

Research Note

Do Digital Displays Enhance Sales? Role of Retail Format and Message Content[☆]

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Abstract

This research examines the impact of in-store digital displays on retail sales across four different store formats. The results of three field experiments show that sales in hypermarkets are enhanced when digital displays are on. However, in supercenters and supermarkets, having the digital displays on has a minimal effect on sales, and in smaller stores (e.g., convenience stores), the digital displays have a negative impact on sales. A follow-up study confirms that the lift in sales in larger stores when the digital displays are on continues five months after their initial installation, though the lift does diminish somewhat. Furthermore, for the digital display to result in a sales lift, the message content must promote the price.

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Digital displays are increasingly prevalent in large retail chains such as Walmart, Tesco, and Carrefour. While generally aiming to enhance the in-store environment (Dennis et al. 2010), and promote certain items (Burke 2009), these screens can also display other information to customers. As retailers face increasing competition from Amazon and other e-commerce providers, digital signage has become a key focus to help increase sales (Roster 2012).

This research note investigates the impact of digital signage on retail sales, as well as whether the impact of the digital signage varies by the retail format (e.g., hypermarket, supercenter). Past research shows that retail formats influence consumers' in-store shopping behavior and proclivity for impulse purchases (Kahn and McAlister 1997; Stilley, Inman, and Wakefield 2010a, 2010b). With an empirical orientation (McGrath and Brinberg 1983) to explore the substantive phenomenon of whether digital displays enhance or detract shopper sales, three field experiments were conducted in a large Swedish grocery conglomerate

that owns hypermarkets, supercenters, supermarkets, and convenience stores. The chain installed digital displays in each of the four retail formats, and then experimentally manipulated whether the displays were on or off.

Study 1 examines the impact of the digital display on sales receipts, time customers spent in the store, and items sold in the hypermarkets and supercenters. The results consistently demonstrate that in hypermarkets, digital displays enhance the amount of the sales receipts, time spent in the store, and the number of products purchased, but they have minimal effects in supercenters. Study 2 explores the impact of the digital display on sales receipts in mid-sized supermarkets and smaller sized stores. In supermarkets, the sales receipts do not vary when the digital display is on or off. However, in the smaller stores, the digital display appears to interfere with customers' focused shopping and results in a reduction in sales. Study 3 examines how the content (price-promotion vs. non-price promotion) shown on the digital display impacts purchases. These findings indicate that price promotional content is more effective.

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Empirical Orientation and Background

Research is important in three domains: substantive, methodological, and conceptual (McGrath and Brinberg 1983). This

Table 1
Previous research about digital displays.

Article	Method	Result
Burke (2009)	Analysis of academic and commercial experiments	Digital display's "advertising effectiveness depends on both the content of the message (appeal type and product category) and the context and quality of exposure (audience need state, traffic speed and direction, message frequency and duration)" (p. 180).
Dennis, Brakus, and Alamanos (2013)	Survey experiment Pretest ($n = 103$) university students Field experiment ($n = 437$) Harrods department store	Digital display ads high on hedonic information evoked affective experience and strengthened experiential processing. Digital display ads high on utilitarian information evoked intellectual experience and strengthened deliberative processing influencing the cognitive route.
Dennis et al. (2014)	Survey-based field experiment ($n = 437$). Test messages content is high-cognitive/low affect; high affect/low cognitive; high cognitive/high affect	Digital display "content high on sensory cues evokes affective experience and strengthens customers' experiential processing route... Digital signage messages high on 'feature and benefits' information evoke intellectual experience and strengthen customers' deliberative processing route" (p. 2250).
Dennis et al. (2012)	Structured questionnaires quasi-experiment ($n = 357$) Compare before and after display installation versus unchanged control mall	Digital display positively impacts shoppers' approach behaviors (e.g., spending). This impact is mediated by perceptions of the retail environment and positive affect.
Dennis et al. (2010)	Survey of mall consumers ($n = 315$)	Digital display has positive effect on "approach behaviors, mediated by positive affect and (arguably) perception of mall environment" (p. 205).
Newman et al. (2010)	Qualitative study, focus groups in three countries	Impacts of digital display on images of shopping mall and atmosphere are influenced by audio and video contents and location of screens.
Newman, Dennis, and Zaman (2006)	Qualitative study, focus groups	Digital display provides helpful information, creates a modern image, and increases shopping enjoyment.

research empirically investigates the substantive issue of how the presence or absence of digital displays in different retail formats affects shopping behavior and sales, using Latin square field experiments. These empirical observations are corroborated with insights from past environmental psychology findings. Given the empirical nature of this research, formal hypotheses are not presented, but background is provided on the substantive and methodological domains.

Substantive Domain: The Role of Digital Displays

Digital signage is growing at a tremendous pace, with the global market expected to be worth over \$17 billion by 2017 (Intel 2014). Yet despite such impressive growth, there is relatively little academic research into digital signage (for exceptions, see Table 1). Thus, we focus our research efforts on three issues. First, do digital displays influence shopping behaviors? Second, is its effectiveness contingent on the store format? Third, does the content (price-promotional vs. non price-promotional) matter?

Two previous studies suggest that digital displays have the potential to enhance shopping behavior. Based on interviews with 315 mall customers, one study found that digital signs enhance approach behavior (frequency of visits, likelihood of revisiting soon, and spending; Dennis et al. 2010). Similarly, consumers in a quasi-experiment, which compared respondents' ratings in a test mall (digital signage) and a control mall

(no signage), revealed higher approach behaviors (visits, spending, items bought, time spent shopping) with digital signage (Dennis et al. 2012). However, both of those studies depended on self-reports to assess approach behavior. To truly test the effectiveness of digital displays, a field study is needed to capture consumers' actual behaviors.

Methodological Domain: Field Experiments in Various Store Formats

Given the potential costs and benefits of digital signage, it is important to determine their actual effectiveness using field experiments. This research reports the results of three field studies. Although field studies sacrifice certain internal validity elements, they increase the external validity of the results (Calder, Phillips, and Tybout 1982, 1983; Lynch 1982, 1983), due to their large samples and focus on actual shopping behavior and purchase data.

Our retailer partner for this study runs multiple retail formats and therefore provided a natural context to assess whether the role of digital displays is contingent on the retail format. These formats included hypermarkets, supercenters, supermarkets, and convenience stores. The hypermarkets carry 29,000–38,000 items, supercenters 12,000–19,000 items, supermarkets 7,000–11,000 items, and convenience stores 4,000–8,000 items. Further descriptive information about the four retail formats appears in Table 2. In each of these retail

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