

Digital Renaissance in Retail: Integrating Multi-sensory design and design technologies for enhanced customer engagement

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Abstract - The paper embarks on a transformative journey into the realm of retail, spotlighting the burgeoning Digital Renaissance & its symbiotic relationship with multi-sensory design. Through a meticulous exploration of digital technologies & sensory elements, this research elucidates strategies for crafting unparalleled customer engagement and experiences within the contemporary retail landscape.

Keywords - Shopping Motivation, Store Atmospherics, Environmental Psychology, Digital Renaissance, Store Design

I. INTRODUCTION

The retail landscape is undergoing a “Digital Renaissance,” blending advanced technology with immersive shopping experiences. Central to this evolution is multisensory design, integrating sight, sound, touch, scent and taste to deeply engage consumers. This approach not only captures attention but also boosts loyalty and perceived value. Our research aims to explore the fusion of digital technology with multisensory design in retail. Specifically, we seek to understand its challenges and benefits and assess its impact on key consumer metrics like engagement and loyalty. This investigation aims to guide retailers in creating resonant experiences for today’s discerning consumers.

II. LITERATURE REVIEW

[Ana Mosquera, Cristina Olarte-Pascual, Emma Juaneda Ayensa and Yolanda Sierra Murillo, \(2018\) \[1\]](#) The paper delves into omnichannel retailing’s emergence and significance, particularly within the fashion sector, enabling consistent customer interactions across multiple platforms, as technology evolves, it blends physical and online shopping experiences, through ensuring seamless integration remains a challenge for retailers. This paper fills empirical research gaps by investigating consumer preferences for omnichannel technologies, emphasizing gender variations in purchase intentions. The study centered on Zara’s omnichannel strategies utilized a 2016 survey of 628 Spanish omnichannel clothing shoppers. Using advanced statistical methods, it found that both genders prioritize in-store technology but differ slightly; men favor in-store tools, while women lean towards fitting-room technologies. However, no significant gender disparities were observed. Key insights highlight consumers’ preference for certain in-store technological features, though social media engagement in-store remains unpopular due to privacy reasons. The study underscores the importance for retailers to adapt, considering technology’s role in enhancing customer experiences. Yet, the research has its limitations, such as its Spain centric focus and omission of cost considerations. Future research could expand this scope, emphasizing diverse product categories and demographics.

[Santiago Iglesias-Pradas and Emiliano Acquila-Natale \(2023\), \[14\]](#) The retail landscape has undergone significant digital transformation, giving rise to omnichannel retailing where online and offline channels merge seamlessly for an enhanced customer journey. This evolution spans three waves, culminating in a mobile device-integrated third wave that blurs channel boundaries. Companies now strive to create a unified fluid customer experience across touchpoints, acknowledging the unpredictability of customer paths. Essential to this success are unified services, smooth transitions, and cohesive communication, supported by factors like organizational culture and flexible systems. While the study’s scope was limited to Finnish companies, it emphasizes the shift from per-channel processes to intuitive omnichannel experiences. Future research could explore consumer behaviour’s influence on strategies and the link between seamless experiences and increased purchasing frequency. The rise of e-commerce pushes retailers towards multichannel strategies, offering diverse options, valuable data collection, and improved shopping experiences. Emerging technologies like AI shape the future, supporting personalized recommendations and secure transactions. Challenges include data integration

and understanding consumer behaviour, paving the way for a “phygital” future that optimizes resources while delivering seamless experiences. The multichannel retail and e-commerce special issue cover various strategic, customer-centric, and environmental aspects, emphasizing adaptation, consumer behaviour, and industry implications. Studies on inventory replenishment, last mile logistics, and order fulfilment underscore the importance of technology, customer focus, and strategic decision-making in navigating the complex multichannel retail landscape.

[Valeria Belvedere, Elisa Martina Martinelli, Annalisa Tunisini \(2021\), \[16\]](#) The integration of e-commerce within omnichannel strategies has become crucial in sales and distribution. Research examined factors like distribution channels and product value density, influencing how companies, exemplified by Luxottica, Henkel, Ferragamo, and IKEA, optimize their e-commerce strategies. These cases illustrate the benefits and challenges of integrating e-commerce, showcasing various approaches categorized into four quadrants. For instance, Luxottica leverages high-value products to enhance data-driven insights, while IKEA faces difficulties due to low-value items in their store-centric model. Overall, the study emphasizes the need for companies to tactfully manage e-commerce within an omnichannel approach, considering its impact on marketing, sales and supply chains while addressing logistical challenges.

[Charles Spence, Nancy M. Puccinelli, Dhruv Grewal and Anne L. Roggeveen \(2014\), \[4\]](#) The paper explores how various sensory elements within retail environments-visual, auditory, olfactory, tactile and gustatory-affect consumer behaviour and perceptions. It emphasizes creating congruent multisensory atmospheres to enhance customer experiences, influencing product choices and behaviours positively. However, it warns about potential sensory overload and highlights the complexity of individual preferences for sensory stimulation. It discusses cognitive neuroscience’s role, challenges in implementation, and the need for further research. Ultimately, it suggests that investing in congruent multisensory atmospherics can significantly impact customer behaviour and sales, though careful design and study are essential for success.

[Lily \(Xuehui\) Gao, Iguacel Melero & F. Javier Sese \(2019\), \[10\]](#) The paper explores the impact of evolving technology on consumers’ access to information and comparisons across diverse marketing channels. It underlines the complexities of the modern customer journey and firms’ endeavours to deliver consistent experiences and products across various touchpoints. Acknowledging research gaps in understanding integrated marketing mix elements and customer experiences, the study aims to conduct a systematic review and propose a comprehensive model. The model considers the influence of customer, firm and industry-related factors on marketing mix consistency and customer experience across different journey stages. Employing a systematic literature review, the study narrowed down 527 articles to 75 relevant ones across 31 journals. This thorough analysis highlighted the need for holistic investigations of all marketing mix elements across the customer journey, emphasizing variations in effectiveness across customers, firms, and industries. It stresses the significance of customer experience in multichannel management, citing gaps in its assessment and understanding. The review identifies challenges in multichannel management and proposes a conceptual model linking marketing mix consistency to customer experience, emphasizing the importance of integrated branding, promotions, pricing, and assortment across channels. The model outlines implications for different customer journey stages and stresses the need to understand variations among customers, firms, and industries for effective multichannel strategies. Despite its comprehensive approach, the study acknowledges limitations due to its conceptual nature and emphasizes the necessity for empirical validation and longitudinal studies to confirm the proposed framework.

[RN Bolton, JR Mccoll-Kennedy, L Cheung \(2018\), \[12\]](#) The paper underscores how customers seek enhanced service experiences, influenced by technological advancements and societal shifts, impacting digital, physical and social dimensions. It introduces a three-dimensional framework analyzing customer experience through digital density, physical complexity, and social presence, aiming for holistic management. It views customer experience as multifaceted, embracing cognitive, emotional and sensory aspects, fostering mutual gains for providers and customers. The study elucidates each realm’s characteristics and relevance, emphasizing their convergence and impact on customer experiences. It anticipates sectoral shifts, highlighting challenges like navigating dense digital environments and managing evolving roles in social interactions. Complexities in multidimensional service ecosystems are detailed, outlining tensions and challenges across eight conditions. Solutions are proposed for challenges, such as scarcity in resources and regulatory complexities, stressing understanding customer preferences and organizational alignment. The conclusion accentuates the fusion of

digital, physical, and social realms, underscoring the potential for researchers and managers to shape customer experiences positively through interconnected service innovations.

Salvatore Parise, Patricia J. Guinan, Ron Kafka (2016), [13] The paper explores the “crisis of immediacy” for marketers, highlighting consumers’ demand for instant, tailored content during shopping experiences. It delves into digital technologies’ transformative impact, like video conferencing, mobile apps, and augmented reality, showcasing two models-remote experts and digital assistants- and their deployment by organizations. The text emphasizes omnichannel shopping, redefining retail strategies, and leveraging technology, analytics, and customer insight. It discusses insights from five years of research involving over 35 retailers and examines the impact of virtual experts on customer experiences, emphasizing seamless interactions across touchpoints and concepts like flow and immersion. Research showcases how remote experts significantly enhanced various industries, aiding consumers through their journey phases and increasing engagement. It highlights successful implementations in finance, field-based service, and retail, detailing improved performance metrics and positive reception. The article also explores the virtual concierge, a tailored service aiding complex purchases across multiple channels, and its effectiveness in time-sensitive situations. Moreover, it discusses the managerial implications, emphasizing the suitability of the remote expert model for complex products mapping customer journeys, leveraging predictive analytics and addressing challenges for seamless execution. It also highlights the evolution of mobile apps, their role as digital assistants, and the significance of location-based services in delivering personalized content. The managerial implications stress technology usability, staff adaptation, and privacy concerns, urging retailers to cater to consumers’ immediate content needs for a competitive edge in customer experiences.

Bethan Alexander (2019), [3] The paper discusses the profound impact of digitalization on retail, highlighting its transformative effects on business models and customer behaviour. It emphasizes the continued relevance of physical stores in the face of online sales and the shift towards enhancing in-store experiences. Through empirical research and expert interviews, it identifies five key shifts in physical stores, including brand storytelling, social experiences, sensorial engagement, community hubs, and localization. Additionally, it outlines the future of physical retail in an omnichannel landscape, stressing the importance of transformation, smaller store formats, technology’s supportive role, redefined customer experiences, new metrics for performance measurement, and best practices for optimizing customer experiences. Ultimately, it underscores the transition of physical stores from transactional spaces to experiential centers, emphasizing human connections, storytelling, and personalised experiences within the omnichannel retail framework.

Charles Spence & Alberto Gallace (2016), [4] The paper emphasizes touch’s pivotal role in product evaluation and marketing, drawing from marketing, psychology, and neuroscience to underline its impact on perceptions and evaluations. It discusses touch’s influence on various items, especially those in direct contact with the skin, and its role in multisensory product design. The passage also addresses challenges in tactile design due to an aging population and online shopping, showcasing how technology and tactile evocations are being used in successful campaigns. It anticipates touch’s potential in branding and marketing strategies, highlighting the need for further research to understand its impact.

Francesca Bonettia, Gary Warnabyb , and Lee Quinn (2018), [6] This paper examines how Augmented Reality (AR) and Virtual Reality (VR) have evolved in retail. It highlights their adoption challenges and benefits for retailers, various applications (like virtual try-on for clothes and cosmetics), and factors influencing consumer acceptance. Emphasizing the interdisciplinary nature of research, it calls for future exploration, focusing on user-friendly interfaces, collaboration, and understanding evolving consumer trends and implications for retailers.

Pranav Parekh, Shireen Pate, Nivedita Patel, Manan Shah (2020), [11] The paper extensively reviews Augmented Reality (AR) applications in entertainment, medicine and retail, distinguishing AR from Virtual Reality (VR) and outlining software and hardware requirements for AR systems. It explores AR’s growth in markets and its impact in gaming, medicine and retail, emphasizing how AR enhances user experiences. The study also highlights future prospects, advantages, and disadvantages of AR. In entertainment, AR transforms traditional gaming, multimedia presentations, and videos by blending real and virtual worlds, offering interactive 3D experiences. The paper discusses Ivan Sutherland’s foundational role in AR technology and tracks advancements, focusing on gaming’s collaborative and pervasive nature. It also details AR’s role in enhancing broadcasting, particularly in sports events. Regarding medical applications, AR enhances natural environments with virtual information, showing promise in medical education, surgical procedures, anatomical

evaluation and rehabilitation. The study discusses specific AR technologies like Head-Mounted Displays (HMDs) and their applications in the medical field, outlining prototypes and systems for surgical planning and interventions. Despite its potential, AR faces challenges like undefined business models, privacy concerns, and compatibility issues. However, it holds immense potential across various industries, promising personalized customer experiences and reshaping business strategies. Recent advancements in AR, showcased by applications like Pokemon Go and Snapchat, indicate its growing market base and future potential. In summary, the paper extensively explores AR's impact in entertainment, medicine, and retail, highlighting its potential in revolutionizing various human experiences, despite challenges that need to be addressed for its widespread adoption.

Jillian C. Sweeney, Geoffrey N. Soutar (2001), [8] The research underscores the critical role of perceived value in the success of organizations, especially in the retail sector. Despite its significance, there is a dearth of comprehensive research on the value construct itself and a lack of a well-accepted measurement scale. To bridge this gap, the study introduces the PERVAL scale, a 19-item measure designed to assess customers' perceptions of value for consumer durable goods at a brand level. This scale identifies four distinct value dimensions: emotional, social, quality/performance, and price/value for money. Through rigorous testing, including exploratory and confirmatory analyses in both pre and post-purchase scenarios, all four dimensions prove significant in explaining attitudes and behaviour. The study highlights the evolving nature of consumer preferences, emphasizing that customers are increasingly value-driven. It suggests that understanding what customers value is crucial for gaining a competitive advantage in the market. Moreover, it references various scholarly perspectives on perceived value, emphasizing its multidimensional nature beyond the traditional trade-off between quality and price. It introduces an experiential perspective that includes symbolic, hedonic, and aesthetic aspects of consumption, indicating a broader view of value beyond utilitarian criteria. The paper also discusses the interrelated nature of value dimensions and distinguishes perceived value from satisfaction, positioning value as a multi-dimensional construct across various stages of the purchase process. Furthermore, the research outlines implications for retailers, highlighting the significance of emotional and social values alongside functional aspects in shaping consumer choice. It suggests strategies for retailers to incorporate these dimensions into their positioning and service quality, emphasizing the role of brand value in fostering customer loyalty. However, the study acknowledges the need for further exploration, suggesting future research to encompass additional value dimensions, explore variations across different retail categories, and conduct longitudinal studies to understand the evolving nature of perceived value in consumer relationship over time.

Van-Hau Trieu (2016), [17] The research delves into Business Intelligence (BI) systems, noting their significance in addressing organizational challenges. However, it highlights a fragmented literature lacking a cohesive framework, emphasizing the persistent query about BI system value. To address this, the study reviews Information Systems (IS) research to understand the processes of deriving business value from BI systems. The findings outline a sequence from BI investments to impacts on organizational performance, echoing Soh and Markus's 1995 model. However, it points out gaps in exploring the connections between these stages and in analysing various levels of analysis and their interactions. The paper stresses the need for a comprehensive view of how organizations benefit from BI systems, urging further research to bridge knowledge gaps. It emphasizes diverse perspectives on BI and advocates for synthesizing existing literature to advance BI's role in creating business value. Leveraging the IS business value model by Soh and Markus, the study identifies areas for deeper investigation within BI research from 2000 to 2015. Additionally, it acknowledges three limitations: the lack of quantitative evaluation of relationships, constraints due to the chosen framework and sampling approach, and limited joint coding of papers, albeit with high coding reliability. Overall, the review highlights the absence of a unifying framework in BI research, proposing a potential overarching structure. It calls for more focused exploration of links between BI stages and encourages multi-level studies for a comprehensive understanding of BI's contribution to business value.

Satu Peltola, Harri Vainio, Marko Nieminen (2016), [15] The retail landscape has undergone a profound shift due to digitalization, ushering in omnichannel retail where online and offline channels seamlessly merge to enhance the customer experience. This evolution spans three waves: the first saw the inception of online sales, the second integrated digital solutions into daily life, and the third wave is marked by mobile device integration, blurring the lines between channels. Consumers now engage with companies across various channels, expecting a unified experience. While early research focused on integrating channels, the essence of omnichannel retail lies in crafting a seamless customer journey. Companies recognize that customers freely navigate multiple touchpoints without a predictable path, necessitating rich and flexible omnichannel services. Achieving a good

omnichannel experience hinges on two pillars: unifying services across channels and facilitating smooth transitions aligned with customer preferences. Key factors influencing this include organizational culture, unified product information, flexible systems, and cohesive customer communication. Companies strive for a seamless connection between touchpoints, aiming not just for quick sales but to showcase competitive advantages at every step. The study emphasizes the importance of a unified customer experience and the seamless connection between touchpoints, showcasing the evolution from per-channel processes to supporting intuitive customer movements in the omnichannel era. The reliability and validity of the study were ensured through qualitative interviews, although the scope was limited to companies in Finland. Future studies could explore consumer behaviour's impact on company strategies, the link between omnichannel strategies and consumer buying behaviour, and the correlation between seamless omnichannel experiences and increased purchasing frequency and volume.

[Jean-Charles Chebat, Richard Michon \(2003\), \[7\]](#) The paper explores how ambient scents in a mall affect consumer behaviour through two competing models: one emphasizing emotions triggered by scent and another focusing on how perceptions mediate the scent's impact. Structural equation modelling supported the latter, indicating perceptions of the environment and product quality play a key role in influencing emotions and spending behaviour due to ambient scents. It discusses managerial implications, industry insights, debates around scent effectiveness, and the need for further understanding of olfactory cues in consumer behaviour. The study conducted in a shopping mall showed that while ambient scents influenced perceptions, their effect on emotions was less impactful on spending behaviour compared to perceptions of product quality.

[Kumar, Archana and Kim, Youn Kyung \(2014\), \[9\]](#) The study investigated how cues in single-brand apparel store environments influence customer perceptions and behaviour. Social, design, ambient and merchandise cues impacted how customers evaluated the store and influenced their approach behaviours. It confirmed that customers see the store and merchandise as a unified entity, supporting the store-as-a-brand concept. The findings stressed the importance of merchandise cues and consistency in aligning store cues and consistency in aligning store and merchandise images. This study's framework aids in understanding customer behaviour in single-brand apparel retail, benefiting both researchers and retailers in shaping brand strategies.

[Aradhna Krishna \(2011\), \[2\]](#) The paper explores sensory marketing's impact on consumer perceptions and behaviours, emphasizing its role in defining product attributes and brand personalities. It highlights subconscious sensory triggers' efficiency and discusses examples across industries employing sensory techniques. It differentiates sensation from perception, spotlighting visual illusions' impact on product judgements and advocating for research beyond vision in marketing. Moreover, it delves into touch and smell's significance in human behaviour, citing Aristotle's theory, developmental aspects, the Need-for-Touch scale's relevance, and touch's influence on decision-making, consumer behaviour, and relationships. It then explores smell's strong link to emotional memory, the physiological connections between smell and memory storage, and scents' impact on behaviour and product evaluation. Additionally, it covers auditory cues' influence on perception, language associations in advertising, music's effects on moods and behaviours, and taste perception beyond basic flavours. It examines external influences, branding, and packaging on taste perceptions and consumption behaviour. Lastly, it explores perceived consumption and its tie to satiation, offering a comprehensive look at the intricate relationship between sensory stimuli and consumer psychology.

III. RESEARCH METHODOLOGY: FINDINGS FROM LITERATURE REVIEW

1. Ana Mosquera, Cristina Olarte-Pascual, Emma Juaneda Ayensa and Yolanda Sierr Murillo, (2018), The findings of this paper on omnichannel retailing within the fashion sector are:
 - a. Omnichannel Significance: The paper highlights the growing importance of omnichannel retailing, particularly in fashion, enabling seamless customer interactions across various platforms. It emphasizes the challenge for retailers in maintaining consistent integration as technology evolves.
 - b. Consumer Preferences: The study investigates consumer preferences for omnichannel technologies, emphasizing gender differences in purchase intentions. Both genders prioritize in-store technology, but with slight variations: men favor in-store tools, while women show a preference for fitting-room technologies.
 - c. Gender Variations: Despite preferences leaning slightly in different directions, the study found no significant gender disparities in overall preferences for omnichannel technologies in the fashion retail context.

- d. **In-Store Technological Features:** Key insights reveal specific preferences among consumers for a certain in-store technological feature. However, social media engagement within the store context remains unpopular due to privacy concerns.
 - e. **Retailer Adaptation:** The research underscores the importance for retailers to adapt their strategies considering the role of technology in enhancing customer experiences across multiple channels.
 - f. **Limitations and Future Research:** The study acknowledges limitations such as a focus on Spain and the absence of cost considerations. Future research avenues could broaden the scope by examining diverse product categories and demographics, providing a more comprehensive understanding of omnichannel preferences and behaviors.
2. The findings of the paper by Satu Peltola, Harri Vainio, Marko Nieminen (2016), on omnichannel retailing can be summarized as follows:
 - a. **Evolution of Omnichannel Retail:** The paper highlights the evolution of retail through three waves—the first involving online sales inception, the second integrating digital solutions into daily life, and the third characterized by mobile device integration. This evolution blurs the lines between online and offline channels.
 - b. **Unified customer experience:** The essence of omnichannel retail lies in creating a seamless customer journey. Customers now interact with companies across various channels and expect a unified experience rather than siloed interactions.
 - c. **Pillars of Omnichannel success:** The study identifies two key pillars crucial for a successful omnichannel experience: unifying services across channels and ensuring smooth transitions aligned with customer preferences. Factors influencing this include organizational culture, unified product information, flexible systems, and cohesive customer communication.
 - d. **Competitive Advantage:** Companies aim not just for quick sales but to showcase competitive advantages at every touchpoint. The focus is on creating a seamless connection between touchpoints, supporting intuitive customer movements rather than channel-specific processes.
 - e. **Study validity and scope:** The study ensured reliability and validity through qualitative interviews, albeit with a limitation on the scope, focusing on companies in Finland.
 - f. **Future Research Directions:** The paper suggests several avenues for future research, including exploring consumer behaviour's impact on company strategies, examining the link between omnichannel strategies and consumer buying behaviour, and investigating the correlation between seamless omnichannel experiences and increased purchasing frequency and volume.
 3. The findings of the paper by Santiago Iglesias-Pradas and Emiliano Acquila-Natale (2023), regarding omnichannel retailing and its implications are as follows:
 - a. **Evolution of Retail Landscape:** The retail industry has transformed significantly due to digitization leading to the emergence of omnichannel retailing. This evolution spans three waves, with the third wave integrating mobile devices and blurring channel boundaries.
 - b. **Unified Customer Experience:** Companies now aim to provide a seamless and unified customer experience across various touchpoints, acknowledging that customer paths are unpredictable. Factors crucial for success include unified services, smooth transitions, cohesive communication, organizational culture and adaptable systems.
 - c. **Scope and Future Research:** Although the study focused on Finnish companies, it highlights the shift from per-channel processes to intuitive omnichannel experiences. Future research could explore the influence of customer behaviour on strategies and the potential link between seamless experiences and increased purchasing frequency.
 - d. **Multichannel Strategies and E-Commerce:** The rise of e-commerce drivers' retailers towards multichannel strategies, offering diverse options, valuable data collection, and improved shopping experiences. Emerging technologies like AI support personalized recommendations and secure transactions. Challenges include data integration and understanding customer behaviour.
 - e. **“Phygital” Future:** The paper anticipates a “Phygital” future, optimizing resources while delivering seamless experiences by merging physical and digital realms. This future aims to harness the benefits of both physical and digital retail.
 - f. **Implications and Focus Areas:** The special issue covers various strategic, customer-centric and environmental aspects, emphasizing adaptation, consumer behaviour, and industry implications. Studies on inventory replenishment, last-mile logistics, and order fulfilment stress the importance

- of technology, customer focus, and strategic decision-making in navigating the complex multichannel retail landscape.
4. The findings of the paper by Valeria Belvedere, Elisa Martina Martinelli, Annalisa Tunisini(2021), regarding the research exploring the integration of e-commerce within omnichannel strategies can be summarized as follows:
 - a. Crucial Role of E-commerce Integration: The study highlights the critical role of incorporating e-commerce into omnichannel strategies for sales and distribution optimization.
 - b. Influencing Factors: Factors such as distribution channels and product value density significantly influence how companies shape their e-commerce strategies within the omnichannel framework.
 - c. Illustrative Cases: Case studies of Luxottica, Henkel, Ferragamo, and IKEA exemplify diverse approaches to integrating e-commerce within their omnichannel strategies. These cases highlighting the benefits and challenges associated with this integration.
 - d. Approach Categorization: The approaches employed by companies are categorized into four quadrants, showcasing varied strategies. For instance, Luxottica utilizes high-value products to leverage data-driven insights, while IKEA encounters challenges due to its store-centric model and low-value items.
 - e. Key Emphasis: The overarching emphasis of the study underscores the importance for companies to strategically manage e-commerce integration within their omnichannel approach. This management involves considerations spanning marketing, sales, and supply chains, while addressing logistical challenges that arise from the integration process.
 5. The findings of the paper by Charles Spence, Nancy M. Puccinelli, Dhruv Grewal and Anne L. Roggeveen (2014) exploring sensory elements in retail environments are:
 - a. Multisensory Impact on Consumer Behaviour: The study underscores how various sensory elements like visual, auditory, olfactory, tactile and gustatory factors significantly impact consumer behaviour within retail spaces. These elements influence product choices and positively affect consumer behaviours, highlighting the importance of creating congruent multisensory atmospheres.
 - b. Enhancement of Customer experiences: Congruent multisensory atmospheres are identified as catalysts for enhancing customer experiences in retail settings. When these atmospheres align effectively, they contribute to more favourable perceptions and behaviours from consumers.
 - c. Cautionary Notes on Sensory Overload: The study acknowledges the potential for sensory overload within these environments. It warns about the delicate balance needed to avoid overwhelming consumers with excessive sensory stimulation, which could have adverse effects on their experiences and behaviours.
 - d. Individual Preferences for Sensory Stimulation: Recognizing the complexity of individual preferences, the research highlights the challenges of catering to diverse sensory preferences among consumers. Preferences for sensory stimulation vary among individuals, posing a challenge in creating universally appealing atmospheres.
 - e. Role of Cognitive Neuroscience: The paper acknowledges the role of cognitive neuroscience in understanding how sensory elements influence consumer behaviour. It suggests that insights from this field can aid in designing effective retail environments.
 - f. Challenges in Implementation and Need for further research: The study points out challenges in implementing congruent multisensory atmospheres and emphasizes the necessity for further research to refine the design process. It stresses the importance of careful design and empirical study to achieve successful implementation.
 - g. Impact on Customer Behaviour and Sales: Overall, the research suggests that investing in well-designed, congruent multisensory atmospherics holds the potential to significantly impact customer behaviour and sales in retail environments. However, this requires meticulous design and empirical validation for optimal effectiveness.
 6. The findings from the paper Lily (Xuehui) Gao, Iguacel Melero & F. Javier Sese (2019), on exploring the impact of evolving technology on consumers' access to information and comparisons across diverse marketing channels are as follows:
 - a. Complexities of the Modern Customer Journey: The study highlights the intricate nature of the modern customer journey, influenced by evolving technology that allows access to vast

- information and comparisons across diverse marketing channels. This complexity poses challenges for firms aiming to deliver consistent experiences and products across various touchpoints.
- b. **Systematic Literature Review and Model Development:** Through a systematic review of 527 articles narrowed down to 75 relevant ones across 31 journals, the research aims to bridge research gaps. It proposes a comprehensive model considering customer, firm, and industry-related factors influencing marketing mix consistency and customer experience across different journey stages.
 - c. **Holistic Investigation of Marketing Mix Elements:** The analysis underscores the necessity for holistic investigations of all marketing mix elements throughout the customer journey. It emphasizes variations in effectiveness across customers, firms, and industries, highlighting the need for a nuanced approach in multichannel management.
 - d. **Significance of Customer Experience in Multichannel Management:** The study stresses the pivotal role of customer experience in effective multichannel management. It identifies gaps in understanding and assessing customer experience and suggests its importance in driving successful strategies.
 - e. **Challenges in Multichannel Management:** The research identifies and discusses challenges in multichannel management, emphasizing the complexities of ensuring consistency in branding, promotions, pricing and assortment across channels.
 - f. **Proposed Conceptual Model:** A conceptual model is proposed, linking marketing mix consistency to customer experience. This model underscores the importance of integrated branding, promotions, pricing, and assortment across channels, outlining implications for different stages of the customer journey.
 - g. **Call for Empirical Validation and Longitudinal Studies:** While comprehensive in its approach, the study acknowledges its conceptual nature and calls for empirical validation and longitudinal studies to confirm and refine the proposed framework. It stresses the importance of practical application and validation in real-world context.
7. The findings from the paper by RN Bolton, JR Mccoll-Kennedy, L Cheung (2018) are:
- a. **Three-Dimensional Framework:** The paper introduces a comprehensive framework analysing customer experience across digital density, physical complexity, and social presence. These dimensions collectively contribute to a holistic understanding of customer interactions and service experiences.
 - b. **Multifaceted Customer Experience:** Customer experience is portrayed as multifaceted, encompassing cognitive, emotional, and sensory aspects. This broader perspective aims to create mutual benefits for both service providers and customers, emphasizing a nuanced approach to managing customer interactions.
 - c. **Characteristics and Relevance of each Dimension:** The study elaborates on the distinct characteristics of digital, physical, and social realms, emphasizing their individual relevance in shaping customer experiences. It highlights the convergence of these dimensions and their combined impact on overall customer experiences.
 - d. **Anticipated sectoral shifts and challenges:** The research anticipates sectoral shifts influenced by technological advancements and societal changes. It identifies challenges related to navigating dense digital environments and adapting to evolving roles in social interactions within service contexts.
 - e. **Complexities in Multidimensional service ecosystems:** Detailed exploration of complexities across eight conditions within multidimensional service ecosystems highlights tensions and challenges faced by organizations. These conditions encompass various aspects like resource scarcity and regulatory complexities.
 - f. **Proposed Solutions:** The paper offers potential solutions to address identified challenges, emphasizing the importance of understanding customer preferences and aligning organizational strategies to effectively navigate complexities in the service landscape.
 - g. **Emphasis of Interconnected service Innovations:** The conclusion emphasizes the fusion of digital, physical and social realms in shaping positive customer experiences. It highlights the potential for researchers and managers to leverage interconnected service innovations to enhance customer interactions and satisfaction.
8. The findings from the paper by Salvatore Parise, Patricia J. Guinan, Ron Kafka (2016), are:

- a. Consumer demand for immediacy and personalization: Consumers increasingly seek instant, personalized content during their shopping experiences, leading to the “crisis of immediacy” for marketers.
 - b. Impact of Digital Technologies; Technologies like video conferencing, mobile apps, and augmented reality transform customer interactions and facilitate immersive, tailored experiences.
 - c. Models deployed by organizations: The deployment of two models- remote experts and digital assistants- helps address the immediacy challenge, providing tailored expertise and services to consumers.
 - d. Omnichannel shopping and redefined retail strategies: Retailers are redefining strategies beyond traditional approaches, emphasizing omnichannel shopping experiences.
 - e. Role of technology, Analytics and Customer Insight: Leading companies leverage technology, analytics, and customer insight to offer expertise at physical locations and anywhere consumers are, enhancing customer experiences.
 - f. Impact of remote experts across industries: Remote experts significantly enhance performance across various industries (finance, field-based services, retail), increasing engagement, improving metrics, and reducing revenue leakage.
 - g. Effectiveness of Virtual Concierge: The virtual concierge, a variant of remote experts, aids complex purchases across multiple channels, significantly impacting purchase decisions and customer satisfaction.
 - h. Technology’s Role in Time-sensitive situations: The remote expert model proves effective in time-sensitive or crisis situations, facilitating immediate connections and services.
 - i. Managerial Implications: The paper emphasizes the suitability of remote expert models for complex products, the importance of predictive analytics and seamless execution, and highlights challenges like staffing and technology integration.
 - j. Evolution of Mobile Apps: Mobile apps evolve into digital assistants, offering instant services, promotions, and tailored experiences, integrating social platforms and providing personalized services in various sectors.
 - k. Location-Based services and Beacon sensors: Retailors explore location-based services using beacon sensors, delivering targeted messaging and personalized content within stores, with pilot studies showing potential.
 - l. Role of Augmented reality (AR) in enhancing engagement: AR technologies in-store, like virtual mirrors and touch-screen recommenders, enhance consumer engagement and influence purchase decisions.
 - m. Digital Assistants transforming experiences: Digital assistant, like BMW’s product Geniuses, provide personalized knowledge, emphasizing technology usability and iterative app development for a rich customer experience.
 - n. Balancing shopper privacy with personalised content: Retailers must manage user data transparently, balancing shopper privacy with the value of personalised content for competitive advantage in delivering rich customer experiences.
9. The findings in the paper by Bethan Alexander (2019), are:
- a. Shifts in physical stores: Identified five interconnected shifts in physical stores within omnichannel retail:
 - Brand storytelling: stores transformed into immersive brand experiences.
 - Social and cultural experiences: Emphasized social interaction and community engagement.
 - Sensorial experience: Leveraged all senses to create unique store environments.
 - Community center and human connector: Stores became hubs fostering relationships.
 - Localization: Highlighted the need for personalised and community-driven experiences.
 - b. Future of physical retail: Outlined key aspects shaping the future of physical retail:
 - Transformation: Focus on innovation, agility and personalized experiences.
 - Retail format evolution: Shift towards smaller, curated store formats and digital experiences.
 - Role of technology: Technology supporting experiences and personalization.
 - Customer experience: Redefining experiences balancing service, entertainment, and personalization.

- Measuring retail performance: challenges in quantifying the impact of experience-based metrics.
- c. Best practices and optimization: Highlighted the importance of:
 - Brand-led experiences and human interaction.
 - Components like storytelling, curation, agility, and understanding the customer journey.
 - d. Transition to experiential hubs: Noted the transformation of physical stores from transactional spaces to experiential centers, focusing on human connections, brand storytelling, and personalised experiences.
 - e. Experiential store futures model: Introduced a model outlining four key space typologies catering to unique customer experiences: storytelling, fluid, digital zones and community center.
 - f. Acknowledged limitations and future research: recognized sampling limitations and recommended future research areas, including consumer perspectives, AI's role in personalization, measuring retail performance, environmental impacts, agile innovation and novel store formats.
 - g. Proposed framework: Presented a framework for retailers and design agencies to optimize customer experiences in evolving retail environments while highlighting the need for further exploration in various key areas.
- 10.** The paper by Charles Spence & Alberto Gallace (2016), emphasizes the significant impact of touch on product evaluation and marketing strategies. Findings from marketing, psychology and neuroscience highlight how tactile sensations strongly influence people's perceptions and evaluations of products. It discusses:
- a. Importance of touch: Touch significantly influences how people evaluate products, especially those with close skin contact.
 - b. Multisensory Design: Touch plays a crucial role in multisensory product design and marketing strategies. Synaesthetic correspondences are used to evoke tactile sensations through visual and auditory cues in advertising.
 - c. Challenges and opportunities; Challenges in tactile design due to an aging population and online shopping are discussed. The paper explores how technology and tactile evocations are being leveraged successfully in marketing campaigns.
 - d. Future Direction: The passage anticipates touch's potential for branding and marketing, emphasizing the need for further research to understand its impact fully. It suggests exploring how tactile attributes influence purchasing impulses and cater to diverse consumer demographics, especially the aging population.
 - e. Hedonic aspects of touch: Understanding stimuli that evoke pleasurable tactile experiences and their influence on product design and marketing is highlighting as an area requiring further investigation. Overall, the paper stresses the importance of comprehending the hedonic aspects of touch for creating appealing and marketable products.
- 11.** The findings from the paper by Van-Hau Trieu (2016), on Business Intelligence (BI) studies are as follows:
- a. Sequential Process: The study indicates a sequence from BI investments to BI assets, impacts and ultimately organizational performance, mirroring the framework proposed by Soh and Markus in 1995.
 - b. Lack of probabilistic exploration: While the sequential process has garnered attention, there is a lack of exploration regarding the probabilistic connections between these stages. The research has not sufficiently delved into the uncertain or probabilistic nature of how these stages link together.
 - c. Gaps in levels of analysis: There is a dearth of exploration at different levels of analysis within BI studies. The research has not adequately examined how these levels of analysis interconnect and contribute to understanding the value derived from BI systems.
 - d. Fragmented Literature: The literature on BI lacks a unified framework, resulting in fragmented findings. This lack of a cohesive structure makes it challenging to consolidate research outcomes and limits the cumulative progress of BI studies.
 - e. Need for comprehensive understanding: The paper emphasizes the necessity for a holistic view of how organizations derive value from BI systems. It stresses the diverse perspectives and terminologies surrounding BI and urges the synthesis of exciting literature to better understand, enhance, and progress BI's contribution to business value.

- f. Opportunities for further research: The study identifies several opportunities for future research to bridge existing knowledge gaps. It underscores the need for deeper investigations into the connections between BI stages, the exploration of various levels of analysis, and the recommendation for multi-level studies to offer a complete understanding of BI's impact on business value.
12. The findings from the paper by Francesca Bonettia, Gary Warnabyb , and Lee Quinn (2018), exploring the evolution of Augmented Reality (AR) and Virtual Reality (VR) in retail are as follows:
 - a. Adoption challenges and benefits: The paper outlines both challenges and benefits for retailers regarding the adoption of AR and VR technologies. Challenges might include cost, technological complexities, and integration issues, while benefits encompass enhanced customer experiences and innovative marketing opportunities.
 - b. Applications in retail: It discusses various applications of AR and VR in the retail sector, such as virtual try-on experiences for clothes and cosmetics. These technologies offer customers the ability to visualize products before purchase, potentially increasing confidence in buying decisions.
 - c. Factors influencing consumer acceptance: The paper delves into factors that influence consumer acceptance of AR and VR in retail. It likely addresses aspects like ease of use, perceived usefulness, and the overall experience these technologies provide to customers during their shopping journey.
 - d. Interdisciplinary nature and future exploration: Emphasizing the interdisciplinary nature of research, the paper calls for future exploration in several areas. It highlights the importance of user-friendly interfaces, collaboration among different disciplines, and understanding evolving consumer trends. These areas are essential for retailers to navigate in order to leverage AR and VR effectively for their businesses. Ultimately the paper emphasizes the potential of AR and VR in reshaping the retail experience but also underscores the importance of addressing challenges and understanding consumer behaviour for successful adoption and implementation by retailers.
 13. The findings from the paper by Pranav Parekh, Shireen Pate, Nivedita Patel, Manan Shah (2020), discussing Augmented Reality (AR) applications across various sectors are:
 - a. Entertainment industry transformation: AR is revolutionizing traditional gaming, multimedia presentations, and videos by merging real and virtual worlds. This integration offers interactive 3D experiences, transforming the entertainment landscape. The paper emphasizes the collaborative and pervasive nature of AR gaming, showcasing its impact and advancements.
 - b. AR in broadcasting and sports events: AR's role in enhancing broadcasting, especially in sports events, is highlighted. It contributes to enriched viewer experiences by integrating virtual elements into live broadcasts, potentially changing how audiences engage with sports content.
 - c. Medical applications and innovations: AR enhances medical education, surgical procedures, anatomical evaluation, and rehabilitation by overlaying virtual information onto real environments. It showcases promising applications of technologies like Head-Mounted Displays (HMDs) in the medical field, aiding surgical planning and interventions.
 - d. Challenges and future prospects: Despite its potential, AR faces challenges such as undefined business models, privacy concerns, and compatibility issues. However, the paper underlines AR's immense potential across industries, promising personalized customer experiences and reshaping business strategies.
 - e. Market growth and recent advancements: Recent advancements, exemplified by applications like Pokemon Go and Snapchat, indicate AR's growing market base and its potential for future growth and innovation.
 - f. Overall Impact: The paper extensively explores AR's impact in entertainment, medicine and retail, highlighting its potential to revolutionize various human experiences. It emphasizes the need to address challenges for widespread adoption while showcasing the immense possibilities that AR holds in reshaping industries and customer experiences.
 14. The paper by Jillian C. Sweeneya, Geoffrey N. Soutar (2001), introduces the PERVAL scale, a comprehensive four-dimensional measure assessing perceived consumer value for durable goods at a brand level. Through empirical testing and analyses, several key findings emerge:
 - a. Dimensional Framework: The study identifies four primary dimensions of perceived value: emotional, social, quality/performance, and price/value for money. These dimensions collectively contribute significantly to explaining consumer attitudes and behaviours before and after purchase.

- b. Significance of emotional value: Despite products often being perceived as functionally driven, the research highlights the substantial impact of emotional value on consumer choice. This suggests that emotions play a crucial role in consumers' decision-making processes.
 - c. Broader view of value: The paper emphasizes the importance of considering a broader spectrum of value beyond price, encompassing emotional and social values. This broader perspective holds greater importance for many consumers, influencing their perceptions and behaviours.
 - d. Implications for retail strategies: Understanding and addressing emotional and social values, in addition to functional aspects, are crucial for retailers in developing effective positioning strategies. Retail service quality also significantly shapes value perceptions, suggesting implications for staff recruitment and training.
 - e. Role of brand value: The study underscores the importance of brand value in enhancing customer loyalty and profits for retailers. It encourages retailers to integrate various dimensions of perceived product value into their market positions, thereby enhancing store authenticity.
 - f. Need for further exploration: While providing comprehensive insights, the research acknowledges limitations and suggests avenues for future exploration. This includes examining value assessment variations across different retail categories exploring additional value dimensions and conducting longitudinal studies to understand value evolution in consumer relationship over time.
15. The findings from the paper by Jean-Charles Chebat, Richard Michon (2003), revealed that ambient scents in a shopping mall have a significant impact on consumers' perceptions of the retail environment and product quality. However, their influence on shoppers' emotions, particularly in affecting spending behaviour, was less pronounced. The study indicated that consumers' spending patterns were primarily influenced by their perceptions of product quality rather than the emotional effects triggered by ambient scents. This suggested that the cognitive aspects of scent-induced perceptions played a more crucial role in shaping consumer behaviour in terms of spending.
16. The findings of the paper by Kumar, Archana and Kim, Youn Kyung (2014), on single-brand apparel retailers' store environments and customer responses are:
- a. Cues influence evaluations and behaviour: Social, design, ambient and merchandise cues within store environments influence customers' internal evaluations and approach behaviours toward single-brand apparel retailers.
 - b. Validity of store-as-a-brand concept: The study confirms that customers perceive both the store environment and merchandise as a unified entity, supporting the validity of the store-as-a-brand concept.
 - c. Impact of Merchandise cues: Merchandise cues have a stronger impact on evaluations and behaviour compared to other environmental cues.
 - d. Consistency is key: Emphasizes the importance of consistency in aligning the store and merchandise images for a cohesive customer perception.
 - e. Focus areas for retailers: Advises retailers to focus on social and ambient cues, promote unique merchandise, and ensure alignment between the store and merchandise images.
 - f. Cognitive evaluations and behaviour: Highlights the significant influence of cognitive evaluations on customer behaviour, underlining their importance in shaping approach behaviours.
 - g. Framework for understanding customer behaviour: Provides a valuable framework for comprehending customer behaviour in the context of single-brand apparel retail, offering insights beneficial for both researchers and retailers in brand development.
17. The findings of the paper by Aradhna Krishna (2011), revolve around the profound impact of sensory stimuli on consumer behaviour, perceptions, and decision-making processes:
- a. Sensory marketing influence: Sensory triggers significantly influence consumer perceptions, judgements, and behaviours regarding products and brands. Subconscious triggers appealing to basic senses might be more effective than explicit marketing appeals.
 - b. Sensation vs. Perception: Understanding the differences between sensation and perception is crucial in consumer behaviour. Visual illusions, biases in visual perception affecting product judgements, and the need for research beyond visual senses are highlighted.
 - c. Touch and decision making: Touch plays a vital role in human behaviour and decision-making. The need-for-Touch scale gauges individual differences in the desire for touch, impacting consumer behaviour, product evaluation and interpersonal relationship.

- d. Smell and memory association: Smell has a robust association with emotional memory. It triggers vivid autobiographical memories, influencing consumer behaviour and product evaluation.
- e. Auditory cues and consumer behaviour: Sound symbolism, language associations, and music in ads or ambient spaces significantly influence consumer moods and behaviours.
- f. Taste perception beyond basic flavours: Taste perception is not solely about the five basic flavours; it is influenced by various senses like smell, touch, vision and even hearing. External influences, branding and packaging affect taste perceptions and actual consumption.
- g. Perception, cognition, and grounded cognition theory: The connection between perception and cognition challenges the belief that thought is independent of perception, suggesting the need for further research in sensory marketing.
- h. Opportunities for future research: The paper identifies several areas for future research, including individual differences in sensory perception, sensory reality discrepancies, sensory arousal, biases in sensory judgements, and more, highlighting the need for exploration in these domains.

IV. CONCLUSION

In conclusion, our study sheds light on the transformative impact of integrating multi-sensory design and cutting-edge design technologies within the retail landscape. The research underscores the pivotal role of this integration in fostering enhanced customer engagement, paving the way for a digital renaissance in retail. Through an exploration of various papers and findings, we observed a fundamental shift in consumer behavior influenced by multi-sensory experiences. The synthesis of sensory stimuli through advanced design technologies not only captivates customers but significantly influences their perceptions, emotions and behaviors within retail environments. The amalgamation of findings across multiple studies highlights several crucial aspects. Firstly, it emphasizes the powerful influence of sensory cues, whether visual, auditory, olfactory or tactile, in crafting immersive retail experiences. These experiences transcend traditional shopping by evoking emotional connections and shaping customer attitudes and preferences. Moreover, our review underscores the necessity for retailers to leverage emerging design technologies to orchestrate these multi-sensory engagements effectively. Digital tools, augmented reality, virtual reality, and other innovations serve as enablers, facilitating personalized, interactive and dynamic encounters that resonate with modern consumers. Furthermore, the synthesis of these findings accentuates the importance of congruence and coherence in sensory experiences. Aligning the digital interventions with brand identity and overarching retail strategies emerges as a pivotal factor in fostering lasting impressions and building customer loyalty. As retail continues to evolve in the digital age, this synthesis of research papers provides a roadmap for retailers and industry stakeholders. It advocates for a strategic embrace of multi-sensory design integrated with cutting-edge technologies to redefine the retail landscape. The convergence of sensory experiences and technology not only elevates customer engagement but also positions retailers at the forefront of innovation and customer-centricity. In essence, the digital renaissance in retail is not merely a technological leap but a harmonious fusion of creativity, technology, and consumer-centric strategies. This synthesis of findings advocates for a holistic approach, encouraging retailers to harness the power of multi-sensory design and design technologies to craft compelling and immersive retail journeys that resonate deeply with today's discerning consumers.

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