An Intelligent Point-of-sale System for Mobile Retailors

Wen-Lung Tsai*
Department of Information Management, Oriental Institute of Technology, Taiwan
*Corresponding author email: wlttsai@mail.oit.edu.tw

Abstract. In a fiercely competitive retail market, the biggest competitive advantage of the physical channel over the virtual channels is the product experience and service. Increasing the professionalism of the salespeople and improving service should be prioritized in physical retail. I use the AIDA model to construct a consumers’ purchase guiding system named “intelligent point-of-sale” (iPOS) that integrates the sales recommendation rule model. Through the app, consumers and salespeople interact with each other and the model recommends appropriate product combinations to the consumers. The system assists salespeople to guide consumers towards a purchase to improve transaction conclusion rate and company profitability.

Keywords: Intelligent system, Point-of-sale, AIDA model, Mobile retailers

1. Introduction
A major part of the retail industry’s traditional consumption behavior occurs in the physical channel. However, with the rise of e-commerce and the popularity of smartphones, a highly unpleasant showroom phenomenon (showrooming) has emerged. A product remains unpurchased after a visit to the physical channel and is later purchased at a lower price from an online store (Kong et. al., 2017). To reduce the effects of showroom phenomenon, the physical channel should use information and communications technology (ICT) to improve service quality and meet the challenges posed by the environmental changes. The concept of smart retail has emerged with the rise of the Internet of Things (IoT), cloud computing, and big data applications. Emerging technologies are being used to transform the retail format from a B2C to C2B and provide customized services and precise marketing. Business efficiency results in providing high-quality products to consumers that are close to their expected experience. One aspect that should be considered in the retail industry is service because it has a direct effect on consumers’ purchasing intention. However, the training process for sales personnel is lengthy and costly, and there is a substantially high turnover among retail salespersons. The exit of service personnel results in a considerable waste of enterprise resources. For the current challenges faced by enterprises, I utilize information technology to explore appropriate methods of straining out. Sha and Lai (2012) pointed out that the current trend of improving service quality is based on the use of information technology. Google’s report entitled “2013 Our Action Planet: Taiwan” (MediaCT, 2013) pointed out that Taiwan’s smartphone dependence had reached 80%. This finding also suggests possible new business models and opportunities for enterprises. Therefore, the main aim of this study uses the attention-interest-desire-action (AIDA) model to constructs an intelligent point-of-sale (iPOS) to enhance the interaction between customers and sales staff through mobile devices and provide real-time product information. The remainder of this study is organised as follows. Section 2 discusses related works. Next section details the proposed method and system design of this study. In final section, this paper presents the discussion and conclusion.

2. Related Works
E. St. Elmo Lewis introduced the AIDA model in 1898 to guide consumers through the purchase process (Xu and Schrier, 2019). In the AIDA model, “A” is to attract Attention from customers, “I” is to induce...
consumer Interest, “D” represents the Desire that the seller seeks to evoke in the consumer, and “A” represents the consumer’s Action. The core of the AIDA model is that it must first attract the attention of consumers and induce consumer interest, which in turn evokes the consumer’s desire and enables consumers to take shopping actions. The following elements of the AIDA model will be integrated into my system design.

Attention: Rawal (2013) defined attention as an individual’s concentration of consciousness or thought about an object. Orquin et al. (2019) proposed three ways to attract consumers’ attention: (1) location—placing advertisements in unexpected places; (2) impact factors—inducing shocking feelings in consumers; and (3) personalization—integrating the consumer’s elements into the advertisement. According to the sales process of the AIDA model, attracting consumers’ attention is the first step in shaping consumer behavior. Therefore, it is very important to determine the means of transferring consumers’ attention to the products and services provided (Junior Ladeira et al., 2020).

Interest: Schiefele (1991) argued that interest is generated by the interaction between the individual and external environment, especially the relationship between “people and things.” Renninger et al. (1992) distinguished interests into personal (an individual’s perception is stable and remains unchanged with the situation) and situational (an individual is stimulated by the external environment). Thus, I can induce consumer interest in products or services through the influence of the external environment. In addition, Liu et al. (2019) pointed out that consumers become interested when they deem products and services to be beneficial. Therefore, highlighting the benefits of a product/service is an indispensable aspect of arousing consumer interest (Wei et al., 2020).

Desire: Perugini and Bagozzi (2004) defined desire as an inner state that drives individuals to perform actions or achieve goals and is an important element in motivating people to act. Davis (1984) categorized desire into two levels: volative (consumers want a product but have no strong motivation to take action) and appetitive (consumers have a strong motivation to satisfy their desires). In the literature on desire, I find that evoking a consumer’s desire requires raising the consumer’s awareness that the product or service can meet his/her needs and that the benefits are greater than the cost.

Action: Action refers to the “activities necessary to achieve a certain purpose.” When discussing action-related research, the consumer’s adoption of purchase behavior is a “process” that involves all relevant decisions and activities in the process of completing purchase behavior. The literature points out that when consumers understand product information, such knowledge can influence their purchase decisions.

In the literature, the AIDA model-related research lays the foundation for understanding consumers’ decision-making process and cites numerous examples on facilitating consumers in completing the purchase. However, in the real-life cases cited in the literature, information systems are rarely used for impact factor analysis, marketing strategy application, advertising, and promotion activities. Therefore, this study uses the AIDA model to construct an iPOS as shown in Figure 1 and integrates the sales recommendation analysis model obtained by analyzing historical sales data.

3. Method and System Design
There are only a few studies on the use of AIDA model in the field of information systems. Alavi and Mosavi (2017) forecasted the behavioral pattern of all four dimensions of the AIDA model while
emphasizing the role of integrated marketing communication elements. Prathapan et al. (2018) adopted the AIDA model in digital marketing for measuring the promotional efforts of tourism websites. These studies are the closest in terms of relatedness between the AIDA model and information systems. This study focuses on the mobile phone retail industry where, currently, the main sales model introduces the specifications and content of products and projects to consumers through paper and pencil, catalogs, and demo devices. Receiving comprehensive information is difficult through these media. Therefore, this study uses the AIDA model to design an iPOS to innovate the current sales model. Furthermore, the study utilizes the multimedia communication function of mobile devices to provide diverse information, such as images, audio, and video. To consumers, the presentation of merchandise and project content can provide enhanced visual effects, thereby, improving the operational efficiency and profitability of enterprises. The marketing mechanism (as Figure 2) that takes place after implementing the iPOS is as follows:

- **Step. 1 (Attention):** In recommended and best-selling mobile phones and promotional screens, a large-scale layout and pictures should appeal to consumers.
- **Step. 2 (Interest):** Provide detailed product information or content of the project according to consumer concern, thereby inducing consumer interest.
- **Step. 3 ( Desire):** When consumers are interested in a variety of products, they can use the product competition function to understand the hardware specifications of each product and select the product that best meets their needs.
- **Step. 4 (Action):** After selecting an item, they can combine it with the system-recommended project list or purchase or add the item to their wish list. The items to be purchased by the consumer are displayed on the wish list, for them decide on which items to purchase.

![Marketing mechanism of iPOS.](image)

Before meeting the needs of consumers and providing full product information, the model gradually guides consumers towards purchase intention and complete the final purchase. Results

In this study, the four-stage AIDA model is presented on an app platform. When building the auxiliary sales module, it can be divided into five parts: recommended mobile phone, best-selling mobile phone, accessory purchase, product competition, and wish list.

(1) **Recommended mobile phone:** This page presents a list of recommended mobile phones curated by the salesperson. The information and functions of this page are as follows (as Figure. 3):

- Recommended list: a list of recommended mobile phones curated by the salesperson
- Recommended project list: displays the list of projects curated by the salesperson
- Project content: displays information about the content of the project
- Mobile phone addition: the products are not matched with any project; adds the price of the mobile phone to the wish list
- Project addition: combines the mobile phone and project fee and adds it to the wish list at the project price
- Product competition: competes with other products on hardware specifications
(2) Best-selling mobile phones: The best-selling mobile phone page is presented as the recommended mobile phone page, except the best-selling mobile phone list is the result of an analysis of recent sales records. Pushes a list of recommended projects that meet the needs of consumers and yields higher gross profit. The information and functions of this page are as follows:
- Best-selling mobile phone list: result of an analysis of recent sales records.
- Recommended project list: after analyzing the historical sales record, pushes the list of recommended projects that meets the needs of consumers and yields higher gross profit.
- Project content: displays information about the content of the project.
- Mobile phone addition: the products are not matched with any project; adds the price of the mobile phone to the wish list.
- Project addition: combines the mobile phone and project fee and adds it to the wish list at the project price.
- Product competition: competes with other products on hardware specifications.

(3) Accessories purchase: The main function of this page is to allow consumers to buy accessories. On loading the page, it displays the currently “hot” accessories. The information and functions of this page are as follows:
- Best-selling accessories: pre-set display of the currently best-selling accessories when the page is loaded.
- Accessories category: consumers can query accessories by category.
- Brand filtering: according to the brand fast accessories products.
- Sorting: sorts according to sales volume and price of the products.

(4) Product competition: The main function of this page is to allow consumers to add interesting products to the product competition page for product hardware specification competition and add symbols to highlight the superior performance of each product. The page information and functions are as follows:
- Hardware specifications: product hardware specifications’ competition item.
- Product competition: symbols for the best-performing product in a single specification allow consumers to quickly identify the best-performing items for each specification.

(5) Wish list: The main function of this page is to allow consumers to add interesting products to this page and compare them against the project price. The information and functions of this page are as follows:
- Show purchases: shows the items that the consumers are currently purchasing.
- Project price comparison: compares the project price of the product combination.
- Plug-in bonus: selects a plug-in bonus item (e.g., call answering, etc.).
- Service change: selects a service transaction item (e.g., replacement card, etc.).
4. Discussion and Conclusion
This study contributes to the literature by constructing an intelligent point-of-sale (iPOS) based on the AIDA model for a mobile phone retailer in Taiwan. In terms of its academic implications, it proves the marketing mechanism of the AIDA model implemented in practical information systems. In addition, the proposed study design and architecture were tested further in the retail market. The designed system was used to improve the existing sales process and reduce the threshold for salesperson entry, training costs, and mediation time between salespeople and consumers. Thus, the company’s rate of transaction conclusion and profitability are improved. However, the system discussed in this study is still in the testing stage. I believe that only after it is actually implemented in the market can it be verified and evaluated effectively. Future studies should verify and further adjust the proposed study structure. The findings can be proven by sales records after the introduction of the system. The recommended content of the project should be improved, so that the choices picked by the salesperson is close to the consumer’s demand, in this way, yielding high gross sales margin. Smart retail refers to the use of emerging technology to provide customized services and accurate marketing in retail. The future development of smart retail would entail the use of face recognition systems to analyze age, gender, traffic, touched products, and purchase rate of consumers. Upon entering the door of the facility, retailers would be able to study the biometric characteristics of consumers according to the analysis results, thereby, providing consumers with customized services and accurate marketing. This will, in turn, transform the operational strategy from a passive one to active. This use of technology will also help enterprises improve their operational efficiency and profitability.

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