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Innovation Marketing Model For Telecommunications Companies In The Democratic Republic Of Congo

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Abstract: This article examines and proposes an innovation marketing model tailored to telecommunications companies operating in the Democratic Republic of Congo, with the objective of designing and validating an analytical framework for understanding innovation adoption mechanisms. Drawing on empirical data collected from telecommunications firms and subscribers in the city-province of Kinshasa, the study integrates organizational, individual, and social factors to account for the specificities of the Congolese context. The findings reveal a strong convergence between empirical results and established theories of innovation adoption and diffusion, while highlighting significant contextual characteristics related to market structure and user behavior.

The results indicate that innovation adoption is primarily influenced by individual characteristics such as age, level of education, and openness to change, as well as by perceived value, functional utility, and user experience rather than technological novelty alone. Market segmentation and competitive dynamics among operators shape differentiated adoption behaviors, with social influence and word-of-mouth playing a central role in diffusion processes. Based on these insights, the study proposes an original innovation marketing model, termed OPSI-MPF, which provides both a theoretical contribution to the literature and a practical decision-support tool for telecommunications companies in the DRC.

Keywords: Model, Innovation Marketing, Company, Telecommunications

1. INTRODUCTION

In a context marked by globalization, intensified competition, and rapid socio-economic transformations driven by information and communication technologies, innovation has become a central lever of competitiveness and sustainable performance for firms. Economic and management literature emphasizes that innovation must be integrated within a market-oriented logic in which the customer plays a pivotal role. Marketing thus emerges as a strategic interface that enables firms to identify needs, guide innovation design, and facilitate its diffusion, reinforcing the link between innovation, value creation, and economic performance as initially highlighted by Schumpeter.

From this perspective, innovation marketing differs from traditional marketing by intervening upstream in the innovation process. It contributes not only to the promotion of products and services but also to the definition of offerings, the analysis of explicit and latent consumer needs, and the development of effective launch and diffusion strategies. In environments characterized by accelerated technological change and intense competition, such as the telecommunications sector, innovation marketing plays a crucial role in reducing adoption risk and enhancing the perceived value and legitimacy of innovations among consumers.

The telecommunications sector in the Democratic Republic of Congo provides a particularly relevant context for examining innovation adoption dynamics, given its high level of competition, significant technological investments, and frequent introduction of new products and services. Despite this dynamism, certain innovations face adoption challenges, underscoring the need for analytical models adapted to local realities. Accordingly, this article aims to analyze the organizational, individual, experiential,

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and social determinants of innovation adoption in the Congolese telecommunications sector, with the objective of contributing to the literature on innovation marketing while offering practical insights to support strategic decision-making by operators in the DRC.

Theoretical framework

It is worth recalling that the available theoretical and empirical work highlights the existence of numerous approaches aimed at analyzing innovation marketing in the telecommunications sector. Several authors have contributed to this subject, including Lambert (1991), Johnson (2008), Le Nagard-Assayag (2015, 2022), Kotler (2015), Lalla (2016), Ameziana (2018), Benmakhlouf (2022) and Boukella (2023).

Although the theoretical model used in this research is inspired by these previous contributions, it has nevertheless been adapted to take into account certain environmental specificities of the context studied, in order to make it more relevant and operational for our analysis.

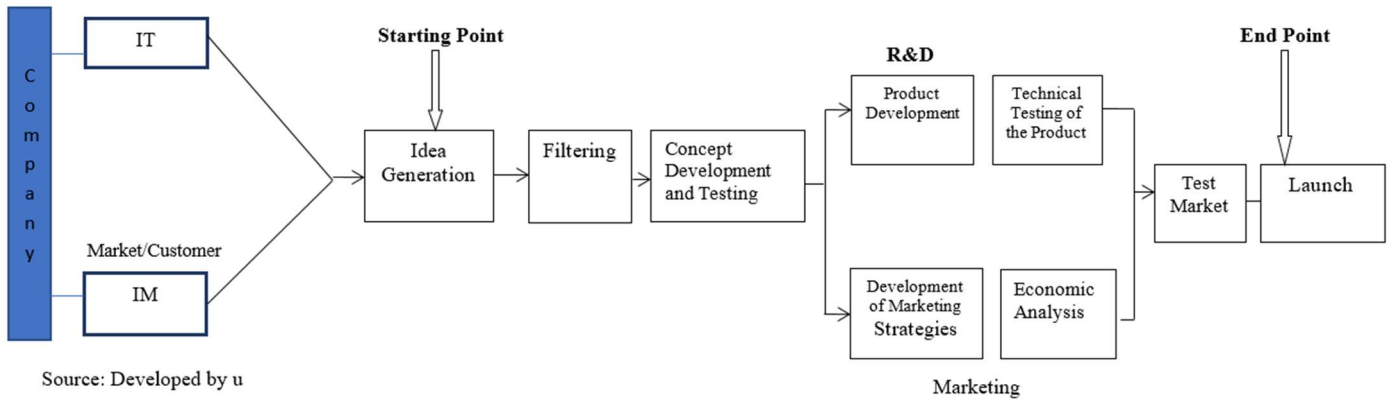

Figure 1: Theoretical Framework of Innovation Marketing

In this study, the hypotheses tested empirically posit that the adoption of innovations proposed by telecommunications companies is influenced by a set of determinants, including organizational factors, the sociodemographic and individual profile of users, user satisfaction and experience, as well as social influence and marketing communication (H_1). More specifically, it is argued that the organizational factors of telecommunications companies exert a positive and significant influence on the adoption of innovations (H_2), that the sociodemographic and individual characteristics of users affect their propensity to adopt mobile phone innovations (H_3), and that perceptions of value and ease of use contribute positively to the adoption of innovations, with overall satisfaction also playing a positive role, although it is not the sole determinant (H_4). Finally, social influence and marketing communication are assumed to have a positive and significant effect on the adoption of innovations (H_5).

2. LITERATURE REVIEW

The literature on innovation and innovation marketing consistently highlights the strategic role of innovation as a driver of competitiveness and value creation in contexts characterized by intense competition and rapid technological change. Innovation cannot be separated from a market orientation, where marketing serves as a central interface between the company, the customer, and the competitive environment. Recent studies emphasize the growing importance of communication and social levers in innovation strategies. For instance, Benmakhlouf (2022) shows that influencer marketing is an effective tool to enhance company resilience, particularly during crises, making social influence a key factor in the credibility and diffusion of innovations.

From an organizational perspective, innovation marketing is a driving force in the innovation process, coordinating internal and external stakeholders to create value for customers and improve innovation performance (Boukella, Souki, & Chitti, 2023). Hamidi (2016) also highlights that innovation marketing strengthens customer involvement from the early stages, enhancing the positioning of the company. Le Nagard-Assayag, Manceau, and Delerm (2022) note the limitations of traditional marketing for innovations that

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precede demand, emphasizing the need to integrate economic, social, and environmental dimensions. In the telecommunications sector, Ameziane (2018) points out that innovation strategies require cross-functional resource mobilization and rapid responses to technological changes, while alignment between strategy and business model remains a critical determinant of performance.

Innovation adoption is multidimensional, shaped by organizational, individual, experiential, and social factors. Kotler and Manceau (2015) distinguish between incremental and radical innovations, both requiring customer focus and structured marketing efforts, while Lambin (1991) highlights how marketing innovations improve distribution, communication, and customer experience. Rogers' (1995) adoption model emphasizes the stages of knowledge, persuasion, decision, implementation, and confirmation, with perceived value, ease of use, experience, and social influence as key determinants. Mottis (2007) further stresses the need to balance technological progress and market responsiveness. Despite these insights, few studies provide an integrated model for emerging markets, a gap this research addresses by proposing a contextualized innovation marketing model for telecommunications companies in the Democratic Republic of Congo.

3. METHODOLOGY

In the quantitative dimension, the econometric approach is preferred to define a model that would explain the adoption of innovations by telecommunications companies through the explanatory variables of innovation marketing.

Data Collection and Sample Selection

The data for this study were collected through a face-to-face survey conducted between April and July 2025, targeting 1225 users of telecommunications products and services and 60 marketing and sales agents from Vodacom-Congo, Airtel-DRC, Orange-DRC, and Africell-DRC in the City-Province of Kinshasa. The survey population included subscribers who use these services daily and the agents responsible for implementing innovations in the market. Sampling was conducted using purposive and simple random methods, taking into account the characteristics of each municipality, with reference to data from the Congolese Postal and Telecommunications Regulatory Authority (ARPTC, Q4-2024), which reported 16.000.000 mobile phone users in Kinshasa, distributed across the four main operators and 24 communes.

Given the absence of comprehensive subscriber lists by municipality, a multi-stage sampling process was applied, involving the municipality, neighborhood, and individual user as survey units. The 24 communes were included, with sample sizes adjusted according to the number of neighborhoods and mobile penetration rates, estimated at 67% at the end of 2024. Neighborhoods were randomly selected, followed by a random draw of avenues and plots to identify individual users. Only users meeting the selection criteria were interviewed, ensuring that the sample accurately reflected the distribution and characteristics of mobile service users in Kinshasa. The sample size was then determined using a structured formula and procedural steps.

- First, the initial sample size n_1 was calculated as follows (Muayila Kabibu, H., and Mujinga Kapemba, A., 2023):

$$n_1 = \frac{Z^2 \overline{P}\,(1-\overline{P})}{e^2} \quad (1)$$

With :

- e: the margin of error of 5%, i.e., $e = 0.05$;
- Z: the 95% confidence level, i.e., $z = 1.96$;
- $\overline{P}$: the estimated proportion of the population of 67%, that is, $\overline{P} = 0.67$;
- The expected response rate is approximately 80%, i.e., r = 0.8

$$n_1 = \frac{(1{,}96)^2 \text{x}\, 0{,}67(1-0{,}67)}{(0{,}05)^2} = 340$$

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- Secondly, we adjusted the sample size as follows:

$$n_2 = n_1 \frac{N}{N + n_1} \qquad (2)$$

With :

- The base population of the survey, i.e. N = 16,000,000 mobile phone users in Kinshasa, end of December 2024 (ARPTC, Q4-2024).
- The initial sample, i.e. $n_1 = 340$

$$n_2 = 340 \frac{16.000.000}{16.000.000 + 340} = 340$$

- Third, we took into account the effect of sampling by multiplying the adjusted size (n_2) by three (3), that is:

$$n_3 = n_2 \times 3 = 340 \times 3 = 1.020 \qquad (3)$$

- Next, we adjusted the sample size n_3 to account for the estimated response rate **r** of 83%, or 0.83. This led us to the final sample size:

$$n = \frac{n_3}{r} = \frac{1.020}{0,83} = 1.229 \qquad (4)$$

However, after eliminating the 4 poorly completed survey protocols (filled with errors), we were left with a sample of 1,225 mobile phone users to survey and beneficiaries of the various products and/or services offered by telecommunications companies in the city-province of Kinshasa.

The table below shows the distribution of users according to their distribution in the municipalities of residence :

Table 1: Distribution of respondents according to municipalities of residence.

N°	Municipality of residence	Number neighborhood by Municipality	Proportion in %	Number of subscribers Estimated by municipality by the end of 2024	Number of users to investigate
1	Bandalungwa	8	2.0	320,000	25
2	Barumbu	9	2.3	368,000	28
3	Bumbu	13	3.3	528,000	40
4	Gombe	10	2.5	400,000	31
5	Pen	18	4.6	736.000	56
6	Kasa-vubu	7	1.8	288.000	22
7	Kimbaseke	46	11.7	1.872.000	143
8	Kinshasa	7	1.8	288.000	22
9	Kintambo	8	2.0	320.000	25
10	Silence	17	4.3	688,000	53
11	Tired	15	3.8	608,000	47
12	Limited	14	3.6	576,000	44
13	English	9	2.3	368,000	28
14	Charcoal	18	4.6	736,000	56
15	Maluku	31	7,9	1.264.000	97
16	Masina	21	5,3	848.000	65

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17	Matete	13	3,3	528.000	40
18	Mont-Ngafula	21	5,3	848.000	65
19	N'djili	13	3,3	528.000	40
20	N'sele	43	10,9	1.744.000	134
21	Ngaba	6	1,5	240.000	18
22	Ngaliema	21	5,3	848.000	65
23	Ngiri-Ngiri	8	2,0	320.000	25
24	Selembao	18	4,6	736.000	56
	Total	**394**	**100**	**16.000.000**	**1.225**

Source: Author.

Furthermore, the staff working specifically within the marketing and sales departments of these various telecommunications companies are distributed according to each company's market share. According to the fourth-quarter 2024 report from the Congolese Postal and Telecommunications Regulatory Authority (ARPTC), the market share of telecommunications companies is as follows:

Business	Market share in % at the end of 2024	Number of agents selected
Vodacom-DRC	35.94	22
Airtel-DRC	29.16	17
Orange-DRC	28.98	17
Africell-DRC	5.92	4
Total	**100**	**60**

Source: Author.

Investigative instrument and its administration

The study employed a structured questionnaire as the main survey instrument. Two distinct questionnaires were developed: one for users of telecommunications products and services, composed of five modules covering respondent identification, mobile network subscriptions, service usage, innovation, and user satisfaction; and another for marketing and sales staff, structured into three modules focusing on staff identification, innovation within the company, and the internal innovation process. The design of these instruments complied with the ethical and professional standards of the American Marketing Association, ensuring the reliability, relevance, transparency, and ethical integrity of the data collected.

Data collection among subscribers was conducted through face-to-face interviews to reduce non-response and questionnaire loss. Trained interviewers, primarily final-year students from relevant academic fields at the National Pedagogical University, were recruited, trained, and involved in a pre-survey before the main data collection, using Kobo Collect software. Security considerations and geographic proximity were also taken into account in their selection. In contrast, the questionnaire for marketing and sales staff was administered in paper format by the researchers, with the assistance of company managers.

Data processing and analysis

Data processing began with a thorough verification of the completed questionnaires, in both electronic and paper formats, followed by data coding and cleaning to correct entry errors. Once the questionnaires were encoded, computer-based processing was required for data entry and analysis. To this end, SPSS version 27 and Microsoft Office 2019 were used. SPSS 27 served as the primary tool for statistical analysis and data management, while Microsoft Excel was used to synthesize tables, graphs, and statistical test results. Word processing and data entry were carried out using Microsoft Word.

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Data analysis constitutes a fundamental stage of this research, particularly within an empirical framework. Beyond the descriptive presentation of tables and figures, it allows raw data to be transformed into scientific knowledge by facilitating hypothesis testing, identifying relationships between variables, structuring the research process, and strengthening methodological rigor. Within the scope of this study, data analysis was conducted at three complementary levels.

Univariate analysis

Univariate analysis is the cornerstone of any serious statistical approach. It consists of examining only one variable at a time, without considering the others. It is essential because it allows us to explore the data, describe the key characteristics of each variable, identify anomalies, prepare the data, and visualize the data.

Bivariate Analysis

Bivariate analysis is an intermediate statistical approach situated between univariate and multivariate analysis, aimed at examining the relationship between two variables simultaneously. It facilitates the understanding of associations and dependencies between variables, supports data visualization and simplification, and provides a basis for subsequent multivariate analysis and informed decision-making. In a bivariate relationship, one variable is considered independent and exerts an effect, while the other is dependent and reflects the outcome of this influence.

To test the existence of a statistically significant relationship between two non-metric variables, the Chi-square (χ^2) test is commonly used. This test is based on the null hypothesis of independence between variables and relies on significance thresholds ($p < 0.01$, 0.05, or 0.10) to determine statistical relevance. In addition to the Chi-square statistic, measures such as Cramer's V are employed to assess the strength of the association. However, since the Chi-square value may be inflated by table size, Cohen (1988) recommends the use of the Omega (Ω) coefficient, which adjusts for this effect and allows interpretation of the relationship's magnitude based on Pearson correlation benchmarks.

Value	Strength of the statistical link
Less than 0.05	Lack of relationship
Between 0.05 and 0.10	Very low
Between 0.10 and 0.20	Weak
Between 0.20 and 0.40	Moderate
Between 0.40 and 0.80	Forte
Between 0.80 and 1	Shady (Collinearity)

Source: Cohen, J., (1988).

It should be clarified in this regard that the fact that there is an association relationship between the two variables does not necessarily mean that there is a cause-and-effect relationship between these variables.

Multivariate analysis

a. Theoretical framework

Multivariate analysis is a key statistical approach for understanding complex phenomena involving multiple variables simultaneously. It overcomes the limits of univariate and bivariate analyses by providing an integrated view of interactions between variables, improving predictive accuracy, reducing interpretation bias, and facilitating data synthesis and dimensionality reduction. In this study, multivariate analysis is implemented through logistic regression, specifically binary logistic regression, which is appropriate given the qualitative nature of the dependent variable, namely the adoption of innovations proposed by telecommunications companies in the Democratic Republic of Congo.

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Binary logistic regression makes it possible to estimate the probability that an individual belongs to a specific category of the dependent variable in this case, adoption versus non-adoption of innovation based on a set of explanatory variables. This method respects fundamental probabilistic constraints, ensuring that estimated probabilities lie between 0 and 1 and that categories are mutually exclusive and exhaustive. The analysis is based on survey data collected from subscribers in Kinshasa, where the dependent variable takes the value 1 for adoption and 0 otherwise. The probability of adoption (P1) serves as the reference variable, with the probability of non-adoption (P0) being its complement, such that $P_1 + P_0 = 1$.

b. Mathematical Formulation and Estimation

In order to model the probability of adoption of innovations Depending on the characteristics of subscribers and telecommunications company agents, it is essential to use a function that guarantees probabilities between 0 and 1. The logistic function is chosen for this purpose because it allows for reliable estimation and easy interpretation of the results. Although it is not the only possible function, it is particularly well-suited to multivariate analysis and the handling of qualitative dependent variables, making it a relevant tool for studying innovation adoption behaviors.

For P_1, the basic logistic model is as follows:

$$P_1 = \frac{1}{1 + e^{-z}} = \frac{e^z}{1 + e^z}$$

Where z represents a linear function of several independent variables.

$$P_1 = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_k X_k)}}$$

This last relationship is transformed into a Logit .

So,

$$1 - P_1 = 1 - \frac{1}{1 + e^{-z}} = \frac{e^{-z}}{1 + e^{-z}}$$

By comparing the last two relations, we obtain by transformation

$$\frac{P_1}{1 - P_1} = e^z$$

The report

$$\frac{P_1}{1 - P_1}$$

It is known in English as "Odd."

$$\text{Odd} = \frac{P_1}{1 - P_1} \equiv \Omega$$

If we take the logarithm of " Odd ", we obtain the expression known as " Logit ".

By definition,

$$\ln(P_1) = \ln\left(\frac{P_1}{1 - P_1}\right) \equiv \ln\Omega$$

Using this definition, the logistic relationship can be written as:

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$$\ln(P_1) = \ln\left(\frac{P_1}{1-P_1}\right) \equiv \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_k X_k$$

Odd lends itself to a relatively simple sensitivity analysis.

Either,

$$\Omega_{P_1} = e^{\beta_0 + \beta_1 (X_1 + 1) + \beta_2 X_2 + \beta_3 X_3 + \cdots . + \beta_k X_k}$$

And

$$\Omega^*_{P_1} = e^{\beta_0 + \beta_1 (X_1 + 1) + \beta_2 X_2 + \beta_3 X_3 + \cdots . + \beta_k X_k}$$

It appears that the impact of a one-unit change in X_1 is Ω_{P_1} equal to e^{β_1}. This is reflected in the following two expressions:

$$\ln(\Omega^*) = \ln\Omega + \beta_1$$

And

$$\Omega^* = \Omega . e^{\beta_1}$$

The estimation of the Logit model , applied to the analysis of innovation adoption in telecommunications companies , is performed using the maximum likelihood method . This method consists of estimating the model parameters by maximizing the probability of observing the adoption behaviors observed in the sample, under the assumption that the chosen specification is correct. The estimation procedure, based on an iterative process, is widely documented in the econometric literature and is implemented in several statistical software packages. These tools provide both overall indicators of model fit, coefficient estimates along with their standard errors and significance tests, as well as elements for assessing the robustness of the results. They also allow for conditional predictions of adoption probabilities based on the values of the explanatory variables.

4. RESULTS

It will consist of estimating the logit model (logistic regression), incorporating the variables which, at the end of the bivariate analysis, were found to be significantly associated with the adoption of innovations by mobile phone companies in the DRC.

Table 2: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on the characteristics of respondents

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall significance of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob.**
Sex	Male Ref.			**0.002**	98.5	6.9	78.9	489,895	0.000***
	Female	-0.463	0.629	**0.003**					
Age ranges	Ref . 45 years and over			0.162					
	Under 18	-0.538	0.584	0.464					
	18-24 years old	0.213	1,237	0.162					
	25-34 years old	0.345	1,413	**0.006**					
	35-44 years old	0.703	2,019	**0.011**					
Marital status	Ref . Widower			**0.003**					
	Bachelor	1,132	3,101	0.118					

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	Bride)	0.519	1,681	0.302					
	Divorcee)	0.535	1,707	0.132					
	Separated	0.855	2,352	**0.001**					
Level of education	Ref. Other			**0.048**					
	Primary	-0.876	0.416	**0.059**					
	Secondary	0.600	1.821	0.191					
	Sup. and Univer .	0.383	1,467	**0.002**					
*(significant at the 10% threshold); **(significant at the 5% threshold); ***(significant at the 1% threshold)*									

Source: Author based on survey data

The results in Table 2 indicate that the model explaining the adoption of innovations in mobile phone companies based on gender, age, marital status, and education level is generally significant ($\chi^2 = 489.895$; $p < 0.001$). The results show that women have a 62% lower probability of adoption than men, while individuals aged 25-34 and 35-40 are respectively 1.5 and 2 times more likely to adopt innovations than those aged 45 and over. Furthermore, separated individuals have a 2.4 times higher probability of adoption than widowed individuals. Education level also appears to be a determining factor: those with a higher education degree are 1.5 times more likely to adopt innovations, while those with a primary school education have a reduced probability of 41.6%. The model displays a high predictive capacity, correctly identifying 98.5% of adopters and 6.9% of non-adopters, for an overall prediction rate of 78.9%.

Table 3: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on the use of different networks

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob**
Vodacom	Ref. Yes			-	100.0	0.0	78.6	459,812	0.000***
	No	0.151	1,163	0.232					
Airtel	Ref. Yes			-					
	No	0.655	1,924	**0.000**					
Orange	Ref. Yes			-					
	No	0.245	1,278	**0.050**					
Africell	Ref. Yes			-					
	No	0.812	2,253	**0.000**					
*(significant at the 10% threshold); **(significant at the 5% threshold); ***(significant at the 1% threshold)*									

Source: Author based on survey data

The information in Table 3 indicates that the model explaining innovation adoption based on subscription network is globally significant ($\chi^2 = 459.812$; $p < 0.001$). The results show that Vodacom network membership does not lead to a statistically significant difference in adoption compared to other subscribers, while Airtel, Orange, and Africell subscribers have an adoption probability approximately twice as high as non-subscribers. In terms of predictive performance, the model correctly identifies all adopters but none of the non-adopters, for an overall classification rate of 78.6%, indicating generally satisfactory but asymmetrical predictive capability depending on adoption profiles.

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Table 4: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on the length of network subscription

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob**
Subscription length : Vodacom	Ref. More than 5 years			**0.003**	98.5	5.3	78.6	483,447	0.000***
	No response	-0.194	0.824	0.313					
	Less than a year	-1.156	0.315	**0.000**					
	Between 1 and 2 years	-0.243	0.784	0.370					
	Between 3 and 5 years	-0.557	0.573	**0.014**					
Subscription length : Airtel	Ref. More than 5 years			**0.000**					
	No response	0.913	2,492	**0.000**					
	Less than a year	0.633	1,884	**0.087**					
	Between 1 and 2 years	0.356	1,427	0.289					
	Between 3 and 5 years	-0.039	0.962	0.897					
Subscription length : Orange	Ref. More than 5 years			**0.052**					
	No response	0.108	1,114	0.547					
	Less than a year	-0.160	0.852	0.683					
	Between 1 and 2 years	-0.589	0.555	**0.034**					
	between 3 and 5 years	-0.300	0.740	0.255					
Subscription length : Africell	Ref. More than 5 years			**0.000**					
	No response	1.102	3,011	**0.000**					
	Less than a year	0.456	1,578	0.280					
	Between 1 and 2 years	0.470	1,599	0.258					
	between 3 and 5 years	0.272	1,313	0.420					
(significant at the 10% threshold); **(significant at the 5% threshold); *(significant at the 1% threshold)*									

Source: Author based on survey data

Table 4 shows that subscription length has a significant influence on the adoption of mobile phone innovations ($\chi^2 = 483.447$; $p < 0.001$). The results indicate that, at Vodacom, subscribers with less than one year of service or between three and five years of service are less likely to adopt innovations. At Orange, subscribers with one to two years of service have a reduced probability of

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adoption. Conversely, no statistically significant influence of subscription length was observed for Airtel and Africell. Predictively, the model correctly identifies 98.5% of adopters and 5.3% of non-adopters, for an overall classification rate of 78.6%, reflecting generally satisfactory explanatory power, although this varies depending on subscriber profile.

Table 5: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on network loyalty

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob.**
Network loyalty: Vodacom	Other			**0.021**	98.7	6.1	78.9	504,208	0.000
	No response	0.346	1,414	0.554					
	Friends	0.899	2,457	0.147					
	Family	-0.113	0.893	0.851					
	Work	-0.019	0.981	0.976					
	Quality of service	0.210	1,234	0.727					
loyalty : Airtel	Other			**0.000**					
	No response	0.711	2.036	0.278					
	Friends	0.452	1,572	0.536					
	Family	-0.380	0.684	0.591					
	Work	-0.471	0.624	0.500					
	Quality of service	0.579	1.784	0.410					
loyalty : Orange	Other			**0.007**					
	No response	0.350	1,419	0.531					
	Friends	0.183	1,201	0.763					
	Family	-0.211	0.810	0.724					
	Work	-0.378	0.686	0.527					
	Quality of service	0.613	1,846	0.297					
loyalty : Africel	Other			**0.000**					
	No response	0.443	1,558	0.470					
	Friends	0.208	1,232	0.768					
	Family	-0.409	0.664	0.563					
	Work	-0.807	0.446	0.247					
	Quality of service	-0.589	0.555	0.384					
*(significant at the 10% threshold); **(significant at the 5% threshold); ***(significant at the 1% threshold)*									

Source: Author based on survey data

Table 5, in terms of results, shows that network loyalty does not have a statistically significant influence on the adoption of innovations for Vodacom, Airtel, Orange, and Africell subscribers, although the overall model is significant ($\chi^2 = 504.208$; $p < 0.001$). Predictively, the model correctly identifies 98.7% of adopters but only 6.3% of non-adopters, for an overall classification rate of 78.9%. This suggests that, in the context studied, the adoption of innovations depends more on other factors than on self-reported network loyalty.

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Table 6: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on the most used subscription network

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob.**
Most used network: Vodacom	Ref. Yes			-	100.0	0.0	78.6	484,483	0.000***
	No	0.281	1.325	**0.024**					
Most used network: Airtel	Ref. Yes			-					
	No	0.671	1,956	**0.000**					
Most used network: Orange	Ref. Yes			-					
	No	0.268	1,308	0.041					
Most used network: Africell	Ref. Yes			-					
	No	0.645	1,906	**0.000**					
*(significant at the 10% threshold); **(significant at the 5% threshold); ***(significant at the 1% threshold)*									

Source: Author based on survey data

The results in Table 6, in terms of analysis, highlight a significant influence of primary network usage on the adoption of mobile phone innovations ($\chi^2 = 484.483$; $p < 0.001$). The results indicate that less frequent users of the Vodacom, Airtel, Orange, and Africell networks have a probability of adoption 1.3 to 2 times higher than that of primary users. Predictively, the model correctly identifies all adopters but none of the non-adopters, for an overall classification rate of 78.6%, suggesting that the adoption of innovations is more closely associated with opportunistic or exploratory usage behaviors than with primary and routine network use.

Table 7: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on the most used phone service

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob**
Most used mobile phone services : Internet	Ref. Yes			-	98.0	0.8	77.2	38,473	0.000***
	No	0.022	1.022	0.986					
Most used mobile phone services: Messaging	Ref. Yes			-					
	No	-0.092	0.912	0.680					
Most used mobile phone services: Mobile Money	Ref. Yes			-					
	No	0.329	1,390	**0.052**					
Most used mobile phone services : Call	Ref. Yes			-					
	No	0.629	1,876	**0.000**					
*(significant at the 10% threshold); **(significant at the 5% threshold); ***(significant at the 1% threshold)*									

Source: Author based on survey data

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The information in Table 7 shows that the use of telephone services influences the adoption of innovations differently: call usage significantly increases the likelihood of adopting innovations (twice as likely for less frequent users), while internet, messaging, and mobile money use has no significant effect. The model is globally significant (Chi2 = 48.473; p = 0.0%) and correctly predicts 98% of adopters, with an overall adoption rate of 77.2%.

Table 8: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on telephony services considered as innovations

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob**
Internet: innovation at Vodacom	Ref. Yes			-	99.2	5.0	79.0	510,037	0.000***
	No	1.125	3,080	**0.000**					
Email: innovation at Vodacom	Ref. Yes			-					
	No	-0.636	0.529	**0.042**					
Mobile money: innovation at Vodacom	Ref. Yes			-					
	No	-0.165	0.848	0.568					
Call for innovation at Vodacom	Ref. Yes			-					
	No	-0.048	0.954	0.871					
Internet: innovation at Airtel	Ref. Yes			-					
	No	0.044	1.045	0.895					
Messaging: innovation at Airtel	Ref. Yes			-					
	No	1,668	5,303	**0.000**					
Mobile money: innovation at Airtel	Ref. Yes			-					
	No	-0.695	0.499	**0.067**					
Call for innovation at Airtel	Ref. Yes			-					
	No	-0.359	0.698	0.319					
Internet: innovation at Orange	Ref. Yes			-					
	No	0.429	1.535	0.139					
Messaging: innovation at Orange	Ref. Yes			-					
	No	0.579	1.784	**0.088**					
Mobile money: innovation at Orange	Ref. Yes			-					
	No	-0.445	0.641	0.125					
Call for innovation at Orange	Ref. Yes			-					
	No	-0.186	0.830	0.542					
Internet: Innovation at Africell	Ref. Yes			-					
	No	1,327	3,769	**0.001**					
Messaging: an innovation at Africell	Ref. Yes			-					
	No	-0.212	0.809	0.674					
Mobile money: innovation at Africell	Ref. Yes			-					
	No	-0.564	0.569	0.246					
Call for innovation at Africell	Ref. Yes			-					
	No	0.024	1.024	0.959					
(significant at the 10% threshold); **(significant at the 5% threshold); *(significant at the 1% threshold)*									

Source: Author based on survey data

Analysis of Table 8 reveals a differentiated effect of the perception of services as innovations on adoption across operators, despite the overall significance of the model (χ^2 = 510.037; p < 0.001). The results show that certain specific perceptions (particularly of the internet or messaging) significantly influence adoption among Vodacom, Airtel, and Africell, while no effect is observed among

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Orange, and mobile money and calls do not have a significant overall influence. The model's strong predictive power (79% correct classifications and 99.2% of correctly identified adopters) suggests that adoption is based more on usage patterns and expectations specific to each operator than on a homogeneous perception of services as innovations.

Table 9: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on the length of time in using services related to the innovation

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob**
Length of use of innovation services: Vodacom	Ref. Don't know			0.000	98.2	17.2	80.9	575,095	0.000***
	No response	-1.475	0.229	0.001					
	Less than a year	-2.715	0.066	0.000					
	Between 1 and 2 years	-2.680	0.069	0.000					
	More than two years	-1.872	0.154	0.000					
Length of use of innovation services: Airtel	Ref. Not known			0.000					
	No response	1,952	7,043	0.000					
	Less than a year	2,183	8,869	0.000					
	Between 1 and 2 years	0.889	2,433	0.022					
	More than two years	1,592	4,916	0.000					
Length of use of innovation services: Orange	Ref. Don't know			0.000					
	No response	0.133	1,142	0.733					
	Less than a year	-0.320	0.726	0.528					
	Between 1 and 2 years	-1.106	0.331	0.011					
	More than two years	-0.034	0.966	0.935					
Length of use of innovation services: Africell	Ref. Not known			0.000					
	No response	1.565	4,783	0.000					
	Less than a year	0.177	1,194	0.748					
	Between 1 and 2 years	1,531	4.625	0.042					
	More than two years	0.847	2,333	0.062					
*(significant at the 10% threshold); **(significant at the 5% threshold); ***(significant at the 1% threshold)*									

Source: Author based on survey data

Logistic regression shows that the length of service has a heterogeneous effect on the adoption of innovations across operators. The results indicate significant but contrasting impacts between networks, with effects that are sometimes negative and sometimes positive depending on the subscription duration. The overall significance of the model ($\chi^2 = 575.095$; $p < 0.001$) and its strong

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predictive power (80.9% correct classifications and 98.2% of correctly identified adopters) confirm that service length influences adoption in a differentiated and non-uniform way across operators.

Table 10: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on the knowledge source of services

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob**
From whom did you learn which services to use: Vodacom	Ref. Telephone			**0.001**	99.1	5.3	79.0	508,411	0.000***
	No response	-0.030	0.970	0.914					
	Friends	-0.558	0.572	**0.093**					
	Family members	-0.770	0.463	**0.022**					
	Third party	-0.749	0.473	**0.064**					
	TV/radio	-1.114	0.328	**0.007**					
From whom did you learn which services to use: Airtel	Ref. Telephone			**0.000**					
	No response	1.093	2,984	**0.000**					
	Friends	0.003	1.003	0.993					
	Family members	0.205	1,227	0.616					
	Third party	-0.324	0.723	0.471					
	TV/radio	0.892	2,439	**0.079**					
From whom did you learn which services to use: Orange	Ref. Telephone			**0.011**					
	No response	0.189	1,208	0.490					
	Friends	-0.591	0.554	**0.088**					
	Family members	-0.535	0.586	0.117					
	Third party	-0.095	0.909	0.827					
	TV/radio	-0.248	0.781	0.569					
From whom did you learn which services to use: Africell	Ref. Telephone			**0.000**					
	No response	0.961	2.615	**0.005**					
	Friends	-0.270	0.763	0.568					
	Family members	-0.216	0.806	0.707					
	Third party	0.239	1,270	0.717					
	TV/radio	-0.183	,833	0.753					
(significant at the 10% threshold); **(significant at the 5% threshold); *(significant at the 1% threshold)*									

Source: Author based on survey data

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It is worth noting that, as shown in Table 10, length of service acquisition influences innovation adoption primarily at Vodacom: subscribers who acquired their knowledge through family or traditional media are respectively 50% and 70% less likely to adopt, while those with more than two years of service are 85% less likely. For Airtel, Orange, and Africell, no significant effect is observed based on the learning method. The model is globally significant (Chi2 = 508.411; p = 0.0%) and correctly predicts 99.1% of adopters, with an overall rate of 79%, highlighting the specific importance of service acquisition and learning method in innovation adoption depending on the network.

Table 11: Results of the logistic regression of the ease of adoption of innovations made by mobile phone companies on satisfaction with the services of mobile phone companies

Adoption of innovations from mobile phone companies by subscribers									
					Correct prediction of innovation adoption in %			Overall meaning of the model (Wald test)	
Variable	**Terms and conditions**	**Coefficient**	**Odds ratio**	**Sig .**	**Yes**	**No**	**Overall**	**Chi-2**	**Prob**
Satisfaction with mobile phone company services: Vodacom	Ref. Absolutely satisfied			0.000	97.9	7.6	78.6	527,830	0.000***
	No response	1,092	2,981	0.000					
	Absolutely dissatisfied	-0.721	0.486	0.445					
	Rather dissatisfied	-0.739	0.478	0.623					
	Neither satisfied nor dissatisfied	-0.255	0.775	0.671					
	Quite satisfied	-0.269	0.765	0.493					
Satisfaction with mobile phone company services: Airtel	Ref. Telephone			0.000					
	No response	1,092	2,981	0.000					
	Friends	-0.721	0.486	0.445					
	Family members	-0.739	0.478	0.623					
	Third party	-0.255	0.775	0.671					
	TV/radio	-0.269	0.765	0.493					
Satisfaction with mobile phone company services: Orange	Ref. Telephone			0.000					
	No response	1,092	2,981	0.000					
	Friends	-0.721	0.486	0.445					
	Family members	-0.739	0.478	0.623					
	Third party	-0.255	0.775	0.671					
	TV/radio	-0.269	0.765	0.493					
Satisfaction with mobile phone company services: Africell	Ref. Telephone			0.000					
	No response	1,092	2,981	0.000					
	Friends	-0.721	0.486	0.445					
	Family members	-0.739	0.478	0.623					
	Third party	-0.255	0.775	0.671					
	TV/radio	-0.269	0.765	0.493					
*(significant at the 10% threshold); **(significant at the 5% threshold); ***(significant at the 1% threshold)									

Source: Author based on survey data

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Table 11 shows that service satisfaction does not significantly influence the adoption of innovations for Vodacom, Airtel, Orange, and Africell. The model is globally significant (Chi2 = 527.830; p = 0.0%) and correctly predicts 97.9% of adopters, with an overall rate of 78.6%, indicating that the adoption of innovations is not directly dependent on subscriber satisfaction levels.

5. DISCUSSION

The empirical results from telecommunications subscribers in the city-province of Kinshasa largely confirm the theoretical and empirical literature on innovation adoption and diffusion. The predominance of young and educated users supports the findings of Rogers (1995) and Benmakhlouf (2022), which identify age, education level, and human capital as key determinants of receptiveness to technological innovations. The results also reveal a segmented competitive landscape, where Vodacom and Orange benefit from more stable subscriber bases, while Airtel and Africell attract newer users who are more inclined to experiment with recent innovations. This dynamic is consistent with strategic marketing analyses emphasizing the role of positioning, product differentiation, and incremental innovation in competitive markets (Kotler & Keller, 2016; Ameziane, 2018).

Usage patterns indicate a gradual shift toward digital services, particularly mobile internet and messaging, perceived as the main innovations by users. These findings align with research highlighting the importance of perceived value, functional utility, and user experience over technological novelty in the adoption process (Rogers, 1995; Le Nagard-Assayag & Manceau, 2022). Innovation diffusion relies primarily on social influence and word-of-mouth, confirming interpersonal communication and social network theories (Katz & Lazarsfeld, 1955; Valente, 1996), while overall satisfaction does not emerge as a decisive determinant of adoption, echoing the distinction between satisfaction and adoption proposed by Oliver (1999) and Fornell et al. (1996). Overall, the results underline the need for telecommunications operators in the DRC to adopt differentiated innovation strategies grounded in perceived value, user experience, and local social dynamics (Lambin, 1991; Mottis, 2007).

Innovation marketing model for telecommunications companies in the Democratic Republic of Congo (OPSI-MPF model)

As part of this research, an original conceptual model of innovation adoption**,** called *the* ***''OPSI-MPF Model'',*** was developed to analyze the determining factors of the appropriation of innovations proposed by telecommunications companies.

This model is based on four complementary dimensions: " ***organizational factors (O)*** *"* **,** relating to internal structures and practices that promote innovation; " *the* ***individual and sociodemographic factors (P)*** **"** , concerning the profile of users and their perception of innovations; " ***satisfaction*** *and* ***user experience (S)*** **,** reflecting the appreciation and actual use of innovations; as well as ***social*** *influence* ***and marketing communication (I)*** **,** reflecting the impact of social interactions and dissemination strategies on the adoption decision. The inclusion of the author's initials (**MPF**) highlights the original contribution of this model to the empirical analysis of innovation adoption in the telecommunications sector, by providing a structured framework for identifying and measuring the organizational, human, and strategic determinants of this adoption.

Based on analyses conducted with companies and subscribers in the telecommunications sector in the Democratic Republic of Congo, we propose an innovation marketing model based on the combined analysis of agent and user data. This model revolves around four main, interconnected determinants that influence the adoption of innovations:

1. ***Organizational factors*** : Internal sources of innovation (R&D, product departments, specialized teams) and the structured process (preliminary testing, incremental approaches, technical and commercial integration) directly enhance the **perceived quality of services** . Strategic objectives, such as expanding the product range and increasing market share, steer innovations towards competitiveness and added value, in line with the work of Kotler & Keller (2016), Lambin (1991), and Mottis (2007).
2. ***Individual and sociodemographic factors*** : the user profile (age, education level, length of use) and the **perception of innovations** (relative value, compatibility, ease of use) moderate their propensity to adopt innovative services. These mechanisms are consistent with the diffusion of innovations theory (Rogers, 1995) and the TAM model (Davis, 1989).

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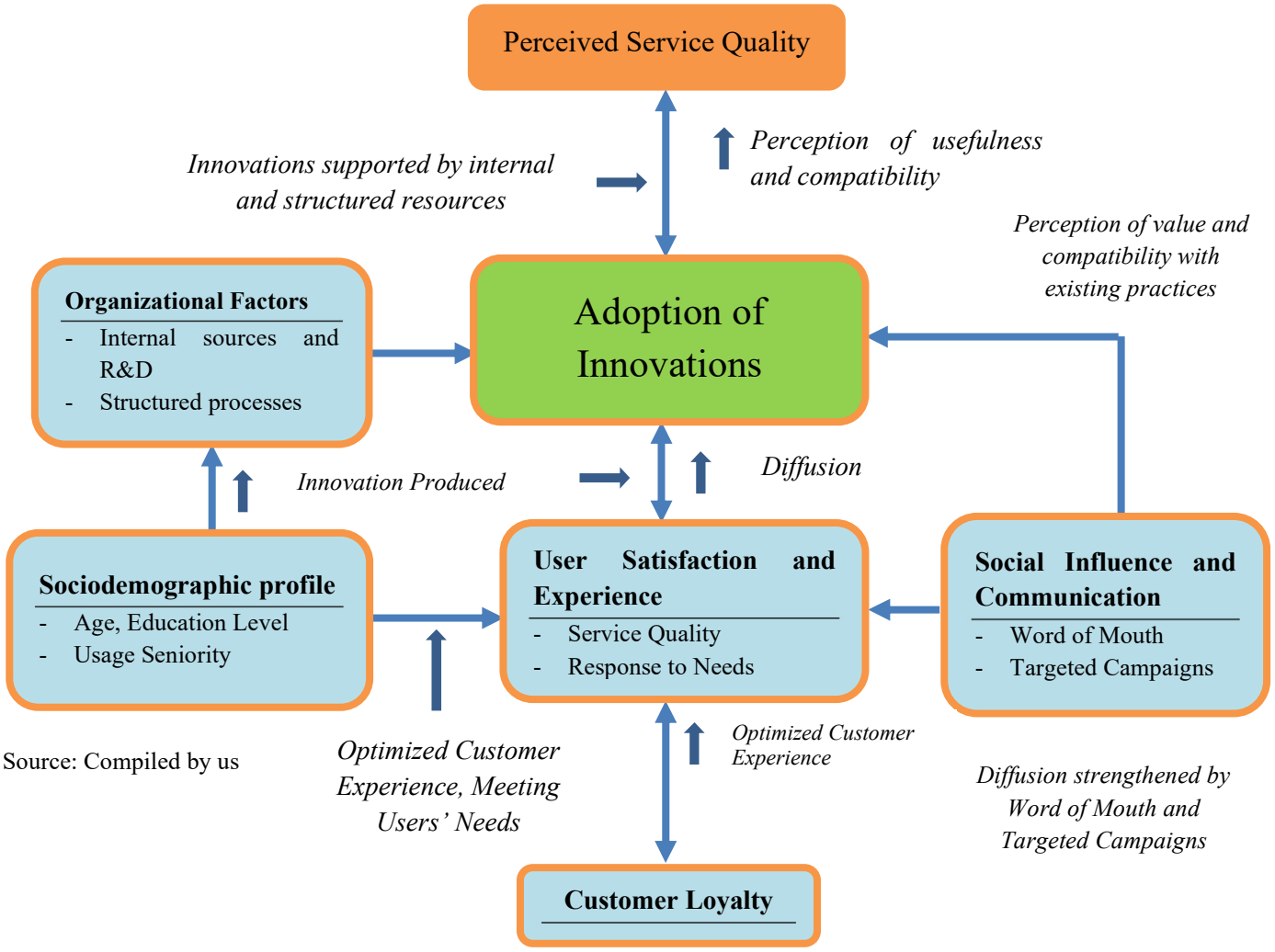
3. ***User satisfaction and experience*** : Perceived quality and overall experience influence adoption, although satisfaction is not always a decisive factor. Innovations can attract both satisfied users, who trust the network, and dissatisfied users, who are seeking improvement, in line with the work of Oliver (1999) and Fornell et al. (1996).
4. ***Social influence and marketing communication*** : word-of-mouth, the influence of family and friends, and targeted marketing campaigns stimulate the dissemination and adoption of innovations. This dimension is particularly crucial in the Congolese context, in accordance with Katz & Lazarsfeld (1955) and Valente (1996).

The adoption of innovations in the telecommunications sector in the Democratic Republic of Congo results from a dynamic interaction between organizational factors, user profiles and perceptions, customer experience and satisfaction, and social influence. The proposed model positions adoption as the central outcome of these interrelated determinants, illustrating how telecommunications companies can structure their innovation strategies by mobilizing internal resources, supporting product and service development through R&D, and optimizing perceived value and compatibility with existing uses. Innovation diffusion is further strengthened by social influence mechanisms, particularly word-of-mouth and targeted marketing communication, in line with the theoretical contributions of Rogers (1995), Davis (1989), and Kotler and Keller (2016), thereby providing a strategic framework for designing user-centered innovations adapted to the specific context of the DRC.

Figure 2: Presentation of the innovation marketing model of telecommunications companies in the DRC



Source: Compiled by us

This model illustrates the main determinants of innovation adoption in telecommunications in the DRC. Organizational factors (internal sources, structured processes) influence the perceived quality of services **.** user profiles and perceptions Factors such as age, education level, and seniority moderate adoption. User satisfaction and experience **,** along with social influence and marketing communication **,** reinforce the diffusion and acceptance of innovations. This model integrates the classic dimensions of innovation diffusion (Rogers, 1995), TAM (Davis, 1989), and innovation marketing (Kotler & Keller, 2016), and is centered on user experience.

6. CONCLUSION

This article analyzes and formalizes an innovation marketing model tailored to telecommunications companies operating in the Democratic Republic of Congo, drawing on empirical data collected from operators and subscribers in the city-province of Kinshasa. The findings show strong consistency with established theories of innovation adoption and diffusion, while highlighting contextual specificities of the Congolese market. Innovation adoption is mainly influenced by individual factors such as age, education level, and openness to change, as well as by perceived value, functional utility, and user experience rather than technological novelty alone. The competitive landscape is characterized by market segmentation and differentiated adoption behaviors across operators, with social influence and word-of-mouth playing a central role in legitimizing and diffusing new services.

Based on these results, the study proposes the OPSI-MPF innovation marketing model, structured around four interdependent dimensions: organizational factors, individual and sociodemographic characteristics, user satisfaction and experience, and social influence and marketing communication. The model highlights that innovation adoption emerges from the dynamic interaction between internal organizational capabilities, user perceptions, experiential quality, and social diffusion mechanisms. It thus represents both a meaningful theoretical contribution to the literature on innovation adoption in emerging economies and a practical decision-support tool for telecommunications operators in the Democratic Republic of Congo, aimed at fostering sustainable and value-creating innovation adoption.

7. RECOMMENDATIONS

Based on the findings of this study, telecommunications companies are advised to strengthen their organizational innovation capabilities by structuring internal processes focused on value creation, experimentation, and continuous improvement of the user experience. Innovation strategies should center on the perceived value and functional utility of services, taking into account the diversity of sociodemographic profiles and subscriber usage behaviors, in order to offer differentiated and tailored solutions. It is also essential to integrate local social dynamics into innovation marketing strategies, particularly by leveraging word-of-mouth, user communities, and opinion leaders, whose influence plays a crucial role in the diffusion of innovations. Furthermore, public decision-makers and regulatory bodies are encouraged to support an environment conducive to innovation through policies promoting digital competition, accessibility and inclusion, while future research would benefit from deepening and extending the validation of the OPSI-MPF model in order to strengthen its analytical and operational scope in the Congolese context and beyond.

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