecision), even if we followed the quality assessment with high rigour. Other studies are needed to confirm the results. Second, we only utilised one database (WoS), while examination of other studies could widen the investigation, including other references. Second, we offer a conceptual view with the help of an ADO framework (Paul & Benito, 2018), although with some illustrations. Future scholars could undertake empirical research to detect the ongoing phygital transformation.

Specific research avenues can be identified from the study due to the emerging nature of the topic, going beyond what can be passing attention and dictated by fashion. Literature on phygital concepts shows that the phygital transformation is a complex phenomenon that connects the immediacy and immersion of the digital world with the interactive exposure of physical reality. Multiple elements are involved and how these elements are integrated and work together is a key aspect for scholars to consider. In this sense, our paper depicts a view of phygital as a new hybrid concept connecting the real and the virtual worlds, not as separate layers that can combine but that can overlap, integrate, and replace. We provide directions for future research based on the items we identified according to the ADO model (Paul & Benito, 2018).

5.1 Antecedents

As already discussed, antecedents are the phygital resources and context comprising elements as objects and applications, but also space and place. Future research could enrich the debate by considering the phenomenon’s full complexity and analysing its facets through the lens of value co-creation. Phygital transformations change the existing marketing and service context into one that is dynamic and blurred. New phygital resources (objects, applications, etc.) can be integrated into phygital interactions among different actors (humans, robots, etc.). Examples of relevant research questions could be: how do actors integrate phygital resources? What are the implications of phygital resources on resources and accessibility? How do phygital objects and applications affect customer engagement? How do phygital contexts shape new value co-creation practices?

In addition, the increasing use of phygital resources enable multiple actors to perform their actions and reproduce relationships in a socio-material setting of new languages, symbols, norms, and practices. Thus, scholars should determine the consequences of phygital transformation for actors, institutions, and social structures. In this sense, further research questions could be: how is language evolving in the phygital context? How does language influence the emergence of practices related to phygital transformation? How do phygital objects and applications affect symbols and norms? What is the role of culture on phygital transformation?

5.2 Decisions

Decision factors could help to better understand how phygital transformation can convey an intricate connectedness among customers and phygital touchpoints involving a broader and hybrid view of the customer journey. Future research could enrich the phygital customer journey debate by investigating the interconnections between touchpoints from the physical and virtual worlds. Certainly, marketing research must adapt to future technological developments. Future research questions could be: which is the technology that best enriches all stages of the customer journey? Which phase of the phygital customer journey is crucial in the decision-making process? What is the profile of the future phygital customer? How will they behave and decide during the journey? What are the events that they will expect? How do managers implement customer journey strategies in a phygital setting? How will the development of shared technological experiences (e.g., AR, VR, metaverse) affect customer perceptions during the journey?

5.3 Outcomes

Phygital experience can be a radical change for value co-creation, and how this can happen has not yet been investigated. This is a bright and promising narrative that assumes phygital transformation provides unique value above and beyond what can be offered via digital or physical means. More research should address the fact that phygital can not only refer to the customer, but also needs to address the broader phygital transformation process and multiple actors. Phygital applications are moving fast and we cannot currently understand how they affect quality of life, well-being, and actors' experiences. Further research can also analyse what types of emotions (i.e., fear, joy, apprehension, excitement) customers experience during their interactions with phygital products/services and how such emotions have a role in affecting the phygital experience. Particular research concerns are privacy and ethics. The main research questions could be: what are the main implications for personal privacy, security, and autonomy in adopting phygital objects and applications? Will customers want to give companies their personal data in order to benefit from a phygital immersive experience? What is the trade-off between customer engagement in phygital contexts and customer security and privacy?

5.4 Implications for practitioners

From a managerial point of view, practitioners need to recognise the complexity of phygital transformation, especially involving its synchronic and diachronic dimensions such as space and time. Nowadays, customers increasingly interact with digital assistants in physical contexts and, similarly, when they use smartphones and tablets for search, entertainment, and payment. Thus, managers have to integrate physical and digital channels to enhance their customer reach, especially from a business strategy perspective. Managers should improve the design of the physical–digital integration that encourages the development of a phygital context, eradicating the distinction between the real and virtual worlds, and connecting disjointed space and place. The proposed framework has shown that although smart technologies are the driving force behind the phygital phenomenon, it is a human-centred process that seeks to build a network of interpersonal interactions between individuals while utilising digital tools to support activities and improve the experience (outcome).

Smart technologies are “new realities”, and they are potentially changing and disrupting several industries and influencing customers during their decision-making journey. Managers must not be afraid of change, but rather must design their new business models to focus on inspiring innovations and co-creating memorable experiences with customers. Starting from this, practitioners should take into consideration how phygital resources (antecedents) are used and how the phygital context (antecedents) develops to influence the entire customer journey (decisions). Therefore, our research suggests that practitioners should recognise the phygital phenomenon as a “nexus, assemblage, or hybrid” rather than just as the union of physical and digital elements.

In addition, practitioners must be more transparent in sharing information (e.g., across their platforms or applications) to minimise customers’ discomfort while encouraging them to seek and provide information in terms of their feedback. Most particularly, they should be completely transparent regarding ethical implications such as security and privacy issues and pricing across channels. They should augment customer engagement through the store, mobile apps, or other relevant channels. In summary, they must implement a phygital culture that entails a comprehensive view of the customers and channels. The blurred phygital reality means there is more room to experiment for managers, customers, and other market actors. Companies should understand how to integrate phygital resources, create phygital contexts, affect the customer journey, and enable customer experience. Managers should not look merely at technologies but should evaluate the cost or benefit of phygital investment in terms of quality of life and well-being, on the one hand, and privacy and ethical concerns, on the other. The highest priority is a strategic, cultural, and social view of phygital transformation. The next step on the managers’ agenda is how the phygital world works and how companies can exploit opportunities and face challenges.

Appendix 1: Selected papers

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
1	<i>Phygital map: accessing digital multimedia from physical map</i>	Nakazawa, J. & Tokuda, H	Empirical study: qualitative method	Cus- tomer	Augmented map interface	Phygital context (space/ place) Phygital objects and applica- tions	Computer Science	21st Interna- tional Con- ference on Advanced Information Networking and Applications Workshops (AINAW'07)	2007
2	<i>Phygital public space approach: a case study in Volpiano</i>	Bazzanella, L. et al	Empirical study: qualitative method	Cus- tomer	Social media	Phygital context (space/ place)	Education	Interaction Design and Architectures	2014
3	<i>Phygital play HRI in a new gaming scenario</i>	Lupetti, M. L. et al	Empirical study: qualitative method	Cus- tomer	Robotics, Artificial intelligence (AI)	Phygital objects and applica- tions	Computer Science	Proceed- ings of the International Conference on Intelligent Technologies for Interac- tive Enter- tainment (INTETAIN 2015)	2015
4	<i>Designing play- ful HRI. accept- ability of robots in every- day life through play</i>	Lupetti, M. L	Empirical study: qualitative method	Cus- tomer	Robotics, AI	Phygital objects and applica- tions	Computer Science	11th ACM/ IEEE International Conference on Human- Robot Interaction (HRI)	2016
5	<i>Exploring the enigma of the happiness construct in phygital fashion experi- ences</i>	Armstrong, K., & Ruter, C	Conceptual study	Double per- spec- tive: pro- viders and cus- tomers	Smart apps	Phygital shop- ping (retail) experi- ence	Econom- ics	In Advanced Fashion Technology and Operations Management	2017

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
6	<i>The phygital shopping experience: An attempt at conceptualisation and empirical investigation</i>	Belghiti, S. et al	Conceptual and empirical study: qualitative method	Double perspective: providers and customers	Touch screens, connected mirrors, NFC cards	Phygital shopping (retail) experience	Business	AMSWMC 2017: Marketing Transformation: Marketing Practice in an Ever-Changing World	2017
7	<i>Robust robot tracking for next-generation collaborative robotics-based gaming environments</i>	Piumatti, G. et al	Empirical study: quantitative method	Custom-ers	Robotics, AI	Phygital objects and applications	Computer science	IEEE Transactions on Emerging Topics in Computing	2017
8	<i>Phygital heritage: An approach for heritage communication</i>	Nofal, E. et al	Conceptual study	Provid-ers	Smart apps	Phygital shopping (retail) experience	Communi- cation	In Immersive Learning Research Network Conference	2017
9	<i>Legal frameworks for the phygital concept</i>	Švec, M., & Madleňák, A	Conceptual study	Cus- tomer	QR codes, augmented reality (AR), 3D, Sixth Sense, Google Glass, Apple Watch	Phygital context (space/place)	Religion	European Journal of Science and Theology	2017

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
10	<i>Brand building with using phygital marketing communication</i>	Moravcikova D., & Kliestikova J	Conceptual study	Providers	AI, virtual reality (VR) and advanced user interaction reality, AR, QR codes	Phygital shopping (retail) experience Phygital context (space/place) Phygital objects and applications	Business	Journal of Economics, Business and Management	2018
11	<i>The phygital tourist experience: the use of augmented and virtual reality in destination marketing</i>	Neuburger, L. et al	Conceptual study	Custom-ers	AR and VR	Phygital Customer Journey	Hospitality	In Tourism planning and destination marketing	2018
12	<i>The phygital experience in the smart tourism destination</i>	Ballina, F.J. et al	Empirical study: quantitative method	Custom-ers	ITC(s)	Phygital context (space/place) Phygital shopping (retail) experience	Hospitality	International Journal of Tourism Cities	2019
13	<i>Phygital customer experience: Definition, characteristics, types, and key success factors</i>	Batat, W	Conceptual study	Custom-ers		Phygital shopping (retail) experience	Business	Experiential Marketing	2019

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
14	<i>Toys that mobilise: past, present and future of phygital playful technology</i>	Heljakka, K., & Ihamäki, P	Conceptual study	Custom- ers	Playful smart technologies	Phygital objects and applica- tions	Computer Science	Proceedings of The Future Technologies Conference (FTC) 2019	2019
15	<i>Transmedial worlds with social impact: exploring intergen- erational learning in collabora- tive video game design</i>	Mansilla, J. C. et al	Empirical study: qualita- tive method	Custom- ers	Video games	Phygital objects and applica- tions	Education educa- tional research	Journal Of Childhood Studies	2019
16	<i>Investigating tangible user interaction in mixed- reality robotic games</i>	Pratticò, F. G. et al	Empirical study: quan- titative method	Custom- ers	Robotics, gaming	Phygital objects and applica- tions	Engineer- ing Com- puter science	9th Inter- national Conference on Consumer Electronics (ICCE- Berlin)	2019
17	<i>A phygital approach to cultural heritage: augmented reality at Regaleira</i>	Andrade, J.G., & Dias, P	Empirical study: qualita- tive method	Custom- ers	Internet of Things (IoT), AR	Phygital objects and applica- tions	Archaeol- ogy	Virtual Archaeology Review	2020
18	<i>Phygitaliza- tion of the customer experi- ence: a qualitative approach</i>	Samir, M., & Soumia, A	Empirical study: qualita- tive method	Custom- ers	Smart apps	Phygital shop- ping (retail) experi- ence	Communi- cation	International Journal of Marketing Communication And New Media	2020
19	<i>Tourism 4.0 technologies and tourist experi- ences: a human- centred design perspec- tive</i>	Stankov, U., & Gretzel, U	Conceptual study	Custom- ers	IoT, Big data ana- lytics, AI, Block- chain, location- based services or VR and AR Systems	Phygital objects and applica- tions	Hospital- ity	Information Technology and Tourism	2020

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
20	<i>Towards a phygital heritage approach for museum collection</i>	Turco, M. L., & Giovannini E.C	Empirical study: qualitative method	Custom- ers	Smart tech- nologies	Phygital context (space/ place)	Archaeol- ogy	Journal of Archaeologi- cal Science- Reports	2020
21	<i>Exploring the involvement–patronage link in the phygital retail experiences</i>	Banik, S	Empirical study: quan- titative method	Custom- ers	Digital screen, smart mirror	Phygital shop- ping (retail) experi- ence phygital context (space/ place)	Business; Econom- ics	Journal of Retailing and Consumer Services	2021
22	<i>Under- standing in-store interactive technology use: a uses and grati- fications theory (UGH) perspective</i>	Boudkouss, H., & Djelassi, S	Empirical study: qualitative method	Custom- ers	Interactive kiosks self- checkouts	Phygital shop- ping (retail) experi- ence Phygital context (space/ place)	Business; Econom- ics	International Journal of Retail & Distribution Management	2021
23	<i>Phygital high- lighting: Achieving joint visual attention when physically co-editing a digital text</i>	Due, B.L., & Toft, T.W.L	Conceptual study	Custom- ers	Smart apps mobile device	Phygital shop- ping (retail) experi- ence Phygital objects and applica- tions	Linguis- tics	Journal of Pragmatics	2021
24	<i>Phygital interfaces for people with intel- lectual disability: an explora- tory study at a social care centre</i>	Gelsomini, M. et al	Empirical study: qualitative and quan- titative method	Custom- ers	Smart app Smart platform IoT	Phygital context (space/ place)	Computer science	Multimedia Tools and Applications	2021

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
25	<i>Shifting to phygital experience management with design science: a six-step method to manage customer journeys</i>	Neuburger, F. et al	Conceptual study	Double perspective: providers and customers	IoT	Phygital shopping (retail) experience Phygital customer journey	Business; Management	Journal of Strategic Management	2021
26	<i>Defining the phygital marketing advantage</i>	Johnson, M., & Barlow, R	Empirical study: qualitative method	Double perspective: providers and customers	IoT Smart app	Phygital shopping (retail) experience Phygital objects and applications	Business; Economics	Journal of Theoretical and Applied Electronic Commerce Research	2021
27	<i>Viewpoint: phygital—the emperor’s new clothes?</i>	Klaus, P. P	Conceptual study	Double perspective: providers and customers	Smart technologies, AI	Phygital shopping (retail) experience	Business; Economics	Journal of Strategic Marketing	2021
28	<i>Blurring luxury: the mediating role of self-gifting in consumer acceptance of phygital shopping experiences</i>	Lawry, C. A	Empirical study: quantitative method	Consumers	Smart mobile devices	Phygital shopping (retail) experience	Business; Economics	International Journal of Advertising	2021

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
29	<i>The role of bricks-and-mortar exterior atmospheres in post-COVID era shopping experience: a systematic review and agenda for future research</i>	Lecointre-Erickson, D. et al	Conceptual study	Custom-ers	Smart technologies, AI	Phygital shopping (retail) experience	Business	Journal of Strategic Marketing	2021
30	<i>The architecture of the phygital customer journey: a dynamic interplay between systems of insights and systems of engagement</i>	Mele, C., & Russo Spena, T	Empirical study: qualitative method	Provider	Smart technologies	Phygital customer journey Phygital objects and applications	Business; Management	European Journal of Marketing	2022
31	<i>The millennial customer journey: a phygital mapping of emotional, behavioural, and social experiences</i>	Mele, C. et al.,	Empirical study: qualitative method	Custom-ers	Smart technologies	Phygital customer journey	Business; Management	Journal of Consumer Studies	2021

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
32	<i>Consumer retention through phygital experience in omnichannel retailing: role of consumer empowerment and satisfaction</i>	Mishra, S. et al	Empirical study: quantitative method	Cus- tomer	Smart platform IoT	Phygital shopping (retail) experience	Business; Economics	Journal of Strategic Management	2021
33	<i>Track and trace, and other collaborative art/archaeology bubbles in the phygital pandemic</i>	Reilly, P. & Dawson, I	Empirical study: qualitative method	Provider	3D-soft- ware	Phygital objects and applications	Archaeol- ogy	Open Archae- ology	2021
34	<i>Actions in phygital space: Work solidarity and collective action among app-based cab drivers in India</i>	Shalini, B. et al	Empirical study: qualitative method	Cus- tomer	Smart apps	Phygital context (space/place)	Ergonom- ics; Management	New Technol- ogy, Work and Employ- ment	2021
35	<i>Places of phygital shopping experiences? the new supply frontier of business improvement districts in the digital age</i>	Silva, D.G., & Cachinho, H	Empirical study: qualitative and quantitative methods	Provider	Smart apps	Phygital context (space/place)	Environ- mental science	Sustainability	2021

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date
36	<i>Big boys don't cry [offline]: the phygital disconnect between online and offline mental wellness engagement</i>	Veer, E., & Dobele, A	Empirical study: qualitative method	Double per- spec- tive: providers and cus- tomers	Smart apps mobile device	Phygital objects and applica- tions	Business	Journal of Strategic Marketing	2021
37	<i>Phygitally yours: examination of virtual reality experiences in digital sports and rec- reational games</i>	Yüce, A. et al	Empirical study: qualitative method	Custom- ers	Digital VR	Phygital context (space/ place) Phygital objects and applica- tions	Communi- cation	Journal The Messenger	2021
38	<i>On-site decision- making in smart- phone- mediated contexts</i>	Liu, X. et al	Empirical study: qualitative and quan- titative methods	Cus- tomer	Smart- phones	Phygital context (space/ place) Phygital shop- ping (retail) experi- ence	Business	Tourism Man- agement	2022
39	<i>What does phygital really mean? A conceptual introduction to the phygital customer experience (PH-CX) framework</i>	Batat, W	Conceptual study	Cus- tomer	Smart tech- nologies	Phygital shop- ping (retail) experi- ence	Business	Journal of Strategic Management	2022

	Title	Author(s)	Types	Perspec- tives	Technolo- gies	Items	ISI catego- ries	Source	Date	
40	<i>How luxury brands build customer-based brand equity through phygital experience</i>	Hyun et al	Empirical study: quantitative method	Provider	Smart mobile device	app	Phygital shopping (retail) experience	Business Journal of Strategic Management	2022	
41	<i>Research trends in technology in the context of smart destinations: a bibliometric analysis and network visualisation</i>	Sustacha, I. et al	Conceptual study	Provid- ers and customers	Smart tech- nologies	Phygital context (space/ place)	Phygital objects and applications	Business Management Letters / Cuadernos de Gestión	2022	
42	<i>Designing educational trajectories for generation Z: identifying cognitive factors</i>	Tolstikova, I. et al	Empirical research: quantitative method	Custom- ers	Smart mobile device IoT	apps	Phygital context (space/ place)	Communi- cation; Computer Science	Digital trans- formation and global society	2022

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