Enhancing Retail Competitiveness with an Intelligent Shopping Assistant System

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Abstract. Adopting artificial intelligence (AI) to elevate sales professionalism and enhance customer satisfaction is vital in the complex brick-and-mortar retail environment. This research explores the deployment of an intelligent shopping assistant system that utilizes advanced AI techniques to optimize sales processes. This system analyzes consumer preferences and behaviors and provides sales staff with a practical decision support and product recommendation tool, enabling personalized consumer interactions. Rooted in the AIDA marketing framework, the system was rigorously evaluated through semi-structured interviews with employees at a mobile telecommunications retailer. These assessments, assisted by the Technology Acceptance Model, focused on its perceived ease of use and usefulness. The findings indicate that these factors significantly influence the sales staff's intention to utilize the system. Amidst the competitive retail market, this AI-enhanced assistant aids sales personnel by reducing dependence on memory for customer interactions, thereby positioning enterprises for competitive advantage.

Keywords: artificial intelligence, intelligent shopping assistant system, AIDA rule, perceived ease of use, perceived usefulness

1 Introduction

Retail is traditionally seen as the final step in delivering consumer goods or services [1]. While most transactions in the traditional retail sector occur through physical channels, e-commerce and the widespread use of smartphones have led to showrooming—where customers inspect products in-store but purchase them at lower prices online [2]. This trend of physically examining products and buying them cheaper online is becoming more prevalent. Additionally, the ongoing impact of COVID-19 has significantly disrupted the physical retail landscape [3], pressing retailers to innovate more aggressively. Embracing AI-driven analytics and marketing strategies becomes essential to harness consumption data effectively and implement value-based, personalized services. Such technological advancements help improve operational efficiency and enhance the customer experience by offering precisely what consumers need at the right moment. As the global economy and consumer behaviors evolve, particularly in the post-pandemic world, leveraging artificial intelligence in marketing will be crucial for retail businesses to meet new challenges and remain competitive [4].

González-Benito et al. [5] and Li et al. [6] recognized the crucial role of information technology in enhancing service quality. By 2017, approximately 16.59 million people in Taiwan were using intelligent mobile devices, which has significantly increased since then. These devices are now essential in everyday life and offer numerous business opportunities for enterprises. The salespeople stand at the interface between businesses and consumers, particularly in the mobile telecommunications sector, where their expertise is built on substantial training and experience. Salespeople are tasked with effectively communicating complex product information, such as specifications, functionality, and pricing, while also considering operators' profitability. However, over time, the

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enthusiasm of salespeople can wane due to various challenges. In this setting, leveraging artificial intelligence to analyze consumer data and preferences can transform traditional sales strategies into dynamic, data-driven marketing systems. By equipping salespeople with AI-powered tools that provide instant recommendations for the most suitable products, businesses can enhance transaction rates and customer satisfaction [7], reduce training costs, and achieve multiple business objectives more effectively.

The AIDA (Attention, Interest, Desire, and Action) model, first proposed by Lewis in 1898 [8], is instrumental in guiding effective product promotion strategies [9]. AIDA emphasizes directing consumer attention towards products or services, nurturing interest, and cultivating a desire that leads to a purchase decision. This study integrates the AIDA framework with cutting-edge AI marketing techniques to develop an intelligent shopping-guide system. This system is designed to enhance the decision-making capabilities of salespeople by providing insights that are tailored to consumer behavior and preferences, assessed through the lens of "usefulness" and "ease of use" from the Technology Acceptance Model (TAM). The findings indicate that this AI-enhanced system improves the effectiveness of salespeople recommending products and significantly contributes to the company's sustainability goals by streamlining operations and enhancing customer engagement.

2 Literature Review

2.1 AIDA Rule with AI

Lewis [8] proposed the concept of AIDA, where "A" means to attract consumer attention, "I" means to arouse consumer interest, and "D" means to arouse consumer desire. The final "A" means to motivate consumer action. As marketing and advertising concepts developed throughout the 20th century, scholars, including Strong [10], proposed satisfaction, conviction, and memory according to the AIDA rule. The rule was also extended with the development of AIDAS [11] based on AIDA. This chapter reviews and discusses literature on the four fundamental stages of AIDS.

Attention. According to the AIDA rule, the first and most crucial step in the sales process is to attract consumers' attention. Rawal [12] asserted that the primary purpose of advertising is to catch consumers' attention. Vendors who cannot use advertising to attract consumers' attention will not complete the sale. Rindova et al. [13] suggested that promotional activities could attract consumers' attention and that media communication facilitates a deeper understanding of products or brands. Armstrong et al. [14] contended that attractive and credible information should be provided so that consumers believe a product to be beneficial. As human attention is limited, it can be allocated to visual targets. Orquin [15] argued that the best way to attract consumers' attention is to interrupt it and then transfer it to the product under promotion. This study argues that attracting consumers' attention at the onset of the sales process is crucial. If advertising does not attract consumers' attention, its effect will be minimal, regardless of the size or significance of the associated investment. It is essential to create an impact strong enough to interrupt attention and transfer it to the products or services on sale.

Interest. Interest is a mental state in which an individual is enthusiastic about an object or idea [16]. Renninger et al. [17] proposed that the interaction between an individual and the external environment generates interest. Liu et al. [18] noted that detailed expressions of the benefits of services could arouse consumer interest. Rawal [12] indicated that after attracting consumers' attention, the advantages of products or services should be fully emphasized to arouse interest and encourage the belief that a purchase is a wise decision. In other words, the greater the benefits of a product or service are believed to be, the greater the interest aroused, and more specifically, the consumer will believe that the decision to purchase a product or service is correct. Accordingly, enterprises should provide an opportunity for consumers to understand the advantages of products and services. This study aims to explore a method of triggering consumers' interest in products and services via the influence of the external environment in a context in which subjects are not clear about their needs.

Desire. Perugini and Bagozzi [19] defined desire as an inner state that drives individuals to take action or achieve goals. Liu et al. [18] proposed that consumers desire to own a product or service when convinced that it

meets their needs. Cronin et al. [20] noted that consumers are more willing to buy a product when they believe the benefit to be greater than the cost. Davis [21] asserted that consumers intend to own a product when it gives them a "sense of reliability." Additionally, Perugini and Bagozzi [19] pointed out that the consumer's desire to buy a product can be aroused when the price is lower than similar products. In a context where the consumer's desire is known, the capacity to accurately ascertain which product or service meets that desire is crucial to enterprises.

Action. Williams and Poehlman [22] indicated that all related activities, opinions, and influences fall under consumer behavior in purchasing products or services. Fahmi and Safitri [23] defined consumer behavior as the search, purchase, use, evaluation, and disposal of consumer products, services, and ideas to meet their needs. They posited that consumer behavior includes all activities involved in acquiring products or services and the decisions taken before and after each activity. In other words, consumer behavior is a process that includes all relevant decisions and activities in completing an act of consumption. Heilman et al. [24] argued that the more information consumers know about a product, the more they prefer that product or brand, further influencing purchase decisions. Similarly, Schuler and Cording [25] indicated that a purchase intention would be formed when consumers fully understood product information and its benefits and value. Aaker [26] proposed that when the time was right, consumers would link the product with the relevant brand information, then generate a positive attitude and purchase intention, leading to purchase behavior.

In digital retail, consumer decision-making is intricately linked to how businesses deploy AI technologies to deliver persuasive and informative marketing. Before completing a purchase, consumers navigate through a sequence of decision points where their preferences are shaped by the information presented to them. Utilizing AI to analyze big data allows businesses to deliver highly targeted advertising and marketing content that resonates with consumer needs and preferences. By aligning these AI-enhanced insights with the stages of the AIDA model—Attention, Interest, Desire, and Action—retailers can provide enriched product information that emphasizes benefits and value and ensures relevancy and truthfulness, thereby enhancing consumer confidence and safety in online environments. This strategic approach helps cultivate strong consumer engagement, prompting favorable purchasing decisions and ultimately fostering the completion of the purchase cycle with a heightened sense of security and satisfaction.

2.2 Cases of Applying the AIDA Rule

Most literature concerning AIDA focuses on the impact of advertising or promoting consumer behavior. Premeaux [27] found an AIDA cycle pattern among female consumers and that marketing methods and word-of-mouth during the purchase decision stage could significantly influence purchase intentions. Shaouf et al. [28] pointed out that gender and age affect attention to advertising media, while occupation and income affect interest in promotional activities. Martins et al. [29] suggested that purchases of smartwatches followed the AIDA rule, while interest and desire significantly impacted the purchase intention. In addition, the AIDA rule has been applied to enterprises' marketing strategies. Hassan et al. [30] proposed that the AIDA rule be applied to the marketing strategies of small enterprises on social media.

Studies on the AIDA rule establish a foundation for understanding consumers' decision-making processes and provide a how-to reference for persuading consumers to complete purchases. However, applying the AIDA rule in the information system is relatively rare compared with impact factor analysis, the application of marketing strategies, advertising, and promotions. Consequently, this study designed the system using the relevant literature (cited herein) as the reference for applying the AIDA rule.

This study argues that it is essential for enterprises to attract consumers' attention with an impact compelling enough to interrupt thought and transfer attention to products and services. Additionally, to arouse interest, it is necessary that consumers fully understand the advantages of products or services and believe them to be beneficial. Furthermore, to stimulate desire, it is essential to make consumers realize that products or services meet their needs and that benefits exceed cost. It is, therefore, crucial to accurately ascertain which products or services meet the needs of consumers. It is also essential to out-compete similar products in terms of price. If these conditions are met, consumers will be persuaded to take action through purchases.

Table 1. Cases of scholars applying the AIDA rule

Related literature	Description
Premeaux [27]	There is indeed an AIDA cycle pattern among female consumers, and marketing methods and word-of-mouth of enterprises in the purchase decision stage can significantly affect consumers' purchase intention.
Shaouf et al. [28]	Gender and age affect consumers' attention to advertising media; occupation and income affect consumers' interest in various promotional activities.
Martins et al. [29]	Consumers' purchase of smartwatches follows the AIDA rule; consumers' interests and desires significantly impact the purchase intention.
Hassan et al. [30]	The AIDA rule can be applied to the marketing strategies of small enterprises in social media.

Consumers make many decisions to complete their purchases. Factors such as consumer demand, brand image, price, relative advantages and disadvantages of products or services, and their benefits affect decision-making. The onus of responsibility falls upon enterprises to facilitate purchase behavior while spurring consumers to make decisions that are favorable for themselves. The AIDA rule (Fig. 1) is incorporated into the design of the intelligent shopping guide system in the following section.
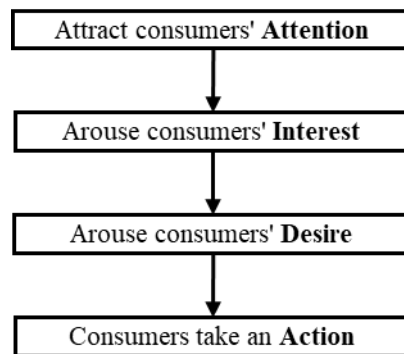

Fig. 1. Procedure of the AIDA rule

3 Methodology

3.1 Case Status and Demand Analysis

This study focuses on a chain-store retailer in the mobile telecommunications industry. At present, this industry generally introduces commodities and service charges using catalogs and displays that need more video and audio elements, making it difficult for consumers to receive comprehensive information. Additionally, consumers can only choose from accessories displayed on store shelves that can only cater to some needs. Furthermore, there are thousands of ways to collocate between mobile devices and telecom service fees, making it overly complicated for sales personnel to recommend products that meet consumers' requirements. Moreover, the mobile device market has become saturated recently, and devices are not replaced as frequently as once. To diversify services, so many products have been added to the portfolio that the number is difficult to estimate. In this context, it is neither efficient nor sufficient for salespeople to rely on memory to deal with the multitude of queries and problems consumers raise. An information system that assists salespeople in this task would be advantageous.

According to the AIDA rule, this study introduces the current sales model. It uses the multimedia communication function provided by mobile devices to push and broadcast diversified information such as images, video, and audio to consumers to better present commodities and telecom service fees. The demand analysis process of the current sales model and the AIDA rule are shown in Fig. 2 and Fig. 3. Differences are listed in Table 2.
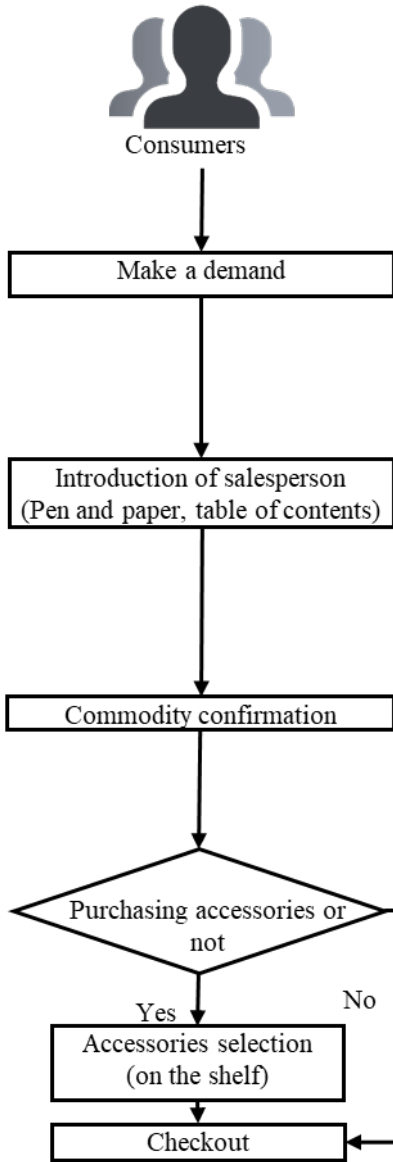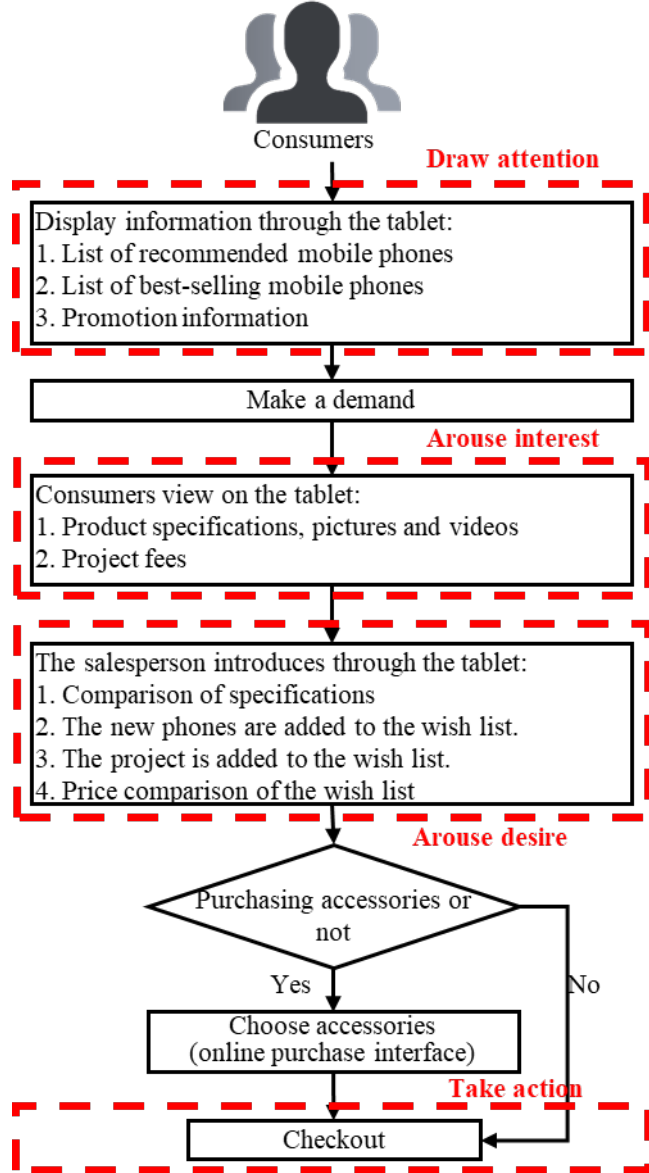
Fig. 2. Flow chart of the current sales model

Fig. 3. Flow chart of the sales model based on AIDA

Table 2. Comparison between the current sales model and AIDA-based sales model

Difference items	Current sales model	AIDA-based sales model
Introduction method of the salesperson	Pen and paper, catalog, presentation model	Pictures, video, and other multimedia information
Accessories selection method	Select on the accessory shelf.	Online shopping screens can quickly filter brands and types and sort them according to price or sales volume.
Price comparison	Choose from catalogs or items provided by salespeople	Products and fees can be freely matched and displayed on the wish list for consumers to choose from.

The primary purpose of incorporating AIDA to improve the existing sales model is to provide consumers with advantageous information according to individual needs through an intelligent shopping guide system to help

them better understand products, prices, and service charges and avoid transaction disputes caused by asymmetric information. The recommended price list is based on consumer preferences and behavior models drawn from historical sales data. By converting consumer demand into parameters, the suggested price list calculated by the model can maximize sales gross profit and reduce mediation time between salespeople and consumers on the premise of meeting consumer demand. The sales process of the intelligent shopping guide system based on AIDA is as follows:

− To attract attention, large layouts and pictures are used in the list of recommended mobile phones, the list of best-selling mobile phones, and the information screen of promotional activities.

− To arouse interest, detailed information such as pictures, videos, hardware specifications, or off-net and local call minutes is provided for the product specified by the consumer.

− When consumers are interested in several products but cannot choose, salespeople compare the advantages and disadvantages of the hardware specifications to help customers select the one that best meets the demand.

3.2 System Design

The application of the four stages in the AIDA rule of the intelligent shopping guide system is described as follows:

Design that Catches the Attention of Consumers. In the AIDA rule, the most important thing is to attract consumers' attention. To accomplish this, it is necessary to provide attractive and credible product information so that consumers believe a product to be beneficial. The system uses mobile devices to promote newly launched products, programs, and activities. For example, when the mobile telecommunications retailer launched its All-You-Can-Eat program for NT$499 to attract consumers' attention, relevant information was promoted through mobile devices.

Design that Arouses Consumer Interest. This study uses the multimedia function of smart mobile devices to provide consumers with diversified information, such as product pictures, videos, specifications, and telecommunication transaction charges, so they better understand a product. For example, when the mobile telecommunications retailer launched its All-You-Can-Eat program for NT$499 to attract consumers' attention, it disclosed the complete charges, such as 90 minutes of free calls to off-net and local telephones, to arouse interest.

Design that Arouses Consumer Desire. The product that arouses the desire should meet the needs of consumers and persuade them that the product's benefit is greater than the cost. The design of this study in this stage is divided into two parts: Product comparison- When comparing products, customers understand the advantages and disadvantages of specifications and choose the model that meets their needs. In this study, consumers needing help choosing among several products can use the comparison function embedded in the system to identify the most suitable one; Wish list- Salespeople can use the sales analysis model from historical sales records to understand consumer behavior and demand. Once consumers have chosen the mobile device they want, the system recommends additional high-profit items, such as accessories or service charges, that meet their needs. Consumers can freely match devices and extra items to produce various sales combinations that form a wish list. For example, the system will recommend contract options once a mobile device is chosen. The consumer then matches their mobile device with those options according to their will, and the resulting combinations appear in the Wish List for further comparison. Here, the prices for combinations are much lower than purchasing a mobile device in isolation, so the consumer's desire to buy is aroused. The features of the system described thus far capture the consumer's attention and then deliver comprehensive information regarding specifications to generate interest so consumers can better select products that meet their needs. Then, to generate desire, the Wish List function compares selected combinations of goods and charges with the prices reduced so that consumers perceive the benefit of the goods to be higher than the cost.

Design that Facilitates Action. In the AIDA rule, success in the final stage (Action) is contingent on the results of the preceding three (Attention, Interest, Desire). Individual stages of the design in isolation cannot motivate purchase actions. Rawal [12] noted that advertisements could strengthen consumers' impression of goods. When

the product impresses consumers enough, and the product's benefits are highlighted successfully by the ad, customers will take immediate action to buy the product. Heilman et al. [24] concluded that the better consumers understand information regarding goods, the more their preference for goods or brands increases. Xu and Schrier [9] suggested that purchase intention is only generated when consumers fully understand the product information and its benefits and value. Accordingly, the system is designed to fully disclose product information in the first three stages to persuade consumers to develop a purchase intention and take action.

4 System Functions and Implementation

Today's retail industry uses the sales system for commodity sales records, cashier, and report management. However, most sales system applications are installed on a central computer, while employees are dispersed and cannot interact with customers through that equipment. This study presents the updated sales system as an APP, using a tablet as the media. Connected to the network, employees in every location can independently check the status of operations and trade with consumers.

The intelligent shopping guide system in this study is designed with the needs of the case company in mind. However, the parameters can be set to address the requirements of any individual mobile telecommunications retailer. The existing sales system is rebuilt with the AIDA rule incorporated into the APP's design. The APP is integrated with the equipment currently in use, which can also be used to view the inventory, sales records, and other information. Purchase intention can be facilitated through the four stages of the AIDA rule. With the integration of the recommendation analysis model, high-profit sales combinations can be pushed to sales personnel. The ten significant functions of the updated system are illustrated in Fig. 4, the main screen.

Store numbers and machine numbers currently bound to the device appear on the upper left of the screen (see Fig. 4). The information is uploaded to the database when transaction records are made so that data required for various reports can be calculated. The intelligent shopping guide module includes five functions: mobile phone recommendation, best-selling mobile phone, accessories selection, product comparison, and wish list, as illustrated in Fig. 5.
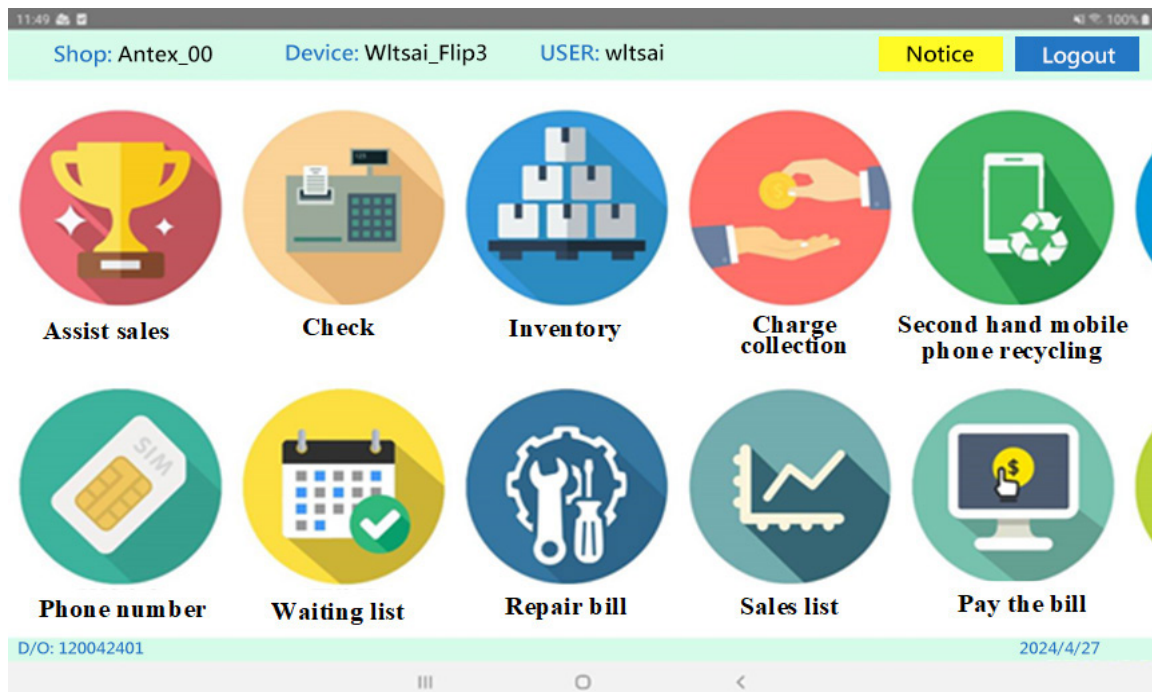

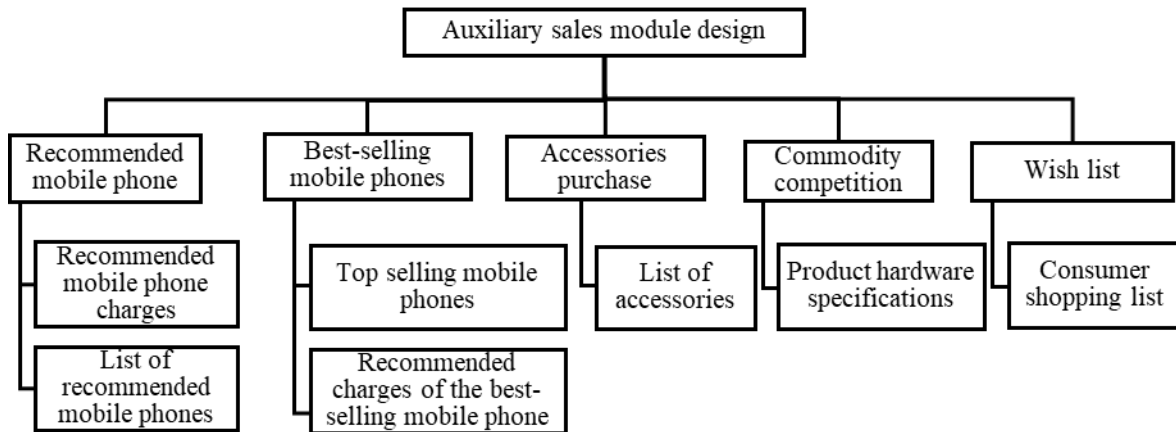**Fig. 4.** The main screen of the intelligent shopping guide system

Fig. 5. Auxiliary sales module

This system is unique because store consumers can see information in the catalog, a list of recommended mobile phones, and recent top sellers and promotions on the tablet PC. It can change consumers' impressions of the store and attract their attention. In addition, the tablet PC can transmit multimedia information. Consumers can click the recommended charge button to view the charge of an item or click the commodity icon to view a detailed introduction. In this way, information is fully disclosed, and consumers understand the product's benefits, thus arousing interest. When consumers are interested in several products, they want to compare specifications. They can click the mobile phone icon to add the mobile phone to the Wish List, click the "Recommendation List" button to query the system, and then add the product and the charge to the Wish List according to the list of recommended items. The product comparison function reveals more detailed hardware specifications, enabling consumers to select those that best meet their needs, while the Wish List function compares item prices. The collocation of commodities and charges can reduce the overall price and persuade consumers that the product's benefit is greater than the cost, thus arousing desire. The process of this stage is shown in Fig. 6.
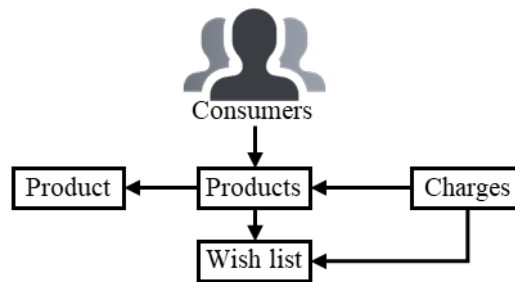

Fig. 6. Flow chart of arousing consumers' desire

Finally, consumers can confirm the purchase of goods on the Wish List page and click the checkout button to pay. Thus, under the condition of satisfying consumers' demands and fully disclosing commodity information, consumers are guided through the three steps of attention, interest, and desire to produce a purchase intention and complete purchase behavior.

5 Analysis and Discussion

The intelligent shopping guide system is a kind of information technology, so the technology acceptance model (TAM) [31] can partially explain consumers' purchase intentions. Many studies have demonstrated that TAM is

a robust model for various information technology acceptance studies and is applicable in many countries [32]. Even though TAM was initially used to study the technological acceptance of work-related activities, the theory can also be successfully applied in various non-organizational environments [33], including the O2O (Online to Offline) marketing model [2]. Using the Technology Acceptance Model (TAM) in this study, the practical value of the intelligent purchasing guide system is explored in terms of perceived usefulness, perceived ease of use, and intention to use.

The TAM architecture [34] is based on two beliefs: (1) The perceived usefulness of using the new information technology; (2) The perceived ease of use of the latest IT. Usefulness is a subjective assessment of the effectiveness of new IT as applied to the relevant work area. Ease of Use shows how easy new IT is for users to learn. According to [2], the relationship between variables in TAM also applies to O2O commerce, namely e-commerce and physical channel commerce. The logic of TAM is that consumers and salespeople rationally use the intelligent shopping-guide system. When the system is practical and easy to use, it can facilitate salespeople completing sales work and customers completing purchase behavior.

Qualitative validation is a viable way to explore the use of new systems or non-quantitative models in highly customizable and human-centric environments. Given that the intelligent shopping guide system designed in this study is highly customized and the knowledge presented by the user interface is people-oriented, this study applied qualitative methods to analyze and discuss the experiences of the staff in using it. The semi-structured interview is widely used in qualitative research into information system-related issues and was thus employed to collect data.

Table 3. Primary data and work content of interviewees

Personnel	Education background	Seniority	Work
Executive Vice President (Senior Manager)	Doctor of Information Management	More than ten years	She assisted in obtaining and filing, project milestone management, and project resource coordination.
Information personnel	Master of information management	More than 15 years	Responsible for the overall planning of the company's projects, customer and demand interviews, system architecture planning, process adjustment
Staff A	Bachelor of Business Administration	Five years	Responsible for the implementation of customer and demand interviews, system analysis and design, program development
Staff B	Master of Business Administration	Two years	Responsible for assisting with system analysis and design, program development and testing, and other administrative work within the project

The interviewees are the users of the intelligent shopping guide system, namely the salespersons (Staff A & B), Information Personnel, and the Executive Vice President of the case company. Table 3 shows the interviewees' primary data and work contents, who belong to different levels (executive, management, and operations). This study examines the system's usefulness and ease of use from various business perspectives so readers can better understand the relevance of the interviewees and interview contents, organizational structure, and orientation.

5.1 Perceived Usefulness

The interviewee was first asked whether their company had a similar intelligent shopping guide system or whether they had used similar software or system tools for sales. This study explored the current sales system with the intent of learning more about the approach to sales in the past.

With technology-based sales assistance, the company can rely on the experience of senior salespeople. Accordingly, ancillary results vary depending on the skills and expertise of the salesperson. This study enquired about the impact on the company when such senior salespeople leave. Presently, the proportion of senior salespeople in Taiwan's telecommunication retail industry is insufficient. When the sales quota is too high, and the work content is highly experience-dependent, it is easy to lose customers, affecting profits.

After understanding the experience of the interviewees and the current market situation, this study asked the interviewee to express his view on the intelligent shopping guide system.

In conclusion, interviewees agree that the system can be used to improve their shopping guide. The interviewee said the intelligent shopping guide system was helpful to their work. Finally, the interviewee was asked to conclude the system's usefulness.

5.2 Perceived Ease of Use

This study wanted to understand the interviewees' views on ease of use and to discover whether this characteristic of the intelligent shopping guide system affected their willingness to use it. The interviewee attaches great importance to the ease of use of a system. However, some systems provide great functionality but need help to operate. Accordingly, this study further explored the impact of ease of use on the employee's willingness to use a system in such a case.

After understanding the interviewee's views in general, we asked him to express his view on the ease of use of the intelligent shopping guide system. The interview content analysis revealed that the case company's employees accepted the operation of the intelligent shopping guide system. Overall, interviewees held a positive attitude toward the intelligent shopping guide system's usefulness and ease of use. They indicated that the perceived ease of use would positively affect the perceived usefulness and indirectly affect the user's behavior intention.

6 Conclusion

In the evolving landscape of retail, driven by the rise of e-commerce and widespread smartphone usage, the dynamics of consumer interaction have transformed significantly. Information technology has accelerated information dissemination, giving rise to showrooming, which presents substantial challenges to traditional retail models. Moreover, the necessity for highly trained sales personnel to effectively introduce and explain products involves considerable investment, contributing to a high turnover rate among employees. In response to these developments, retailers must leverage artificial intelligence solutions to streamline employee training processes and enhance profitability. AI technologies can automate and personalize training, reducing costs and time investments while ensuring consistent knowledge transfer across the workforce. This strategic integration of AI mitigates the impact of rapid staff turnover by making training more efficient. It aligns with the broader goal of adapting to rapid technological advances in the retail sector.

This study collaborates with a mobile telecommunications retailer to create an intelligent shopping guide system powered by advanced artificial intelligence technology. The aim is to harness the latest in AI to transcend the limitations of previous hardware and analyze vast amounts of sales data to discern consumer preferences and behaviors. This AI-driven system swiftly recommends products and services that align with consumer needs and enhance gross profitability. Implementing the AIDA model effectively guides consumers through their purchase journey, significantly reducing the need for extensive employee training and lowering the entry barriers for new staff. Furthermore, it streamlines the time salespeople spend with consumers, thus boosting transaction rates and enhancing profitability and competitive positioning. Integrated into a mobile application, this system delivers its services through a familiar, handheld format, improving interactions between salespeople and customers and elevating overall customer satisfaction.

The proposed research design and architecture have been tested in a mobile telecommunications retail store. However, the system is still in the testing stage and can only be effectively verified and evaluated once more stores have implemented it. In the future, it is hoped to further confirm and refine the research structure by incorporating the sales records post-system-introduction and improve the recommended content of service charges so that the choices provided to consumers may better meet their needs, and enterprises can thus obtain higher sales gross profit.

The core of intelligent retail development includes using emerging AI technologies and big data, providing customized services, and precision marketing. In the future development of innovative retail, in combination with competent sales-assistance technology, facial recognition systems can analyze consumers' age and gender, as well as products they have been exposed to and purchase rate, to formulate business strategies actively. When consumers enter a store, enterprises can identify biological characteristics and provide consumers with specifically customized services and finely accurate marketing, thus improving operating efficiency and profitability.

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