# The Path Toward Omni-channel Retailing: How Large Language Model Facilitates the Process

Retail strategies have been evolving since its early inception that was comprised of mere simple acitivities. Omni-channel retail strategy is, undoubtedly, the most recent strategy attempting to provide a consistant, integrated customer experience across different channels, including online and offline ones. In this article, the marketing challenges commonly arise in the path towards omnichannel retailers are pointed out and the role of technology as a solution is explored deeply. Specifically, we will concentrate on Large Language Models, a type of Generative AI, to assess whether they have the ability to produce consistent advertising messages and convey characteristics of the retailer or not.

## 1. Introduction

The concept of omni-channel retailing is not limited to recent years, but due to new technologies and emerging tools, a large proportion of retailers have adopted such a strategy. More than a decade ago, the term "omni-channel" appeared as a way of interacting with the retailer, through which the customer feels consistency regardless of the channel the customer is using (Rigby 2011). The purpose of such a new strategy is to treat channels as interconnected touchpoints, enabling consumers to enjoy a seamless experience within an ecosystem (Shen et al. 2018). The number of papers related to omni-channel in various journals has shown an upward trend (Cai and Lo 2020), but various challenges inherent in the path toward an integrated and consistent experience demand additional efforts. Although this concept attracts both customers and retailers (Hajdas, Radomska, and Silva 2022), related literature has not covered developments and it requires to conduct research regarding nuanced topics (Saghiri et al. 2017).

A channel represents any contact point or medium that a customer and the firm can interact with each other (Neslin et al. 2006). One of the accepted definitions of omni-channel management is "the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance

over channels are optimized" (Verhoef, Kannan, and Inman 2015). In other words, the objective is to create a shopping journey in which customers feel a seamless experience across offline and online channels (Bhatnagar and Ghose 2004). Omni-channel, however, is not the same as multi-channel (or multiple channel) due to lack of synergy or even cross-channel, which doesn't meet the level of required integration (Li et al. 2018; Hajdas, Radomska, and Silva 2022).

The transition phases from a single- or multi-channel retailer toward channel integration and the creation of a seamless customer experience on different channels raise some serious issues that require appropriate management and tools. Technology, and specifically Artificial Intelligence (AI hereafter), has a multitude of capabilities that can streamline the process and result in omni-channel retailing with the necessary level of integration. This article seeks to explore the prospective benefits of Large Language Models (LLMs hereafter) for addressing the problems and challenges in the way of integrating retail channels.

First, we review the literature to have a clear image of omni-channel retailing from different points of view to grasp what additional steps it requires to implement the strategy. Then, the role of technology and its unprecedented merits that can pave the way to become an omni-channel retailer are explored in the previous studies. Next, we discuss LLMs like ChatGPT and Bard that generate text in response to users prompts. Finally, we ask two commercial LLMs to generate marketing messages and evaluate them with Natural Language Processing (NLP hereafter) to evaluate if the messages meet the characteristics of integrated channels.

## 2. Literature Review

Retailing has evolved in various forms from the past to the present. Each new format, with its customized channels, has undergone testing to measure its efficiency and potential to serve customers satisfactorily. Considering the purchasing process allows us to explore the distinctive features of each format and identify their inherent strengths and weaknesses. One simplified yet insightful framework involves four major steps that customers typically follow: information search, purchase, acquisition, and returns (Gauri et al. 2021). In traditional retail formats, the entire customer journey used to take place at a single physical channel. Nowadays, however, customers can opt for a combination of channels to fulfill their information search, product purchase, and acquisition, or even product return (Kim and Lee 2008). For example, some customers prefer to search offline and buy online, a practice widely known as showrooming (Ailawadi and Farris 2017), or choose products to buy online and collect them at specific locations, known as click-and-collect (Weltevreden 2008). Even more complex, one can place an order in one channel (e.g., on a smartphone), receive the order via another channel (e.g., home delivery), and return it in case of an error through a third channel (e.g., a physical store) (Kembro, Norrman, and Eriksson 2018). Each channel has its own merits, and retailers would benefit from harnessing the advantages and mitigating the disadvantages of each channel.

n an omni-channel retailer, not only is customer value created through the design, deployment, coordination, and evaluation of its channels, but it also aims to integrate all touchpoints in

a way that provides a seamless customer experience (Thaichon, Phau, and Weaven 2022). More specifically, a successful omni-channel management approach results in synergy among channels that contributes to overall effectiveness (Melacini et al. 2018). Synergy exists as the channels of a retailer impact one another, a phenomenon that has been empirically studied. For example, an online channel is likely to earn more if it establishes an offline store in a region where its previous presence was not substantial (Wang and Goldfarb 2017).

One of the early studies in multiple channels management investigated the unexploited opportunities that businesses are often seeking (Zhang et al. 2010). More recently, (Shen et al. 2018) attempted to answer what drives a retailer to seek an integrated and consistent shopping experience, suggesting that the quality of channel integration influences perceived fluency across channels. Increasing cell-phone usage and technological developments have been identified as two important factors (Hajdas, Radomska, and Silva 2022). Notably, in that article, channel integration quality comprises channel choice breadth, channel service transparency, content consistency, and process consistency. However, considering the internal and external obstacles in operationalizing an omni-channel strategy, achieving the ultimate goal of high levels of channel integration may be unattainable for industries with certain characteristics, making this strategy seem utopian for them (Hajdas, Radomska, and Silva 2022).

There are numerous strategic decisions that departments should make, and processes have to be revised and coordinated when transitioning from a multi-channel or cross-channel to an omni-channel approach (Cao 2014). Operations and logistics are essential parts of this transition, but the domains of supply chain management and inventory management have not been discussed sufficiently yet (Cai and Lo 2020). Additionally, the unique characteristics of omni-channel retailing require innovations in warehouse operations as well (Kembro, Norrman, and Eriksson 2018). In this article, however, our focus will be on those aspects that directly affect customers' perceptions.

### 2.1 Marketing Challenges on the Omni-channel Transition Road

The Marketing Science Institute placed a major emphasis on omni-channel retailing as an agenda for marketing research back in 2018 (MSI 2018). Adding a new channel, whether online or offline, contributes to the bottom line, as demonstrated by an empirical study (Wang and Goldfarb 2017). This study highlights the complementary effect of online and offline channels, despite their potential substitution effect in distribution. It emphasizes that opening a physical store or an online one becomes a strategic initiative in a competitive market. Retailers that initially established brick-and-mortar stores (e.g., Walmart, Target, and Kroger) aim to protect their market shares by launching and integrating their own online channels (Jindal et al. 2021). The complementary effect also increases the willingness-to-pay of customers looking for expressive durable goods (goods that, unlike functional goods, cannot be assessed and compared before purchase and have higher uncertainties) in an omni-channel retailer compared to a pure online retailer (Chatterjee and Kumar 2017).

As mentioned earlier, each channel offers distinct benefits for both customers and sellers. Quick delivery is one of the areas where online channels have an advantage over offline ones, but it's not the only one. More importantly, a large assortment, competitive prices, and purchase convenience are the primary reasons why online retailers attract customers (Jindal et al. 2021). However, a customer is likely to interact with multiple channels throughout their purchasing journey, rather than relying on just one. For instance, customers typically progress through various stages, starting with need recognition, followed by information search, purchase, and finally after-sales service, using separate channels or combinations of them (Neslin et al. 2006). Therefore, offline stores also have features that add value to overall business goals. One study introduced the term "supercharging" to describe the valuable effects of customer-experience-focused offline brand stores with no inventory or instant fulfillment on customers' purchasing behavior. Supercharged customers, who have visited the store and had a positive brand experience, spend up to 60% more on average, make purchases more frequently, and have fewer returns (Bell, Gallino, and Moreno 2020).

On that basis, customer experience is a core marketing concept in omni-channel strategy that deserves attention in both research and practice. The quality of the overall experience is a key factor influencing customers' intent to shop and is crucial in determining the success of an omni-channel business (Saghiri et al. 2017). It's defined as a multidimensional construct that encompasses customers' cognitive, emotional, behavioral, sensorial, and social responses to what a business offers at every touchpoint in the purchase journey (Lemon and Verhoef 2016). Nowadays, customers interact more frequently and through myriad touchpoints with a firm, which complicates the customer journey (Lemon and Verhoef 2016). Nonetheless, service integration, which consists of service consistency and transparency, is found to have a direct relationship with several aspects of customer experience (such as flow, referring to involvement in a specific activity without realizing time, and perceived privacy risk), resulting in repeat purchasing (Quach et al. 2022).

Additionally, marketing communication is one of the potential contributors to complementary effects. The main contribution of the article lies in the detection of the mechanism through which marketing communications drive complementarity. In this context, a source of synergy is the way informative advertisements by stores generate more sales for the online channel (Wang and Goldfarb 2017).

### 2.1.1 Integrated Marketing Communications

The messages that customers receive at each step of their journey must be crafted in alignment with the value proposition of the retailer. In an omni-channel world, IMC (Integrated Marketing Communications) underpins the entire strategy, as service consistency makes it feasible. The primary goal is to send clear, consistent, and compelling brand and company messages through integrated and coordinated communication channels. (Kotler and Armstrong 2011).

IMC could be positioned as a resource in Resource-Based View and has been shown to enhance both brand communication effectiveness and market-based performance (Luxton, Reid, and

Mavondo 2014). Similar to omni-channel retailing, the concept of an omni-channel approach to brand engagement emphasizes the need for IMC as a prerequisite for a unified brand experience (Payne, Peltier, and Barger 2017).

Incompetent organizational capabilities such as information sharing and technological assets impedes consistent brand messages across channels (Payne, Peltier, and Barger 2017). However, we propose AI and in specific, LLMs have the potential to overcome those barriers to some extent.

## 2.2 Technology as a Transition Facilitator

Among all the factors causing changes in retailing, technology enhancements and innovative devices can be identified as the leading ones. It's of utmost importance for retailers to reflect on strategies for positioning in the new dynamic marketplace (Grewal et al. 2021). The article recognizes technology as the core enabler of the strategies related to the 6Ps of retailing.

Customer-facing or shopper-facing technologies improve the customer's journey and their engagement with products, services, or brands (Shankar et al. 2021; Grewal et al. 2021). A classification of such technologies and the drivers for adopting them has been studied (Shankar et al. 2021). For instance, AI has numerous applications, including sales/customer relationship management, personalization and recommendation systems, customer service management, supply chain optimization, inventory management, and store task creation. With the vast amount of data that is produced, collected, and analyzed, many retail technologies can be grouped into AI segment (Grewal et al. 2021).

Another newly adopted technology is Augmented Reality (AR hereafter) that has pushed omni-channel strategy one step further. One study points out the role of technologies like cell phones and AR in blurring retail channel boundaries and improving interactions with customers (Brynjolfsson, Hu, and Rahman 2013). Consequently, a reshaped competitive advantage should be considered by both retailers and their supply chain collaborators. It's suggested that AR blurs the boundaries between channels because of its combined offering of embedded, embodied, and extended experiences (Hilken et al. 2018). Virtual try-on tools provide contextual information that used to be exclusively found in traditional stores, or AR can offer specialized and interactive information that was not possible for brick-and-mortar stores in the past.

### 2.2.1 Large Language Models

AI has been thriving in numerous businesses and industries. Goldman Sachs estimates that AI has the potential to increase global GDP by 7% in the next 10 years ("Generative AI Could Raise Global GDP by 7" 2023). Customer-centric industries such as retail are projected to benefit more from marketing and sales AI applications than any other industries due to the vast amount of data generated through customer interactions ("Sizing the Potential Value of

AI and Advanced Analytics | McKinsey" 2023). Recently, generative AI, a compelling subset of AI, has emerged in various fields and practices.

Generative AI is a set of computational techniques that can create new, meaningful content, such as text, images, and audio, thanks to its vast training data sets (Feuerriegel et al. 2023). LLMs have been advancing at an unprecedented pace enabling users to receive answers to their prompts. ChatGPT was released in November 2022, and within just a few months, an updated model called GPT-4 was introduced ("Economic Potential of Generative AI | McKinsey" 2023). In May 2023, Google announced a new large language model, PaLM 2, which enhances its Bard chatbot ("Economic Potential of Generative AI | McKinsey" 2023).

It has been suggested LLMs have the potential to be used as economic agents and researchers would gain reasonable responses to given endowments and scenarios because of large and wide-range data set they have been trained on (Horton 2023). Analysis on ChatGPT responses implies how effective they are as they align with economic theories and marketers could conduct their various researches like conjoint analysis by designing their survey questions and ask LLMs (Brand, Israeli, and Ngwe 2023). LLMs like ChatGPT enable e-commerce businesses to significantly reduce their personnel resource costs by providing automated customer service and order fulfillment services (Rivas and Zhao 2023).

## 3. Coordinating Marketing Messages with LLMs

Our main contribution is to evaluate the marketing messages across different retail channels generated by commercialized and well-known LLMs. The customer should experience what the company has already intended, regardless of customer touchpoints; otherwise, conflicted messages or incompatible experience would hinder unique experience of omni-channel strategy. There are two suggested types of customer touchpoints: personal brand touchpoints that includes any direct connection between a customer and a brand personnel and non-personal touchpoints in which connection is made without a personal encounter (Payne, Peltier, and Barger 2017). We aim to cover both in our analytics as well.

Channel integration, the ultimate objective in omni-channel retailing, can be studied from two main perspectives: the consumer approach and the retail approach (Hajdas, Radomska, and Silva 2022). In this study, we specifically focus on the former, aiming to evaluate whether LLMs are capable of producing marketing messages that foster a coherent brand experience.

## 4. Text Analysis Results

First, we need to write a prompt to ask ChatGPT write effective advertising messages to introduce a fashion retailer targeting segments of the market that intend to purchase clothes with acceptable quality and moderate price. The prompt is as follows: "Suppose you are responsible for writing ad messages in a fashion retailer that sells clothes with affordable prices and acceptable quality. The main purpose at this stage is brand awareness. Generate

50 ad messages without writing anything further". Then, we asked for advertising messages appropriate for retailer website, its official twitter account, and even suggestion for a salesman at the store to introduce the brand.

The following text analyses were performed with the R package tidytext (Silge and Robinson 2016), which is designed based on tidy data principles. Compatibility with the R tidyverse framework enables us to harness the power of other versatile packages to manipulate data and visualize our findings (Wickham et al. 2019).

Figure 1 is a boxplot showing in what range of tokens (words in this case) generated messages are and comparing their distribution across channels. As expected, those sentences suggested to a store introducing the retailers contains more words than those of website, but a text-based social media like twitter entitles the LLM to produce longer sentences and reap the benefits of relevant hashtags.

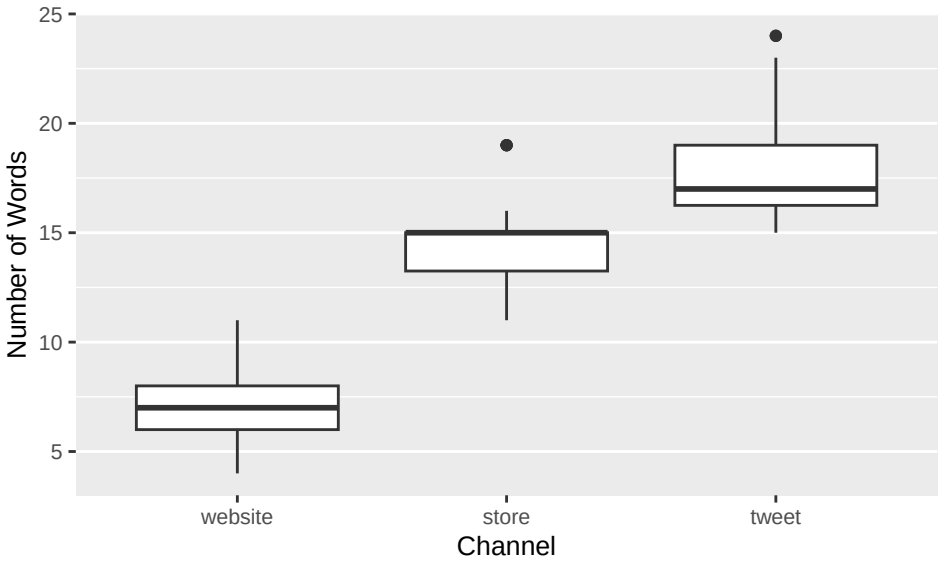


Figure 1: Distribution of words used in each channel

Subsequently, we observe that certain words are commonly used across all channels, and are repeated in the generated messages. Figure 2 reveals that seven words are used with a relative frequency greater than 1% in their respective channel groups, excluding stop words, which do not add any value to our text analysis like "am", "to", "your", etc. The repetition of words "budget", "discover", "fashion", "friendly", "style", and "stylish" is relatively balanced across channels, with the exception of the word "affordable", which is used almost twice as often in the store channel.

After removing English stop words from all generated sentences, Figure 3 compares the five most frequent words in messages crafted for each channel. Two out of eleven words are detected in all three channels. The word "fashion" can be found almost equally across channels, but

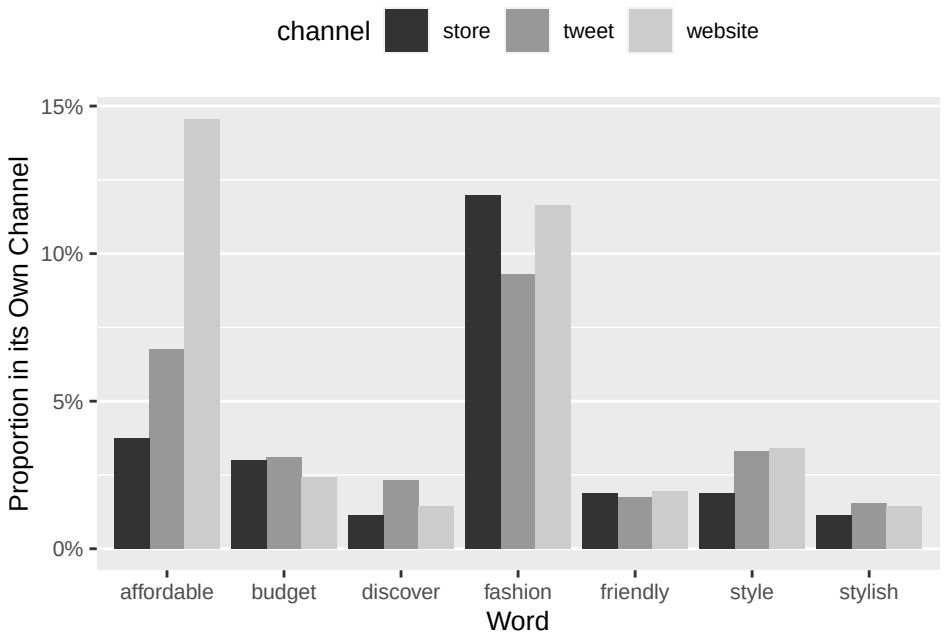


Figure 2: Common Frequent Words Proportion Across Channels

ChatGPT have accentuated the indispensable word "affordable" unevenly. ChatGPT suggest that the salesperson should say the brand name as a part of introduction speech in case a customer has no background information entering the store.

Analyzing individual words in isolation is likely to be misleading due to lack of context having no clue of previous or next words. Thus, texts are tokenized not just word by word but two consecutive words, called "bigrams". Figure 4 plots the three most frequent bigrams for each channel. ChatGPT appropriately has focused on the retailer's main competitive advantage of affordable fashion in its content.

In an omni-channel context, it is essential that messages across interactive channels be consistent. Therefore, we examined which words appeared not only together, but in the same sentence. Such characteristics can be found in the messages that ChatGPT generated for each channel in Figure 5. The word "fashion" co-occurred most frequently with "affordable" and had an indirect association with prices on Twitter. The combination of "budget" and "friendly," which forms a common expression for a worthwhile offer, reflected the average price levels in addition to the word "affordable." Similarly, both store and website messages included the association of "fashion" and "affordable," despite the absence of "budget friendly" in the website channel.

There are words with high rates of repetition in a sentence, but this may be due to the high rates of individual repetition, not necessarily to conveying a particular meaning. We can examine this using the phi coefficient, a well-known measure of binary correlation (Silge and

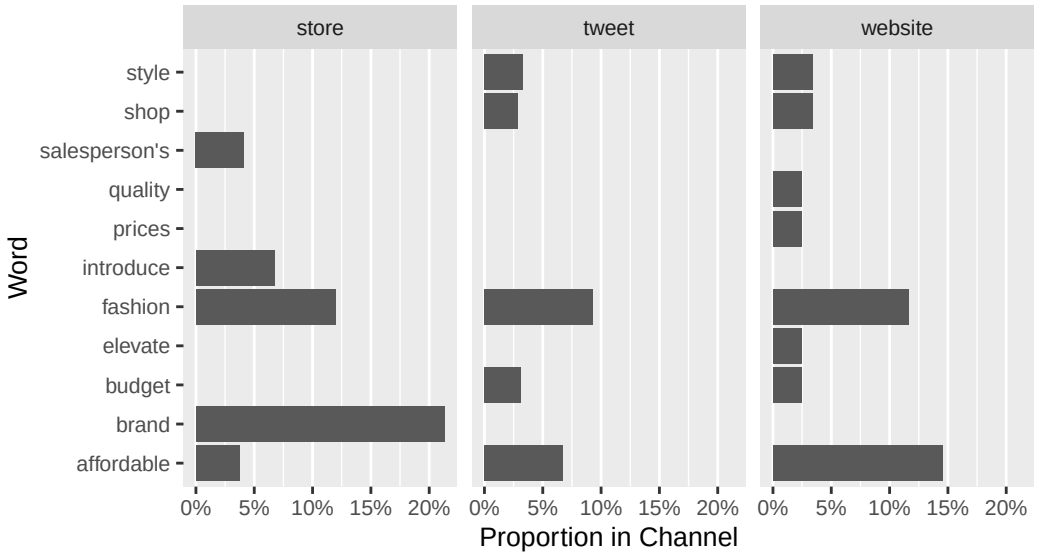


Figure 3: Words Repeated Most Frequently in Each Channel

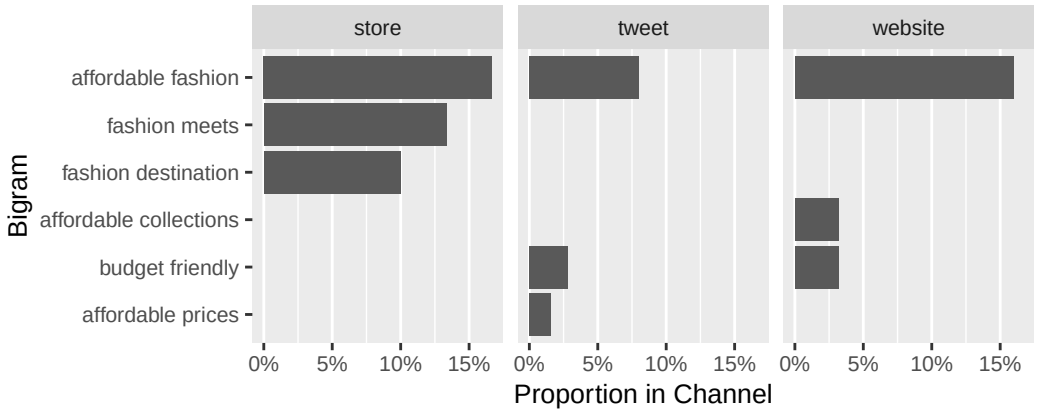


Figure 4: Three Bigrams Repeated Most Frequently in Each Channel

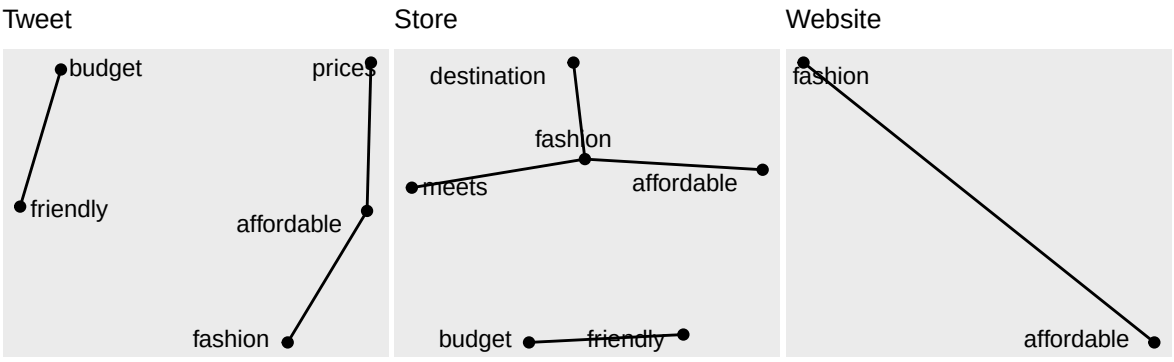


Figure 5: Words Associations

Robinson Jul ) checking which words have stronger correlations. Figure 6 indicates calculated phi coefficient in different channels. The size of each point is drawn with respect to the magnitude of coefficient and the darker points represent negative values. The higher coefficient the stronger correlation of those two specific words appearing in a message. In Only words with more than 5 appearance have been included and coefficient magnitudes less than 0.3 removed from plots.

In tweets that ChatGPT generated, the word "wallet" has a strong positive correlation with "emptying" and a moderate positive correlation with "fabulous." "Prices" also has a weak positive correlation with "love" and a weak positive correlation with "style". The Phi coefficients are weak in the website channel. "Quality" and "prices" have a weak positive correlation, but "affordable" has weak negative correlations with "budget," "prices," and "quality." In the store channel, the positive correlation between the words "friendly" and "budget" is considerable; on the other hand, "fashion" has weak negative correlations with "friendly" and "style."

We can infer from the correlations that words with similar meanings are unlikely to appear together in a message, while words with complementary meanings are more likely to be found as they convey a competitive advantage. However, it would be unwise to rely solely on GPT-LLMs, as they have some pitfalls as well.

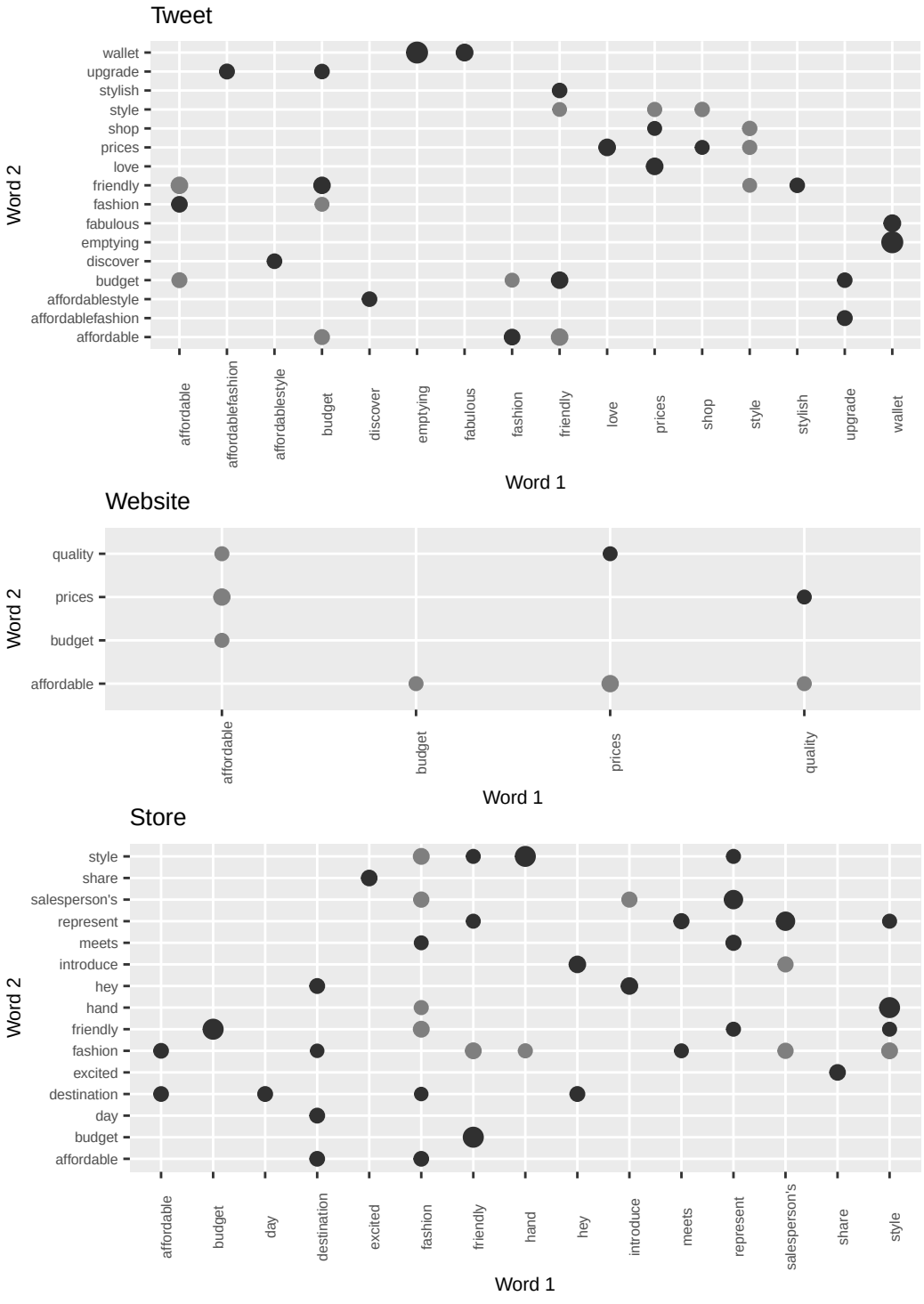


Figure 6: Phi coefficient

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