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Socio-Demographic Factors That Determine the Usage of Mobile Phones in Rural Communities

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Abstract

The aim of this study was to examine the perception and attitude of Nigerian rural dwellers as a gauge for determining whether there is (or not) perceived beneficial use of mobile technologies among rural inhabitants. It also tries to find out the factors that determine mobile phone usage in rural areas. Two factors that determine technology acceptance and use were identified: Perceived Usefulness (PU) and Perceived Ease of Use (PEU). A cross sectional research design was employed for this study using questionnaire as a data collection technique. Using the Statistical Package for the Social Science (SPSS) V15, the findings showed that socio-demographic factors such as age, gender, status, level of education, occupation, income, and social influence are the major determinants of mobile phone ownership and usage in rural areas. It also showed that age and gender affect the perceived benefit and satisfaction of mobile phone in rural communities. It is believed that policy makers will find it helpful if they understood rural inhabitants' perception and attitude toward mobile phone.

Keywords: Age; Gender; Mobile phone; Rural communities; Perception and satisfaction.

1. Introduction

Researches have shown that mobile phone usage brings about effective communication, greater social cohesion and improved social relationships (Frost and Sullivan, 2006; Goodman, 2005; Kwaku and LeMaire, 2006). Unarguably, mobile phones have significant benefits not only to the user but to the society as a whole. For instance, Ashiq *et al.* (2013) claimed that mobile phones serve as a tool for social connection that helps to maintain and manage social relationships. They enable people to seek for help in case of an emergency and allow parents to keep an "eye" on their children (Lesitaokana, 2012); provide us with the opportunity of relating with important others in our lives (Myers, 2013); enhance mobile banking transactions through direct mobile schemes (Feig, 2007); and provide chances for people to make honest living through the internet as web designers, publishers, bloggers, apps developers, internet security consultants, and online marketing professionals (Soyemi *et al.*, 2015).

Academically, mobile technologies have led to a pattern known as mobile learning (or m-learning), which helps students and their faculty to access web contents, remix it, share it, collaborate with others, and create media rich deliverable for the classroom teachers as well as global audience (Ferry, 2009). According to Attewell (2005), mobile technologies have substantial ability to enhance teaching and learning across all education sectors. Their impacts on students are well acknowledged (Rural Technology and Business Incubator, 2008) such that the necessity to use mobile phones in education especially, in college seems to be inevitable (Halder *et al.*, 2015).

McGuigan (2005) describes mobile phone as a means of communication with considerable social and cultural significance. According to him, mobile phone is a symbol in itself, an obscure object of desire and a sign of the times. The United Nations (2004) claims that mobile technology is a major facilitator for information and knowledge sharing that can create development opportunities and choices for rural communities, and can help to improve the living conditions of the rural poor through better and more sustainable livelihood strategies. In a similar view, Onwuemele (2011) argues that the application of Information Communication Technology (ICT) in different areas of human endeavour has brought about many benefits not only to the individual, but also to the community whether in urban or rural areas. Onwuemele states that mobile phone which is an integral part of ICT has become one of the most important media of information communication of our time.

Lustig and Stern (2000) observed that ICT such as mobile phones can have an impact on rural livelihoods and thereby on poverty in rural communities in developing countries. Information for Development Program (2006) outlined the followings as the impact that mobile phones can have on livelihoods:

- ✓ Increased opportunities to access resources and use capabilities through improved access to information
- ✓ Empowerment through information about choices that affect themselves
- ✓ Decreased vulnerability to risk due to the possibility to send and receive information

Ling (2003) avers that the mobile phone has become part of culture of every society in the world as it deeply affects our society, accessibility, safety, and security as well as coordination of social and business activities. According to him, mobile phones allow people to stay in touch and have easy access to information anywhere and anytime. Amongst youths, it nurtures active networks of social relationships and prevents exclusion from the social groups. For adult users, mobile phones are adopted for safety and job-related reasons while the frailer (older and disabled) people adopt it for safety, security, personal independence purposes (Abascal and Civit, 2001) and self image (Oakman, 2006).

Suki and Suki (2007) argued that heavy mobile phone users possess a higher level of knowledge, have more social participation, maintain extensive interpersonal networks and have contact with people not only within the social system but also outside it. This opinion was supported by Goldman (2010) when he claims that mobile phones allow users to do things that they never thought possible without being bound to a home or office computer, from comparing store prices and searching for restaurant reviews to checking into a hotel and social networking at anytime and anywhere.

In the same vein, Persaud and Azhar (2012) pointed out that through mobile phones, consumers can easily and quickly shop for products across multiple channels with substantially greater levels of conveniences, flexibility, efficiency and personalization. According to Keshav (2005), people have adopted mobile phone technology with almost unprecedented enthusiasm to the effect that the status of a mobile phone has changed from an unknown device to an essential device in the span of less than ten years. He opines that this raises questions about the factors that underlie such rampant adoption and use. It is in consideration of Keshav's question that this research work was embarked upon to investigate the factors that determine mobile phone adoption and use among rural dwellers. The reason for this is to provide a better understanding of the perception and attitude of rural dwellers toward mobile phone.

2. Social Influence

Van Biljon and Kotzé (2008) observed that social influence is one of the major factors that affect mobile phone adoption and use. They described social influence as the pressure exerted on the individual by the opinion of others; facilitating conditions, or the necessary infrastructure; perceived usefulness, or the extent to which a user believes that he/she will benefit from using the mobile phone; and perceived ease of use.

Impliedly, social influence has to do with the way other people affect one's beliefs, thought, feelings, and behaviour (Mason *et al.*, 2007). Thus, friends, family members and social status are important factors perceived to be important to users in promoting and encouraging greater dependence on mobile phones (Auter, 2007). According to Suki and Suki (2007), social influence may occur as a result of observation, perception or anticipation of decisions made by others in relation to mobile phones. Conci *et al.* (2010) understood social influence as the feeling of being influenced by relatives and friends (significant others) in the usage of mobile phones. According to them, social factors were significantly related to the behavioural intention to use mobile phone. Similarly, Teo and Pok (2003) found that social influence as a construct influences the adoption of Wireless Application Protocol (WAP) mobile phone among internet users.

In a study that was conducted in a rural area in India, Jain and Hundal (2007) observed that "the rural people were found to be more influenced by the neighbours' usage, just as media was also found as the negligible impact on the choice of buying a mobile phone". According to them, in addition to neighbours, families, relatives and seniors or other influential persons in the community also serve as sources of influence to the adoption of mobile phones. Onwuemele (2011) argues that ICTs, especially mobile phones, are major catalyst for information and knowledge and choice for rural communities. Under certain conditions, they help to improve the living conditions of the rural poor through better and more sustainable livelihood strategies (United Nations, 2004). In an instance, Lustig and Stern (2000) observed that ICT, such as mobile phones can have an impact on rural livelihoods and thereby on poverty in rural communities in developing countries.

In a study of the factors that affect consumer buying behaviour of mobile phone devices, Sata (2013) found that price, social influence, durability, brand, product features and after sales service significantly correlated with the decision to buy a mobile phone device. In their own comparative analysis of rural and urban consumers' buying behaviour towards mobile phone, Madasi and Raghupataiah (2014) discovered that rural consumers mostly use friends, T.V. and mobile phone retailer as the source of information and the purchase decision is taken by self-decision with the help of family and friends.

In a similar comparative study of the influence of cultural, social and marketing factors on the attitude of telecom users in rural semi-urban and urban areas of Chandigarh, Inderjeet Sethi (2014) found that the respondents of rural area are more dependent on their family, spouse or children whereas brand image, advertisement, and innovation in services are considered by the urban and semi-urban respondents. Khayyat and Heshmati (2013) pointed out that many studies have examined the adoption of mobile technologies as a result of which various models have been applied to predict individuals' intentions to use technological innovations. In order to investigate peoples' behavioural intention to adopt mobile phone, the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology Model (UTAUT) were conceptualised.

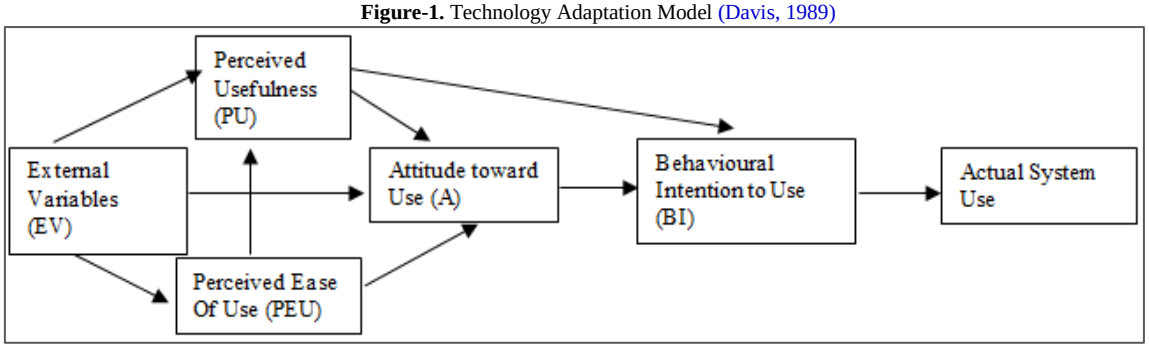
2.1. The Technology Acceptance Model (Tam)

This model was developed by Davis in 1989 to explain the factors that influence the behaviour of an individual regarding accepting and using new technology. Davis identified the factors as perceived usefulness (PU) and perceived ease of use (PEU). Perceived usefulness refers to the user's subjective notion that using a specific application system will increase his/her job performance within an organizational context. This implies the extrinsic features such as the effectiveness and efficiency of the technology. Perceived ease of use suggests the degree to which the user expects the target system to be free of effort. This indicate the intrinsic factors such accessibility and flexibility.

According to Davis, PU and PEU jointly determine the attitude (A) of a person towards using the system. In the end, with the influence of PU and Attitude, Behavioural Intention (BI) influences the use of the system.

Lee *et al.* (2003) claimed that TAM is one of the most influential and commonly employed theories for explaining an individual's acceptance of information systems because it suggest a small number of factors – perceived ease of use and perceived usefulness – which jointly account for usage. Certainly, perceived ease of use and perceived usefulness remain significant determinants of behavioural intention over time, as well as the significant influence of perceived ease of use on perceived usefulness (Kim S. S. and Malhotra, 2005; Venkatesh and Morris, 2000; Wangpipatwong *et al.*, 2008).

Figure-1. Technology Adaptation Model (Davis, 1989)



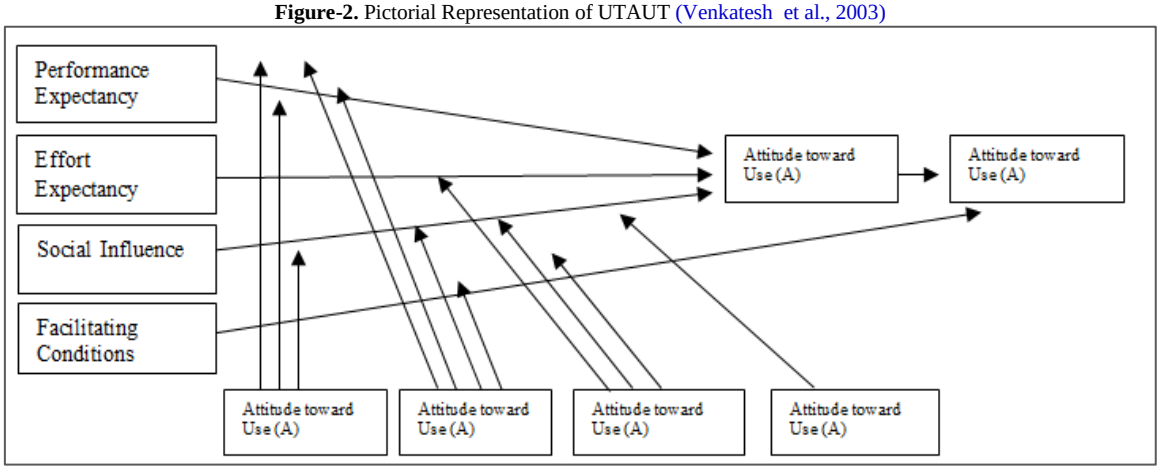
According to Van Biljon and Kotzé (2008), the theoretical tenet for TAM is based on Fishbein and Ajzen's Theory of Reasoned Action (TRA), which is widely used in social psychology to explain why people behave as they do in situations of 'reasoned action' by identifying causal relations between beliefs, attitudes, intentions, and behaviour. Impliedly, TAM is a special case of TRA for modelling technology adoption (Pedersen, 2003).

Davis (1989) strongly avers that PU and PEU are the most cited factors that influence the attitude and behavioural intentions of a person. The factors are also very significant in mobile phone usages (Kargin and Basoglu, 2007). However, Gefen and Straub (2000) claimed that PEU directly affects the adoption of a device, such as a mobile phone, only when the user's primary task is to be done via such device. Thus, PEU is related to the nature of the task an individual is engaged in while PU is related to factors such as job relevance (Kim S. and Garrison, 2008); mobility (Kargin and Basoglu, 2007); convenient/time saver, productivity, and indispensable for business (Donner, 2005).

2.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) was propounded by Venkatesh *et al.* (2003) to explain user's intention to use an information communication technology and its eventual usage behaviour. UTAUT was developed based on the review and consolidation of some other major models such as Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behaviour (TPB), and so on. UTAUT opines that there are three direct determinants of intention to use (performance expectancy, effort expectancy, and social influence) as well as two direct determinants of use behaviour (intention and facilitating conditions). These direct determinants are mediated by gender, age, experience, and voluntariness.

Figure-2. Pictorial Representation of UTAUT (Venkatesh et al., 2003)



Given that this study decided to employ the TAM model to predict behavioural intention to accept and use mobile phone, moderated variables like age and gender as suggested by the UTAUT construct will also be monitored.

2.3. Statement of the Problem

The emergence of mobile technologies have obfuscate the borderline between work and private life and have made every user to be prone to social control by friends, family, and businesses, and to be at risk of addiction. Aman *et al.* (2015) averred that although mobile phones were originally marketed as a source of communication but they

have taken us into a new world and they have "silently crept into intricacies of our life, from our personal life to our family life, friends, and social life in general". Mobile phone has become part of the culture of every region in the world as it deeply affected our society, accessibility, safety, and security as well as coordination of social and business activities, and it has become an obvious need of the day and is in the reach of everyone.

Evidently, several researches have been conducted to bring into limelight, the social as well as individual characteristics that influence the attitude and behavioural intention toward mobile phones. However, such studies are largely focused on the urban dwellers, elites, scholars, and adolescents who are believed to be the avid users. But communication and social lives in rural area is conspicuously changing as well. The penetration of mobile technologies in rural areas is increasing, which makes it necessary to know the factors that affect the perception and attitudes of rural population toward mobile phone usage.

This study therefore investigates the pattern of mobile usage and factors that affect such usage in rural area. The challenges that are faced by such users are also examined. It is expected that this study will enhance better understanding of how mobile technology may impact the life chances of rural inhabitants as a result of which governments, policy makers, telecommunication companies, and network providers will understand how to properly design interfaces to meet the unique needs of the evolving rural population.

3. Objectives of the Study

As stated above, most studies that border on the users' perception of mobile technologies commonly focus on urban and elitist groupings. But such findings may not be transmittable to rural populations due to socio-demographic differences. As a result, this study examines the perception and attitude of Nigerian rural dwellers as a gauge for determining whether there is (or not) perceived beneficial use of mobile technologies among rural inhabitants. Deliberately, the study intends to:

- Investigate the pattern of mobile phone usage among rural inhabitants.
- Examine the factors that determine mobile phone usage in rural area.
- To determine whether there are differences in mobile phone usage among the rural dwellers.
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4. Research Methodology

4.1. Research Design

The cross sectional research design was adopted for this study. A cross sectional study involves investigating people who are similar on the other characteristics but different on a key factor of interest such as age, gender, income level, and geographical locations. This type of design can be used to describe characteristics that exist in a community and it allows a researcher to look at numerous factors at once (such as age, gender, income, locality, and so on). Although it cannot be used to determine cause-and-effect relationships between variables but it provides opportunity to make inferences about possible relationships.

5. Instrument

Based on available literatures on information technology (IT) adoption (Garson, 2006; Murad, 2010; Saxena, 2005) and general technology usage (Becker *et al.*, 2012; Junco, 2013; Rosen *et al.*, 2013), a questionnaire was developed to examine how the perceptions and attitude of Nigerian rural inhabitants might be influenced by the social factors that surround them. The questionnaire which contains 31 questions was divided into two sections. The first section asked respondents about their demographic features such as age, gender, religion, current educational status, ethnic affiliation, occupation, and marital status. The second section of the instrument was formed based on four dimensions of Hofstede's framework for cultural analysis and six aspects of gender studies (Hofstede, 2005). The items in this section were designed in Likert's 5-point response format that ranged from strongly disagree (1), disagree (2), undecided (3), agree (4), and strongly agree (5). Each respondent marked (√) either of the response format (as applicable) for each statement. This allowed the responses to be grouped and analyzed statistically using SPSS V15.

A pilot study was conducted to determine the validity and clarity of the questionnaire after it was formed. This was necessary for the improvement of the instrument, and eventually, three items were removed while another four were reworded to ensure comprehension. A Cronbach's coefficient alpha that was computed to determine the reliability of the items yielded 0.76.

6. Participants

This research work was carried out in the Yewa (formerly, Egbado) South Local Government Area of Ogun State, Nigeria. It is a Local Government Area (LGA) in the Senatorial West of Ogun State, and its headquarter is located in Ilaro. The LGA has ten (10) geo-political wards namely: Ilaro I, Ilaro II, Ilaro III, Iwoye, Idogo, Owode I, Owode II, Ilobi/Erinja, Oke-Odan, and Ajilete. Natives of the LGA speak Yewa and Egun dialects, which are subcultures of the predominant Yoruba language. The inhabitants of the LGA are mainly farmers and traders while a few people engage in craftsmanship. The LGA was chosen because the researcher resides there, which makes it easier for information to be obtained.

Using a purpose sampling technique 5 (five) wards that have access to at least one of the main Global System Mobile (GSM) network providers, that is, MTN, Glo, Etisalat, Airtel, were chosen for this study. Fifty (50)

respondents were then randomly selected from each community, making a total of two hundred and fifty (250). One hundred and thirty two (52.8%) of the respondents were males while one hundred and eighteen (47.2%) of them were females. Their mean age in years was 35.

Table-1. Demographic analysis of the respondents

Demography	N = 243	%
Gender: Male	128	52.7
Female	115	47.3
Age: 20 – 30	98	40.3
31 – 40	66	27.2
41 – 50	50	20.6
50 & above	29	11.9
Ethnicity: Ajilete	50	20.6
Ilobi/Erinja	48	19.8
Oke-Odan	47	19.2
Idogo	50	20.6
Iwoye	48	19.8

Out of the 250 respondents, 243 completed the questionnaire, which makes a response rate of 97.2%. Eventually, the respondents were grouped into three: (1) Those that own and use mobile phone; (2) Those that do not own but have used mobile phone; and (3) Those that do not own and have never used mobile phone.

Although 250 respondents were selected for this study but the 243 that completed and returned the questionnaire were used in the data analysis. Specifically, out of the 50 people that were studied in Ajilete area of the LGA, 27 (54%) of them claimed to own and use mobile phone; 14 (28%) of them do not own mobile phone but have used it; and 9 (18%) of them do not own and have never used a mobile phone. 48 people were studied in Ilobi/Erinja, out of which 30 (62.5%) of them claimed to own and use mobile phone; 11 (22.9%) of them do not have mobile phone but have used it; only 7(14.6%) of them do not have any phone and have never used it. Out of the 47 respondents that were studied in Oke-Odan, 25 (53.2%) of them own and use mobile phone while 12 (25.5%) of them do not have a mobile phone but have used it; 10 (21.3%) of them neither have nor have ever used a mobile phone. Out of the 50 people that were studied in Idogo, 29 (58%) of them own and use mobile phone; while 13 (26%) of them do not own but have used it; and 8 (16%) of them have never used a mobile phone. Among the Iwoye respondents, 28 (58.3%) have mobile phone; 14 (29.2%) of them do not own bur have used it; while 6 (12.5%) of them have never used a mobile phone.

7. Data Analysis

The respondents' perception based on the two identified aspects of technology acceptance, that is, PEU and PU represent the dependent variables while the socio-demographic factors, specifically, age, gender, occupation, marital status, level of education, income, and social influence were chosen as independent variables.

The estimated coefficient of the variables, the ratio of the coefficient to squared equals, the Wild statistics, and the degree of freedom were computed using SPSS V15. The means, reliability assessment, and t-test were also determined.

The level of significance was set at 0.05 and the Scheffe method of multiple comparisons was used to determine the significantly differing categories for each independent variable, that is, age and gender.

Table-2. Variables in the equation

	B	**S.E.**	**Wald**	**df**	**Sig.**	**Exp(B)**
Age	.052	.301	.021	1	.846	1.055
Gender	2.105	1.207	2.547	1	.107	8..818
Status	.149	.542	.161	1	.735	1.616
Occupation	-.331	.353	1.315	1	.278	.701
Income	-1.100	.179	26.919	1	.000	.356
SI	-.539	.556	1.428	1	.232	.503
Education	.578	.218	4.505	1	.043	1.861

Table 2 summarizes the roles of the identified variables. Column B is the estimated coefficient of the expounding variables. The ratio of B to squared equals, squared, equals to wild statistics. If the wild statistics is significant (that is, less than 0.05), then the independent variable is influential. Summarily, factors that influence the usage of mobile phone in rural communities include age, status, level of education, occupation, income, and influence from other people.

Table-3. One way analysis of the mean difference in users' satisfaction by age

Mobile phone dimensions	20 – 30	31 – 40	41 – 50	50 & above	F
	I	II	III	IV	
Ease of use	2.74	2.11	3.21	3.87	11.76*
Usefulness	2.16	1.98	2.80	3.19	9.62*
N	98	66	50	29	

$\mu \geq 0.05$, Scheffe M.C. for significantly differing groups. Ease of use: (I-II), (I-III), (I-IV). Usefulness (I-II), (I-III), (I-IV).

Table 3 above shows that there are significant differences in the level of mobile phone usage based on the ages of the respondents on the two identified aspects of PEU and PU. To ascertain the group that differed significantly, Scheffe multiple comparison was performed and the results showed that the respondents aged above 50 years are more satisfied compared with respondents who are less than 50 years. This implies that there is a positive correlation between the age of the respondents, and the level of satisfaction with mobile phone, that is, the higher the age of the respondents, the more satisfaction towards the two dimensions of mobile technology.

Table-3. T-test for users' satisfaction with mobile phone by sex

Mobile phone dimensions	Sex	No	Mean	SD	T Value
Ease of use	Male	89	2.13	0.96	2.84*
	Female	68	1.65	0.87	
Usefulness	Male	91	2.09	1.09	2.91*
	Female	70	1.87	0.89	

$\mu \geq 0.05$

A t-test was performed to find out whether gender affects the citizens' preference for mobile phone usage. The test shows that there are significant differences in all two dimensions of preference between the sexes. As shown in the table, the means for males are significantly higher than that of the females.

Table- 5. The overall mean value of the respondents to the two dimensions of technology

Mobile phone dimensions	Mean Ranking
Ease of use	2.19
Usefulness	2.07

1-2 Unfavorable; 2-3 Less Favorable; 3-4 Favorable; 4-5 More Favorable

8. Conclusion

One of the major findings of this study is the discovery of the factors that influence the usage of mobile phones in rural communities and it reveals that age, status, level of education, occupation, income, and social influence are the major determinants of mobile phone ownership and usage. The study also reveals that there is a significant positive relationship between the age and gender factors and the perceived usefulness as well as perceived ease of use of mobile phones among rural dwellers. In other words, there is a positive correlation between the age and gender of the respondents and their level of satisfaction with mobile phones.

In view of the above findings, it is recommended that government, policy makers, and GSM network providers must ensure efficient access of rural communities to mobile phone centres through the provision of phone centres at cheap call rates. Also, enlightenment programmes must be embarked upon so that the benefits of using mobile phones as well as the business opportunities that abound in the adoption of mobile phone would be exposed to rural dwellers.

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