

Review Article

Supply Chain from the Demand Orientation: A Systematic Literature Review and Theoretical Model Construction

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Abstract: Demand management research has always attracted considerable attention from academia and industry, covering almost all fields, including multiple disciplines, including philosophy, economics, mathematics, management, psychology, etc. This paper provides a systematic review of 110 peer-reviewed journal articles published from 2013 to 2018. The primary purpose is to study how companies design and plan optimal product sales decisions under different demand patterns. We passed to organize and analyze these 110 articles, summarizing the specific role of demand on the consumer goods supply chain, and the relationship to corporate sales decisions. We found that customer demand has driving force and starting point for suppliers to make product sales decisions in the field of consumer goods supply chain. The customer demand for products dramatically affects the degree of market segmentation and also determines the benefits of manufacturers and retailers. However, the existing research is only done under the uncertainty of demand and does not consider the three different demand patterns, real, false, and semi-real. Therefore, there is a significant theoretical gap in existing research. Our goal is to establish a theoretical bridge through the combing and review of relevant literature systems and to construct a conceptual model of the demand-oriented supply chain. This conceptual model will provide an essential reference for the direction of future research.

Keywords: Demand Orientation, Supply Chain, Precision Marketing, Sales Decision

1. Introduction

From the perspective of the supply chain, demand is an essential cognition for end consumers and a primary means of mastering the latest developments in the market. Suppliers cannot accurately grasp the most recent market demand information, and cannot effectively formulate product specifications and sales decisions that meet the newest market frontiers or fashion trends [1]. Retailers can predict market demand information by observing product sales, thereby making the best purchasing decisions based on trade-offs between forecast reliability, procurement costs, and availability of existing resources [2]. Therefore, customer demand has gradually become a significant factor affecting product design, [manufacturing, and sales.

With the rapid development of internet technology, communication between suppliers, retailers, and customers is

no longer limited to traditional offline channels. E-commerce is gradually becoming the mainstream of business models and is changing the lifestyle of consumers and becoming a significant factor affecting consumers' purchasing power. The rich transaction data generated by e-commerce allows companies to explore customer browsing behaviors, habits, preferences, and even features. Manufacturers and retailers to anticipate online consumer product demand, thereby developing a marketing strategy that exceeds customer expectations [3-5].

For companies, the marketing strategy may be that the company develops a sales plan for the current or next stage based on current market demand information. But for researchers, research marketing strategy is not only to study its management practices, but also to study the theoretical basis behind marketing strategies, and to propose new theoretical innovations based on marketing data analysis. Relevant

scholars believe that theory is a series of hypotheses that explain and predict certain phenomena. It is necessary to establish strong theoretical viewpoints in addition to past empirical findings. Every interpretation of the recent phenomena must Support by evidence. They all need to withstand peer testing and are often used to explain what has happened and to predict future events [6-8].

Articles with strong theories tend to start with one or two conceptual declarative and establish a logical and informative case that is both concise and interrelated [9]. In this paper, the relationship between precision marketing, sales decision, and the supply chain seems to be unrelated, but it feels closely related. If the add core factor demand, the relationship between the three will become a logical construct. The construct can adequately explain the core characteristics of the research phenomenon and thus derive the problems, nature, and strategies to be studied in this study [10].

From a marketing point of view, demand is a state in which things felt necessary, and the requirements for a particular product or service can be purchased [11-12]. Marcuse's research sees ideological factors as a mainstream factor that increasingly influences consumer purchasing power. He believes that those demand imposed or directed by individuals from the external environment for specific social and economic interests are false demands [13]. Under the circumstance of human environmental impact, it is difficult for people to distinguish between what is real demand and what is false demand. Marcuse's research verifies that fetishism is not a result of mass consumption, but an idea of the use of goods as a matter of course. A commodity is a consumer's concern for style or fashion, not the result of capitalism, nor the expression and operation of middle-class values, but merely the idea that the commodity itself is a culture [14].

Crawford researched consumers to enter the mall to purchase the products they need. The author found that consumers came to the mall with real demand and faced a series of a wide range of product information, consumers are forced to divide the demand into smaller elements. These are neither false demands nor objectively determined real demand, but rather material and symbolic aspects of consumers forming request in a state of uncertainty. This ever smaller element is the demand between real demand and false demand. We call it semi-real and semi-false demand [15].

These three forms of demand cover a wide range of products in various industries and become an essential factor influencing consumers' purchasing behavior. In the past five years, relevant scholars have conducted rich research on demand. Research on the relationship between demand and supply chain [2, 16-18]. Research on the relationship between demand and marketing [3, 19-21]. Research on the relationship between demand and decision making [22-25].

Existing research shows that the development of commodity production and sales by customer demand. The customer's preference for products dramatically affects the degree of market segmentation and also determines the benefits of manufacturers and retailers. In today's mobile

Internet as a daily habit of people, customer-centric is the key to business development, especially when market competition is fierce, many companies have realized the importance of customer participation, because the purpose of customer participation is through provide personalized product design, get a good user experience, and effectively meet customer demand [26-28]. It can say that the production or sale of products that meet the demand of customers is an essential channel for enterprises to gain an advantage in the fierce market competition. So, how do the manufacturer and retailer formulate what kind of strategy to collect or sell products that meet consumer demand or exceed consumer expectations based on what type of data collection? These are the main issues to be addressed in this paper.

Our literature review provides a promising approach to future research by combing and summarizing existing research to assess theoretical gaps and integrating literature on requirements, precision marketing, and sales decisions. We conducted a literature review to answer our primary questions. How can manufacturers and retailers use what kind of data to collect based on these three requirements to develop a strategy to manufacture or sell products that meet consumer demand or exceed consumer expectations? We propose a supply chain theory model. This model is designed to address the management issues of manufacturers and retailers who implement precision marketing strategies to manufacture or sell products that meet consumer demand or exceed consumer expectations. Therefore, we have contributed to the theory of the relationship between precision marketing and sales decision-making from demand orientation.

2. A Systematic Literature Review

Our literature review relies on a structured, transparent and reproducible method of selecting and evaluating scientific contributions [29]. It compensates for a way to bridge the gap between practice and theory in organizations and management. Such research methods enable researchers and practitioners to clearly understand the nature of the approach and what elements include in the implementation of society material practices. It's a view of Theory-as-elucidation. The applied research of relevant methods helps researchers to express and display the obscure viewpoints in theoretical analysis better and more clearly, so they can grasp the essence of academic innovation [30].

We only study peer-reviewed journal articles, excluding books, book chapters, and other non-reviewed publications, as peer review serves as a quality control mechanism that validates the theories provided by these articles [31-33]. Therefore, using the 2013-2018 timeframe, we searched the Web of Science, Engineering Village, Springer Link, Academy of Management, and Elsevier Science Direct databases by keyword, and sorted out relevant peer-reviewed articles published during this time.

2.1. Group A: Theoretical Studies

Theories are propositions that are logically interconnected

and empirically verify [34]. In the field of management research, the theory is an essential factor in the use of scientific methods to build knowledge. Therefore, theory plays a fundamental role in scientific research and the development of disciplines. The research on the relevant theoretical basis in the paper is to refer to the method developed by the predecessors to lay the foundation for the

formation of new conceptual perspectives [9]. In advancing academic debates, it is essential to develop theoretical rethinking and to expand the use of theories (Table 1) [33]. In this part, we collected 26 related articles, systematically combed the reports of relevant theories in this period, and gave their definitions.

Table 1. Theoretical studies (n=26).

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
Demand Theory	[35-38]	Theoretical	Personal or household consumption model from demand-based	Whether basic needs are necessary for the theory of demand at the individual level, they are required in understanding the theory of aggregate demand. Studies have shown that a more equitable distribution always leads to the higher output of the traditional neo-Kaleckian macroeconomic model, and also proposes conditions that reduce workers' income inequality, leading to a more wage-led demand. The study identified Muslim Customer Perceived Value (MCPV) dimensions, examined the interrelationships between MCPV, customer satisfaction, customer loyalty, and Muslim customer retention, and developed and tested a conceptual model of the consequences of MCPV in tourism.
	[39-40]	Theoretical	Ideology affects demand	By studying Marcuse's influence on individual needs in ideology, explore the potential impact of psychoanalytic theory on today's educational philosophy. The study used Althusser and Zizek to analyze the ideological function of the ethical consumption gap critically.
	[41]	Theoretical	Expand the impact of product categories on demand concentration	Product categories may increase demand concentration, which is contrary to the "long tail effect" theory prediction, due to the expansion of product categories, demand will no longer concentrate on "hot" products.
	[19, 42]	Theoretical	Enabling consumers to design their unique products that meet their specific preferences is a key value driver for modern mass customization systems.	The negative impact of feedback consumers on self-designed product satisfaction mediate by the uncertainty of decision making and the complexity of the perception process. Consumers using the sales configurator to customize the product experience can be a source of interest for the consumer experience, beyond the traditional belief that it has a product that better suits his/her specific needs.
	[43-45]	Theoretical	Customer perceived value dimension.	The relationship between consumer value and satisfaction depends on the consumer's past loyalty and the need for uniqueness. Consumers react differently to different types of service recovery. Research suggests that regardless of satisfaction and loyalty, customers are reluctant to pay more for their regular brand than for other brands. That means that superior perceived value cannot achieve through the quality of service, which indicates a lack of differentiation between brands in the field.
	[46]	Theoretical	The impact of online reviews on consumer demand	The study evaluates these artifacts by using a set of experiments and hypothesis tests, which verifies the effectiveness and efficiency of the proposed objects. Online consumers are reluctant to use only digitally transmitted information to purchase expensive products, and consumers are more likely to buy more and cheaper products online through the accumulated online shopping experience.
	[47-48]	Theoretical	Product uncertainty and product prices have an interactive impact on online consumer buying decisions.	The study validated the impact of online relationship strength, perceived diagnostics, and product-related risks on consumers' willingness to purchase.
	[18]	Theoretical	Markov decision process and describe the structure of the optimal policy.	The study found that if orders cannot fulfill immediately, they are either out of stock or lost in the case of long-term demand or the fact of step-in demand.
Precision Marketing Theory	[49-52]	Theoretical	Facility management (FM) value network provides a conceptual foundation for considering demand-driven, service-oriented and user-centric FM methods by considering customer, customer and end-user perceptions of value.	The research made a preliminary contribution to the value study of FM by focusing on the demand side. It raises questions about the nature of the discipline and its practices and provides an understanding of the further research necessary to support evidence-based decision making. The findings and ideas for further research on the added value of FM provide input for future specialization of FM.
	[25]	Theoretical	Research development of an effective method for visualizing the distribution characteristics of demand.	This approach can found in the significant data stream of customer reviews that contain useful information to predict sales proximity better. The results of the study discuss the impact of current demand on operational decisions.
	[53-54]	Theoretical	The research develops and describes the framework of data precision marketing	By developing and integrating the evolving issues surrounding the touchpoints and future research issues, a research agenda developed for future precision marketing research. This paper analyzes the development path of e-commerce

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
			research, highlighting the touch points in the marketing process and the marketing strategy decision process that data technology has and will have a significant impact.	marketing based on big data, combines the intelligent technology with the design-related aspects of intellectual and precise marketing framework, and builds an RFMA model that combines the characteristics of power suppliers to achieve k-means clustering, to “accurate” divides customer
	[55]	Theoretical	A new decision-making framework technique using data mining for accurate labeling propose by using the case study method.	Precision Marketing provides personalized customer service and is used to help companies increase profits through effective marketing. The goal of this technology is to help companies identify potential characteristics of different customer categories and propose appropriate precision marketing strategies to reduce inventory for each customer category ultimately.
	[56]	Theoretical	The study identifies the factors that contribute to accurate sales forecasts by proposing a conceptual model and using the principles of agency theory.	Research can guide managers on how to build a more effective compensation system and use it to identify incentives that encourage salespeople to provide accurate and inaccurate sales forecasts.
	[57]	Theoretical	User-based and content-based dimensions are used to predict user forwarding behavior.	Weibo is becoming a means of disseminating information through user forwarding behavior. Making full use of the user's behavior data in Weibo for accurate marketing is an essential method for enterprises to achieve performance.

According to the relevant research of the demand, combined with the research theme of this research, we believe that the demand is the explicit desire of people to obtain inner satisfaction when purchasing the (specific) products or services according to the actual situation of production and life.

According to the research related to precision marketing, combined with the actual study, we believe that precision marketing is the advantage and characteristics of enterprises using big data, collecting data reflecting the state of consumer behavior, and then refining the data to grasp the consumers demand to develop appropriate and personalized marketing

decisions, and ultimately establish long-term interaction with consumers.

2.2. Group B: Qualitative Research

We collected 23 qualitative articles using case studies and experimental methods (Table 2). These studies use a variety of theoretical approaches to explore the relationship between demand for precision marketing, demand for sales decisions, the relationship between precision marketing and sales decisions, and sales decisions and firm performance.

Table 2. Qualitative studies (n=23).

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
Demand Theory	[21, 58-59]	Case study	The authors propose a method based on quality function deployment (QFD) method to analyze market demand and customer.	The results of the study demonstrate the effectiveness of this approach in improving customer satisfaction while reducing environmental issues and costs. The study used ANP-QFD to translate customer requirements (CR) into LSP system indicators to develop its security design. The results of this security performance development study can benefit LSPs in improving customer efficiency in enhancing efficiency and enhancing security.
Demand Theory	[22]	Design of experiments	Retailers face uncertainty in consumer demand trade promotion decisions in the retailer channel.	Market experiments can reveal trade-promoting results in which industry data is scarce or non-existent.
	[2, 60]	Design of experiments; Case study	Retailers' optimal purchasing decisions.	Two-tier programming is used to simulate purchase problems, and a binary search solution approach is developed to solve optimal solutions. The study developed a new policy for retailers to consider medium- and short-term decisions. The study concluded that retailers provide prices to consumers during the medium-term planning period. The medium-term plan is random due to uncertainty in pool prices and demand.
	[61]	Case study	Food transportation characteristics in urban areas	Exploring the demand for potential users, logistics and transportation resources (such as vehicles and facilities) and tailored service measures are essential prerequisites for implementing urban logistics measures.
	[62]	Design of experiments	The study determined how the supplier's inventory service level affected the needs of retail customers.	Experimental results show that the increase in historical fill rate associated with statistically significant and current management growth in retail demand.
	[63, 64]	Design of experiments; Case study	Consumer demand for fair trade.	Although consumers value ethical sourcing, there is significant heterogeneity in the willingness to pay. The results of the study show that consumers have the right trade preferences for unfair trade coffee

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
	[65-68]	Case study	The study develops an overall operational planning framework for grocery retailing.	types under all conditions. At the heart of the research is the development of consistent requirements and SC planning matrices. It demonstrates the framework for planning interdependencies and defining retail operations. The grocery planning framework integrates retail details and the level and sequence of decisions. Studies have shown that the coherent planning framework summarizes the general design options for the last mile order fulfillment resulting from the new requirements of OC fulfillment.
	[69, 70]	Case study; Document analysis	Coupon incentive-based demand response (CIDR)	Data analysis shows the benefits of the proposed program in terms of social welfare, consumer surplus, LSE profit, retail electricity price robustness, and implementation readiness. With the help of the proposed conceptual framework, an appropriate implementation framework can establish that can be used to develop the most appropriate IBDRP for any retail electricity market.
	[71]	Case study	The study assessed the impact of the use of flexibility in demand, also known as demand response, on the effects of power system operations.	The results of the study show that the general demand response helps to reduce the cost of power system operation, improve reliability and reduce emissions. Also, higher uncontrollable abilities increase these benefits, thereby increasing the social value of demand response.
	[72, 73]	Case study	Supply chain planning under uncertainty of demand.	The model proposed by the Institute dynamically combines transportation networks, facility investment costs, time value of money and possible changes in production processes. Also, time variations and demand uncertainties for dairy products during each period of the planning period are considered to determine the optimal facility location and optimal yield. Research design and planning have a countercurrent supply chain while considering production, distribution and reverse logistics activities.
	Precision Marketing Theory	[74]	Design of experiments	The authors propose a hybrid data mining model based on the generalized fuzzy soft set (GFSS) theory integrated learning classification algorithm.
[55]		Case study	A new decision-making framework for precise tagging using data mining techniques constructed.	The decision-making framework proposed by the researchers is useful and can provide an excellent and precise marketing strategy for the company.
Sales Decisions Theory	[75]	Case study	How does the store manager respond to the performance evaluation choices in the contract and the changes in the authority after the inventory decision?	The combination of performance appraisal options related to salesperson compensation and the inventory management system will increase the gross profit of retail stores and a reduction in inventory valuation losses.
	[76]	Case study	Sales and operations planning (S&OP) processes.	The study found that in the complex planning environment and the ambitious sales and operations planning (S&OP) goals, the advanced planning and scheduling (APS) system is particularly well-suited to support the S&OP process.

2.3. Group C: Quantitative Study

We collected 26 articles using quantitative research methods (Table 3). These studies use a variety of theoretical approaches to explore the application of demand in marketing, the application

of demand in decision-making, the application of big data technology in precision marketing, the relationship between precision marketing and management decision-making, and the implementation of sales decisions in the supply chain.

Table 3. Quantitative studies (n=26).

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
Demand Theory	[77-79]	Structural Equation Model; Descriptive statistics; Econometric model	Impact of online product reviews on consumer buying experience products.	Data analysis results verify the profit impact of product reviews and its relationship to the number of comments. The study provides a management foundation for improving the online presence of hotels on social media platforms through the strategic use of crucial review factors. The study identified the commercial value of consumer reviews and the management's response to hotel performance. The results show that overall ratings, attribute ratings of purchase value, location and cleanliness, changes and numbers of consumer reviews, and the number of management responses are significantly related to hotel performance.
	[20, 80]	Structural Equation	Online convenience affects	Convenience, transactions, and monitoring are dimensions that affect the

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
Demand Theory		Model; Meta-analysis	consumers' intention to use online shopping.	convenience of online shopping. The frequent monitor of consumer perceptions and expectations of online accessibility is a prerequisite for continuous improvement to provide highly convenient online services. The study illustrates the profit impact of product reviews and its relationship to the number of reports and finds that false review increases consumer uncertainty on online retail platforms with false product reviews, more positive comments and more comments have less impact on consumer choice.
	[41]	Least squares	Study the impact of expanding product categories on demand concentration	The study found that product categories may increase demand concentration, which is contrary to the "long tail effect" theory prediction, due to the expansion of product categories, demand will no longer concentrate on "hot" products.
	[81-83]	Logistic regressive; Elaboration likelihood model	Online reviews data measure product attributes affect customer satisfaction.	Manufacturer-specified design attributes can affect customer satisfaction. Online reviews will continue to promote the re-distribution of consumer word-of-mouth. While online management responses can improve the future satisfaction of complaining customers who receive answers, they reduce the future happiness of customers who complain about but not receive management responses.
	[23]	Econometric Model	Online priority retailers and participation in critical omnichannel decisions.	Increase overall demand and online channels; generate business spillover effects on other channels by attracting customers with higher service costs; increase overall operational efficiency by raising the conversion rate of sampling channels and lowering revenue; amplify these demand and operational benefits when it comes to customers.
	[24]	Descriptive statistics	The influence mechanism of customer online shopping behavior on online seller sales decision. Develop an efficient inventory and logistics management system to solve a real-world seasonal demand forecast	The impact of online sellers' e-service products on cumulative customer ratings can adjust through product positioning (utility/health) and high/low perceived risk; higher customer aggregate ratings have a positive impact on demand.
	[16]	Cluster analysis	Research purchase issues for multiple products (such as resource limits, demand forecast updates, and expedited order issues)	The method conducts data survey and analysis in the actual SKU store daily demand database of a retailer in Singapore. The data analysis shows that the proposed plan is significantly better than other widely used intermittent demand forecasting methods.
	[2, 84-86]	Multivariate analysis; Structural Equation Model	The research aims to understand how companies manage their products and services and integrate supply chain management (SCM) and demand chain management (DCM) strategies.	The study shows that, based on the latest demand forecasts and inventory, retailers can offer expedited orders at a higher cost during the sales season, which is limited by the minimum number of reorders. Studies have shown that consumers' perceptions of organic foods affect their behavioral intentions and then lead to actual purchases.
Precision Marketing Theory	[3, 87, 88]	Structural Equation Model	The research aims to understand how companies manage their products and services and integrate supply chain management (SCM) and demand chain management (DCM) strategies.	The study proposes the research gaps associated with the shift in traditional activities that companies have moved from pure products to product services, and rethinks supply chain management methods. Web-based DCM integration can improve service innovation performance. Studies have shown that the effective implementation of responsive supply chain strategies involves the integration of inter-organizational resources (i.e., socio-relational and techno-process integration) across the global supply chain to increase production capacity.
	[89, 90]	Principal components analysis & Cluster analysis	The research proposes a market-driven product positioning and design decision support system (DSS).	The research proposed system enables companies to make more informed decisions about market-driven product positioning and design. The result of the design is a computer-based tool that considers important BM assessment criteria by integrating market analysis based on joint study and determines the impact on the business models of all participants involved.
	[91]	Cluster analysis & Artificial neural network	By establishing a multidimensional space-time big data model, this paper proposes an accurate marketing scheme combining spatiotemporal data clustering and neural network.	The research establishes an online accurate marketing system model based on big data, realizes the Hadoop + MapReduce precision marketing model platform, stores all data in a distributed storage system, and uses data mining technology to process it, providing a basis for enterprise decision-making.
Sales	[92]	Cluster analysis	Build a "user portrait database" and the corresponding E-R diagram.	The research establishes an online accurate marketing system model based on big data, realizes the Hadoop + MapReduce precision marketing model platform, stores all data in a distributed storage system, and uses data mining technology to process it, providing a basis for enterprise decision-making.
	[93-95]	Principal	The research is intended to	The research results show that the method can design an active and agile

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
Decisions Theory		components analysis; Equivalent optimization model; Bi-level programming model	optimize the design of agile supply chain network under uncertain conditions.	supply chain network under uncertain conditions within a reasonable execution time. The parameter optimization method of the study can provide an effective and flexible way for decision-makers to design the supply chain network. The proposed model can reduce or eliminate the adverse effects of supply uncertainty on the collaborative logistics network (CLN) resource matching process.

2.4. Group D: Mathematical Analysis

We collected 35 articles using mathematical analysis methods (Table 4). These studies use a variety of theoretical approaches to explore the application of demand in marketing, the application

of demand in decision-making, the application of big data technology in precision marketing, the relationship between precision marketing and management decision-making, and the implementation of sales decisions in the supply chain.

Table 4. Mathematical method (n=35).

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
Demand Theory	[96]	Mathematical modeling	Impact of online product reviews on different participants in the channel structure The authors examine the impact of user-generated content on two competing companies that are uncertain about the location or valuation of consumers and sell horizontally differentiated products.	Online product reviews provide consumers with additional information to mitigate product quality uncertainty and its adaptability to consumer demand. The study found that user-generated content has very different meanings for competing companies' location decisions and quality decisions. When a company is unsure of the consumer's taste and chooses their product location, the benefit of the company or consumer from user-generated content depends on which of the two effects predominates.
	[97]	Mathematical modeling	The authors research the housing demand structure concerning consumption and investment.	Demand for improved and invested housing exceeds primary consumer demand in small cities in Jiangsu Province. The study found that housing demand falls among younger and middle-aged families who stay in smaller homes rather than to trade up.
	[98, 99]	Function model; Dynamic model	Government subsidies provided directly to consumers can affect suppliers' production and pricing decisions	The results of the study demonstrate that decentralized decision-making is also optimal for joint management of suppliers and government policymakers, and subsidies provide a coordination mechanism.
Demand Theory	[100]	Function model		The study examines the impact of demand and returns uncertainty on network configuration through stochastic programming (scenario-based). The calculation results show that the model can deal with the possibility of demand and back simultaneously. The main innovation of the research is to consider the CLSC network configuration and selection process in both uncertain and uncertain decision-making environments. The model can determine the number and location of open facilities and the flow of products in the network. In the multi-mode requirements fulfillment policy, some models are defined by the customer, one of which must be met by the network. The main advantage of this policy, not the prefix requirement, is the excellent performance of the facility's capacity usage, which increases the network's profit and retains market share. The study proposes a deterministic mixed integer linear programming (MILP) model for downstream petroleum supply chain (PSC) networks to determine the optimal distribution center (DC) location, capacity, mode of transport, and amount of transfer. Multimodal freight transport involves the use of transportation to combine the shipping of goods from origin to destination.
	[101-104]	Mixed-integer linear programming model	A closed-loop supply chain (CLSC) network	Research has developed a versatile optimization model that directly uses demand data to create a practical decision-making tool. The study analyzes the finite-time dynamic pricing model, where the demand for each period depends not only on the current price but also on the past amount of the reference price.
	[105-107]	Mathematical modeling; mixed integer linear programming	Supply chain network design with multimode requirements	Research has developed a stochastic mathematical formula for designing multi-product supply chain networks, including several capable production facilities, distribution centers and retailers in uncertain markets. The study considers Supply Chain Network Design issues in agile manufacturing scenarios, with multiple levels
	[108, 109]	Function model	Study dynamic pricing issues, where companies offer products that sold in a fixed time frame	
	[110, 111]	Stochastic mathematical formulation; Lagrangian heuristic	Network of multi-product supply chains	

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
Precision Marketing Theory	[112]	Numerical example	Economic order quantity (EOQ) model This study proposes an optimization approach to remanufacturing process planning that takes into account reliability and cost.	and multiple cycles in the case of various customer needs. The purpose of the study is to maximize the total profit over the finite planning horizon.
	[113]	Multi-objective optimization problem	Microblogging is becoming a means of disseminating information through user forwarding behavior. Making full use of the user's behavior data in Weibo for accurate marketing is an essential method for enterprises to achieve performance.	The study gives an illustrative example to illustrate the effectiveness of the proposed model and the proposed algorithm. The results show that the method can effectively improve reliability and reduce costs.
	[114]	Nonnegative matrix factor		This method effectively improves the accuracy of forwarding behavior prediction and provides new ideas for forwarding behavior prediction in dynamic social networks and enterprises to implement precise marketing strategies.
	[115-117]	Numerical analysis & Sensitivity analysis; fuzzy multi objective mixed-integer nonlinear programming	Comprehensive supply chain model.	Coordination and back ordering increase the overall expected profit of the system, and as the price sensitivity of demand increases, these two measures become more critical to the supply chain. The comprehensive model provides a more inclusive and integrated perspective for supply chain integration. It expects that a consensus on supply chain integration could be achieved based on this model. The conceptual framework will help researchers identify integration variables in the supply chain. The designed model is primarily used to address integrated multi-site, multi-cycle and multi-product aggregation production planning (APP) issues under uncertainty.
Sales Decisions Theory	[118]	Function model	The authors study a new modeling framework for generating sales and operations plans developed that integrated promotional and production planning decisions. The study establishes a unified functional model that captures essential relationships and trade-offs between time to market, sales channels, pricing, and production decisions.	The results of numerical analysis reveal exciting findings of the benefits of developing a comprehensive sales and operations plan, as well as the optimal time and quantity of promotions, and how these findings influence by the interdependence of marketing and production-related factors.
	[119]	Function model		The findings demonstrate the link between these critical decisions and describe and quantify their synergy in profit generation.
	[57, 120]	Lagrangian model; Numerical algorithm	Manufacturer's optimal pricing and product strategy.	Under the guest's pricing (NYOP) mechanism, the manufacturer's optimal strategy mainly depends on the cost of bidding, manufacturing cost savings, production capacity, and market size. The calculations show that it is always beneficial for manufacturers to adopt different wholesale pricing strategies for retailers. The results of the study show that the proposed collaborative model can raise the two-stage supply chain (SC) profit to a level close to the centralized model, and also ensure that the channel members' benefits are higher than the decentralized decision. Two aspects of sustainable practices (environmental and social costs) have quantification in the inventory model of the supply chain. The study identified pricing for green levels of products that compete with non-green products. This problem solves in two different situations: centralized and decentralized. The study designed a comprehensive approach to transforming the principles of sustainability into a supply chain planning model that allowed decision makers to choose alternatives that reflect the balance he or she would like to make in the three dimensions of sustainability.
Sales Decisions Theory	[121-124]	Mathematical programming model; Numerical analysis; Multi-objective mathematical programming	Sustainable supply chain	In this supply chain, demand is sensitive to the initiatives of the promotion/sales team. The study recommends that the company's management determine the optimal order initiatives/promotional quantity, reorder points and sales team initiatives/promotions to achieve its maximum profit. Unlike the traditional integrated supplier-purchaser coordination model, the study incorporates overlapping delivery and imperfect projects into the production-allocation model. The model improves the observable fact that the system may experience a shortage during screening and
	[125-127]	Function model	Production-inventory model of two-stage supply chain consisting of one manufacturer and one retailer	

Theoretical framework	Studies	Typology of study	Aim of the study	Main findings and propositions
	[128-130]	Mixed integer programming model; Numerical simulation	An essential goal of the supply chain S&OP (sales and operations plan) is to achieve favorable coordination of customer needs and supply chain capabilities through a coordinated program for sales, production, distribution, and procurement.	also considers quantity discounts. The study demonstrates how these S&OP decisions can formulate with the economic, market, supply, and system uncertainties by using a modeling approach based on stochastic programming and recourse. Research suggests that the frequency of new product development, customer service levels and supply uncertainty as particularly crucial for the S&OP process. The study aimed to find the best balance between sales requirements and industry restrictions while limiting inventory, emergency supplies and maintaining reasonable delivery times for customers.

3. Research Review

Overall, the relevant research on the application of precision marketing, sales decision, and supply chain is rich in content, rich in results, constantly enriching and developing demand theory, fully demonstrating the importance of demand research and scholars are passionate about research in this field.

Specifically, research on demand has continued to be hot. Scholars use quantitative and qualitative tools to study demand management, covering almost all fields, including multiple disciplines, including philosophy, economics, mathematics, and management, psychology, etc. People have explored the theoretical and applied research of demand in various fields, and studied multiple details of these theories and applications [13, 131-135].

Today, with consumer demand as the core and mobile Internet as the daily behavior habit, demand management research has also attracted considerable attention from academia and industry. According to the literature search, the application of demand in precision marketing and sales decision-making is also a hot topic in academic research in recent years [22, 25, 46, 96, 97, 108, 136].

For most companies, companies face customers who need to meet individualized interactions and demand. Therefore, understanding the value of customer needs through customer interaction, producing and selling products that meet customer needs has become the core of corporate marketing activities. At this point, the reorganization of data from different sources (such as customer interaction information, sales data, etc.) produces and sells products that meet the individual demand of customers according to the three manifestations of demand and formulates corresponding optimal strategies. This method has empirically validated in some industries [134, 137-139].

Also, with the frequent interaction between enterprises and consumers, the advancement of modern manufacturing technology and the personalized sales service in the era of artificial intelligence are increasing, and enterprises can satisfy customers' demand using personalized customized products. Therefore, how to meet customer needs is important information to consider when planning operational measures for production, sales, and decision-making in the era of big data. It can say that demand directly affects the company's precision marketing and production planning, inventory control and sales decisions in the supply chain. Therefore,

demand is a critical factor for precision marketing, sales decisions, and supply chain variables [16, 134, 140].

Research from relevant literature on demand found that the focus of research is on one of the points between demand and marketing, the relationship between demand and decision, the relationship between demand and supply chain, including online marketing and online reviews. As the influence mechanism of consumer demand forecasting factors, online convenience affects consumer demand, consumer customized products affect sales decisions of customers, customer-driven supplier diversification management phenomena, etc. [3, 17, 20, 136, 140].

Existing research has theoretically defined the relevant concepts of the three manifestations of demand (real demand, false demand, and semi demand) [13, 15]. Real demand is what consumers demand. False demand is a demand that consumers do not need, relying on economic benefits, good mood or advertising to influence purchasing power. A semi demand is a demand between real and false demand. We can understand that the significant share of reserves and circulation in the circulation of physical commodities is real demand. The portion of the transaction that exceeds the necessary parts, such as for speculative arbitrage, is a false demand.

The existing research shows that the market and demand have changed from the original product to the customer-centered. Nowadays, the most important thing for enterprises is the analysis of customer demand characteristics and preferences. Customer demand and choice significantly influence the degree of market segmentation. It also determines the level and depth of product diversification [141, 142]. Therefore, meeting customer needs has become the primary goal of precision marketing. Obtaining customers' preference information for future products through data mining and analysis methods, and formulating corresponding sales decisions are not only a meaningful way to implement precision marketing, but also an essential channel for manufacturers and retailers to gain advantages in fierce market competition [143, 144].

From the content and results of the literature review, demand is the core of precision marketing, and the data information in precision marketing is the key to sales decision. Therefore, it is theoretically necessary to explore the relationship between demand-oriented precision marketing and sales decisions.

However, as we have raised the research questions, the

existing research only studies Demand and Precision marketing [3, 19-21], Demand and Sales decisions [22-25], Demand and Supply chain [16, 61, 66, 105], Precision Marketing and Sales Decisions [55, 89], Sales Decisions and Supply Chain [93] two variables or relationships of Demand, Sales decision, Supply chain relationship three variables [115, 118-119]. Existing research shows that the relationship between precision marketing and sales decision-making from the perspective of manufacturers and retailers is still a relatively blank research area. Therefore, we study of the three manifestations of demand, how do manufacturers and retailers view the data that needs to be collected by precision marketing, and how to make sales decisions that exceed customer expectations based on the results of data analysis.

4. Theoretical Model Construction

We will focus on this theoretical gap by constructing a supply chain model to study the relationship between precision marketing and sales decisions in three manifestations of demand. This model is designed to address the management issues of manufacturers and retailers who implement precision marketing strategies to manufacture or sell products that meet consumer demand or exceed consumer expectations.

Before building a model, we first need to understand what is supply chain.

From the literature review, it found that demand is the primary driving force for customers to take action to participate in transactions, and customers are individuals or organizations that purchase products or services, including individual customers and group customers. Customers satisfy their demand by acquiring, using, or consuming goods and services [145].

For individual customers, many people's demand influenced by social factors, personal growth experiences, and consumer experiences. To meet the same demand, different people may have completely different desires. For example, everyone needs to get warm on a cold winter night. However, some people want electric blankets, while others like old duvets. Unmet demand is a gap between the actual and ideal state of a person's physical or mental state, resulting in an imbalance.

For group customers, they must also meet some demand to survive and develop. These demands reflect the different strategic objectives of the organization, which are related to the resource inputs, fixed equipment, raw material supply and services necessary to achieve organizational goals [145].

Relevant scholars believe that people's demand is innate, the types are not too much, and the content is not too complicated, but according to the hierarchy of demand [13] show that meets as long as the low-level demand, it translates into the motivation to pursue higher-level demand. Although the demand is limited, the means and methods to meet various demand are diverse. For example, to fill the stomach, to meet the physiological demand of hunger, consumers can have countless choices, but the consumer's ability to pay causes him (they) to exchange for the value that can be brought to them —

the product of the most significant interest. Therefore, people always choose the products or services that are most valuable or best suited to their desires based on their ability to pay. Thus, research shows that demand with sufficient purchasing power support has a market value [12, 13, 146]. The importance of demand in an intense market environment is unquestionable, but it cannot determine the price alone, nor can it determine the purchase amount alone. A market must have both suppliers and customers. Otherwise, it is impossible to generate transactions. With demand, customers are interested and willing to buy a product to get the utility to meet their demands and desires before they can trade and provide products or services that meet their requirements, that is supply [145].

Customer demand, supply, sales, and raw material prices are the necessary information that companies demand to plan their operations in inventory, production, and distribution. Since the beginning of commercial trade, access to data (the data here includes a collection of demand information, personal information, transaction information, behavioral habits, etc.) has always been a significant event for companies to survive. In the traditional supply chain, manufacturers and retailers put a lot of effort and cost into collecting data, hoping to achieve supply chain coordination. Nowadays, the development of modern information technology makes the method of obtaining data fast and straightforward. Therefore, exploring ways to use data for accurate marketing in a supply chain effectively has become a hot area of supply chain management research [135, 147].

Based on the literature review, we will explore the building process a supply chain theory model that allows retailers to make optimal sales decisions for individual customers. Before this model built, we first need to determine the method used to construct the model.

Principal component analysis (PCA) forms the basis of multivariate data analysis. Its core idea is to reduce the dimensions of the dataset, where there are a large number of interrelated variables while preserving as many changes as possible in the dataset. This reduction achieved by converting to a new set of variables that are separate principal components and are ordered, so the first few variables retain most of the variables that exist in all of the original variables. PCA provides an approximation table of data, data matrix x , just two small matrices T with P' in terms of the product. These matrices matrices T with P' capture x basic data model [148, 149]. According to Marcuse (1991) [13] the study of true and false demand, and concerning the model construction method of Petroni & Braglia (2000) [150], we will construct the model using PCA.

Our research content consists of two participants, the retailer (R) and individual customer (I), who analyze how R sells a product of A for a particular customer I by assuming a false demand D_2 . The research method is mainly a first-hand data survey method.

According to the basic principle of the PCA model, this paper determines the relevant indicators of retailer R, product A, false demand D_2 , and individual customer I (Table 1).

Table 5. Parameter indicator.

Raw variable	Index	Regression equation
Retailer (R)	Product Pricing P_R	$R = R(P_R, Q_R, O_R)$
	Product inventory Q_R	
	Product sales O_R	
Product (A)	Style K_A	$A = A(K_A, C_A, Z_A, G_A)$
	Colour C_A	
	Quality Z_A	
	Features G_A	
False demand (D ₂)	Timeliness S_{D2}	$D_2 = D_2(S_{D2}, G_{D2}, P_{D2})$
	Feature G_{D2}	
	Price suitability P_{D2}	
	Features G_I	
	Style K_I	
Individual customer (I)	Quality Z_I	$I = (G_I, K_I, Z_I, S_I, C_I, P_I, U_I)$
	Comfort S_I	
	Colour C_I	
	Price P_I	
	Discount U_I	

In the construction model, PCA can eliminate overlapping or closely related indicators/variables to achieve dimension reduction. Therefore, the repeated indicators in this article have prices (P_R, P_{D2}, P_I), style (K_A, K_I), features (G_A, G_{D2}, G_I), quality (Z_A, Z_I), colour (C_A, C_I), eliminating duplicate indicators $P_{D2}, G_I, K_I, Z_I, C_I, P_I$ after that, the critical indicators are:

$$P, Q_R, O_R, K_A, C_A, Z_A, G_A, S_{D2}, G_{D2}, S_I, U_I$$

We use these indicators in a unified manner x_i to represent ($i = 1, 2, \dots, 11$), as shown in table 2, the purpose of is to facilitate the establishment of a principal component analysis model.

Table 6. List of symbols.

Symbol	Meaning
$x_1 = P$	Product price
$x_2 = Q_R$	Retailer's inventory
$x_3 = O_R$	Product sales
$x_4 = K$	Product style
$x_5 = C$	Product color
$x_6 = Z$	Quality of products
$x_7 = G$	Product function
$x_8 = S_{D2}$	Timeliness of product service
$x_9 = G_{D2}$	Product usability
$x_{10} = S_I$	Product comfort
$x_{11} = U_I$	Product price discount

Then the random variables composed of these 11 indicators are recorded as,

$$x = (x_1, \dots, x_{11})$$

Random variables x average value set μ , covariance matrix is set Σ ,

Linear transformation of x can form a new composite variable, denoted by y ,

$$\begin{cases} y_1 = \mu_{11}x_1 + \mu_{21}x_2 + \dots + \mu_{p1}x_p \\ y_2 = \mu_{12}x_1 + \mu_{22}x_2 + \dots + \mu_{p2}x_p \\ \dots \\ y_p = \mu_{1p}x_1 + \mu_{2p}x_2 + \dots + \mu_{pp}x_p \end{cases}$$

Through the collect data, using software get on principal component analysis, selecting variable product prices x_1 , retailer inventory x_2 , price discounts x_{11} , you can get the ratio of extracting the original variables, the number of principal components and the coefficients in front of each primary part. From $y = \mu_i 'x$, the influence of each variable on the optimal sales decision model can affect analysis according to the factors in the principal component analysis.

Finally, to achieve the optimal sales, we also perform a mean test on R, A, D2 and I, to more accurately analyze which variables affect R. And combined with the model constructed by PCA, analysis the impact of each variable on R. It is also necessary to consider the influencing factors of A, D₂ and I.

5. Conclusion

The predecessors have carried out a lot of research work on

the demand, precision marketing, and sales decision-making, and put forward many methods, viewpoints, and theories that can use for reference. However, the existing research finds that there are few scholars in the academic field to research the subject of our study. In the Internet+ era, manufacturers and retailers influence the change mechanism of sales decisions through precise marketing according to different demand patterns.

We proposed the "Supplier-Product-Different Demand Patterns-Customer" supply chain theory model to promote the study of the relationship between precision marketing and sales decisions to provide a more detailed understanding of the supply chain for demand and will stimulate future research. We build the supply chain model can effectively help manufacturers and retailers collect relevant customer data, such as transaction data, online reviews, behavioral data (such as browsing habits, hobbies, etc.), and accurately mark data results for accurate marketing. We study aims to explore the internal mechanism of precision marketing's impact on sales decisions from a demand perspective. The ultimate goal is to manufacture and sell products that meet or exceed the demand of consumers. The personalized marketing strategy ultimately promotes the improvement of business efficiency.

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