Determinants of Consumer's Adoption of Latest Version Smartphones: An Empirical Study of Saudi Consumers

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ABSTRACT

This empirical study investigates the determinants of the adoption of the latest version of smartphones among Saudi Arabian consumers. Through a quantitative approach and data collected from 377 participants, the research explores factors, such as personal characteristics, social influences, product features, price considerations, social media impact, online purchasing behavior, and the role of advertisements. Descriptive and inferential analyses provide insights into the sample population's demographic profiles and occupational patterns. The ANOVA test evaluated the relationship between various factors and consumer adoption of the latest smartphones. The results indicated no significant difference in the adoption behavior based on the personal characteristics, influence from family and friends, or product features. However, data for other hypotheses were missing, impeding a comprehensive analysis. While the test provided useful understanding, further examination and interpretation are necessary to draw conclusive insights into the factors influencing smartphone adoption. This study contributes valuable knowledge into the complex dynamics of smartphone adoption in Saudi Arabia, offering targeted strategies to manufacturers, marketers, and policymakers, and aiming to enhance market penetration and consumer engagement.

Keywords-consumer behavior; adoption; new product; smartphone

I. INTRODUCTION

Product innovation is introducing new products to the market, either by delivering entirely new items or changing the existing products [1]. Accelerated technology innovations lead to shorter product lifecycles, and customers frequently need to decide whether to upgrade to a new version or keep their current product. They could use specific coping mechanisms to manage the tension and ambiguity [2]. According to [3], 71% of companies consider product innovation as one of their top three strategic priorities, with 70% of them identifying new products as "important" or "very important" for their future. New products are typically classified as Really New Products (RNPs) or Incremental New Products (INPs). RNPs and INPs differ in terms of functional and technological innovation. INPs are new products derived from previously existing items, whereas RNPs offer a new product segment that demands consumers to participate in continual learning [4].

The idea of RNPs is relatively recent. According to [5], It is a product that revolutionizes product categories or defines new categories, shifts market structures, represents new technology, necessitates consumer learning, and causes behavioral changes. The smartphone sector is one of the areas in which companies witness product innovation processes on an ongoing basis to ensure success in the market. In Saudi Arabia, 92% of individuals aged 12 to 65 use smartphones, with 83.83% of them accessing the internet. This stresses the importance of this type of product in the lives of individuals and manufacturing enterprises [6-8]. Organizations can now generate revenue and expect to survive due to new goods, but there are significant dangers involved with Innovative projects that should not be disregarded. Therefore, business executives must forecast the success of novel products in advance [9]. If a study on the consumer's readiness is performed, the new product is considered the first step in predicting the success of new products/its success. Consumer behavior is a multidimensional concept that involves dynamic relationships between perception, information, attitude, motivation, and effective manifestation. Authors in [10] studied an individual's or a group's integration into a society's goods and service consumption procedures at a certain time, as well as their decision-making regarding the latter. The study of consumer

behavior includes identifying the factors influencing them and their interaction with the various marketing stimuli to which they are exposed, including new product introductions. For many products, the adoption process follows a consistent pattern, beginning with the development of the new product and ending with its widespread acceptance by the final consumers [11].

Adoption is a decision to make full-scale and continuous use of an innovation. This definition placed a strong emphasis on the intention to use innovation continuously [12]. The consumer adoption process is later followed by the consumer-loyalty process, which is the producer's concern [13]. According to [14], several factors influence the adoption of new products, such as technological factors, economic factors, lack of infrastructure, personal characteristics, and environmental concerns. The results of the study by Mehra concluded that: price value, observability, perceived usefulness, and compatibility have been found to have a significant impact on young smartphone users' behavioral intention to adopt the newest Android phone version, while performance expectancy, effort expectancy, and compatibility have emerged as factors that indirectly affect this intention [15]. According to [16], the main factor influencing the adoption of new products is consumer inventiveness. The results in [17] revealed that the psychological characteristics of the consumer have an impact on their adoption of new products. The consumer's experience of using the product can also be added as one of the factors influencing this type of adoption [18]. Furthermore, the demographic traits of the customer determine how much of an impact their attitude has. Customers with lower incomes and at younger ages tend to be more affected [19]. Thus, age and income can be considered as factors influencing consumer attitudes toward new products.

Socio-economic status, political variables, and new product attributes influence a consumer's decision to purchase new products [20]. Authors in [21] confirmed the influence of marketing strategy on consumer-perceived quality, perceived value, perceived risk, and purchase intention, which is critical for various industries in many countries. Price, advertising, and word-of-mouth also affect consumer adoption of new products in the markets. Today, social media plays an important role in boosting the influence of word of mouth and advertisements [22, 23]. According to [24], the category of early adopters of new products influences other consumers through social media platforms. According to [25], even after adjusting for individual traits and sales calls, evidence of social influence remains. Additionally, those with a pivotal position in the network and frequent product users have greater influence. Authors in [26] disclosed that influential individuals are less susceptible than non-influential individuals and cluster on the network, while susceptible individuals are not. This suggests that influential people who have influential friends may play a key role in the network spread of a product. Online buying provides more information to the consumer through the possibility of comparing new products with other products, in addition to obtaining the opinions of these products' users, in some cases, which reduces the feeling of risk when deciding to purchase new products [4, 27, 28]. This study assumes that online purchasing is one of the variables affecting consumer adoption of new products.

The following research question was developed. What factors influence whether new smartphone models are adopted by consumers? Referring to the findings of previous studies, it the following hypotheses were formulated:

- H1: Personal characteristics positively affect consumer adoption of the latest version of smartphones.
- H2: Family and friends positively affect consumer adoption of the latest version of smartphones.
- H3: Product features positively affect consumer behavior towards new smartphones.
- H4: Price positively affects consumer behavior towards new smartphones.
- H5: Social media platforms positively affect consumer behavior towards new smartphones.
- H6: Online purchase positively affects consumer behavior towards new smartphones.
- H7: Advertisements positively affect consumer behavior towards new smartphones.

The research model was built based on previous studies, similarly to the above research hypotheses, as shown in Figure 1.

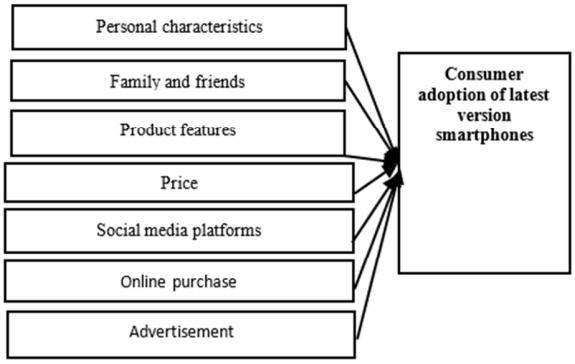

Fig. 1. Research model.

II. MATERIALS AND METHODS

This study investigates the determinants influencing the adoption of the latest version of smartphones among Saudi consumers, with a sample size of 377 participants. Employing a quantitative research approach, data were collected through a structured questionnaire designed to capture key variables related to smartphone adoption behavior. The target population consisted of Saudi consumers aged 15 years and above, who own smartphones and reside across different regions of Saudi Arabia. Utilizing a convenient sampling technique, respondents were questioned through online platforms and email lists, ensuring a diverse representation of demographic backgrounds and geographical locations. The questionnaire was meticulously crafted based on a comprehensive review of

existing literature and consultations with domain experts. It comprised sections covering demographic information, smartphone usage patterns, and factors influencing the adoption decision. Before distribution, the questionnaire underwent a pilot test on a small subset of respondents to assess clarity, relevance, and comprehensibility, leading to refinements to enhance its effectiveness. Data analysis involved both descriptive and inferential statistical techniques. Descriptive statistics, such as frequencies and percentages, were utilized to summarize demographic characteristics and survey responses. Inferential analyses, including ANOVA Tests, were conducted to explore the relationships between identified determinants and smartphone adoption and validate the hypotheses. To ensure the reliability and validity of findings, measures were taken to assess the internal consistency of questionnaire items using Cronbach's alpha coefficient. Additionally, ethical considerations were paramount throughout the research process. Participants were assured of anonymity, confidentiality, and voluntary participation, with informed consent obtained before data collection. In summary, this research methodology provides a robust framework for examining the determinants of smartphone adoption among Saudi consumers. By analyzing a sample size of 377 participants, this study aims to offer valuable insights into the factors shaping consumer behavior in the context of smartphone adoption in Saudi Arabia.

III. RESULTS AND DISCUSSIONS

A. Sample Profile

The descriptive statistics of Table I provide a comprehensive overview of key variables related to smartphone adoption among the sample population. Overall, the descriptive statistics provide valuable insights into the demographic and occupational characteristics of the sample population concerning smartphone adoption. These findings lay the groundwork for further analysis and interpretation of the factors influencing smartphone adoption behavior among the study participants. Table II depicts the distribution of the demographic characteristics of the sample population.

TABLE I. DESCRIPTIVE STATISTICS

	N	Range	Min	Max	Mean		Std. Dev	Var
		Statistic			Statistic	Std. Error	Stat	Stat
Age	377	3.00	1.00	4.00	1.8939	.04231	.82151	0.675
Gender	377	1.00	1.00	2.00	1.7056	.02351	.45639	0.208
Civil situation	377	2.00	1.00	3.00	1.7109	.02622	.50919	0.259
Occupation	377	4.00	1.00	5.00	1.9151	.07163	1.3907	1.934
Valid N (listwise)	377	-	-	-	-	-	-	-

Table II outlines the demographic characteristics of the sample population concerning smartphone adoption. Most respondents fall within the age range of 15-40, comprising 77.5% of the total sample. This finding suggests that a significant proportion of smartphone adopters in the study are relatively young adults, consistent with the trend observed globally, where younger demographics tend to exhibit higher rates of smartphone adoption due to their familiarity with technology and digital lifestyles. Moreover, a gradual decline in the percentage of respondents as age increases is evidenced, with only a small proportion, 3.2%, aged more than 60. This trend underscores the generational gap in smartphone adoption, highlighting the importance of considering age-related differences in consumer behavior and preferences when examining adoption patterns. Overall, the age distribution Table underscores the importance of demographic factors, particularly age, in understanding the adoption of smartphones among Saudi consumers. This information can enable targeted marketing strategies and product development efforts tailored to specific age groups, ultimately facilitating greater market penetration and consumer engagement in the rapidly evolving smartphone landscape.

TABLE II. AGE

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	**15-20**	137	36.3	36.3	36.3
	20-40	155	41.1	41.1	77.5
	41-60	73	19.4	19.4	96.8
	More than 60	12	3.2	3.2	100.0
	Total	377	100.0	100.0	

Table III presents the distribution of respondents based on gender regarding smartphone adoption. Among the sample of 377 participants, 29.4% were identified as male, while the majority, constituting 70.6%, were identified as female. This gender distribution highlights a significant presence of female respondents in the study, indicating their substantial representation in the context of smartphone adoption. The data suggest a potential gender discrepancy in smartphone adoption, with a higher proportion of female respondents compared to the male ones. This finding aligns with broader trends indicating that women are increasingly active users of smartphones, leveraging them for various purposes, such as communication, social networking, and accessing digital content. Understanding gender disparities in smartphone adoption is essential for devising targeted marketing strategies and designing user-friendly interfaces that cater to the preferences and needs of diverse user groups. Additionally, this insight can inform initiatives aimed at bridging the digital divide/gap and promoting equitable access to technology across gender lines.

TABLE III. GENDER

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	**Male**	111	29.4	29.4	29.4
	Female	266	70.6	70.6	100.0
	Total	377	100.0	100.0	

Table IV illustrates the distribution of respondents based on their occupation compared to smartphone adoption. Most participants, comprising 62.1% of the sample, are identified as students. This finding underscores the significant presence of students within the sample population, indicating their prominent role in smartphone adoption behavior. Students are often early adopters of technology, leveraging smartphones for educational purposes, communication, and entertainment.

Furthermore, a proportion of respondents, about 12.5%, are employed in government jobs, whereas 8.2% work in the private sector. Additionally, 6.4% are identified as freelance workers and 10.9% fall under the category of "Other" occupations. These findings suggest a diverse occupational profile among respondents, reflecting the varied socioeconomic backgrounds within the sample. The distribution highlights the importance of considering occupational differences in smartphone adoption behavior, as individuals from different occupational sectors may have distinct usage patterns, preferences, and motivation for adopting smartphones. Understanding the relationship between occupation and smartphone adoption is crucial for tailoring marketing strategies, designing targeted interventions, and developing smartphone features and applications that cater to the specific needs and interests of diverse occupational groups.

TABLE IV. OCCUPATION

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Student	234	62.1	62.1	62.1
	Government Job	47	12.5	12.5	74.5
	Private sector	31	8.2	8.2	82.8
	Freelance	24	6.4	6.4	89.1
	Other	41	10.9	10.9	100.0
	Total	377	100.0	100.0	

TABLE V. MARITAL STATUS

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Single	119	31.6	31.6	31.6
	Married	248	65.8	65.8	97.3
	Other	10	2.7	2.7	100.0
	Total	377	100.0	100.0	

Table V delineates the distribution of respondents based on their marital status concerning smartphone adoption. Among the sample of 377 participants, the majority, constituting 65.8%, are identified as married. This significant representation of married individuals underscores the relevance of marital status in understanding smartphone adoption behavior, as married individuals often have distinct usage patterns and priorities compared to their single counterparts. Furthermore, 31.6% of the respondents are identified as single, indicating a notable presence of unmarried individuals within the sample population. Single individuals may exhibit different smartphone adoption behaviors, influenced by factors, such as social connectivity, lifestyle preferences, and economic considerations. Additionally, a small proportion of respondents, 2.7%, fall under the category of "Other" marital statuses, suggesting a heterogeneous mix of marital statuses within the sample. Understanding the relationship between marital status and smartphone adoption is vital for devising targeted marketing strategies, designing user-centric features, and developing tailored interventions that cater to the diverse needs and preferences of individuals across different marital statuses. By recognizing the nuanced dynamics between marital status and smartphone adoption, stakeholders can better address the unique challenges and opportunities associated with each demographic group.

B. Measurements

Table VI provides valuable insights into the reliability and validity of the measurements used in the study. The high Cronbach's Alpha coefficient suggests that the measurements exhibit strong internal consistency, enhancing the confidence in the reliability of the findings obtained from these measurements.

TABLE VI. MEASUREMENTS FIABILITY

Total variance explained						
Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.294	25.488	25.488	2.294	25.488	25.488
2	1.505	16.724	42.212	1.505	16.724	42.212
3	1.205	13.385	55.597	1.205	13.385	55.597
4	1.110	12.330	67.927	1.110	12.330	67.927
5	0.879	9.765	77.692			
6	0.702	7.805	85.497			
7	0.487	5.406	90.904			
8	0.460	5.117	96.020			
9	0.358	3.980	100.000			

Reliability Statistics	
Cronbach's Alpha	N of Items
0.904	10

C. Hypotheses Test

Table VII presents the relationship between various factors and consumer adoption of the latest version of smartphones, as indicated by the hypotheses tested.

The ANOVA test results demonstrate the relationship between various factors and consumer adoption of the latest version of smartphones, as proposed by the hypotheses tested.

- For Hypothesis 1 (H1), which suggests that personal characteristics positively affect consumer adoption, the F-test shows a non-significant F-value of 0.194. This indicates no significant difference in adoption behavior based on personal characteristics, failing to support H1.
- Hypothesis 2 (H2), proposing that family and friends positively affect consumer adoption, yields a non-significant F-value of 0.479. This indicates no significant difference in adoption behavior based on the influence from family and friends, failing to support H2.
- For Hypothesis 3 (H3), which suggests that product features positively affect consumer behavior, the F-test produces a non-significant F-value of 0.453. This indicates no significant difference in the adoption behavior based on product features, failing to support H3.
- Hypotheses 5 and 7 were rejected, indicating that there was no statistically significant support for them. However, Hypotheses 4 and 6 were accepted, with a significance level of 5%.

In summary, while the ANOVA test provides insights into the relationship between certain factors and consumer smartphone adoption, further analysis and interpretation of the

results are needed to draw meaningful conclusions about the tested hypotheses.

TABLE VII. ANOVA TEST AND HYPOTHESES TEST

Hypotheses	Sum of squares		Mean square	F
H1: Personal characteristics positively affect consumer adoption of the latest version of smartphones.	Between Groups	2.472	2.472	0.194
	Within Groups	547.933	1.457	
	Total	550.405		
H2: Family and friendspositively affect consumer adoption of the latest version of smartphones.	Between Groups	1.215	1.215	0.479
	Within Groups	909.822	2.420	
	Total	911.037		
H3: Product features positively affect consumer behavior towards new smartphones.	Between Groups	.945	.945	0.453
	Within Groups	629.100	1.673	
	Total	630.045		
H4: Price has a positive influence on onsumer behavior towards new smartphones.	Between Groups	6.249	6.249	0.003
H5: Social media positively affects consumer behavior towards new smartphones.	Between Groups	5.814	5.814	0.089
	Within Groups	752.112	2.000	
	Total	757.926		
H6: Online purchases positively affect consumer behavior towards new smartphones.	Between Groups	12.070	12.070	0.017
	Within Groups	785.539	2.089	
	Total	797.608		
H7: Advertisements have a positive influence on consumer behavior towards new smartphones.	Between Groups	1.068	1.068	0.359
	Within Groups	476.265	1.267	
	Total	477.333		
	Total	229.442		

IV. CONCLUSIONS

This study aimed to investigate the determinants influencing the adoption of the latest version of smartphones among Saudi Arabian consumers. Through a quantitative approach and data collected from 377 participants, the research explored various factors including personal characteristics, social influences, product features, price considerations, social media impact, online purchasing behavior, and the role of advertisements. The descriptive statistics provided insights into the demographic profiles and occupational patterns of the sample population, highlighting the predominance of young adults, particularly students, and a notable representation of female respondents. However, the analysis of hypotheses using ANOVA tests revealed mixed results. While some hypotheses, such as the influence of personal characteristics, family and friends, and product features, did not show significant differences in adoption behavior, which is inconsistent with the previous studies [14, 19, 15]. The data for other hypotheses, including the impact of price, social media platforms, online purchases, and advertisements, were missing, hindering a comprehensive analysis. This study helped to understand the purchasing behavior of Saudi consumers towards new versions of smartphones, by identifying factors influencing consumer behavior, and are crucial for manufacturers, marketers, and policymakers, which aim at enhancing market penetration and consumer engagement. Further research and interpretation of the results are necessary to discover other factors influencing smartphone adoption comprehensively.

However, based on the available results, it can be inferred that personal characteristics, influence from family and friends, and product features may not significantly affect the consumer adoption of the latest smartphones among Saudi consumers. Further research is needed to confirm these findings and explore additional factors that could influence adoption behavior. Despite these limitations, the study underscores the importance of understanding consumer behavior in the context of smartphone adoption. Manufacturers, marketers, and policymakers can leverage these insights to develop targeted strategies aimed at enhancing market penetration and consumer engagement in the rapidly evolving smartphone landscape. Moving forward, future research should aim to address the gaps identified in this study, by collecting comprehensive data and conducting further analysis, to gain a deeper understanding of the factors driving smartphone adoption in Saudi Arabia. Efforts like these will contribute to the development of more effective strategies for meeting the needs and preferences of Saudi consumers in the smartphone market.

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