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A Decision-Oriented 5C1S Digital Marketing Mix Strategy for the Real Estate Sector: A Fuzzy Set e-Delphi Approach

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ABSTRACT

Effective marketing decision-making requires frameworks capable of delivering analytical precision while remaining adaptive to continuously changing patterns of consumer behaviour within digital environments. As strategic orientation increasingly influences organisational competitiveness and market sustainability, the alignment between marketing mix decisions and emerging customer expectations has become substantially more important. Under conditions of accelerated DT, conventional marketing mix models are no longer sufficient to address the sophisticated expectations of contemporary real estate consumers. The traditional 4Cs framework, comprising Customer Need, Cost, Convenience, and Communication, inadequately reflects the complex requirements of digitally empowered buyers, particularly within Thailand's rapidly evolving real estate industry. To overcome this strategic limitation, the present study introduces a decision-oriented 5C1S Digital Marketing Mix Strategy that expands the traditional 4Cs structure through the integration of two additional dimensions: Customisation and Service Innovation. A Fuzzy Set e-Delphi methodology was employed, involving 21 field specialists, including university academics, digital marketing professionals, and real estate entrepreneurs, through systematically designed in-depth interviews to examine and refine the proposed framework. Subsequently, quantitative evidence was obtained from 766 real estate entrepreneurs to evaluate the practical applicability and strategic significance of the framework. The findings demonstrate that the 5C1S model, consisting of Customer Need, Cost, Convenience, Communication, Customisation, and Service Innovation, substantially improves customer satisfaction, reinforces competitive advantage, and facilitates more effective consumer purchasing decisions. The framework provides practical strategic direction for real estate entrepreneurs intending to redesign marketing planning approaches according to digital market requirements. Beyond industry-specific contributions, the 5C1S strategy also advances the wider sustainability discourse by offering enterprises a decision-oriented mechanism that supports the alignment of marketing investment with long-term customer value generation and organisational resilience.

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1. Introduction

DT has substantially transformed industrial operations across multiple sectors, with the real estate industry experiencing particularly significant disruption. The real estate market has become increasingly competitive, while consumers now rely extensively on SM platforms to search for information, compare alternatives, and make purchasing decisions. Owing to the rapid evolution of customer behaviour, organisations are required to continuously modify marketing strategies to remain competitive and responsive to market expectations [26]. According to the findings of Zinneha and Yilmaz [34], SM has emerged as the primary interaction channel connecting property buyers and sellers. It additionally contributes to the establishment of consumer trust, strengthens emotional attachment towards businesses, and directly influences purchasing behaviour. Nevertheless, although SM expands opportunities for customer engagement, it simultaneously intensifies market competition and diminishes differentiation among property projects. Consequently, entrepreneurs must formulate innovative strategic approaches capable of addressing deeper and more complex customer expectations [5].

Moreover, marketing strategy represents a central component of organisational success. The development of marketing strategy has progressively shifted from a product-oriented perspective towards customer-centred and long-term relationship-based approaches, particularly within the digital environment [17]. The traditional 4Ps marketing framework, consisting of Product, Price, Place, and Promotion, was previously regarded as one of the most widely utilised strategic tools [22]. However, criticism emerged regarding its insufficient customer orientation, resulting in the introduction of the 4Cs Marketing Mix concept proposed by Robert F. Lauterborn to better correspond with changing consumer behaviour patterns [17]. Despite improving customer focus, the 4Cs framework remains insufficient in the contemporary digital era, where consumers possess elevated knowledge levels, sophisticated expectations, and increasingly personalised demands.

This perspective is further reinforced in Marketing 4.0, which emphasises that digital-age marketing should prioritise customer relationships and position customers at the centre of all marketing activities. Organisations are therefore expected to focus strongly on customer satisfaction and service design capable of generating positive and enduring experiences. Nevertheless, the 4Cs framework demonstrates limitations in fostering positive consumer experiences and maintaining customer relationships within SM environments, where behavioural patterns are considerably more complex [14]. As a result, businesses have increasingly sought alternative approaches capable of strengthening emotional connections and delivering enhanced customer experiences [27].

With rising customer expectations concerning value creation and service experience, Customisation and Service Innovation have become essential factors in establishing and sustaining long-term customer relationships [27]. Contemporary consumers increasingly demand customised services and innovative transaction experiences that enhance convenience and perceived value. Customisation enables organisations to tailor products and services according to individual customer preferences, thereby improving satisfaction and strengthening customer loyalty [28]. Similarly, Service Innovation contributes to the creation of superior customer experiences and new forms of value through the advancement of processes, technologies, and service models aligned with evolving consumer behaviour. These deficiencies indicate that the 4Cs framework inadequately addresses personalised requirements, emotional engagement, and heightened service expectations. Therefore, integrating Customisation and Service Innovation into the marketing mix has become necessary to establish a more advanced digital marketing approach centred on customer engagement and value co-creation.

Within Thailand's highly competitive real estate industry, characterised by extensive SM adoption and intensified market rivalry, limited research has systematically integrated consumer behaviour in

SM environments with the 4Cs framework. Furthermore, insufficient scholarly attention has been directed towards the development of SM marketing strategies specifically designed for Thailand's real estate sector. This gap highlights the necessity for an innovative strategic framework, namely the proposed 5C1S model, which directly addresses the limitations of the traditional 4Cs approach through the incorporation of personalisation and Service Innovation to satisfy individual consumer expectations and strengthen competitive advantage within the digital marketing environment. The principal objective of this study is to develop an innovative 5C1S Digital Marketing Mix Strategy for the real estate sector. Based on the identified research gaps, the study pursues the following objectives:

1. To determine and identify appropriate indicators of the 5C1S strategy through expert consensus using the Fuzzy Set e-Delphi technique.
2. To construct and validate the structural model of the 5C1S Digital Marketing Mix Strategy and assess the extent to which the model corresponds with empirical evidence within the context of Thai real estate entrepreneurs.

The investigation employed a mixed-method approach integrating Fuzzy Set e-Delphi and Confirmatory Analysis to examine and validate a genuinely customer-oriented model. The proposed 5C1S framework contributes theoretically by extending the traditional 4Cs framework into the digital era. Practically, it supports Thai real estate enterprises in formulating marketing strategies capable of strengthening customer relationships, enhancing competitive positioning, improving customer satisfaction, and influencing residential property purchasing behaviour, thereby contributing towards the long-term sustainability of the real estate industry.

2. Literature Review

2.1 4Cs Marketing Mix

DT has transformed the nature of marketing by reducing reliance on conventional mass-marketing approaches and increasing emphasis on specialised and customer-focused strategies. This transition corresponds with the movement from the traditional 4Ps framework, consisting of Product, Price, Place, and Promotion, towards the 4Cs approach, as organisations increasingly seek to understand consumer preferences and utilise digital platforms to engage customers more effectively. Such developments enable marketers to design targeted campaigns that strengthen customer engagement and improve satisfaction within the digital environment [18]. The 4Cs Marketing Mix has become particularly significant in the digital era because consumers now possess greater authority to search for information, compare alternatives, and make purchasing decisions through SM platforms [7]. The conceptual framework introduced by the author, comprising Customer Need, Cost, Convenience, and Communication, was developed to replace the traditional 4Ps model with a more customer-oriented marketing approach.

2.2 Customer Need (CUS)

Among the components of the 4Cs framework, Customer Need is regarded as the most essential and influential dimension. Customer needs refer to consumers' expectations for products or services capable of solving problems and delivering maximum satisfaction. Understanding these extensive and deeply rooted needs represents a fundamental determinant of business success and serves as a core foundation of marketing strategy. Organisations are therefore required to recognise both the current and future products or services desired by consumers. As a central principle of customer-oriented marketing strategy, Customer Need plays a particularly significant role within digital marketing and SMM environments [10].

Consumer needs can generally be classified into functional and emotional dimensions. Functional needs relate to purchasing motivations associated with product performance and practical utility, whereas emotional needs concern deeper psychological expectations, including feelings of ownership, attachment, and personal fulfilment derived from products or services. Furthermore, within the digital era, organisations must analyse customer touchpoints and utilise data-driven approaches in product and service development to better understand customer requirements and create increasingly sophisticated consumer experiences [24]. Previous studies have demonstrated that organisations capable of accurately identifying genuine customer needs and designing products or services that effectively address consumer pain points are more likely to influence purchasing decisions positively [35]. This capability enables businesses to formulate strategic plans based on customer behavioural data, thereby addressing actual consumer requirements beyond basic operational functions and responding effectively to rapid changes within the digital marketplace [31].

2.3 Cost (COS)

Cost, commonly referred to as Customer Cost, extends beyond the selling price of a product or the production expenses incurred by a business. Instead, it represents the total expenditure borne by consumers in exchange for obtaining a product or service. Within the 4Cs framework, the concept of Cost shifts the emphasis away from the traditional “Price” dimension of the 4Ps model, which primarily reflects organisational revenue generation, towards the broader financial burden experienced by customers. Monetary costs include not only the direct purchase price of a product but also associated expenditures, including transaction charges and other related expenses. In digital marketing, pricing strategies should be developed according to perceived product value and customer willingness to pay. Consequently, the initial stage of pricing strategy formulation involves aligning product value with customer expectations and purchasing capacity [35].

Organisations may strengthen competitive advantage by delivering superior value relative to competitors, either through additional benefits or by enabling customers to obtain equivalent benefits at lower overall costs [2]. An emphasis on Customer Cost significantly influences organisational performance and market success. Previous research has demonstrated that customer cost exhibits a positive and statistically significant relationship with consumer purchasing decisions. Cost is therefore regarded as a major determinant influencing customer selection of products and services [12]. Within the real estate sector, the optimisation of sales strategies, particularly those associated with cost considerations, such as offering differentiated property options tailored to varying customer financial requirements, can substantially improve organisational competitiveness within the marketplace.

2.4 Convenience (CON)

Convenience represents a fundamental characteristic of digital marketing. Within the 4Cs framework, Convenience replaces the traditional concept of Place in the 4Ps model, shifting attention from company-controlled distribution channels towards systems that enable consumers to access and purchase products or services with minimal difficulty. In digital marketing environments, Convenience functions as an alternative to physical stores, warehouses, and office locations. Through SM platforms and online technologies, consumers can access information regardless of time or geographical location. A Convenience-oriented strategy therefore seeks to maximise customer comfort throughout the processes of purchasing, accessing, and utilising products or services [30].

Convenience encompasses multiple factors designed to reduce customer effort across the entire consumption cycle, including pre-purchase, purchase, and post-purchase stages. These factors include the selection of accessible sales channels, customer-friendly service systems, efficient

product selection processes, and flexible payment methods. Customers are consequently able to locate company branches or offices more easily and obtain rapid services that minimise time expenditure [13]. Furthermore, digital systems allow consumers to conduct enquiries, reservations, confirmations, and payment transactions efficiently without leaving their homes. Such convenience has become particularly important during the post-COVID-19 period, where convenience increasingly represents a primary consumer expectation that must be emphasised within digital marketing activities [7]. Organisations capable of maximising customer Convenience are more likely to achieve stronger competitive advantage within the marketplace. Previous studies have confirmed that Convenience exerts a significant positive influence on consumer purchasing decisions. Consequently, digital marketing and SMM strategies should prioritise activities that enhance customer Convenience through the effective utilisation of digital technologies to reduce consumer time, effort, and transactional burden, ultimately encouraging purchasing behaviour.

2.5 Communication (COM)

Communication represents the final dimension of the 4Cs Marketing Mix and replaces the concept of “Promotion” within the traditional 4Ps framework. The transition from Promotion to Communication reflects a movement away from one-directional advertising and persuasive messaging towards a more customer-centred communication approach [32]. Within digital marketing environments, Communication focuses less on direct product promotion and more on delivering meaningful and valuable information to consumers. This includes communicating the value of products, services, and pricing structures while simultaneously influencing customer attitudes and preferences to encourage store visits and purchasing decisions [35].

Contemporary consumers not only expect access to useful information but also seek opportunities to interact directly with businesses by providing enquiries, feedback, and complaints. Consequently, ineffective Communication can undermine the success of broader marketing activities and promotional strategies [11]. In digital marketing contexts, Communication functions as a strategic mechanism that enables organisations to engage customers regarding products, services, and organisational offerings while also facilitating immediate responses and real-time feedback. The implementation of an effective Communication strategy generates multiple organisational benefits. Previous studies have indicated that businesses must communicate efficiently and interactively to establish and strengthen relationships with new customers [29]. Moreover, effective customer interaction contributes significantly to the development of strong customer relationships and the achievement of organisational sales objectives [30]. Communication additionally exerts a substantial influence on long-term customer loyalty and relationship sustainability [21].

2.6 Customization (CUZ)

Customisation refers to a strategic approach centred on developing products or services that correspond closely with the specific needs of individual customers, with the objective of delivering offerings aligned to customer expectations and acceptable price levels. This process commonly involves customer participation, either partially or fully, within product design and decision-making activities to ensure that products effectively reflect personal preferences and requirements. Within the real estate industry, Customisation particularly emphasises customer involvement in property design and decision-making processes [19].

Rather than focusing solely on constructing new properties, Customisation represents a broader strategic initiative aimed at developing products specifically suited to customer needs while remaining within the financial limits customers are willing to accept. Consumers who participate in designing or co-designing products frequently develop a stronger sense of ownership and emotional

attachment towards those products. Previous research has identified Customisation as a significant contributor to business profitability and market growth [4]. Furthermore, it has been shown to improve customer retention and satisfaction substantially [15]. Consequently, organisations that prioritise the adaptation of products and services according to individual customer expectations and preferences are better positioned to expand into new market segments, attract diverse customer groups, and strengthen competitive advantage. Ultimately, such strategies contribute towards the delivery of superior customer experiences, resulting in higher levels of customer satisfaction and loyalty, which subsequently support substantial growth in sales performance and organisational revenue [28].

2.7 Service Innovation (SEI)

Service Innovation refers to the development, creation, modification, and introduction of new forms of services designed to satisfy continuously evolving customer expectations and increasing demands for superior service quality. Within highly competitive business environments, Service Innovation is regarded as an essential organisational survival strategy [9]. In the context of organisational SMM activities, Service Innovation plays a critical role in shaping strategic directions. It functions as an important mechanism for differentiation, customer engagement, and value co-creation while simultaneously aligning organisational activities with digital trends and rapidly changing consumer behaviour within increasingly digitised and competitive markets [23].

Service Innovation enables organisations to remain flexible and responsive when addressing unpredictable and rapidly changing customer demands. It additionally assists businesses in designing effective marketing plans and strategic initiatives capable of establishing sustainable competitive advantages that competitors cannot easily replicate within short periods [6]. Such innovation also contributes towards improved profitability and the generation of more stable and predictable revenue streams. Previous research has demonstrated that Service Innovation allows organisations to respond rapidly to customer requirements, exceed customer expectations, and create memorable experiences that strengthen consumers' perceptions of importance and personal value [8].

Particularly within digital environments, the integration of digital technologies into service processes significantly enhances overall customer experience by enabling services to become more convenient, efficient, and accessible. SMM strategies that effectively utilise Service Innovation are more likely to achieve customer satisfaction, which subsequently encourages positive behavioural outcomes, including repeat purchasing behaviour and customer referrals [31]. Overall, the existing literature indicates that although the traditional 4Cs framework remains relevant within the digital era, it lacks sufficient flexibility to address personalised consumer requirements, emotional engagement, and rapidly evolving technological dynamics. To overcome these limitations, the incorporation of Customisation and Service Innovation is necessary. Consequently, the proposed 5C1S framework represents a more comprehensive customer-oriented digital marketing approach designed to correspond with the requirements of Thailand's highly competitive real estate industry, where digital interactions increasingly influence consumer behaviour. The proposed conceptual framework is illustrated in Figure 1.

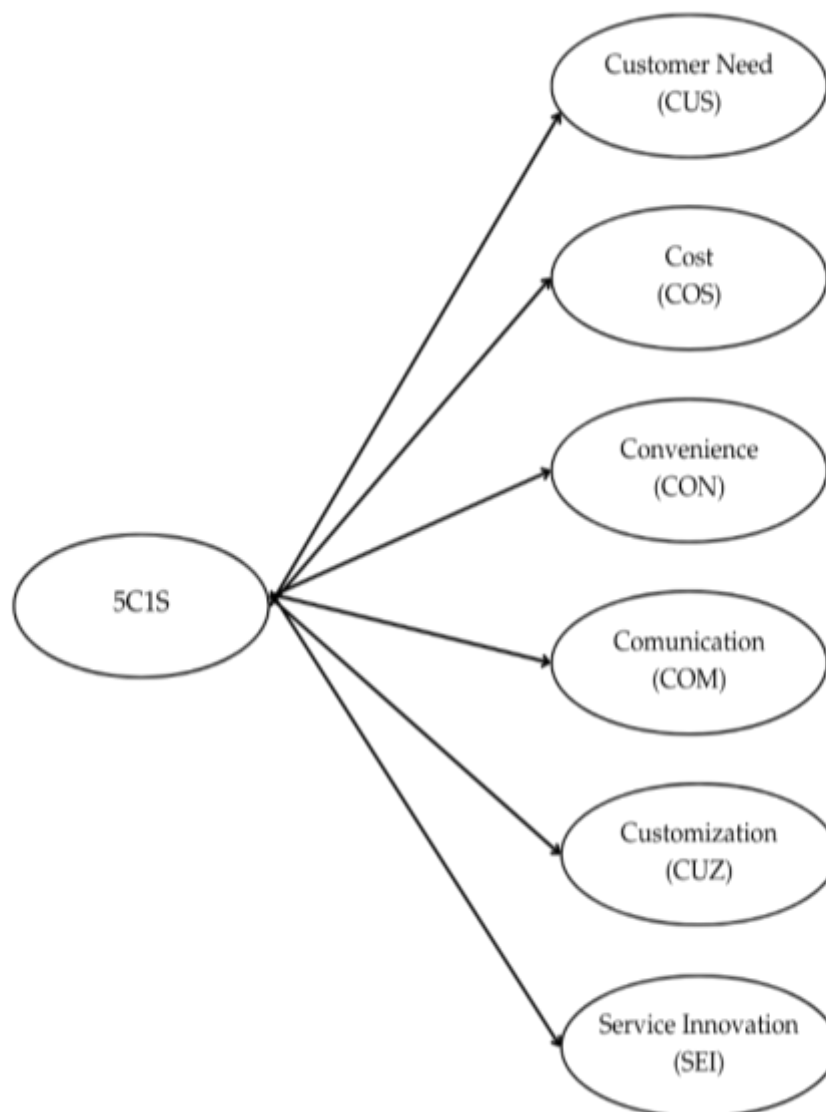


Fig.1: Conceptual Framework

3. Materials and Methods

This study adopts a mixed-method research design, integrating both qualitative and quantitative approaches to develop and empirically validate a new customer-centric marketing framework. The main objective is to construct and test the 5C1S New Social Media Marketing Mix model, which seeks to demonstrate how digital and SM marketing capabilities can enhance consumer engagement within Thailand's real estate sector. The research is structured into two sequential phases. The first phase is qualitative, in which the Fuzzy Set e-Delphi method is applied to identify, refine, and validate the core dimensions of the proposed model through expert consensus. The second phase is quantitative, where Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are employed to assess the reliability and validity of the model, ensuring its empirical robustness. The following sections outline the procedures used for both qualitative and quantitative data analysis.

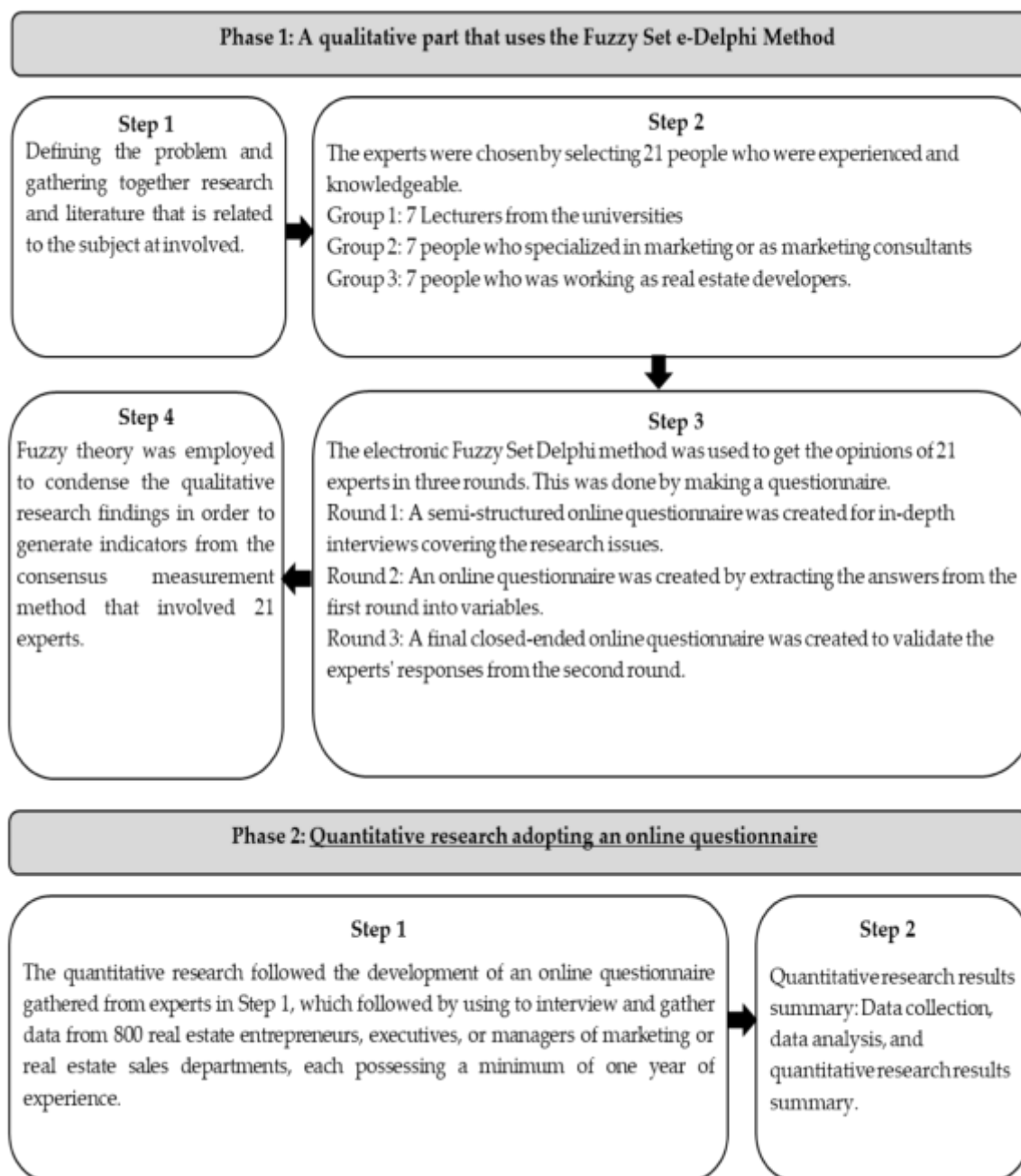


Fig.2: Research Process

Figure 2 illustrates the full research design adopted in this study, which is organised into two principal phases. In Phase 1, the Fuzzy Set e-Delphi method is employed to identify, evaluate, and validate the indicators of the 5C1S framework through expert consensus. Phase 2 involves quantitative analysis, where EFA and CFA are conducted to empirically verify the structural validity and reliability of the 5C1S Marketing Mix Strategy Model.

3.1 A Qualitative Part that Uses the Fuzzy Set e-Delphi Method

The first phase of this study employed a qualitative approach using the Fuzzy Set e-Delphi method, with the objective of collecting expert judgments and identifying a validated set of indicators for the 5C1S Digital Marketing Mix Strategy model. This phase aimed to establish a satisfactory level of consensus among experts prior to proceeding to the quantitative stage of analysis. A total of 21

experts were selected through purposive sampling based on their professional expertise and experience in real estate, marketing, and academia. This sample size aligns with Delphi methodology guidelines, which recommend a minimum of 17 experts to ensure the reliability and credibility of findings.

Data collection was conducted over three Delphi rounds. In Round 1, partially structured online questionnaires were used to conduct in-depth interviews, enabling the identification of the most relevant components of the variables. In Round 2, the responses obtained from the first round were analysed and synthesised into a refined set of indicators. In Round 3, a structured closed-ended questionnaire was administered to achieve consensus among experts. At this stage, participants evaluated the importance of each indicator using a seven-point Likert scale. These responses were subsequently transformed into Triangular Fuzzy Numbers (TFNs) to capture the uncertainty and variability inherent in expert judgement. The TFNs consist of L (Lower value), M (Middle value), and U (Upper value), representing the corresponding levels of agreement on the Likert scale. Figure 3 illustrates the transformation process of the seven-point Likert scale ratings into triangular fuzzy values (L, M, U). In addition, Table 1 presents the TFNs assigned to each linguistic term of the Likert scale, specifying the exact L, M, and U values used as the foundation for subsequent fuzzy computations [20]. After converting all expert responses into TFNs, the next step involves calculating the average fuzzy value across all Delphi rounds, followed by a defuzzification process to obtain a single crisp value that represents the overall consensus level for each indicator. The mathematical expressions used in these computations are presented below.

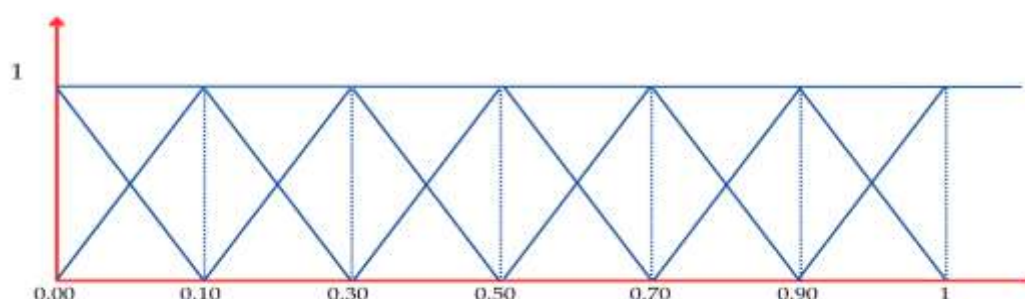


Fig.3: Triangular Fuzzy Values for the Seven-Point Likert Scale

Table 1

Triangular fuzzy numbers for the seven-point Likert scale (L,M,U)

Extremely Unimportant	Very Unimportant	Unimportant	Moderately Important	Important	Very Important	Extremely Important
EUI (0,0,0.1)	VUI (0,0.15,0.3)	UI (0.1,0.3,0.5)	MI (0.3,0.5,0.7)	M (0.5,0.7,0.9)	VI (0.7,0.9,1.0)	EI (0.9,1.0,1.0)

Once the fuzzy values from all experts have been obtained, they are aggregated to determine the overall fuzzy consensus, referred to as the Fuzzy Average. This is computed using the arithmetic mean formula applied to the triangular fuzzy numbers provided by all respondents.

$$L_{avg} = \frac{L_{round1} + L_{round2}}{2}$$

$$M_{avg} = \frac{M_{round1} + M_{round2}}{2}$$

$$U_{avg} = \frac{U_{round1} + U_{round2}}{2}$$

The aggregated fuzzy values were subsequently transformed into crisp values through a

defuzzification process. This step converts the averaged triangular fuzzy numbers into single representative values to facilitate clearer interpretation and to serve as the basis for evaluating the level of expert consensus. The defuzzied values were calculated using the Crisp Value formula.

$$Crisp = \frac{L_{avg} + M_{avg} + U_{avg}}{3}$$

The crisp value reflects the degree of importance assigned to each indicator based on aggregated expert consensus. In this study, a threshold of $Crisp \geq 0.70$ is adopted as the acceptance criterion for retaining indicators within the model. Indicators with crisp values below this threshold are considered to have insufficient expert agreement and are therefore excluded from further analysis and model development.

3.2 Instrument Development and Validation

Following the completion of Phase 1, where variables and indicators were derived through the Fuzzy Set e-Delphi process, the validated set of criteria was used to construct a structured quantitative questionnaire aimed at testing the structural validity of the 5C1S Digital Marketing Mix Strategy model. The questionnaire was carefully designed and comprised three main sections: screening questions, demographic information, and 70 indicator items representing six latent constructs, namely Customer Need, Cost, Convenience, Communication, Customisation, and Service Innovation.

A seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree), was employed to capture respondents' perceptions and attitudes towards SM marketing strategies within the real estate sector. Prior to full-scale data collection, a pilot study was conducted with 30 participants who shared similar characteristics with the target population. This step was undertaken to assess question clarity, internal consistency, and overall instrument reliability. The results demonstrated strong internal reliability, with Cronbach's Alpha values ranging from 0.83 to 0.91, exceeding the recommended threshold of 0.70 and indicating a high level of measurement consistency. Furthermore, content validity was reviewed and confirmed by the expert panel from Phase 1, ensuring that all questionnaire items were conceptually aligned with the 5C1S framework. Following this validation process, the finalized questionnaire was deployed in the quantitative phase to examine the structural relationships among variables and to empirically test the proposed model in Phase 2.

3.3 A Quantitative Research

In Phase 2, the quantitative component of the study employed an online questionnaire as the primary data collection instrument. The target population comprised real estate developers, project managers, and marketing or sales supervisors with a minimum of one year of professional experience and active involvement in SM-based real estate marketing activities. Given that the exact population size could not be precisely determined, a simple random sampling technique was applied. A total of 766 valid responses were collected, satisfying the recommended sampling guideline of at least 10–20 times the number of observed variables [25]. The final sample demonstrated diversity across key demographic characteristics, including gender, age, occupational role, level of experience, and geographical location. This heterogeneity enhances the representativeness of the dataset in relation to Thailand's real estate sector. Moreover, because respondents were directly engaged in real estate marketing and project management decision-making, the demographic composition strengthens the robustness and reliability of the subsequent analysis of the 5C1S model.

3.4 Population and Sampling

The study sample comprised 766 respondents, including entrepreneurs, executives, marketers,

and sales personnel operating within Thailand's real estate industry. All participants had a minimum of one year of professional experience in the field. In terms of gender distribution, 50.5% were female, 40.7% were male, and 8.7% identified as other genders, indicating a relatively balanced gender representation and highlighting the significant role of women in marketing and sales functions within Thailand's contemporary real estate sector. Regarding age distribution, the largest proportion of respondents (50.1%) were between 31 and 40 years old, representing a key working-age group actively involved in business decision-making. This was followed by individuals aged 41–50 (28.1%), 51–60 (11.9%), below 30 (9.1%), and above 60 (0.8%). These findings indicate that the sample is predominantly composed of mid-career professionals with substantial experience and strategic influence in marketing and managerial roles.

In relation to occupational roles, 37.3% of respondents were real estate project owners or business partners, 25.2% were project executives, 19.1% were marketing staff, and 18.4% were sales personnel. This distribution confirms that the majority of respondents are directly involved in project management and marketing decision-making processes, aligning with the objectives of the study. With respect to work experience, 31.1% of participants had 1–3 years of experience, 26.2% had 4–6 years, 15.0% had 7–9 years, and 27.7% had more than 10 years of professional experience. This indicates a diverse range of experience levels within the real estate sector. Geographically, respondents were distributed across Thailand, with 34.7% based in Bangkok and the metropolitan region, 16.7% in the Central region, 18.1% in the Southern region, 11.4% in the Northern region, 10.8% in the Eastern region, and 8.2% in the North-eastern region. This distribution ensures broad national coverage of the real estate market. Overall, the sample reflects diversity in gender, age, occupation, experience, and geographic location, thereby enhancing the reliability and representativeness of the data used to evaluate the 5C1S Digital Marketing Mix Strategy model within Thailand's real estate industry.

4. Data Analysis

The collected data were analysed using both descriptive and inferential statistical techniques. Descriptive statistics, including mean, standard deviation, and percentage, were applied to summarise respondent characteristics and overall data distribution. Inferential statistical analysis was then conducted to validate the structural integrity of the 5C1S model through EFA and Confirmatory Factor Analysis (CFA). All analyses were performed using statistical software, and the results are reported in Chapter 4. The initial stage of analysis involved EFA, which was used to examine the underlying factor structure of the observed indicators and to reduce the number of variables for improved interpretability and construct clarity. Subsequently, CFA was employed to assess the validity of the measurement model at both first-order and second-order levels. The evaluation criteria included factor loadings, composite reliability ($CR > 0.70$), and average variance extracted ($AVE > 0.50$), in accordance with established methodological standards [25]. In addition, model fit was assessed using multiple goodness-of-fit indices, including Chi-square/df, Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR). These indices were evaluated based on internationally accepted thresholds to ensure that the proposed model demonstrated both statistical adequacy and theoretical consistency [33]. The full results of these analyses are presented in Chapter 4.

5. Results

This section presents the findings from both qualitative and quantitative analyses conducted across the two phases of the study, aimed at examining the suitability and validity of the 5C1S Digital Marketing Mix Strategy model within the context of SM-based real estate businesses. The chapter

begins with the qualitative results derived from the Fuzzy Set e-Delphi technique, which was used to identify, refine, and validate the importance of six key indicator dimensions: Customer Need (CUS), Cost (COS), Convenience (CON), Communication (COM), Customisation (CUZ), and Service Innovation (SEI). The validated indicators were subsequently subjected to Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to establish construct validity and ensure that the measurement model achieved an acceptable level of fit.

Prior to conducting factor analysis, the dataset was carefully screened to ensure accuracy and completeness. Initially, 929 responses were collected. However, after assessing data normality and applying Mahalanobis Distance analysis, cases exhibiting skewness values beyond ± 1.5 were excluded. This resulted in a final valid sample of 766 observations. The retained dataset met the requirements for Structural Equation Modelling (SEM), as all variables demonstrated acceptable skewness and kurtosis within the ± 1.5 threshold, confirming suitability for multivariate analysis. In addition, the reliability of the measurement instrument was re-evaluated using Cronbach's Alpha on the final dataset. The results indicated reliability coefficients ranging from 0.86 to 0.94, exceeding the recommended threshold of 0.70 [33]. These findings confirm that the measurement instrument exhibits a high level of internal consistency and reliability, making it suitable for subsequent statistical analysis and model validation.

5.1 Fuzzy Set e-Delphi Result

The e-Fuzzy Delphi method constituted the initial phase of the study and was employed to evaluate the proposed indicators of the 5C1S framework through expert consensus. In this stage, a total of 45 indicators across six dimensions—Customer Need, Cost, Convenience, Communication, Customisation, and Service Innovation—were assessed by 21 experts, including academics, marketing practitioners, and real estate developers. The results indicated that the defuzzied (crisp) values of all 70 indicators ranged from 0.857 to 0.967, which is substantially higher than the predefined acceptance threshold of 0.70. Accordingly, all indicators were retained and classified as valid, reflecting a strong level of agreement among the expert panel. No items were eliminated at this stage, confirming that the proposed indicators are appropriate and consistent with the core dimensions of digital marketing strategies in the real estate context. This high level of consensus further supports the conceptual clarity and relevance of the 5C1S framework. Following this validation process, the retained indicators were subjected to quantitative analysis, including EFA and CFA, to examine the underlying factor structure and assess the measurement properties of the proposed model in greater depth.

5.2 Exploratory Factor Analysis (EFA)

EFA was conducted to examine the underlying structure and interrelationships among the 70 observed variables derived from the six latent constructs of the 5C1S model: CUS, COS, CON, COM, CUZ, and SEI. PCA with Varimax rotation was applied to ensure a clear and orthogonal factor structure while reducing cross-loadings among items. However, prior literature indicates that the six constructs of the 5C1S model do not have well-established sub-dimensions, particularly in SM-based real estate contexts. Therefore, EFA was performed separately for each latent construct to empirically identify their internal structure. This approach enabled clearer dimensional specification, model simplification, and the development of a more parsimonious and practically interpretable indicator set. The EFA results confirmed that all six constructs demonstrated satisfactory validity and structural clarity. KMO values for all constructs exceeded 0.80, indicating strong sampling adequacy. In addition, Bartlett's Test of Sphericity was statistically significant across all variable sets ($p = 0.001$), confirming sufficient inter-item correlations for factor extraction. The detailed results are presented in Table 2.

Table 2

KMO and Bartlett's Test Result

Variables	KMO	χ^2	df	Sig. (p)
Customer Need (CUS)	0.838	3352.769	66	<0.001
Cost (COS)	0.871	4076.780	66	<0.001
Convenience (CON)	0.847	4823.388	66	<0.001
Communication (COM)	0.888	6045.358	66	<0.001
Customization (CUZ)	0.884	3484.638	45	<0.001
Service Innovation (SEI)	0.915	5076.672	66	<0.001

The analysis of each construct indicated that the underlying structure remained consistent with the original theoretical framework, with all six constructs preserved. The results further showed that a streamlined process was applied, whereby the three most significant indicators with the highest factor loadings for each component were selected to ensure accurate representation of the construct's conceptual domain. The refined factor structure of the 5C1S model following variable reduction is presented in Table 3 (Rotated Component Matrix Summary), which illustrates the newly extracted components associated with each construct.

Table 3

Rotated Component Matrix Summary

New Item	New Definition	Original Item	Component Loading	Eigenvalue	% of Variance	Cumulative %
Customer Need (CUS)						
CCUS1	Product design quality and innovation	CUS3	0.793	2.774	23.117	23.117
		CUS4	0.782			
		CUS5	0.752			
		CUS6	0.632			
CCUS2	Safety standards & After-sales warranty	CUS7	0.706	2.445	20.378	43.495
		CUS10	0.686			
		CUS11	0.714			
		CUS12	0.696			
CCUS3	Variety and lifestyle amenities	CUS1	0.882	2.121	17.679	61.174
		CUS2	0.617			
		CUS8	0.628			
		CUS9	0.537			
Cost (COS)						
CCOS1	Perceived value and additional fees	COS2	0.700	3.767	31.390	31.390
		COS3	0.804			
		COS4	0.702			
		COS5	0.671			
		COS10	0.576			
		COS11	0.740			
		COS12	0.696			
CCOS2	Affordability and competitive financial terms	COS1	0.724	2.079	17.327	47.717
		COS8	0.664			
		COS9	0.758			

Table 3 (Continued)
Rotated Component Matrix Summary

New Item	New Definition	Original Item	Component Loading	Eigenvalue	% of Variance	Cumulative %
CCOS3	Financing feasibility and price flexibility	COS6	0.758	1.847	15.390	64.108
		COS7	0.674			
Convenience (CON)						
CCON1	Convenient digital sales process	CON1	0.753	3.428	28.564	28.564
		CON2	0.671			
		CON7	0.705			
		CON8	0.820			
		CON9	0.725			
		CON10	0.402			
CCON2	Ease of information and contact access	CON3	0.578	2.439	20.321	48.885
		CON4	0.750			
		CON5	0.857			
		CON6	0.527			
CCON3	Digital support for title transfer and home handover	CON11	0.858	1.962	16.350	65.235
		CON12	0.865			
Communication (COM)						
CCOM1	Quality and engagement of digital content	COM4	0.621	3.294	27.450	27.450
		COM5	0.791			
		COM6	0.849			
		COM7	0.808			
		COM8	0.596			
CCOM2	Multi-platform advertising and online admin	COM1	0.818	2.703	22.523	49.973
		COM2	0.797			
		COM3	0.723			
CCOM3	Real-time engagement and feedback	COM9	0.745	2.547	21.229	71.202
		COM10	0.844			
		COM11	0.657			
		COM12	0.561			
Customization (CUZ)						
CCUZ1	Material selection & modification	CUZ4	0.710	2.851	28.508	28.508
		CUZ5	0.834			
		CUZ6	0.754			
		CUZ7	0.656			
CCUZ2	Co-Design and foundational function choice	CUZ1	0.889	2.542	25.416	53.925
		CUZ2	0.711			
		CUZ3	0.611			
		CUZ8	0.607			
CCUZ3	Customized financial and promotion	CUZ9	0.809	1.501	15.014	68.939
		CUZ10	0.830			
Service Innovation (SEI)						
SSEI1	Continuous service innovation development	SEI1	0.718	3.941	32.840	32.840
		SEI2	0.687			
		SEI3	0.713			
		SEI4	0.756			
		SEI5	0.739			
		SEI6	0.674			
SSEI2	Enhanced digital customer service efficiency	SEI7	0.641	2.214	18.447	51.287
		SEI8	0.841			
		SEI9	0.601			
SSEI3	Technological differences and personnel availability	SEI10	0.864	2.057	17.141	68.428
		SEI11	0.762			
		SEI12	0.551			

The EFA, conducted separately for each construct to allow the underlying structure to emerge empirically, revealed that all six dimensions of the 5C1S model comprise three sub-components each, resulting in a total of 18 components. Accordingly, the original 70 indicators, which loaded onto these factors with varying item distributions (ranging from 2 to 7 items per factor), were consolidated into 18 composite indicators by averaging the items within each sub-component (Figure 4). These composite indicators (e.g., CCUS1, CCOS1) were subsequently used in place of the full item set for further analysis. The extracted factors demonstrated factor loadings ranging from 0.40 to 0.89, with eigenvalues between 1.50 and 3.77, and collectively explained more than 60% of the total variance. This refinement process substantially simplified the measurement structure, reducing the model from 70 individual items to 18 composite indicators. Despite this reduction, the instrument retained strong reliability and structural validity, thereby confirming its suitability for further validation through CFA.

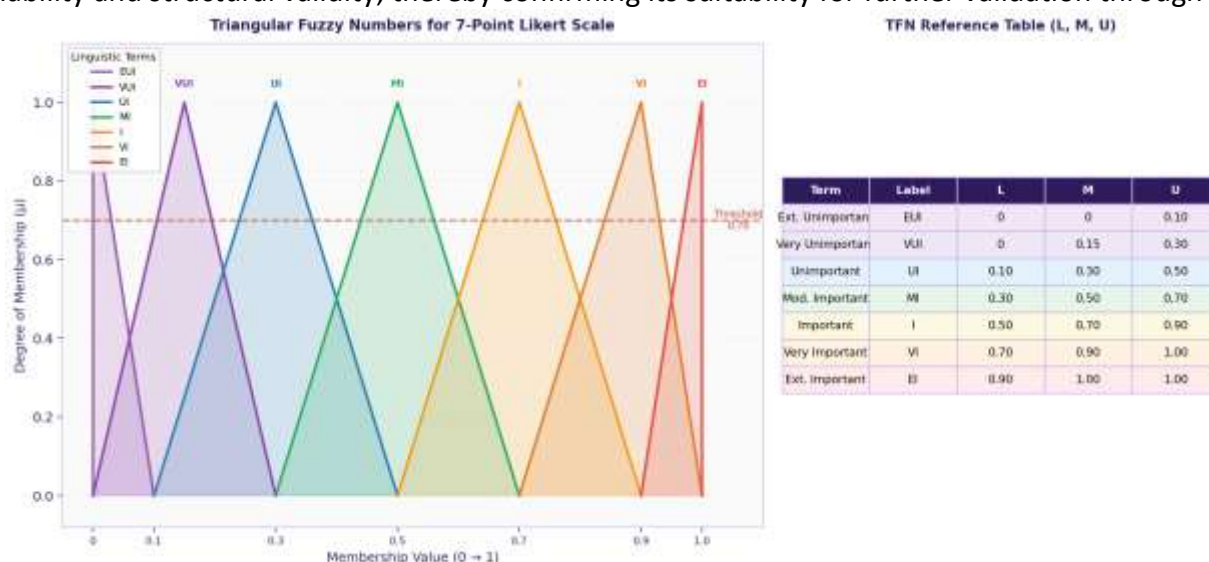


Fig.4: Triangular Fuzzy Numbers for 7-Point Likert Scale

5.3 Descriptive Statistics

The descriptive statistics of the 5C1S measurement model indicate that the mean values ranged from 5.70 to 6.16, reflecting a generally high level of agreement among respondents across all constructs. The standard deviation values ranged from 0.64 to 0.96, indicating an acceptable degree of response variability and dispersion across the measurement items. All constructs demonstrated strong internal consistency, with Cronbach's α values between 0.85 and 0.93. In addition, convergent validity was confirmed, as composite reliability (CR) exceeded 0.70 and average variance extracted (AVE) was above 0.50 for all constructs. These findings collectively confirm the reliability and validity of the measurement model prior to conducting CFA. The detailed results are presented in Table 4.

Table 4
Descriptive Statistics

Variable	Code	M	SD	λ	λ^2	α	CR	AVE
Customer Need (CUS)	CCUS1	6.012	0.692	0.826	0.682	0.853	0.834	0.630
	CCUS2	6.161	0.646	0.876	0.768			
	CCUS3	6.060	0.646	0.662	0.439			
Cost (COS)	CCOS1	6.074	0.661	0.844	0.712	0.884	0.900	0.750
	CCOS2	5.990	0.679	0.902	0.813			
	CCOS3	6.100	0.733	0.852	0.725			

Table 4 (Continued)
Descriptive Statistics

Variable	Code	M	SD	λ	λ^2	α	CR	AVE
Convenience (CON)	CCON1	6.041	0.698	0.828	0.686	0.893	0.858	0.668
	CCON2	6.126	0.732	0.858	0.736			
	CCON3	5.970	0.958	0.763	0.583			
Communication (COM)	CCOM1	6.150	0.736	0.869	0.755	0.925	0.917	0.786
	CCOM2	6.120	0.851	0.888	0.789			
	CCOM3	5.951	0.743	0.903	0.815			
Customization (CUZ)	CCUZ1	5.745	0.728	0.962	0.925	0.879	0.867	0.697
	CCUZ2	5.700	0.723	0.930	0.862			
	CCUZ3	6.119	0.721	0.526	0.277			
Service Innovation (SEI)	SSEI1	5.948	0.695	0.954	0.911	0.918	0.927	0.810
	SSEI2	5.792	0.769	0.904	0.818			
	SSEI3	5.947	0.703	0.838	0.702			

Note: M is mean; SD is Standard deviation; λ is Standardized regression weights; λ^2 is squared multiple correlations; α is Cronbach's alpha; CR is composite reliability; AVE is average variance.

5.4 Second-Order Confirmatory Factor Analysis: 2nd CFA

After confirming the reliability and construct validity of the first-order measurement model, a second-order CFA was conducted to validate the hierarchical structure of the 5C1S framework. The model comprises six first-order latent constructs: CUS, COS, CON, COM, CUZ, and SEI, which collectively represent the core dimensions of the digital marketing mix strategy within Thailand's real estate sector.

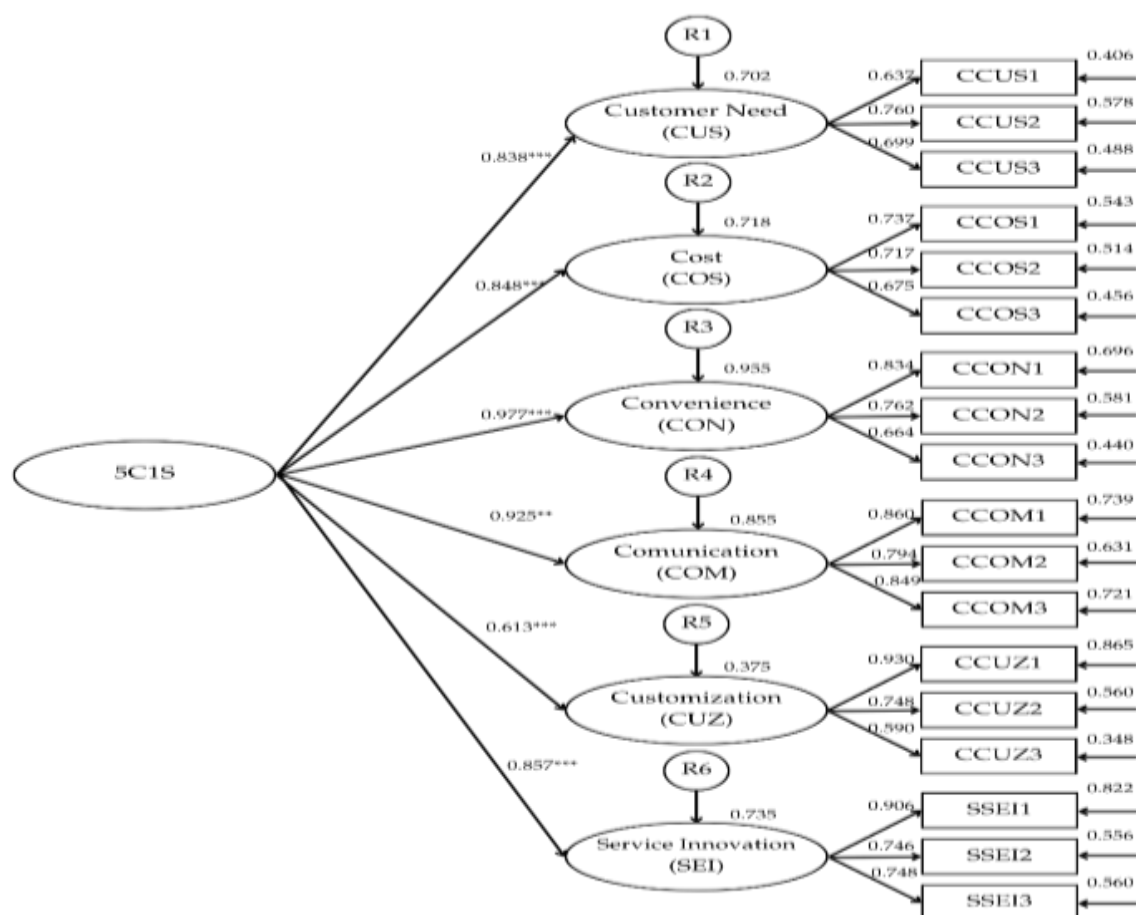


Fig.5: The Second-Order Confirmatory Factor Analysis Model

These constructs are further reflected under a higher-order latent construct, namely the 5C1S Digital Marketing Mix Strategy (Figure 5). The results indicate that the model demonstrates an excellent overall fit with the empirical data. All goodness-of-fit indices met the recommended thresholds, with $\chi^2/df = 4.087$, GFI = 0.946, AGFI = 0.903, CFI = 0.964, TLI = 0.943, RMSEA = 0.064, and RMR = 0.025. These values confirm that the model fits the observed data adequately and satisfies established criteria for structural validity.

Table 5

Fit Indices for 2nd-Order CFA

Fit Indices	χ^2/df	GFI	AGFI	CFI	TLI	RMSEA	RMR
Recommended Criteria	<5	≥0.90	≥0.90	≥0.90	≥0.90	<0.08	<0.05
Actual Value	4.087	0.946	0.903	0.964	0.943	0.064	0.025

Overall, the findings confirm that the 5C1S model provides a robust and theoretically coherent representation of the underlying construct relationships. The detailed results are presented in Table 5 and Figure 6.

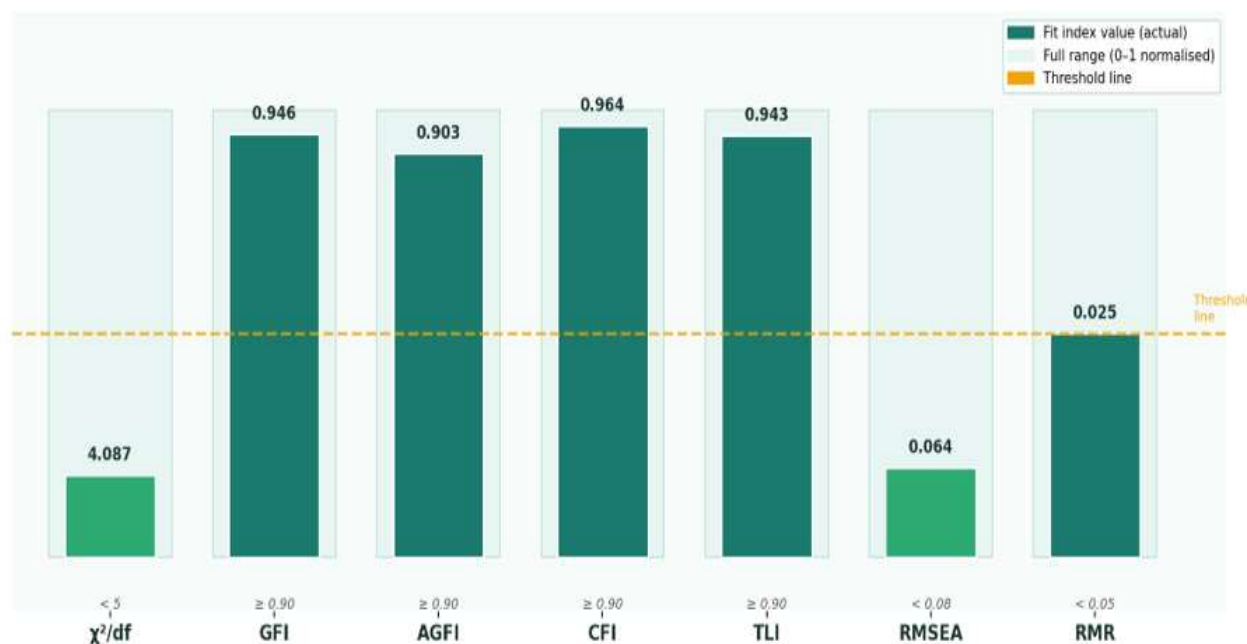


Fig.6: Model Fit Indices – 2nd – Order CFA

The standardized regression weights for the first-order constructs ranged from 0.563 to 0.990 and were all statistically significant at $p < 0.001$. These findings indicate that all six constructs exhibit strong loadings on the higher-order factor, thereby confirming their substantial contribution to the overall 5C1S model. The detailed results are presented in Table 6.

Table 6

Standardized Regression Weights of the Second-Order CFA Model

2 nd Construct à 1 st Construct	Standardized Estimate	R ²	P-Value	Result
5C1S à Customer Need (CUS)	0.838***	0.702	<0.001	Supported
5C1S à Cost (COS)	0.848***	0.718	<0.001	Supported
5C1S à Convenience (CON)	0.977***	0.955	<0.01	Supported
5C1S à Communication (COM)	0.925**	0.855	<0.001	Supported
5C1S à Customization (CUZ)	0.613***	0.375	<0.001	Supported
5C1S à Service Innovation (SEI)	0.857***	0.735	<0.001	Supported

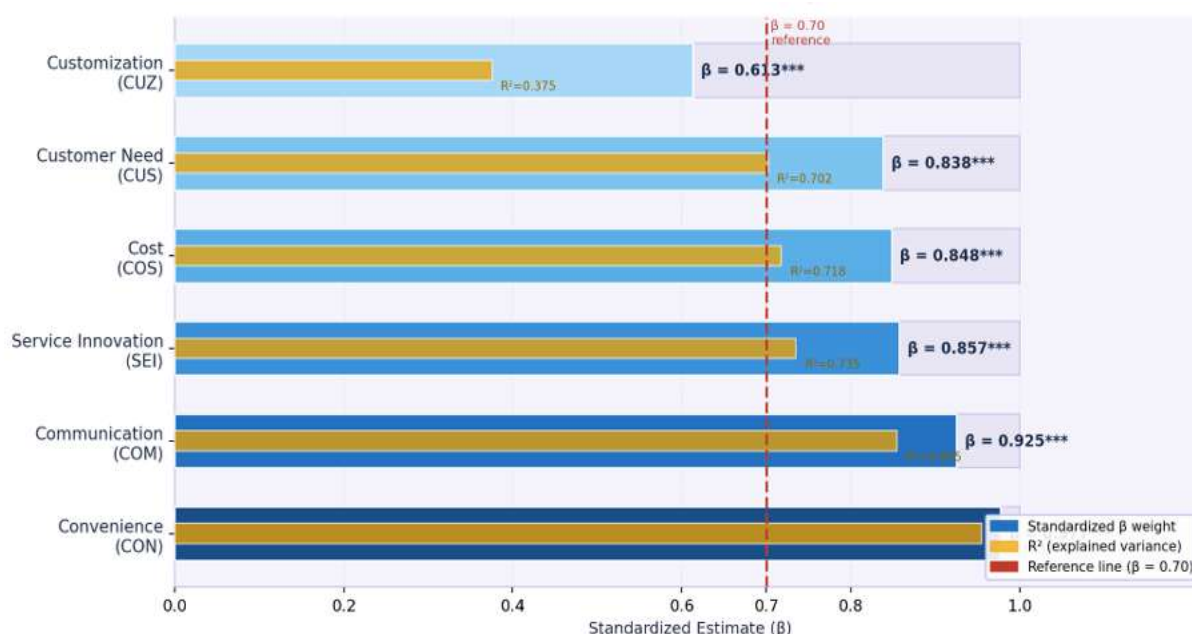


Fig.7: Standardized Regression Weights – Second-Order CFA Model

Noted: ** p-value < 0.01, *** p-value < 0.001

The results of the second-order CFA for the 5C1S model show standardized regression weights ranging from 0.613 to 0.977, all statistically significant at $p < 0.001$. The coefficient of determination (R^2) values for the first-order constructs ranged from 0.375 to 0.955, indicating that the constructs adequately explained the higher-order model. Among these, CON ($R^2 = 0.955$), COM ($R^2 = 0.855$), and SEI ($R^2 = 0.735$) demonstrated the strongest explanatory power, whereas CUZ ($R^2 = 0.375$) showed a comparatively lower value but remained statistically significant (Figure 7). Overall, the findings confirm that the 5C1S model, as validated through second-order CFA, demonstrates a well-fitting structural configuration supported by empirical data, thereby indicating strong structural validity of the measurement model.

6. Discussion

The study findings confirm that the 5C1S model is suitable for explaining SM marketing strategies within the real estate industry. High factor loadings across most variables indicate strong alignment with contemporary marketing behaviour in an environment where online and offline interactions are increasingly integrated. The results show a strong influence of CON (0.977) and COM (0.925), followed by SEI (0.857), COS (0.848), CUS (0.838), and CUZ (0.613). These outcomes reflect a key trend in the current real estate market, driven by Customer-Centric Integration, where the primary focus is on delivering seamless cross-channel experiences rather than competing solely on price. The dominance of CON and COM is consistent with the findings of Arbabi et al. [1], who emphasised that ease of access to information and effective digital communication are critical drivers of purchase decisions in SM environments.

Meanwhile, COS and CUS further support the concept of perceived value formation, which is shaped by the relationship between customer benefits and the costs incurred [3; 16]. Overall, the results indicate that Thai real estate developers in the SM marketing era are transitioning from product-centred selling towards experience-based value delivery, where technology, communication, and service-oriented strategies play a central role. This shift aligns with the principle of Value Co-Creation, which emphasises active customer involvement in decision-making processes and shared value creation between firms and consumers.

6.1 Theoretical Interpretation

This study extends the traditional 4Cs Marketing Mix by adapting it to a digital marketing context. It introduces two additional components—Customization and Service Innovation—forming an integrated 5C1S model that aligns with current real estate industry trends, where digital technology adoption is balanced with human-centred experience. The findings reflect the expectations of contemporary consumers who prioritise simplified processes across all stages of decision-making, particularly in information search and purchase evaluation. This aligns with the principles of Omnichannel Marketing, which emphasises a seamless and integrated customer experience across multiple platforms. Digital functionalities such as online home reservations, project visit scheduling, and mortgage pre-assessment significantly reduce both time and financial costs while simultaneously enhancing customer satisfaction.

Bidirectional communication plays a crucial role in shaping customer behaviour. This is consistent with prior research suggesting that trust and purchase intention increase when firms actively engage consumers through interactive and authentic content. In the real estate sector, platforms such as Facebook, TikTok, and LINE OA are no longer used solely for information dissemination but also function as interactive engagement channels between brands and customers. Service Innovation further enhances customer experience through the integration of technologies such as virtual tours, chatbots, and CRM systems, enabling faster response times and more relevant service delivery. Within this model, Cost is reinterpreted as Customer Cost, which includes financial, time, and effort-related burdens associated with purchasing decisions. These can be reduced through digital services such as transparent loan information systems and price comparison tools, thereby strengthening perceptions of fairness and value.

At the core of modern marketing, customer need remains, where product development and communication strategies are shaped by a deep understanding of consumer requirements such as safety, location, accessibility, and lifestyle-oriented features. Although Customisation demonstrates the lowest loading (0.613), it reflects a structural constraint within the real estate sector rather than strategic irrelevance. This finding is consistent with prior studies indicating that individual-level Customisation depends on organisational readiness, production capacity, and technological infrastructure. Further research suggests that Customisation often begins with content personalisation and targeted digital offerings as an initial strategic adaptation in emerging markets. Despite its lower loading, CUZ remains statistically significant ($p = 0.001$), confirming its relevance within the 5C1S framework. From a value co-creation perspective, CUZ reflects customer willingness to participate in shaping personalised real estate offerings, particularly through SM platforms. Although full physical product customisation in housing is limited in practice, it remains a key driver of customer-centric digital engagement. Overall, the 5C1S model can be viewed as an evolutionary extension of the 4Cs framework, offering a more comprehensive explanation of SM marketing behaviour in the real estate sector, particularly in emerging markets such as Thailand, where technological advancement and consumer behaviour continue to evolve simultaneously.

6.2 Implications for Practice

In terms of strategic implications, this study provides clear guidance for real estate developers in Thailand in designing a hybrid marketing approach that effectively integrates online and offline operations. Developers are encouraged to prioritise the development of highly convenient customer journeys in which key activities—such as property searching, enquiries, booking, payment processing, and loan applications—can be completed within a single integrated platform. Examples include property reservations via LINE OA or immersive virtual property tours. In addition, firms should strengthen a bidirectional communication strategy by incorporating SM content such as verified user

reviews, video walkthroughs, and live Q&A sessions. These mechanisms enhance trust formation and support long-term customer relationship development. Real estate organisations are also expected to invest in Service Innovation to enhance service quality and responsiveness. This includes the use of chatbots for real-time enquiry handling, CRM systems for customer tracking and management, and real-time information updates that improve transparency and customer confidence in decision-making.

From a cost perspective, the concept of Customer Cost is increasingly associated with value efficiency, emphasising solutions that are “cost-effective and easier” for consumers [3; 16]. This includes simplifying financial decision-making processes through transparent pricing tools and reducing perceived transaction burdens. Furthermore, Customisation should be implemented in a controlled and standardised manner, allowing customers to personalise selected aspects such as materials or minor design features while maintaining overall construction efficiency and operational feasibility. Overall, the findings confirm that COM, CON, COS, and CUS represent the core driving dimensions of SM marketing strategies in the digital real estate context, while SEI and CUZ function as key differentiating factors for future competitiveness. When effectively integrated, the 5C1S model enables Thai real estate firms to develop a fully coordinated marketing system that bridges digital engagement with physical sales processes, ultimately supporting transformation into customer-centric digital organizations.

7. Conclusion

This study develops the 5C1S SM marketing mix framework to explain and enhance SM marketing strategies in Thailand’s real estate sector. Quantitative results from real estate entrepreneurs confirm that the model is both theoretically robust and statistically valid, effectively capturing marketing behavior in the digital era across integrated offline–online environments. The findings indicate that CON, COM, SEI, COS, CUS, and CUZ are the key influencing factors in descending order of impact. This highlights seamless convenience, effective SM communication, service innovation, fair customer cost perception, strong understanding of customer needs, and structured customization collectively drive marketing success in the digital age. Although CUZ demonstrates relatively lower influence (0.613), its statistical significance ($p < 0.001$) confirms its relevance within the model. This suggests that, while customisation is still developing in Thailand’s real estate context, it remains important for strengthening long-term relationships and supporting Value Co-Creation. In contrast, SEI plays a critical role in generating new customer value through technological integration and continuous service improvement. Theoretically, this study extends the 4Cs framework by incorporating CUZ and SEI, producing a more comprehensive digital marketing model suited to the convergence of online and offline marketing environments. The results demonstrate that the 5C1S model effectively explains entrepreneurial marketing behaviour in the real estate sector and provides a foundation for future model development across other industries. Practically, the study offers clear strategic implications for Thai real estate firms. These include leveraging SM to build authentic, trust-based relationships; creating seamless omnichannel customer experiences; implementing controlled and standardised customisation (e.g., material or design options within fixed frameworks); and investing in service innovation through digital tools and technologies to enhance responsiveness and customer satisfaction in a sustainable manner.

8. Limitations and Future Research

Although this study proposes a significant 5C1S framework, several limitations should be acknowledged for future research development. First, the sample is predominantly composed of real estate entrepreneurs in Thailand, which may limit the generalisability of the findings to international

contexts with different technological maturity levels and consumer behavioural patterns. Future studies are recommended to extend the analysis to multiple countries to enable comparative evaluation between emerging and developed markets. Second, the measurement of CUZ may not fully capture customer engagement behaviours facilitated by advanced digital tools, such as online property design platforms or smart configurator systems. Future research should therefore incorporate more explicit behavioural indicators that reflect the use of such technologies in SM environments. Third, the present study does not extensively examine macro-level influences such as economic conditions and government policy frameworks. Future research should integrate these variables and test the 5C1S model across additional service sectors, including hospitality and commercial real estate, while also applying advanced analytical techniques such as Multi-Group Analysis to assess model generalisability. Overall, this research contributes a relevant SM marketing framework for the modern real estate industry by linking digital marketing concepts with practical business applications. It assists practitioners in developing customer-oriented strategies that integrate CUS, CON, COS, and COM while leveraging SEI and CUZ to enhance differentiation and long-term sustainability.

Author Contributions

Conceptualization, D.P., S.P. and S.L.; methodology, D.P., S.P. and S.L.; software, D.P., S.P. and S.L.; validation, D.P., S.P. and S.L.; formal analysis, D.P., S.P. and S.L.; investigation, D.P., S.P. and S.L.; resources, D.P., S.P. and S.L.; data curation, D.P., S.P. and S.L.; writing—original draft preparation, D.P., S.P. and S.L.; writing—review and editing, D.P., S.P. and S.L.; visualization, D.P., S.P. and S.L.; supervision, D.P., S.P. and S.L.; project administration, D.P., S.P. and S.L. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (or Ethics Committee) of Rangsit University (Certification Number: COA.No. RSUERB2025-115).

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

All essential research contributions of this study are comprehensively detailed within the main manuscript. Additional information or clarification is available upon request from the corresponding author(s).

Conflicts of Interest

The authors declare no conflicts of interest.

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