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Understanding Retail Atmospheric, The Magic Of Silent Cues – A Bibliometric Analysis

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Abstract

The sale and purchase of goods & services have evolved. The exchange of goods moved from a camel back to mega malls and details have taken over the entire spectrum and mindset of the shopper. Aim of this paper is to understand the complex retail atmospheric that evolved over time and see through the future research areas. Modern retail store formats (hypermarkets, supermarkets, convenience stores) with their self-service nature place a great deal of importance on the retail atmospheric in terms of success or failure (volume of sales). A plethora of researches are conducted worldwide and in India on the retail atmospheric (external, internal, signage, layout, shelf allocation and speed) and its effects on many dependent variables like sales, time spent in store and purchase behavior and there is enough evidence globally to be able to clearly state that the atmosphere has an effect on shopper spending. Our focus area of study is the floor plan and the retail shelf space allocation in particular and despite the depth of this subject, empirical research works in Indian context are just a few. This work intends to find a gap in Indian context through bibliometric analysis and to shed light on the factors related to the retail atmospheric and all the avenues where further researches can be conducted in Indian context especially in focus areas of retail store floor plan, category adjacency, shelf space allocation and Customer's buying pattern or Customer decision tree as the industry terms it.

Keywords: Retail, Retail atmospheric, External environment, Internal environment, Impulse buying, Consumer behavior, Shelf Space Allocation.

Understanding Retail Atmospheric, The Magic Of Silent Cues – A Bibliometric Analysis

Retail Atmospheric refers to the deliberate design and management of the sensory environment in a retail space to influence customer emotions, perceptions, and purchasing behavior. Coined by Kotler (1973), the concept highlights how elements like lighting, music, scent, layout, and colors shape the shopping experience and encourage specific consumer actions. Research shows that a well-designed atmospheric strategy can enhance brand perception and loyalty (Baker et. al. 2002), Increase dwell time and impulse purchases (Grewal et. al. 2003), Create a competitive edge by differentiating the retail experience (Milliman 1982). Retail store design and ambience have a remarkable effect on shoppers' buying decisions. As a result, a retail outlet must be designed with a focus on the major aspects of store design and atmosphere, such as window display, visual merchandising, and mannequin display. (Khan et. al. 2023)

The purpose of this paper is to identify the publication trends and growth in the area of retail atmospheric research over time through literature survey and bibliometric analysis. This work aimed to investigate the studies on retail atmospheric in theoretical, methodological and empirical aspects. Bibliometric research was carried out based on 1422 articles published in Web of Science journals. The paper identifies the publication trends, present the number of articles per year, main journals, most cited references, most used keywords, find out most influential papers and authors and also analyze co-authorship and collaboration networks to explore the emerging research themes and research gaps.

Literature Survey

Key Elements of retail atmospheric includes exterior of retail store, interior of retail store, Visual merchandising, store flow, shelf presentation, branding and signage.

Exterior Atmospheric: The external variables include the storefront, marquee, entrances, display windows, building architecture, the surrounding area, and parking. Exterior atmospheric play a significant role in shaping consumers' perceptions and behaviors by influencing their first impressions and the overall appeal of a retail store. Researchers like Ward, Bitner, and Barnes (1992), Edwards and Shackley (1992) and Pinto and Leonidas (1994) found that external variables have an influence on the behavior of retail consumers. In alignment with past research demonstrating that the design of the built environment shapes consumer behavior (e.g., Bitner 1992; Kotler 1973; Levav and Zhu 2009; Meyers-Levy and Zhu 2007), we assert that the front of the retail store attracts customer.

A well-maintained **storefront** communicates professionalism and brand identity (Mower et al., 2012). Clear, attractive signage increases visibility and conveys brand value. Effective **signage** helps in brand recall and customer engagement (Turley & Milliman 2000). The entrance design impacts accessibility and invites customers in. Open and clean **entrances** are associated with higher foot traffic (Berman & Evans 1998). **External Window displays** serve as a preview of the store's offerings. They significantly impact customers' moods and patronage intentions when aesthetically pleasing and informative (Chebat & Morrin 2007; Mower et al., 2012). Unique and aesthetically designed **store architecture** differentiates a brand and enhances its appeal.

Architectural uniqueness fosters a memorable shopping experience (Turley & Milliman, 2000). **Differentiation** in exterior design creates a competitive edge, making the store stand out in crowded retail environments (Mower et al., 2012). Proper lighting, signage placement, and strategic landscaping contribute to increased **visibility**, attracting more potential customers (Chebat & Morrin, 2007). Strategic placement or **location** in high-traffic areas ensures better accessibility and customer convenience (Berman & Evans, 1998). Adequate and safe **parking** adds

to customer convenience, directly influencing store preference (Mower et al., 2012). The overall **exterior appearance**, including cleanliness and maintenance, is a critical factor for creating a positive first impression (Mower et al., 2012). Well-designed **pathways and entrances** ensure smoother access, which is particularly important for families and individuals with disabilities (Turley & Milliman, 2000). Compliance with **safety regulations** and maintaining **cleanliness** enhances trust and attracts health-conscious customers (Mower et al., 2012). Surrounding Area: The neighborhood's quality, including landscaping and ambiance, contributes to the overall customer experience and influences footfall (Chebat & Morrin, 2007).

Interior atmospherics: Interior atmospherics in retail stores play a crucial role in shaping the shopping experience and influencing customer behavior. The choice of materials and designs (**Flooring & Ceiling**) affects the ambiance, such as creating a luxurious feel with marble or a rustic vibe with wood (Berman & Evans, 2001). Proper **lighting** enhances product visibility and sets the mood, with studies showing its significant impact on consumer emotions and buying decisions (Kotler, 1973; Zhou & Wong, 2004). Retailers use ambient **scents** to evoke positive emotions and create memorable shopping experiences (Milliman & Turley, 2002). Well-placed and attractive **fixtures** facilitate easy browsing and contribute to the store's visual appeal (Sirgy et al., 2000). **Wall texture and finishes** can align with the store's theme and target audience preferences, impacting perceptions of quality and comfort. **Background music or soundscapes** influence the pace of shopping and create an emotional connection (Bell & Ternus, 2006). Warm or cool **colors** can evoke specific emotional responses and perceptions of product quality (McGoldrick 1990). Comfortable store **temperatures** ensure longer shopping durations and customer satisfaction (Berman & Evans, 2001). A **clean environment** is critical for positive customer perceptions and trust in the brand. Spacious, well-organized **aisles** improve navigation and reduce shopper stress. The **trial spaces** should be well-lit, clean, and comfortable to enhance the decision-making process. **Reducing unused or "dead"** spaces helps optimize the retail layout and increases customer engagement. **Properly displayed** products, arranged aesthetically, draw attention and simplify the shopping process (Bell & Ternus 2006). Informational and promotional **graphics** guide customers and create a cohesive brand identity.

Larger **stores sizes** allow for more variety and better experiences, but they must balance spaciousness with accessibility (Zhou et.al. 2004). Modern stores increasingly use **digital displays** to provide dynamic content, advertisements, or interactive tools that engage customers and enhance the shopping journey (Levy & Weitz, 2012). Clear **directional signs** ensure smooth navigation, improving customer satisfaction, especially in larger stores or malls (Bitner 1992). Incorporating **technologies** like augmented reality (AR) for virtual try-ons or smart mirrors in trial rooms enriches the customer experience. Areas where customers can customize or **personalize** products create an engaging and memorable shopping experience (Pine & Gilmore 1999).

Eco-friendly materials and **energy-efficient** lighting appeal to environmentally conscious shoppers enhancing brand loyalty (Harris 2010). Comfortable **seating zones** allow shoppers to relax, extending their time in the store and increasing the likelihood of purchases. Conveniently placed **service counters** ensure easy assistance and streamline checkout processes. **Themed interiors** create a cohesive narrative, reinforcing brand identity and creating an immersive environment (Berman & Evans, 2001). **Dynamic lighting** that changes based on time of day or seasons adds a layer of innovation and sophistication to the shopping experience. Incorporating natural scents or **indoor plants** not only improves air quality but also enhances the ambiance.

Visual merchandising: is an activity that coordinates effective merchandise selection with effective merchandise display (Walters & White 1987). VM is therefore concerned with both how the product/brand is 'visually communicated' to the customer and also whether this message is

decoded ‘appropriately’ in this context affecting a positive psychological or behavioral outcome ultimately leads to purchase (Kerfoot et. at. 2017).

Visual merchandising includes arranging a variety of products in an appealing manner to maximize sales potential. **Assortments** should align with customer preferences and store objectives (Raghu 2013). Creating **themes for displays**, such as festive or seasonal settings, enhances customer engagement and emphasizes product relevance during specific periods (Sodhi & Kant 2013). Properly arranged **racks and shelves** facilitate ease of browsing and highlight the organization of merchandise, improving customer experience (Tshepo Tlapana 2021). Grouping items that complement one another, such as clothing **ensembles**, provides styling ideas to customers and increases basket size (Pegler 1983). Strategically placing **impulse-buy items near payment counters** can boost sales while customers wait (Chaudhary & Jadhav 2014). Effective **display** arrangements, such as tiered setups or categorized sections, allow for better visibility and product emphasis (Bailey & Baker 2014). A **planogram** outlines the placement of products by style, size, or type, ensuring uniformity across stores in retail chains (Raghu 2013). Using **props and mannequins** adds life to displays, especially in apparel stores, helping customers visualize product usage. (Law et. al. 2012) **Signage at points of sale** informs customers of offers, product highlights, or payment options, increasing purchase likelihood (Baek et al., 2015). Methods such as **window displays, cross-merchandising, or interactive setups** effectively catch customer attention and drive foot traffic into stores (Baek et al., 2015). These elements collectively contribute to creating an engaging and profitable retail environment.

In-Store signages: Informational and promotional **graphics** guide customers and create a cohesive brand identity. (Roopa & Ramesha 2019). Types of In store signages includes:

Category Signage: Signage that helps customers navigate product categories within the store (Quartier, Cleempoel, & De Marez 2009). Effective category signage can improve customer satisfaction and influence buying decision. A study involving over 3,000 shoppers revealed that 82% of purchase decisions were made in store, with 62% of shoppers making impulse buys during their shopping experience. Notably, 16% of unplanned purchases were driven by in- store promotions, highlighting the impact of effective signage in prompting spontaneous buying decisions. (The impact of in-store signage on consumer purchase decisions | Marketing Dive)

Promotional Signage: Used to highlight discounts, sales, or special promotions. Promotional signage can significantly boost product visibility and sales, particularly when paired with other marketing tactics (Anderson & Simester 2001). **Point-of-Sale Signage** are placed at checkout areas to promote last-minute purchases or advertise offers. Effective point-of-sale signage, such as for tobacco control, has shown measurable impacts on purchasing behavior (Cohen et al., 2011). **Digital Signage** are dynamic digital displays used for advertisements, customer engagement, or wayfinding. Digital signage improves customer engagement and sales by leveraging targeted and visually appealing content (Burke 2009) Benefits: Offers flexibility in content, interactivity, and real-time updates. **Directional Signage** guides customers through the store, pointing out restrooms, exits, or specific product sections. Large retail stores like IKEA or supermarkets often use directional signs to lead shoppers to popular sections like groceries or home goods. (Piippo 2024). **Informational Signage** provides details about product use, benefits, or availability (Bitner 1992). Electronics retailers may use signage to highlight product features or compare specifications. **Branding Signage** highlights the store’s or a product’s branding to reinforce identity and build customer loyalty. (Lindstrom 2008). High-end stores like Apple or Nike use sleek, branded signage to reflect their brand ethos. **Regulatory or Compliance Signage** displays mandatory information like safety warnings, legal age restrictions, or return policies. Signage stating “You must be 21 to purchase alcohol or tobacco” at checkout counters. (Armour, Gordon & Min 2020). **Interactive Signage:** Uses touchscreens or other technologies to allow customers to interact with content, such as

checking inventory or customizing products. Beauty stores like Sephora use interactive screens to offer makeup tutorials or product recommendations (Gambetti 2010). **Window Signage** are placed on store windows to attract passersby and showcase offers or products. Retailers often use bold, eye-catching window signage during seasonal sales or product launches. (Sachdeva & Goel 2003)

Floor Graphics: Adhesive signs or patterns placed on the floor to guide shoppers or highlight promotions. Arrows pointing to a clearance section or promotional offers displayed on the floor. (Crankshaw 2012). **Endcap Signage** are signage on display racks at the end of aisles, showcasing promotional or featured items. A supermarket endcap promoting pasta with matching sauces and utensils. (Blessa 2015). **Way finding Signage** is part of a broader category that includes maps or detailed guides for navigating large stores or complexes. Department stores with multiple floors may provide way finding kiosks or printed maps. (Blessa 2015). **Sustainability or Eco-Friendly Signage** highlights environmentally friendly practices, recycling options, or sustainability-focused products. Signs near reusable bags or products made with recycled materials. (Worakittikul, Saenwerm & Naruetharadhol 2024)

Retail Presentation: Well-designed store layouts are critical because they have a strong influence on in-store movement designs, shopping environment, shopping behavior, and operational productivity (Behera & Mishra 2017).

Idea Oriented Presentation is a visual merchandising strategy (VM) where products are displayed in a way that communicates a theme, concept, or lifestyle (Ebster & Garaus 2015). The focus is on inspiring customers by showcasing how products can be used together or fit into a specific context, encouraging purchases by creating a compelling narrative around the items.

This approach is particularly effective in industries such as fashion, home décor and lifestyle retail. Displaying furniture, home decor, or apparel in a room setting to inspire customers. (Merrilees & Miller 2001). **Item and Size Presentation** is a merchandising strategy focused on organizing products by item type and size. This method ensures a clear and logical layout, making it easy for customers to find the exact product they need in the desired size. It is particularly effective in fashion retail, footwear, and other industries where size variation is a critical factor in the buying decision. Simplifies shopping for customers and ensures a clean, organized look. (Levy, Weitz, & Grewal 2018). **Color Presentation** is a VM strategy that organizes products based on color, creating an aesthetically pleasing and cohesive display. (Bell & Ternus 2012). This approach leverages the psychological and emotional impact of colors to attract attention, convey a theme, and enhance the overall shopping experience. Attracts attention and makes the store aesthetically pleasing (Bellizzi & Hite 1992). Color presentation is widely used in fashion retail, home décor, and lifestyle stores, where visual appeal plays a crucial role in influencing customer behavior. **Price Lining** in VM refers to the strategic arrangement of products in retail spaces to highlight specific price points, making it easier for customers to compare options within a price range and encouraging purchases (Grewal, Roggeveen & Nordfält 2017). This technique not only simplifies the shopping experience but also maximizes perceived value and promotes upselling by emphasizing differences in quality or features at various price tiers. Helps customers quickly identify products within their budget and compare options. (Monroe 1973). Electronics stores, grocery retailers, or apparel brands highlighting budget, mid-range, and premium products.

Vertical Merchandising is a VM strategy that involves organizing products vertically on shelves or displays. This approach maximizes the use of vertical space and aligns with natural eye movement, making it easier for customers to browse and select products (Sorensen, H. 2009). It is widely used in retail environments like grocery stores, fashion outlets, and electronics shops to create visually appealing and customer-friendly layouts. Products are displayed vertically from top

to bottom, typically on shelves, to allow customers to easily browse across different categories or sizes (Chandon, Bradlow & Young 2009).

Tonnage Merchandising is a retail strategy that focuses on presenting large quantities of a single product or product category in a visually impactful way. This approach emphasizes abundance and value, creating a perception of cost-effectiveness and urgency that can encourage customers to make bulk purchases or stock up on items. (Underhill 2009). It is particularly common in grocery stores, warehouse clubs, and discount retailers.

Frontal Presentation refers to the strategic display of products so that their most visually appealing or informative side faces the customer directly. (Pegler) This technique is widely used in retail and merchandising to capture customer attention, convey product value, and enhance overall sales. It emphasizes creating a visually engaging and accessible layout that encourages customers to engage with the displayed items (Kerfoot, Davies & Ward 2003).

Grid Presentation is a VM technique where products are arranged in a systematic, grid-like structure, creating a clean and organized display. (Levy et. al. 2018). This method is widely used in retail environments to maximize space efficiency, promote easy navigation, and allow customers to compare similar products side-by-side. (Baker et. al. 2002). It is especially effective in grocery stores, electronics outlets, and department stores.

Story Telling Display in VM involve creating immersive and thematic product presentations that tell a story, evoke emotions, or convey a lifestyle, inspiring customers to engage with the brand and its offerings. (Schmitt 1999). This technique goes beyond merely showcasing products—it creates a narrative that resonates with customers, helping them envision how the products can fit into their lives. (Bone & Ellen 1999). Fashion stores, gift shops, and high-end retailers during holidays or special events.

Pyramid Display is a triangular composition, where products are arranged in layers, with the widest base at the bottom and items tapering toward a focal point at the top. (Ebster & Garaus 2015). This structure naturally draws the eye upward, emphasizing the most important or premium product. Products like wine bottles, books or boxes are stacked or arranged in a pyramid structure to create a visually appealing presentation.

Cross Merchandising Presentation is a strategic retail technique where complementary products from different categories are displayed together to encourage additional purchases. The goal is to inspire customers by showcasing how products can be used together, solving a need or creating a desirable lifestyle presentation. (Grewal et. al. 2017). Related products are grouped together to encourage cross-selling. (Doha et. al 2017). Example: pairing wine with cheese or chargers with electronic devices. Baked goods with coffee or tea. Tortilla chips displayed alongside salsa and guacamole. A complete outfit display, pairing clothes with shoes and accessories.

Eye Level Merchandising is a visual merchandising strategy where products are displayed at the customer's eye level to maximize visibility and encourage purchases. This principle leverages consumer psychology, as items at eye level are more likely to catch attention and be perceived as more accessible or desirable. (Verhoef et. al. 2015) Products are displayed at eye level, as this is where customers tend to focus the most. (Chandon et. al. 2009). Used for high-margin products in grocery or department stores.

Interactive Displays in retail are innovative merchandising tools that engage customers through interactivity, blending technology, creativity, and customer experience. These displays are designed to capture attention, foster engagement, and provide personalized experiences, enhancing the overall shopping journey. (Pfiffelmann et. al. 2019). Displays where customers can touch, try, or interact with products encourages hands-on experience, increasing the likelihood of purchase.

Shelf Talkers are small, attention-grabbing displays or signs placed on retail shelves to highlight specific products, promotions, or features. These tools are commonly used in visual merchandising to influence purchasing decisions at the point of sale. (Bell et. al. 2011). Grocery stores and

pharmacies use these to direct attention to specific products to boost product visibility and provides quick information to customers.

Mannequin Displays are a cornerstone of visual merchandising in the retail industry, used to showcase apparel, accessories, or lifestyle products in an engaging and life-like manner. (Kerfoot et. al. 2003). Provides styling inspiration and showcases products in a lifelike setting. They help customers visualize how products can be worn or used, influencing purchase decisions by creating aspirational or relatable narratives. Mannequins are used to showcase clothing, accessories, or themed outfits. (Fornari et. al. 2016).

Merchandising Rules (MR) for product display on shelves: Merchandising is a cornerstone of retail success, involving a spectrum of activities from strategic planning to in-store execution. (Marshall et. al. 2006). The merchandising rules set as the benchmark by retailers to be followed by the planogrammer at the planning stage and to be maintained by the retail operators at the store location where the customer interact with the product displayed as per the rules and guidelines. MR for Merchandisers and Planners are different from MR for Retail Store Operators and Salespersons based on the roles and responsibilities of the stakeholders involved. Understanding these distinct yet interconnected roles is critical for achieving operational efficiency and maximizing customer satisfaction. (Kotler et. al 2015).

Merchandisers and retail planners are Responsible for developing overarching merchandising strategies, analyzing market trends, and ensuring product availability at the right cost and time. **Effective assortment planning** is critical to meeting consumer demand and maximizing shelf efficiency. (Hübner et al. 2016). Merchandisers and retail planners optimize product mix to cater to customer preferences and **maximize category performance**. Use data analytics to **forecast demand** and ensure variety across price points. **Shelf-space allocation** directly impacts product visibility and profitability. (Kotzab and Madlberger 2001). Merchandisers and retail planners allocate shelf space based on sales potential, product turnover, and category importance. **Develop planograms** to guide store layouts. **Inventory synchronization** reduce operational inefficiencies (Raman et al. 2001). Merchandisers and retail planners maintain optimal inventory levels to prevent stockouts or overstocking. Leverage **just-in-time (JIT)** inventory techniques for cost efficiency. They also **Design promotional calendars** and ensure alignment with marketing strategies. Monitor the impact of promotions on sales performance (Buttle 1984).

Retail store operators and ground sales staff are responsible for implementing merchandising plans, maintaining in-store displays, and interacting directly with customers. Accurate **planogram implementation** boosts sales by aligning displays with customer expectations. (Ehrenthal & Stolzle 2013). Store operators/ground staff ensure **adherence to store layouts** provided by planners. Regularly **update displays** to reflect seasonal themes or promotional activities. They conduct regular **shelf audits** to replenish stock and **ensure consistent availability**. Rotate products to prevent expiration (FIFO method). Salesperson expertise and **customer engagement** is directly linked with improved customer loyalty (Babin & Attaway 2000). Retail operators/ground staff **guide customers** toward high-margin or promotional products. **Provide product knowledge** to enhance customer satisfaction. Keep displays clean, organized, and visually appealing. **Use signage** to highlight promotions, best sellers, or new arrivals.

Merchandisers and planners operate as architects of retail strategies, while retail store operators and salespersons act as builders executing these blueprints. Recognizing their unique contributions and fostering collaboration can drive operational efficiency and improve customer satisfaction.

Bibliometric Analysis

Bibliometric analysis of literature available in Web of Science indexed journals on the core topic of retail atmospherics is conducted and the findings are presented in this article. This paper tries to deep-dive into the following research questions through a bibliometric review and network visualization analysis:

1. The major trends in the research carried out in Retail Atmospherics wrt the publication of research papers/articles and citations.
2. The top contributors to knowledge generation in this domain in terms of top authors, countries, journals and organizations.
3. The underlying inter-relationships between the most frequently used author keywords that can provide direction toward unexplored avenues of research.
4. The cooperation relationships between the countries contributing to research in this domain.
5. The research gaps that can translate into potential avenues for research in the field of Retail Atmospherics, especially in the area of shelf space allocation, item hierarchies helping the customers to pick and choose, store layout and category adjacencies helping the customers navigate the store naturally?

The analysis shows that although retail atmospherics research is still emerging, it has promise for future studies because shops all over the world are quickly implementing the outcomes it to improve overall consumer experience and increase profitability through loyalty and repeated visits.

Data Source: We pulled the data from “Web of Science” with the **Search Query** “Retail Atmospherics” as our main topic under study with sub topics “Floor plans”, “Planogram”, “Customer Decision Tree”, “Shelf Space Allocation”, “Store Ambience”, “Store Atmospherics” and “Atmospherics”. Use used the time period of 35 years of modern retail development globally with the **Time Frame** from 1990 to 2025 and extracted the data on **02 April 2025**

Number of Publications: Total 1423 valid publications were found in Web of Science which were extracted by country, by type of publication, by authors, by keyword occurrence, by WOS category, by universities publishing these and by number of citations.

We observed the WOS categories picked up by our keywords (Table 1) and in the next stage we removed the unrelated categories to focus only on the relevant categories. Top category was business but there were some other works being pulled due to the use of our term “Atmospherics” that included work in the field of electromagnetic induction, radio waves and environment to name a few, we considered irrelevant for our work and manually removed few of these to pull the data again.

After removing these unrelated categories we again pulled the data to stay closer to the subject and maintain focus on business, economics architecture and management. See Table 2, after data cleaning the relevant global papers in the field of retail atmospherics drops down to 801. We still maintained the construction and building technology because the store layout are sometimes studied under the construction and civil engineering and filling the retail store happens at the later stage depending upon the received layout.

The categories finally selected are further studied for finding out the trend of publications and major contributing authors in the field. We found that 773 of these articles are published in English language, 11 in Spanish, 7 in French and 6 in German, rest are in other languages.

Types of Publications: the data is extracted from the year 1990 to 2025. The publications Included the editorial, book review, meeting abstract news items and letters but primarily with 83.4% articles (Total 668) and 13.3% proceeding papers (total 107) covers 96.7% of the total web of science publications.

Index type: The papers are published mainly in the Social science index (SSCI) where 441 papers are published, the 210 papers are published in Science citation index Expanded (SCI-Expanded) chart 1 below lists all indexes of WOS where the authors published their work.

Year on Year trend: Retail atmospherics has always been a very niche subject and there are very few researches globally in this area, the chart 2 below gives a glimpse of the YOY publication in Web of Science on Retail Atmospherics. The chart shows a clear rise in the number of publications over a period of 35 years and shows an upward trend. Year 2021 and 2024 has maximum number of publications overall and since year 2000 it was only in year 2006 that we saw a decline in the number of articles published.

Active Countries by number of articles: Major contribution in retail is from the USA with 235 articles is stands on the top of the chart, Chart 3 below showcases the countries and their contribution in terms of articles published in Web of Science on the topic of retail atmospherics. England comes distant second with 84 articles and China with 69 articles comes third. India on ninth rank has published 35 articles with major (13 articles) coming from IIM systems.

Most Cited Paper:

The top contributing article in the field of retail store atmospherics is “Atmospheric effects on shopping behavior: A review of the experimental evidence” by Turley, LW and Milliman, RE (Journal of Business Research, Volume 49, Issue 2, Page 193-211 DOI: 10.1016/S0148-2963(99)00010-7) this has received 1077 citations in Web of Science core collection and 1313 citations across all databases so far.

Second most influential article with 716 citations in WOS core collection and 824 citations across all databases is “Empirical testing of a model of online store atmospherics and shopper responses” by Eroglu, SA; Machleit, KA and Davis, LM (Psychology and Marketing, Volume 20, Issue 2, Page 139-150, DOI: 10.1002/mar.10064).

Third major contribution with 665 citations in WOS Core and 781 citations across all databases is by the article “Perceived quality, emotions, and behavioral intentions: Application of an extended Mehrabian-Russell model to restaurants” by Jang, SC and Namkung, Y, published in Journal of Business Research, Volume 62, Issue 4, Page 451-460 DOI: 10.1016/j.jbusres.2008.01.038.

Fourth most cited article is by Grewal, D; Roggeveen, AL and Nordfält, J, with title “Future of retailing, published in the Journal of retailing, Volume 93, Issue 1, Page 1-6, DOI: 10.1016/j.jretai.2016.12.008 has received 578 citations in WOS core and 686 citations across all databases till date.

Fifth most cited paper is “Customer Experience Management in Retailing: Understanding the Buying Process” by Puccinelli, NM, Goodstein, RC, Grewal, D, Price, R, Raghubir, P, and Stewart, D published in Journal of Retailing, Volume 85, Issue 1, page 15-30 in 2009 with DOI: 10.1016/j.jretai.2008.11.003. This has received 671 citations across all databases and 550 citations in WOS core circulations.

Authors & Affiliations: Major contributing authors are Jean Charles Chebat from HEC Montreal Technion Israel Institute of Technology, Montreal University, Canada with 13 articles and 1436 citations to these papers. Dhruv Grewal from Babson college, Wellesley, Massachusetts, USA is another most influential author in this field with 13 articles and 2841 citations to his work. Anne L. Roggeveen (Ph.D. Columbia University) is the Charles Clarke Reynolds Professor of Retailing & Marketing at Babson College is another notable author and researcher with 9 articles and 1152 citations to her work.

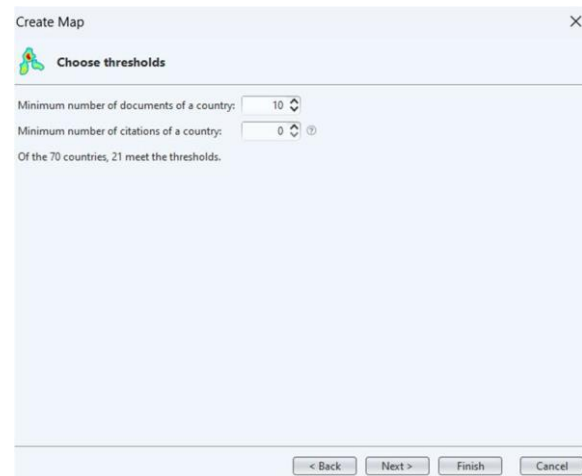
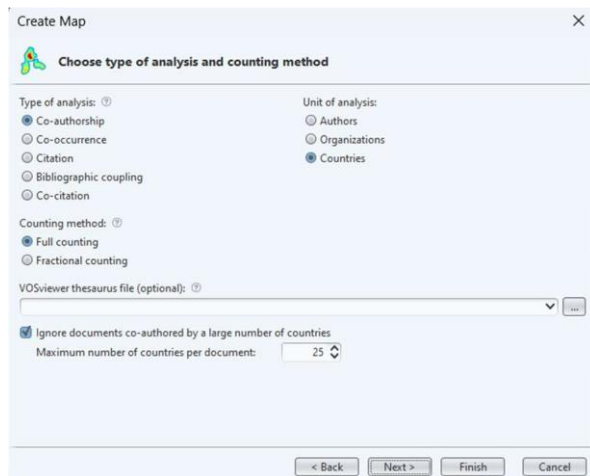
Journals attracting these articles: Table 3 depicts the journals attracting maximum number of articles in the field of ‘retail atmospherics’. Clearly the Journal of business research, Journal of retailing and consumer services, Journal of retailing, International journal of retail distribution management and European journal of marketing published more number of articles in Web of Science core collection. We can see the journals in buildings and architecture are also publishing articles in the field of retail atmospherics due to the fact that the engineers while designing the retail store takes care of the civil structure, power supply, entry – exits, cash counter locations, changing rooms, store rooms, customer service areas and often these areas are fixed locations in the store and cannot be moved unless there is a major redesigning is planned at the retail store. Psychology and environmental enthusiasts also study retail store layout and atmospherics due to academic reasons and therefore we observe the usage of this term in these journals also.

Keywords with appearance: The top keywords with maximum number of appearance are listed in the table 3. Atmospherics is the most frequently used keyword among our fetched 801 papers with impact being the second in frequency with 160 appearances.

VOSviewer Analysis:

VOSviewer is a software tool for **creating maps based on network** data and for **visualizing and exploring** these maps. We used VOSviewer version 1.6.20 for our analysis of data we downloaded from Web of Science indexed journals by using the keyword “Retail Atmospherics”. After pulling this data we created the ‘tab delimited’ file in WOS to export this data and then retrieve this file in VOSviewer for further analysis. Network visualization analysis (Van Eck & Waltman, 2010) was conducted using co-authorship ties between nations conducting research in this area, citation links between journals publishing research literature in the subject of retail atmospherics, and keyword co-occurrences of the most cited author keywords.

We pulled the data into VOS viewer and created a map using bibliographic data, we had chosen bibliographic database files as data source, then we selected the files from 'Web of Science' downloaded data (801 publications) and then we had repeated the above steps to study co-authorship, co-occurrence, citation and



Co-Occurrence Analysis: We conducted Analysis of Keywords occurring together in research articles published in different parts of the world and indexed in WOS for understanding more deeply on how these keywords are used and their significance.

Map 1: is created with keywords (Total 211) that we pulled out from WOS and found that the major keyword with most occurrences and links was Atmospherics. We also checked the total links those exists among all these 211 keywords) to be 5432 means either of these 211 words are used this many times together in various research papers and articles. Link Strength means how many times these two terms are used together in the same published reference paper. Total links is shown by the size of the bubble in the map, 'atmospheric' 'impact' 'satisfaction' are large bubbles with more number of links.

Map 2: Upon focusing on keyword 'Atmospherics' we found that the keyword is used 250 times with total 191 links and link strength of 1690. All these connecting lines in the map are the link strengths, selecting any curved line give us the strength, means how many times these two keywords appeared together. The map also shows many indirect links between keywords eg. Layout is not directly linked with atmospherics but layout is linked with design and design is linked with atmospherics.

Map 3: The keyword "Floor plan" shows indirect linkage with the keyword "Design" and another keyword "Architecture" that is part of engineering and design and lesser connected with customer perception, ease of shopping and behavior. However the keyword "Layout" (Refer Map 3) has more direct linkages with social science research subjects like "behavior", "emotional responses", "choice", "comfort", "servicescape", "environment" and "floorplan" apart from "atmospherics" and "impact". Keyword "Layout" has 32 links and total link strength of 49.

Map 4: Another important keyword is "Cues" that has total 103 links and link strength of 274 with 39 occurrence, is directly linked with keyword "floorplan". This keyword "Cues" also referred to as "Silent Cues" showing co-occurrence with keywords like "Scent", "Music", "Sound", "Memory", "Loyalty", "Floor plan" and "Layout".

Customer loyalty is studied with environment and music. Sensory marketing shows links with behavior and consumption whereas the word floor plan does not show any links and thereby opens

up a huge window for researchers to explore. Similarly the keyword ‘planogram’, that operators and planners claims to be the biggest tool to generate impulse purchase is missing in this map and is apparently a huge gap.

Co-Authorship Analysis: We also checked which all countries are participating and sharing knowledge in retail atmospherics domain and created separate map for the same. We selected only those countries where at-least 10 research papers are published in this area and VOSviewer gave us 21 such countries to study.

Map 5: Density visualization of co-authorship by country clearly shows the contribution of the USA far ahead of the other countries. USA has in all 19 links and total link strength of 112, total 232 research papers and 13, 876 citations to its credit.

England is the second most influential country in terms of retail atmospherics publications with 17 links and 47 link strength, 82 documents and 2676 citations. France with total links 12 and link strength of 23 and 1113 citations stands at third position followed by Germany with 11 links, link strength of 18 and 699 citations. Netherlands, Canada and Spain with 10 links are also among the leading countries contributing in this research area.

Map 6: Indian researchers have co-authored with USA, Canada, England, China and Taiwan for retail atmospherics. India shows 5 links and total link strength of 10 and 34 documents published so far and have received 835 citations.

Citations Analysis: We checked for citations by Institute and found that Babson College is the front runner with 11 documents and 2312 citations followed by Purdue University with 10 documents and 1664 citations and Alabama University with 6 documents and 938 citations at third most contributing institution. All the top contributing universities also have links for citation, co-authorship and co-occurrence.

Map 7: shows citations by authors, for extracting this we selected only the authors with minimum 5 documents published and we find that Dhruv Greval is most cited author with 11 papers and 1941 citations with total strength of 107. His article “Future of Retailing” coauthored with Roggeveen, AL and Nordfalt, J is also at rank 4 among the most cited articles list.

Roggeveen Anee, L. with 9 documents and 1152 citations is the second most cited author and is the co-author of Future of Retailing as well. Spence Charles is third most influential author with 9 documents and 499 citations to his name.

Conclusion

This paper evaluated the global trends in research on retail atmospherics using bibliometric and network visualization analysis. Research on retail atmospherics has started with the modernization of retail but in the last six years the production of research articles in this field has seen a jump with more multi-authored articles being published in this subject.

The study shows the stronghold of USA in retail atmospheric researches with 29% publications coming from there globally, top researchers and universities are also from USA. Social Science Citation Index (SSCI) with 55% publications and Science Citation Index Expanded (SCI-Expanded) with 26% publications jointly hold more than 80% of total WOS publications in this area. Other key findings includes:

1. Floor plan and retail store layout though has remarkable impact on consumer purchase behavior and acts as silent cues, these are yet to be deeply studied from the customer point view and how the floor plan can help shopper enjoy his / her shopping trip, spend more time in store, finds everything naturally and easily and buys out of impulse.
2. More work is being done for designing the **floor plan** (or store layout) from engineers' viewpoint, as the keywords are more part of designing, architecture and algorithm studies and there is a lot of scope to study layout from customer behavior, ease of shopping and retail store environment view point.
3. Planogram is majorly an unexplored topic and studies around planogram designing, methodologies, strategies, customer decision tree, product hierarchies etc. are very few though heavily used terms in the industry.
4. Space Allocation Problem, the toughest retail dilemma is being studied only from algorithm and architecture viewpoint and have a huge scope to study it from customer perception and satisfaction angles.

Implications of the study

Theoretical Implications

A bibliometric study aims to offer a numerical evaluation of the research conducted over time in a certain sector of knowledge. Since the idea of retail atmospherics gained popularity, this paper has tried to give a brief overview of the major developments in the field. It sheds light on how the idea of retail atmospherics is worked by the academicians and researchers and the main perspective-based lenses that scholars have used to study this phenomenon. Researchers might use the study's insights into current author-country relationships as a guide for future academic collaborations. By offering a fundamental framework for their investigation into retail atmospherics, this study can also provide as a springboard for novice researchers in this area. Furthermore, the researchers in emerging economies can pick up the trend from this paper to investigate their market specific dynamics in the field of consumer behavior and ease of shopping.

Managerial Implications

The bibliometric analysis in the area of retail atmospherics has indicated that although the research in this area is not new, still there are certain elements of retail store planning and setup that due to various reasons consider only the architectural inputs while designing the retail store floor. Silent retail cues within the isle, shelves and checkouts are real game changers for increase in impulse

purchase at the stores, this could be the natural flow of merchandise visibility through smartly done floor plan and this could also be the availability of the right item at the right place that can be done with smartly done shelf allocation. There are areas where more fundamental researches can help improve shopping experience and overall sales and profitability. Shelf space allocation problem, customer decision tree and product hierarchies, Store layout, category adjacencies, impulse cues through store design elements etc. are such problems those can be solved through more academic researches and industry should collaborate with researchers interested in finding solutions to real retail problems.

Societal Implications

In the digital era of online shopping, the customer walking in the retail store is for fun and ease, the days of shopping list are gone and the retailers designing the retail store smartly and in natural flow creates a proxy shopping list in the minds of the customer to shop. Moreover the focus will now shift to more customer service and customer delight thereby enhancing the overall retail experience.

Limitations of the study

A possible limitation of the study could be that citation and co-citation data and trends are typically dynamic in nature and are expected to change over a period of time.

Scope for future research

The research domain on retail atmospherics is attracting significant interest from academicians and researchers. This study attempts to encapsulate the key trends in retail atmospherics research during the period 1990–2025. A detailed study of the sample set of 801 research articles has revealed potential avenues for future researches.

Research on retail atmospherics and silent cues has indicated that the world's most expensive real estate (Kaikati and Kaikati 2006) the retail shelves are to be organized in a way to fulfill multiple purposes. Future research could delve deeper into which specific aspects of retail atmospherics (customer decision tree, shelf space allocation problem, layout and floor plan) offer significant returns in terms of enhanced customer value.

Also used Web of Science publications only due to scope of the study but researchers can pull out the data from Scopus and other indexes to further enhance the results of this study.

Declaration

No funding or financial assistance of any kind is received in writing this article. We make sure that all the citations are duly credited and have not published this paper anywhere else except for this conference (International Conference: Innovative strategies of economics, commerce, finance and management for sustainable and inclusive global future, Poona college of arts, science and commerce, Camp Poona, 411001).

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Table 1 Web of Science Categories under scanner (First Cut – 1423 publications)

Table 1 (WOS Categories under scanner)		
Web of Science Categories	Record Count	% of 1,423
Business	318	22.347
Construction Building Technology	118	8.292
Management	115	8.082
Engineering Civil	113	7.941
Architecture	108	7.59

Engineering Electrical Electronic	90	6.325
Meteorology Atmospheric Sciences	84	5.903
Astronomy Astrophysics	71	4.989
Computer Science Information Systems	66	4.638
Environmental Studies	66	4.638
Hospitality Leisure Sport Tourism	66	4.638
Geosciences Multidisciplinary	61	4.287
Computer Science Artificial Intelligence	54	3.795
Telecommunications	53	3.725
Geochemistry Geophysics	50	3.514
Computer Science Interdisciplinary Applications	47	3.303
Environmental Sciences	45	3.162
Computer Science Software Engineering	44	3.092
Engineering Multidisciplinary	33	2.319
Computer Science Theory Methods	29	2.038
Green Sustainable Science Technology	29	2.038
Physics Applied	29	2.038
Remote Sensing	29	2.038
Geography	28	1.968
Psychology Multidisciplinary	28	1.968

Source: All figures collected from Web Of Science Analytics

Table 2 Web of Science Categories under scanner (After removing irrelevant categories)

Table 2 (WOS Categories under scanner after filtering)		
Web of Science Categories	Record Count	% of 801
Business	311	38.826
Management	109	13.608
Architecture	97	12.11
Construction Building Technology	96	11.985
Engineering Civil	90	11.236
Hospitality Leisure Sport Tourism	62	7.74
Computer Science Interdisciplinary Applications	28	3.496
Economics	25	3.121
Public Environmental Occupational Health	23	2.871
Computer Science Artificial Intelligence	21	2.622

Multidisciplinary Sciences	21	2.622
Psychology Applied	19	2.372
Information Science Library Science	18	2.247
Computer Science Information Systems	17	2.122
Psychology Multidisciplinary	17	2.122
Food Science Technology	14	1.748
Computer Science Theory Methods	12	1.498
Psychology Experimental	11	1.373
Social Sciences Interdisciplinary	10	1.248
Operations Research Management Science	9	1.124
Sociology	9	1.124
Cultural Studies	8	0.999
Engineering Multidisciplinary	8	0.999
Art	7	0.874
Business Finance	7	0.874
Showing 25 out of 74 entries		

Source: All figures collected from Web Of Science Analytics

Table 3: Journals with maximum number of articles

Table 3: Journals with maximum number of articles	
Publication Titles	Record Count
JOURNAL OF BUSINESS RESEARCH	51
JOURNAL OF RETAILING AND CONSUMER SERVICES	44
AUTOMATION IN CONSTRUCTION	27
INTERNATIONAL JOURNAL OF RETAIL DISTRIBUTION MANAGEMENT	22
JOURNAL OF RETAILING	21
EUROPEAN JOURNAL OF MARKETING	20
BUILDINGS	16
JOURNAL OF SERVICES MARKETING	16
A U ARCHITECTURE AND URBANISM	15
JOURNAL OF ASIAN ARCHITECTURE AND BUILDING ENGINEERING	14
HERD HEALTH ENVIRONMENTS RESEARCH DESIGN JOURNAL	13
JOURNAL OF BUILDING ENGINEERING	13
PSYCHOLOGY MARKETING	11
FRONTIERS IN PSYCHOLOGY	9

Source: All figures collected from Web Of Science Analytics

Table 4: Top keywords with maximum appearances

Table 4: Top keywords with maximum appearances				
keyword	occurrences		keyword	occurrences
atmospherics	250		perceptions	42
impact	160		store environment	41
behavior	114		cues	39
model	91		store atmospherics	39
satisfaction	84		loyalty	37
environment	77		retail atmospherics	36
quality	68		servicescape	36
experience	57		customers	35
background music	55		responses	35
music	52		shopping behavior	34
consumption	50		ambient scent	33
emotions	50		customer satisfaction	33
design	49		information	30

Source: All figures collected from Web Of Science Analytics

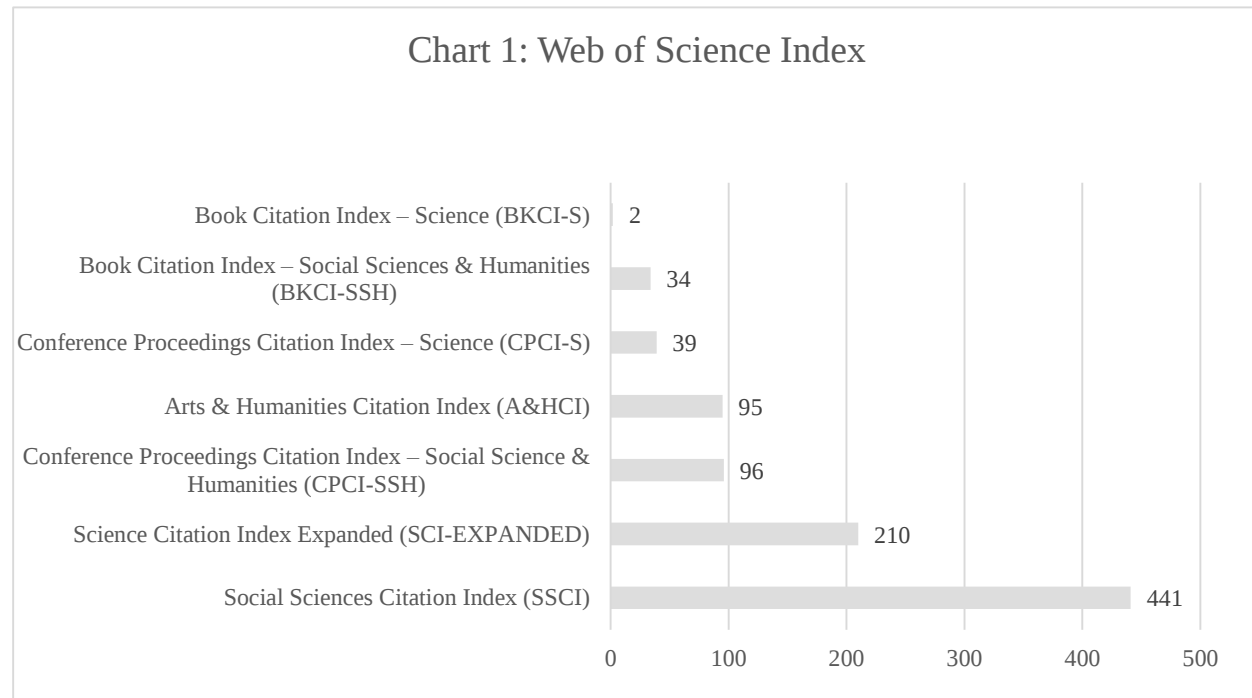
Table 5: Top 10 published articles with author and Journal out of total 801 publications.



Top 10 of 801 Publications

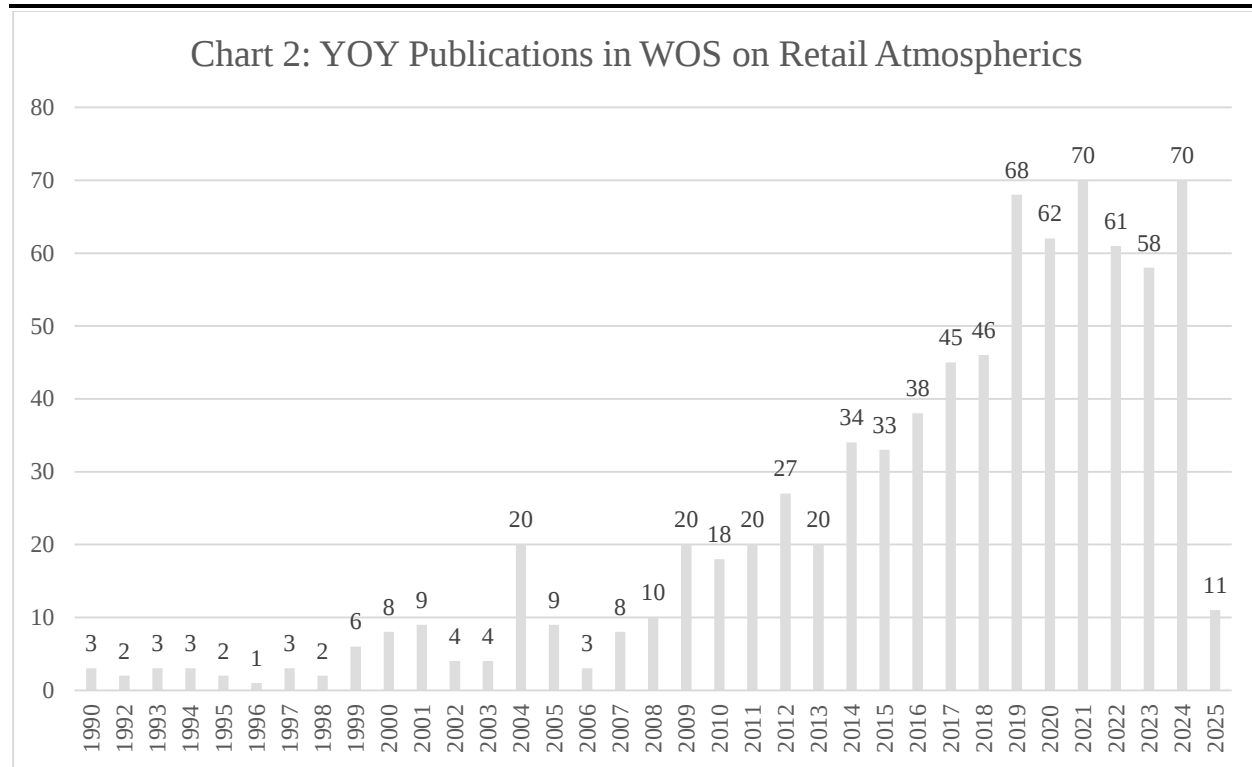
Research Publication Title	Author	Journal
Atmospheric effects on shopping behavior: A review of the experimental evidence	Turley, LW and Milliman, RE	JOURNAL OF BUSINESS RESEARCHarrow_drop_down 49 (2) , pp.193-211
Empirical testing of a model of online store atmospherics and shopper responses	Eroglu, SA; Machleit, KA and Davis, LM	PSYCHOLOGY & MARKETINGarrow_drop_down 20 (2) , pp.139-150
Perceived quality, emotions, and behavioral intentions: Application of an extended Mehrabian-Russell model to restaurants	Jang, SC and Namkung, Y	JOURNAL OF BUSINESS RESEARCHarrow_drop_down 62 (4) , pp.451-460
The Future of Retailing	Grewal, D; Roggeveen, AL and Nordfält, J	JOURNAL OF RETAILINGarrow_drop_down 93 (1) , pp.1-6
Customer Experience Management in Retailing: Understanding the Buying Process	Puccinelli, NM; Goodstein, RC; (...); Stewart, D	JOURNAL OF RETAILINGarrow_drop_down 85 (1) , pp.15-30
AN EXPERIMENTAL APPROACH TO MAKING RETAIL STORE ENVIRONMENTAL DECISIONS	BAKER, J; LEVY, M and GREWAL, D	JOURNAL OF RETAILINGarrow_drop_down 68 (4) , pp.445-460
Impact of ambient odors on mall shoppers' emotions, cognition, and spending - A test of competitive causal theories	Chebat, JC and Michon, R	JOURNAL OF BUSINESS RESEARCHarrow_drop_down 56 (7) , pp.529-539
Cross-category effects of induced arousal and pleasure on the Internet shopping experience	Menon, S and Kahn, B	JOURNAL OF RETAILINGarrow_drop_down 78 (1) , pp.31-40
Retail environment, self-congruity, and retail patronage: An integrative model and a research agenda	Sirgy, MJ; Grewal, D and Mangleburg, T	JOURNAL OF BUSINESS RESEARCHarrow_drop_down 49 (2) , pp.127-138
An expanded servicescape perspective	Rosenbaum, MS and Massiah, C	JOURNAL OF SERVICE MANAGEMENTarrow_drop_down 22 (4) , pp.471-490

Source: All figures collected from Web Of Science Analytics

Figure 1: Top web of science index with maximum number of publications.

Source: All figures collected from Web Of Science Analytics

**Figure 2: Year on year scientific publications in web of science on Retail Atmospherics**



Source: All figures collected from Web Of Science Analytics

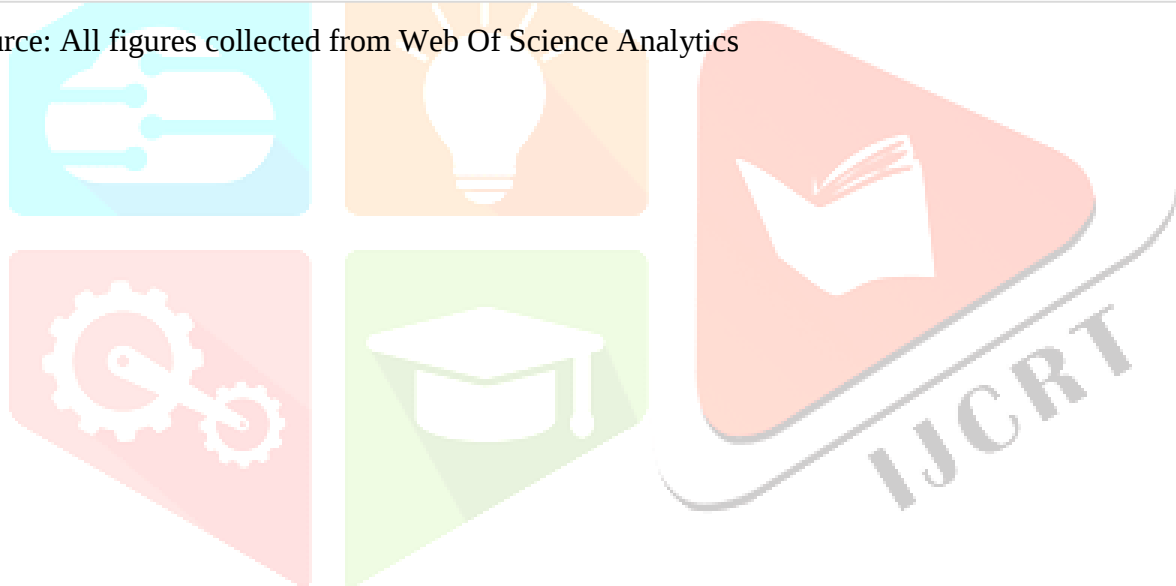
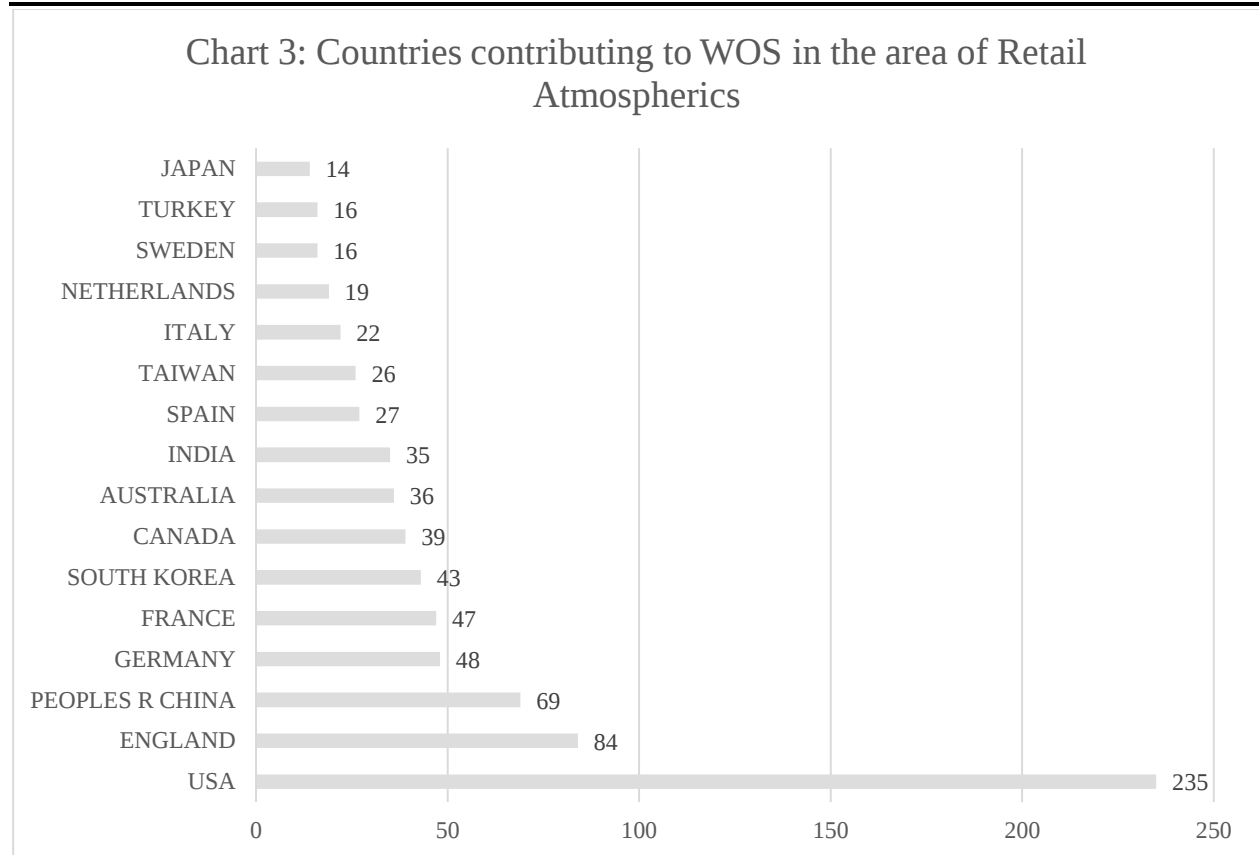
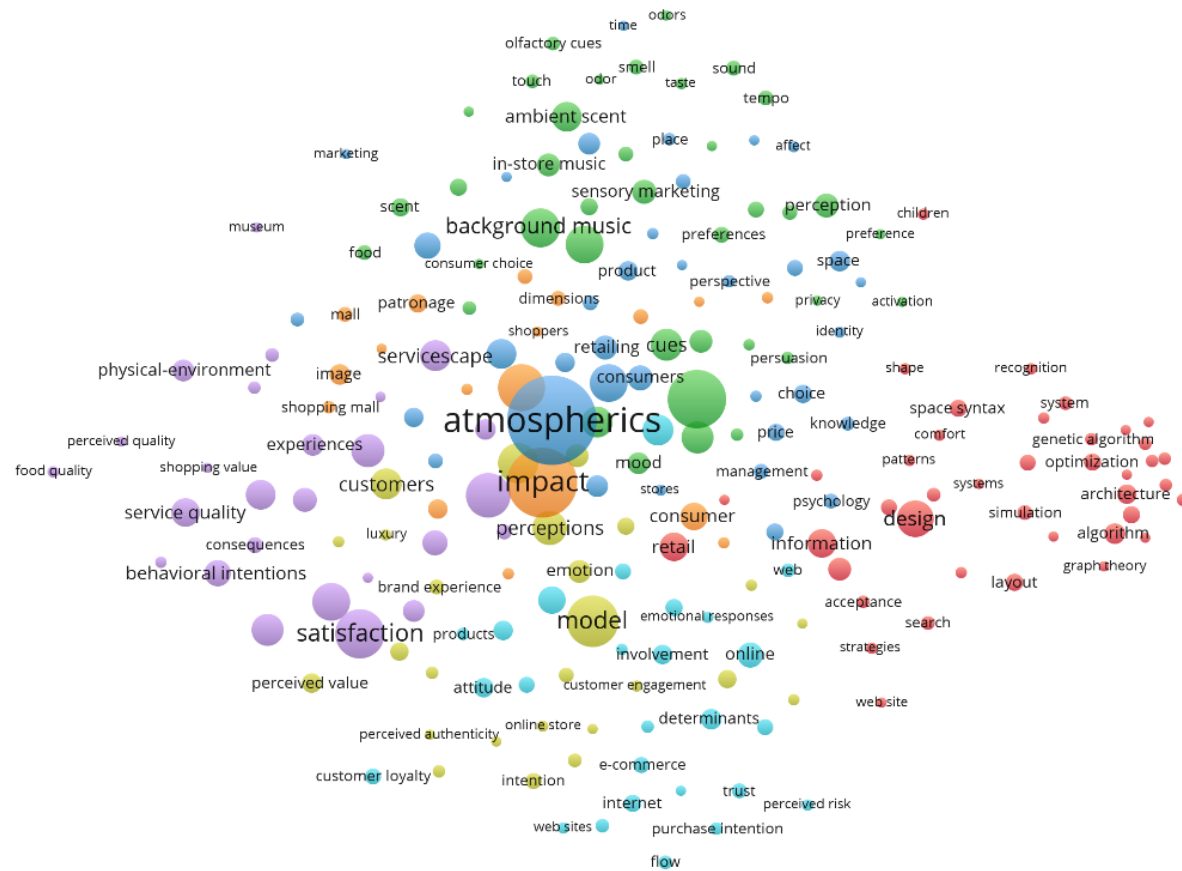


Figure 3: County-wise contribution in publications on retail atmospherics



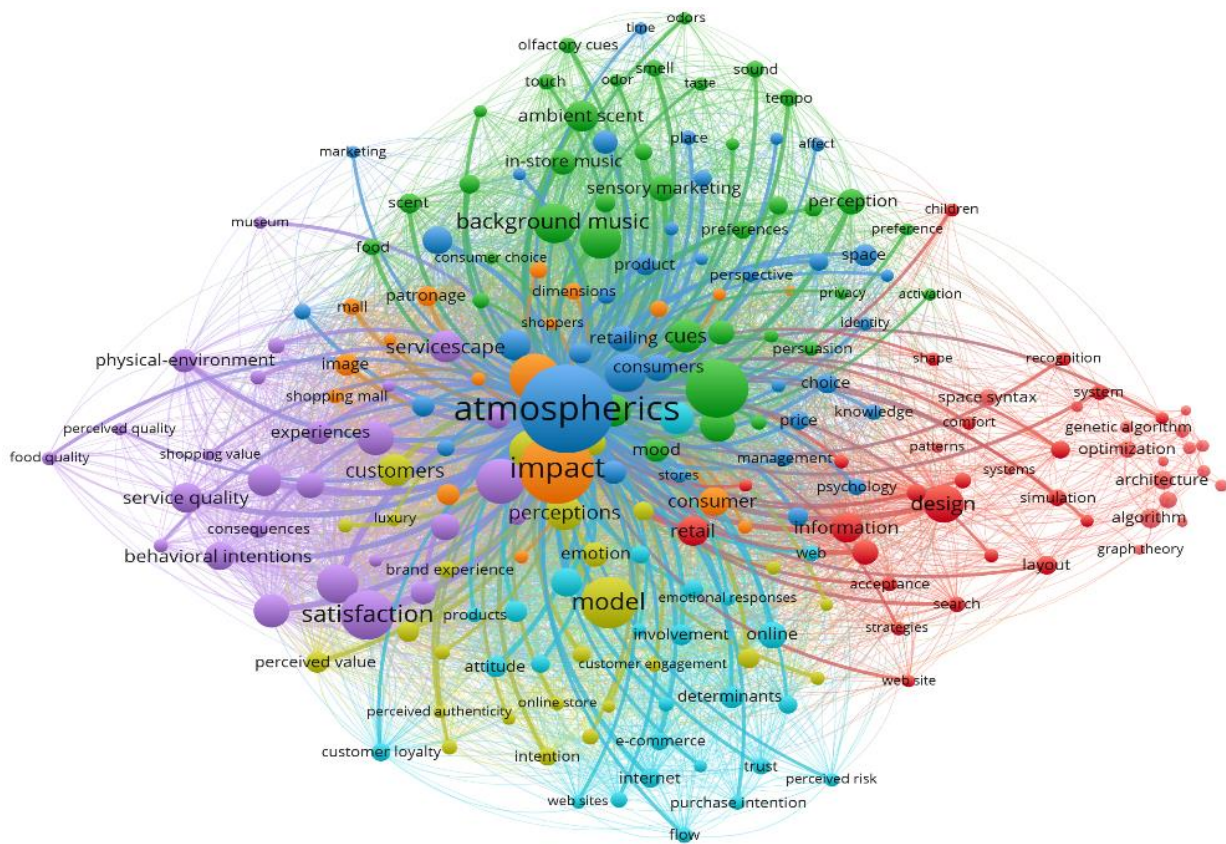
Source: All figures collected from Web Of Science Analytics

Map 1: Co-Occurance Analysis of Keywords

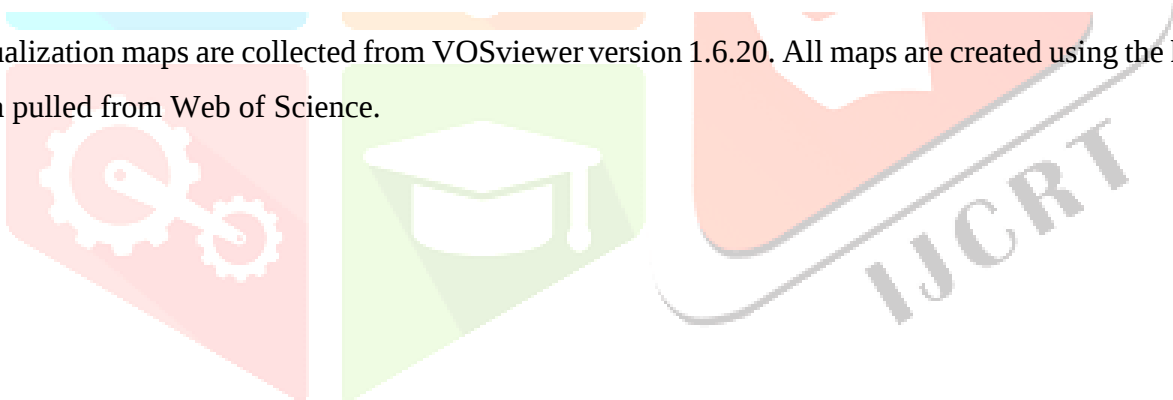


Source: All visualization maps are collected from VOSviewer version 1.6.20. All maps are created using the keywords data pulled from Web of Science.

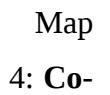
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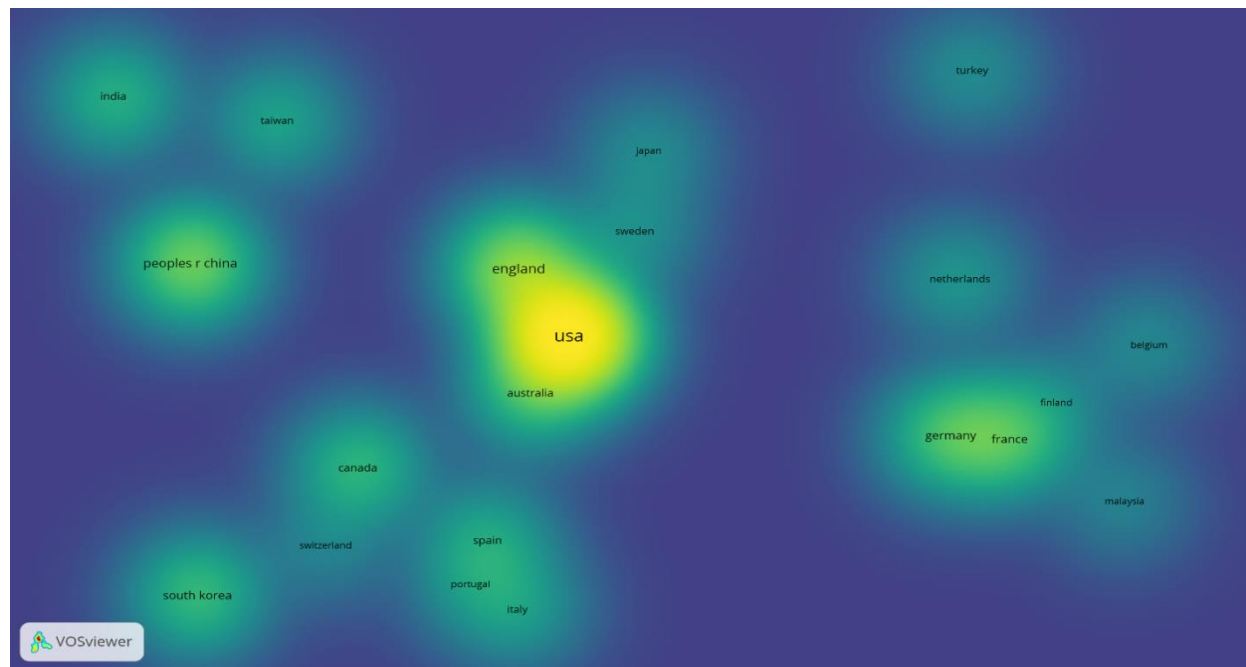


Source: All visualization maps are collected from VOSviewer version 1.6.20. All maps are created using the keywords data pulled from Web of Science.



Source: All visualization maps are collected from VOSviewer version 1.6.20. All maps are created using the keywords data pulled from Web of Science.

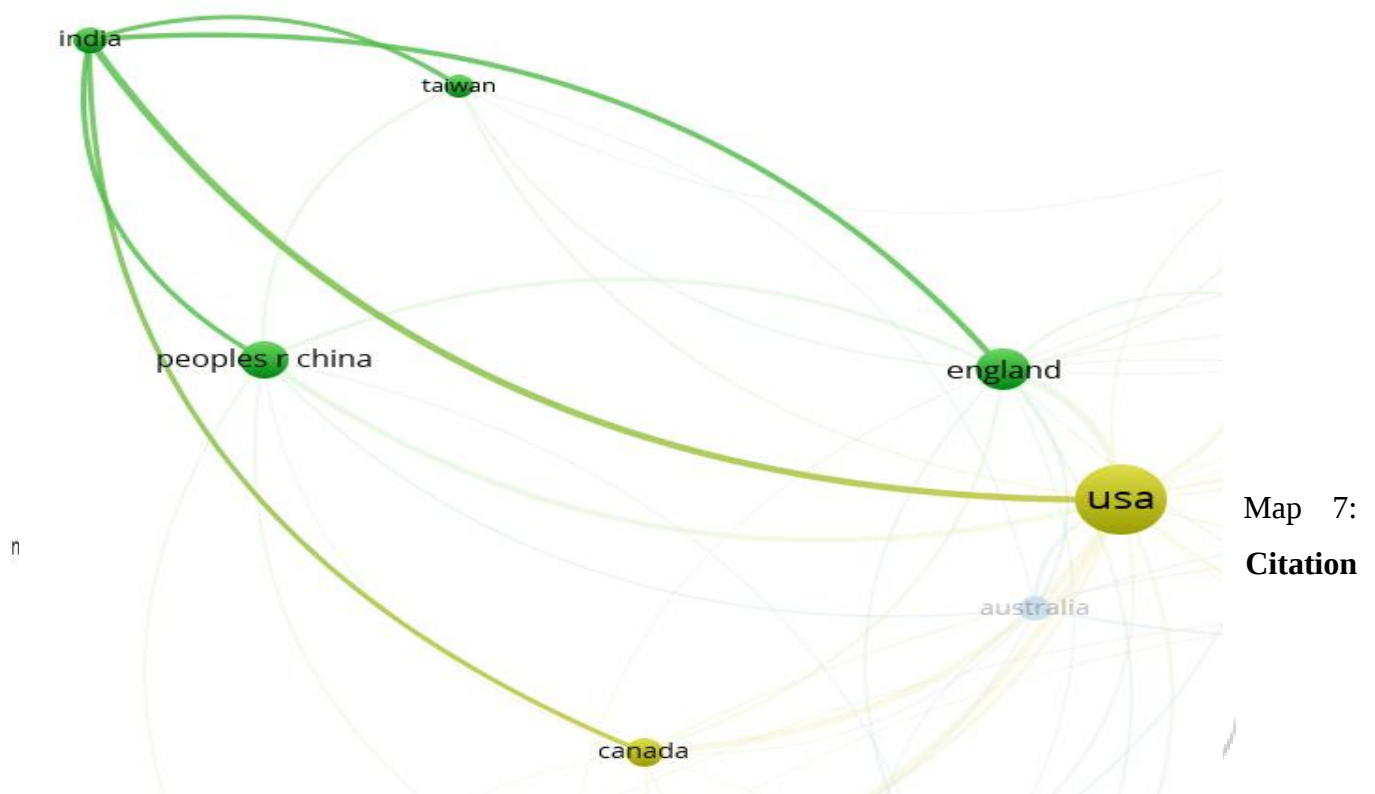
Map 5: Co-Authorship Analysis of countries – Density Visualization Map



Source: All visualization maps are collected from VOSviewer version 1.6.20. All maps are created using the keywords data pulled from Web of Science.

Map 6: Co-Authorship Analysis of countries – Focus India

Source: All visualization maps are collected from VOSviewer version 1.6.20. All maps are created using the keywords data pulled from Web of Science.



Analysis of of Authors

Source: All visualization maps are collected from VOSviewer version 1.6.20. All maps are created using the keywords data pulled from Web of Science.