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Original Research Paper

Quantitative Analysis of Context-Based Mobile Marketing in Saudi Arabia

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Abstract: Saudi Arabia is witnessing a phase wherein cultural adaptability is evolving, and more flexibility is being identified due to economic diversification and other factors. With the advancement of technology, e-commerce and other digital initiatives are on the rise, which have created ample opportunities for mobile-based marketing strategies. Different researchers have indicated that due to the high penetration rates of smartphones and other tech-savvy gadgets, most people are browsing advertisements and videos on these gadgets. Additionally, the expansion of 5G connectivity has led to a huge surge in data traffic. These factors indicate that the *Mobile-first* generation of today's Saudi Arabia is very much receptive to context-based mobile marketing. This research paper endeavours to investigate the effectiveness of Context-based Mobile Marketing (CBMM) through quantitative analysis. Factors like Demographics, Customers' preferences, Use of artificial intelligence (AI), Product quality, etc. are key determinants for quantitative analysis, and this paper strives to examine the impact of context-based mobile marketing under the influence of such factors. In order to conduct different analyses, a representative sample of mobile users was targeted with survey questions revolving around CBMM trends in Saudi Arabia's retail industry. Thereafter, the obtained results were subjected to different statistical tests that aimed to identify the significant relationships between contextual factors and key performance indicators (KPIs) of CBMM campaigns. This helped establish the utility of CBMM towards appealing to and retaining customers, differentiating from market competitors, enhancing brand visibility, adapting to emerging customer trends, etc., in the retail industry of Saudi Arabia.

Key Words: Mobile marketing, Context-based marketing, Saudi Arabia, Quantitative analysis.

Introduction

We are living in a time when there is an increasing requirement for context-based marketing. It is obvious that building and maintaining customer relationships, driving sales, and staying competitive in the age of increasingly dynamic and data-driven marketing are essential attributes for modern-day business. Context-based marketing provides a higher return on investment, enhances brand loyalty, and enables real-time adaptability and overall competitive advantage; thus, it is very crucial for today's digital landscape.

As regards quantitative analysis, it is a common understanding that a comprehensive marketing research strategy usually blends the quantitative and qualitative methods to perceive a generalised idea about consumer behaviour and market forces. But, at the same time, it is quite noteworthy to

College of Business, Arts and Social Sciences Brunel University, London, UK ¹Corresponding Author's Email: 2151182@brunel.ac.uk College of Business, Arts and Social Sciences Brunel University, London, UK La Trobe University, Australia mention that quantitative studies help the researchers acquire exact and unbiased information by employing different statistical methods to study market share, sales amount, consumer demographics and other statistical metrics and, thus, offer better insight into the marketplace [1][2][3][5]. Further, quantitative studies usually involve large sample sizes, which enables them to provide better outcomes even for a bigger population [3][5]. These studies are also helpful in evaluating the efficacy of various marketing stratagems, pricing models or product features [3, 4]. Also, due to its inherent nature, quantitative studies are widely employed by firms to obtain predictive competence and make strategic marketing decisions [2][5]. Quantitative data can highlight trends and patterns that are imperative for performance measurement and, in turn, can help comprehend how different variables interact and impact the outcome [3][6]. Thus, it is safe to arrive that quantitative research has a significant role to play in apprising decision makers as it leverages them to authenticate hypotheses, experiment assumptions and make strategic decisions considering the available evidence [4][6][8]. Thus, it becomes obvious that in the set-up of the Saudi Arabian business environment, the quantitative data

analysis is poised to play a significant role in CBMM while encompassing factors like consumer behaviour, marketing strategy, competitive advantage, etc.

In order to start with quantitative analysis in the ensuing context, the necessity for examination of data arises for the purposes of authentication, statistical credibility and validation. Thereafter, the cause-and-effect association between the research factors are measured by applying inferential analysis, which is carried out by applying factor analysis to load all the associated and correlated business marketing elements to evaluate the hypothesis about the factors' loading on their parent factors. It is also imperative to critically design the questionnaire, which, in turn, will help ascertain the rationality, credibility, and applicability of the collected data. A well-structured questionnaire helps in the collection of quality data, lessens the probability of the participants offering inaccurate or confusing information and also for the purpose of data validation, i.e. the degree to which the data measures its aims to be evaluated [8][9][10]. Thus, a carefully designed questionnaire enhances the possibility that the data gathered correctly reflects the variables of interest [10][11]. A well-structured questionnaire also plays an important role in measuring the consistency of the outcome, i.e. Data Reliability, ascertaining that the questions are relevant to the research objectives, boosting the quality of responses, minimising response bias, providing data standardisation and improving the overall efficiency of collection data [9][12][13][14].

Quantitative analysis for CBMM can comprise of the following steps:

- 1. Defining Research Objectives: The objectives of the quantitative analysis should be clearly defined, as well as the specific aspects, viz. Consumer preferences, the effectiveness of marketing strategies, market trends, etc., should be ascertained.
- 2. Identifying Key Metrics: The key performance indicators (KPIs) should be determined, which include metrics such as conversion rates, clickthrough rates, app downloads, user engagement, sales revenue, etc.
- 3. Collection of Data: Quantitative data related to CBMM can be gathered from various sources, including:

- Mobile analytics platforms
- Social media
- Customer surveys
- Market research reports
- 4. Cleaning and Preparation of Data: This ensures the quality of collected data and its suitability for analysis. This may involve removing duplicates, handling missing values, standardising data formats, transforming variables as needed, etc.
- Choosing Analysis Techniques: The selection of appropriate quantitative analysis techniques is made based on research objectives and the nature of the. Common techniques for analysing mobile marketing data are:
- Descriptive statistics: Data characteristics are summarised and tested using measures like mean, median, standard deviation and frequency distributions.
- Inferential statistics: Hypotheses are tested and inferences are made about population parameters using techniques such as t-tests, chi-square tests, regression analysis or ANOVA.
- Time-series analysis: It analyses temporal patterns over time to identify trends, seasonality or patterns of user behaviour.
- Predictive modelling: It is used to forecast future trends in mobile marketing performance or to identify factors that influence consumer behaviour.
- Segmentation analysis: It is used to segment the target audience based on demographic, geographic or behavioural characteristics to tailor marketing strategies and messages more effectively.
- 6. Performing Analysis: Data is analysed using statistical software such as R, Python or other specialised analytics platforms.

Once the outcome of the analysis is obtained, then the results are interpreted in the context of the research objectives and validated by comparing the findings benchmarks. Sensitivity analyses are handy in this context, and Iterations should also be performed in view of feedback and new insights. Then, the findings are effectively communicated in the form of reports, presentations, dashboards, etc. The insights gained from quantitative analyses should be used to optimise business strategies, allocate resources and enhance the effectiveness of campaigns.

Against this backdrop, this research paper proposes to investigate into the effectiveness of Contextbased Mobile Marketing (CBMM) through quantitative analysis. In all, there are six chapters in this piece of writing. The next chapter discusses Literature review which is followed by Research Methodology. Later, Findings and Results are discussed followed by Discussion and Conclusion.

Literature Review

Mobile marketing leverages to reach consumers in various contexts. The smartphone penetration in Saudi Arabia has reached 89% in 2023, as per a DataReportal report

(https://datareportal.com/reports/digital-2023saudi-arabia) [15]. Further, a study by Euromonitor suggests that social media and messaging apps are the most popular mobile applications, indicating a strong preference for mobile communication and engagement. Understanding these usage patterns is essential for tailoring context-based marketing strategies (https://www.euromonitor.com/) [16]. Further, it is imperative that a quantitative approach is required to gauge the effectiveness of locationbased advertising, which highlights the need for context in CBMM campaigns. Contextually relevant ads tailored to cultural norms and local preferences are found to be more effective in driving engagement and purchase intent. In order to ascertain the effectiveness of CBMM campaigns and optimise marketing strategies, regression analysis can be employed, which has been found to reflect relevance, interactivity and trust in the brand are key predictors of customer engagement. Though CBMM is promising for Saudi Arabia, challenges like privacy concerns, cultural sensitivities, technological limitations, etc., exist. Privacy perceptions and attitudes towards mobile advertising among Saudi consumers are some serious concerns, which can underscore the importance of transparent data practices and privacy controls to mitigate privacy-related concerns and enhance consumer trust in mobile marketing initiatives.

As the study at hand analyses and discusses CBMM trends in the retail industry in Saudi Arabia, the following research questions and hypotheses were outlined and mapped:-

Research Questions	Research Hypotheses		
RQ1. Does customer preference depend on the relevancy of advertisement and user search history while buying products through mobile?	H1. What motivates the users to participate in CBMM, and what is the consumers' attitude towards CBMM when buying a product?		
RQ2. What are the key factors of social marketing that affect CBMM in Saudi Arabia?	H2. Positive relationship between key factors of social media and CBMM.		
RQ3. Does AI influence marketing trends in Saudi Arabia's retail industry?	H3. Impact of information technology on marketing trends.		
RQ4. How can CBMM help to improve social marketing in Saudi Arabia and what is the impact of Govt. policies on mobile marketing in the country?	H4. The positive impact of the government's social commerce policy on CBMM in Saudi Arabia.		
RQ5. Does product quality impact the product cost, and how effective is location-based product promotion in the country?	H5. Positive impact of product quality on costs. H6. Location based promotion is more effective than promotion in whole country.		
RQ6. How can CBMM impact the general factors of marketing in Saudi Arabia?	H7. A positive relationship between CBMM and general marketing factors.		

Table 1: Research Questions and Re	esearch Hypotheses
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Further, for the purpose of the proposed study, 16 different marketing factors were extracted in

relation to CBMM, and those were grouped with these RQs and hypotheses as depicted below:-



Fig 1: Mapping of 16 different marketing factors extracted for the purpose of CBMM

Phase-wise treatments for all these factors were employed under the aegis of CBMM, which underscores that marketing will focus on all the crucial aspects reflected in the study.

Methodology

The importance of designing a well-structured questionnaire has already been discussed at length. In order to adapt quantitative analyses for CBMM, the following steps related to the questionnaire were adhered to:

Step 1. Use of quantitative techniques to gather data	Step 2. Identifying responses of the research
and ranking of factors.	participants.
Step 3. Data collection to derive opinions and	Step 4. The phrasing of questions and structuring to
information related to research questions.	avoid vagueness.
Step 5. Outlining and logical alignment of questions.	Step 6. Pilot testing via SurveyMonkey and
	circulated among 50 participants.
Step 7. Finalisation of research questionnaire as	Step 8. Circulation of research questionnaire through
evidenced by results of pilot testing.	SurveyMonkey and social media.

Table 2: Steps undertaken to conduct quantitative analyses for CBMM

The pilot research involved 26 participants, and 23 responses were registered as valid. Members were chosen from diversified strata belonging to different cities of Saudi Arabia. The questionnaire was treated with credibility, and rationality benchmarks for conducting a primary survey prior to the pilot study. Further, Cronbach's alpha and

Split-half reliability methods were employed to assess the internal consistency of the questionnaire. Also, Test-retest reliability and Parallel form reliability were employed with a view that in the event of similar outcomes with both these measures, the credibility of the questionnaire is assured regardless of the use of any specific item. In order to gather data, the survey was circulated among 550 participants with well-diversified profiles in Saudi Arabia. The responses were received from 335 contributors, i.e. almost 61%, and it was found to be appropriate. Thereafter, the data was entered into SPSS for further editing and coding. The final 308 respondents' data were chosen for further evaluation; the remaining was summarised as a result of partial response or omitted values.

Findings and Results

In response to hypothesis H1, "What motivates the users to participate in CBMM and what is consumers' attitude towards CBMM while buying a product", a demographic data analysis was carried out, which illustrated the survey response of 309 participants scattered across 50 cities of Saudi Arabia. The survey yielded that 16.7% of the study participants were from the city of Al-Bahah; 17.0% were from the Al-Jafer city;21.9% were from the Al-Khobar city; 27.9% were from the Al-Madinah city; 29.3% were from the Al-Mawain city and so on.

In response to the survey question "Participant experience in retail industry", the following results were observed:-

Experience	% of Participants	Experience	% of	Interpretation
in Yrs		in Yrs	Participants	
22	0.5%	5	19.5%	The overall impression emanating out of this finding is that most of the participants
15	1.4%	4	11.8%	representing the young generation in
8	5.5%	3	14.5%	Saudi Arabia lack experience in buying in
7	8.5%	2	4.7%	
6	11.2%	1	6.8%	

 Table 3: Summarisation of responses to survey question (1)

In response to the survey question "Participant knowledge in mobile marketing", it was observed that about 7.9% of study participants had a very high level of mobile marketing experience, 27.4% of study participants had only a basic level of mobile marketing understanding, 17.5% study participants have not any experience or understanding level of mobile marketing knowledge and 31.5% study participants has very basic knowledge of mobile marketing. In response to the survey question "Relevancy of advertisement and user search history", it was observed that about

0.27% participants believe that advertising is slightly relevant based on tier location and companies should not user search history, 24.93% participants have no idea on the importance of advertisement and use of user search history is legally permissible or not, 41.92% participants believe the overall advertisement is ok, but companies should not user the user search history because it is their privacy.

Similarly, the findings about some other survey questions are as follows:-

Survey Question	Response	% of Participants	Survey Question	Response	% of Participants
	Very high level	7.9%		Very unlikely	16.6%
Participant knowledge of mobile marketing	Only basic level	27.4%	The usefulness of personalised Ads	Very likely	22.1%
	No experience	17.5%	1	Somewhat likely	16.6%
	Very basic level	31.5%		No idea	23.1%

Table 4: Summarisation of responses to survey questions (2)

	Few times per week	18.1%		Not Sure	14.5%
Frequency of participants buying items using retail industry sites	Multiple times per day	17.3%	Does product	Not Effective	7.4%
	Not often 26.89	26.8%	advertising impact the product sale	Highly Influential	17.3%
				Somewhat	
	Once per day	5.2%		Influential	36.7%
	Once per week	17%		Moderately Influential	8.22%

Framework Validation

As illustrated earlier, the 16 marketing factors in relation to CBMM in Saudi Arabia were extracted. Obviously, these extracted factors are in line with the modern advancements in the field of Information Technology with which the modern days' gadgets are supplemented. It is expected that such devices offer an opportunity for marketers to share information with the target customers at locations that have a particularly higher advertising effect [17][18]. Further, it is quite challenging to

cater advertisements to huge strata of the population. Relevant adverts are considered to have a greater impact on the target customers, provided that the audience believes it is relevant. Relevance enhances attention and encourages customers, such as brand recall. A lot of research is available that discovers how adverts can be made relevant to the target audience [19][20]. There are diverse studies conducted that are associated with different fields and have used several concepts and terminologies [21][22][23]. A phase-wise breakup of those 16 extracted marketing factors is as follows:-

T 11	_	DI	• 1	· ,	C		1	C (•.1	<i>.</i> .	
Table	5:	Phase-w	/ise al	lignment	01	mar	keting	factors	with	respective	aıms

Phases	Factors	Aim	
Dhasa 1	F1- User search history and information	Check the customer preferences and	
	F2-User excitement and Ads relevancy	attitudes towards CBMM	
	F3-Customer location		
Dhasa 2	F4-Customer browser history	Check the factors impacting CBMM	
r nase 2	F5-Product reviews	Phase 1)	
	F6-Event and Holiday Campaign		
Phase 3	F7-Data privacy and security	Check the social marketing policies in Saudi Arabia towards CBMM	
	F8-Authenticity		
	F9-Proximity-Based Marketing	Check the role of Information technology	
Phase 1	F10-Personalization		
T hase 4	F11-Trust Building	and mobile marketing towards CBMM	
	F12-Data-Driven decision making		
Phase 5	F13-Promotion		
	F14-Product location	Check the role of general factors of	
	F15-Product price	marketing towards CBMM	
	F16-Definition of product quality		

It is essential to point out that these factors were tested for reliability and significance. It is safer to state that these tests are helpful in obtaining internal consistency of data, precise measurement, quality control, confidence in decision making, comparability over time, data validation, identification of difficult items, integral research, refining the tools used etc. For the sake of reliability testing it is crucial to use SPSS or any other statistical software tool.

Going forward, different factors falling under the relevant test hypotheses were outlined and for each of the factors, firstly the respective Pearson Correlation and 2-tailed sigma values were correlated. Thereafter, the P-values for the respective hypotheses were estimated based on these findings and then, the respective P-values were compared with Cronbach's Alpha values for each hypothesis. A summarised result is as follows:-

Hypothesis	Identified Factors	P-value of factors vis-à-vis Cronbach's Alpha (Finding)	Significance		
H1	User search history and information User excitement and Ads	P-value < Cronbach's Alpha	Significant relationship between both the factors		
	relevancy				
	Event and Holiday Campaigns				
	Product reviews				
	Customer browser history				
H2	Customer location	P-value < Cronbach's	Significant relationship		
	User search history and information	Alplia	between an the factors		
	User excitement and Ads relevancy				
	Proximity-Based Marketing				
Ц2	Personalisation	P-value < Cronbach's	Significant relationship		
115	Trust Building	Alpha	between all the factors		
	Data-Driven decision making				
Н4	Data privacy and security	P-value < Cronbach's	Significant relationship		
117	Authenticity	Alpha	between both the factors		
	Product location				
H5, H6 & H7	Promotion strategy	P-value < Cronbach's	Significant relationship		
	Price of the product	Alpha	between all the factors		
	Product quality				

Table 6: Hypotheses-wise identified factors and their significance

Pattern Matrix

When the 16 extracted marketing factors were treated under the aegis of Pattern Matrix, it was identified that all the sub-factors were loaded into their respective main factors, indicating that our hypotheses were correct and the proposed framework was valid.

Structure Equation Modelling (SEM) and Framework Validation

SEM is used for multiple reasons, viz. Framework evaluation and testing, Path analysis, Confirmatory

Factor Analysis (CFA), Moderation Study Analysis, Error handling in research, Structure analysis, Variable analysis etc. CFA, as a sub-set of SEM, confirms that well observed variables (signs) support the planned latent concepts or factors. CFA was employed in this study to evaluate the framework further and strengthen its validity. The corresponding SEM (illustrated below) indicated that sub-factors are aligned with their parent factors. Moreover, the alpha value in each main factor and sub-factor is positive, which also complements the validity of our proposed framework of context-based mobile marketing.





Discussion and Conclusion

With the foregoing discussion, it has become evident that CBMM should emphasise content that is pertinent to users' interests, likings, and situations in which targeted marketing as per the search record can be used. Businesses can develop special marketing campaigns, themed advertising, and limited-time offers related to special occasions and holidays. It can boost brand visibility, attract sales, and enhance customer determination. Geotargeting can be used effectively for this purpose. Further, Listing consumer history, search records, and location data enables business ventures to adapt content and campaigns. Also, Positive product reviews offer social proof, develop trust and offer value to potential consumers. Assessing these factors offers credible data for making informed marketing decisions, augmenting campaigns, and overall marketing efficacy in the moveable spaces. The study also vouches for the support of the Saudi government towards CBMM, as a framework for customer data protection ought to be laid by the government since customers in Saudi Arabia largely lack trust in the retail industry. This study also highlighted the fact that Businesses can use pricing strategies like sales, bundle offers or category pricing to attract various consumer segments. Further, communicating value via pricing is critical in advertising messages. Businesses use a combination of marketing, public relations, social media and other channels to advertise products or services. The strategy should be to adapt the marketing efforts according to the

target audience and influence channels where they are most likely to be involved. In physical trade, strategic product positioning within stores can influence sales. In e-commerce, businesses emphasise improving online product positioning, focusing on featured products, and using Search Engine Optimization (SEO) techniques to boost visibility. Also, Focusing on product quality in advertising messages, using client testimonials, and underlining any quality accreditations or awards help develop trust and credibility.

Saudi Arabia has a varied and rapidly developing economy that attracts businesses from across the globe. Marketing is important for local businesses to compete on a global scale and for international businesses to establish an influential existence in the Saudi market. CBMM efforts like advertising, branding and promotions boost the visibility and awareness of marketing brands. An influential brand's existence boosts the probability of customers opting for a certain retailer over its competitors. Digital marketing, social media marketing and online marketing are major elements of reaching out and connecting with the tech-savvy target audience. The Saudi Government has been dynamically encouraging tourism, paving new opportunities for businesses in the hospitality, entertainment and retail divisions. CBMM is helpful in promoting particular products, services and promotions. E-commerce is undergoing swift growth in Saudi Arabia, particularly with the rising adoption of digital technologies. Businesses require effective online marketing strategies to influence ecommerce success and access customers via digital channels. With the growth of e-commerce, having a dominant online presence is critical for retail businesses. Digital marketing strategies such as social media marketing, search engine optimisation (SEO), and virtual marketing will help attract traffic to e-commerce policies. The Saudi government has launched several economic and social initiatives like Vision 2030, which is targeted at expanding the economy and encouraging innovation. CBMM is bound to play a key role in helping these initiatives by supporting local industries, appealing to foreign investments, and demonstrating innovation.

Thus, we can conclude by stating that CBMM is crucial in the retail industry in Saudi Arabia to appeal to and retain consumers, differentiate from market competitors, boost brand visibility and adapt to emerging customer trends. CBMM is a strategic and dynamic procedure that meaningfully supports the overall growth and success of retail businesses.

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