

Customer Perceptions of Service Quality, Satisfaction and Loyalty in Mobile Telecommunications

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Abstract. *Customer experience is increasingly valued as a critical factor for long-term competitive positioning in saturated mobile telecommunications markets. As the operational differences become increasingly non-existent and technology barriers are smaller, customer satisfaction levels, product quality, and value perception contribute to loyalty and long-term performance. Recent scientific literature has focused on integrative models of customer satisfaction, which illustrate that customers' loyalty is determined by their perception of quality, perceived value, and satisfaction in a multi-faceted manner, especially in high-technology service industries. Nevertheless, there is little empirical data from the mobile telecommunications markets in developing European economies. This research utilises a quantitative research design comprising a cross-sectional research to analyze the relationships among perceived service quality, perceived value, customer satisfaction, and customer loyalty within a telecom business. Data were collected from 300 customers of a leading mobile operator via an online survey with an adapted questionnaire. Data were analyzed using descriptive statistics, internal consistency analysis, exploratory factor analysis, Pearson correlation analysis, and multiple regression models. In this analysis, the relationship between perceived service quality and perceived satisfaction as well as loyalty is well indicated and the multidimensional structure of perceived service quality is confirmed. The perceived value stands out as the most significant factor for customer satisfaction, while customer satisfaction is identified as the strongest predictive agent for customer loyalty. The strong internal reliability measures that have been established confirm that the measurement instrument is relatively reliable. These results provide further support for the soundness of these integrated customer satisfaction concepts which validate the usefulness of integrated customer satisfaction models in this particular sector and are valuable for operators better to optimize customer experience, satisfaction, and loyalty and to offer support to operators who wish to improve the customer experience and loyalty in digital markets.*

Keywords: mobile telecommunications, perceived service quality, customer satisfaction, customer loyalty, perceived value, customer experience, ECSI model.

Introduction

With digitalization, the increase of mobile internet services and increasing dependence of consumers on mobile connectivity in carrying out daily tasks, the telecom industry is undergoing vast changes. Network infrastructure bears many functional and technical demands due to these services. With this in mind, service quality has become an important assessment metric in

determining the efficiency of mobile telecommunications services from a technical approach and user experience perspective. Current research findings have documented that both objective quality of network performance and the subjective sense of dependability, coverage, service continuity, and customer support engagement all affect user satisfaction.

Contemporary literature underlines customer perception as key in understanding service evaluation and loyalty behavior, but the previous methods of service quality assessment have primarily centred on technical performance measures. The following research question is addressed in this study: In mobile telecommunications services, which aspects of perceived service quality have the biggest impact on customer loyalty and satisfaction? The study uses a quantitative method based on a structured questionnaire that was modified from the European Customer Satisfaction Index model and administered to customers of an important mobile telecommunications provider in order to address this question. This study adds empirical evidence to the literature by identifying the major factors that influence customer satisfaction and loyalty.

Literature review

Considered broadly in telecom, service quality is multifaceted and integrates the subjective perceptions of users about service delivery with technical network performance. Mobile services are defined as the functional translation of network capabilities through applications (Cox, 2012; Sauter, 2021), and are usually mobile calls (voice communication, mobile internet access, and multimedia services) with distinct performance requirements. As mobile networks operate with heterogeneous traffic types, sensitivity to latency, packet loss, and throughput vary across services (Janevski, 2019), service quality cannot be consistently evaluated across services. Thus, research has shown that in particular for data-intensive and multimedia use cases, user satisfaction is determined not only by objective measures on performance, but also subjective aspects such as perceived reliability, service continuity, coverage, and customer support, which are essential for the experience (Varela et al., 2014; Zhou et al., 2019; Kalia et al., 2021).

Where the research is more oriented on the objective performance measurements in QoS, customer satisfaction models focus on mechanisms for subjective evaluation. In the literature, integrated evaluation frameworks linking customer satisfaction and loyalty to perceived service quality are proposed to cope with this complexity. Such models give a deeper insight into the mobile telecommunications customer experience by integrating technical performance, perceptual and behavioral factors. Though very little data exist on the relative importance of various aspects of service quality, the evidence points to perceived value and perceived service quality in determining satisfaction and loyalty outcomes (Al-Shehri et al., 2017; Mazhar et al., 2023).

According to recent empirical research in this industry, customer satisfaction and perceived service quality are positively related. Suchanek and Bucicova (2025) show that, even in post-pandemic conditions, overall customer satisfaction is significantly impacted by perceptions of service reliability, network coverage, and customer support quality, using a structural model based on the European Customer Satisfaction Index. According to their findings, satisfaction is influenced by perceived service quality at all stages of market maturity.

Simultaneously, perceived value has become a significant factor in determining customer satisfaction, sometimes outweighing the direct impact of perceived service quality. Consumers assess perceived benefits as service dependability, flexibility, and support quality in addition to price when determining value.

Research from developing telecom markets shows that perceived value has a significant positive impact on customer satisfaction, which in turn leads to increased levels of customer loyalty

(Hajar et al., 2022). These results demonstrate the increasing significance of perceived value in fiercely competitive and cost-sensitive telecommunications markets.

On the basis of empirical data reported by Ting et al. (2020), more satisfied customers have lower switching intentions and are more likely to stay with their service provider. Despite this rich field of research on the relationship between service quality, perceived value, customer satisfaction and customer loyalty, only a small number of studies have explored all of these dimensions simultaneously in a single framework, especially in emerging European economies. While ECSI relationships have been empirically tested well, the relative explanatory power of the perceived value vs. perceived quality relationship in emerging European telecom markets is still not known. This study aims to fill this gap by looking at the relationships among perceived service quality, perceived value, customer satisfaction and customer loyalty in that context. Given the previous literature reviewed and the identified empirical voids, the following hypotheses are formulated:

H1: In the mobile telecom sector, perceived service quality has a significant positive effect on customer satisfaction.

H2: Perceived value exerts a significant positive effect on customer satisfaction in mobile telecommunications services.

H3: Customer satisfaction has a significant positive effect on customer loyalty in mobile telecommunications services.

Methodology

This research instrument was a structured questionnaire that was designed from the European Customer Satisfaction Index (ECSI) model. Although the causal structure from the original ECSI model, namely relationships between operator image, customer expectations, perceived service quality, perceived value, customer satisfaction and customer loyalty, was not changed, the questionnaire was adapted from the conceptual form and the items in use proposed by Suchanek and Bucicova (2025). At the same time, the instrument was adapted to the specific characteristics of Romania's telecommunications market and the post-pandemic time in which services were used. The data were captured using an online survey which was given to customers of a single major mobile telecommunications firm in Romania.

To adjust to the recent developments in mobile service consumption, that is, increased mobile data usage, intensive use of digital applications, video streaming and increased mobility, the questionnaire was conceptually and contextually modified in relation to the initial instrument introduced by Suchanek and Bucicova (2025). A comprehensive examination of the mobile service experience could be achieved by establishing the psychological construct of perceived service quality as having a multidimensional nature.

There are two primary sections to the questionnaire. The sociodemographic variables (gender, age group, education level, employment status, type of residence, and predominant use of mobile services) in the first section are used to characterize the sample and function as control variables in further analyses. The study's six latent constructs: operator image (IM), customer expectations (EXP), perceived service quality (PQ), perceived value (PV), customer satisfaction (CS), and customer loyalty (CL), are represented by measurement items in the second section. All items were measured using a seven-point Likert scale.

The operator's image reflects customers' general perceptions of the provider's standing in the market, reputation, and credibility. This study considers items that measure the operator's perceived social responsibility, perceived innovativeness, and overall brand image. To act as benchmarks, customer expectations (measured by expected service quality, suitability to everyday

needs, and perceived staff efficiency) set the standard of service performance for consumers. The perceived value is defined with items that assess price-quality fairness and value for money. Customer satisfaction, also a type of overall evaluation of service experience, encompasses overall satisfaction, expectation fulfillment, and comparison of the service with an ideal operator. Finally, behavioral intentions are reflected in terms of customer loyalty, with items that measure resistance to switching in response to moderate price increases, willingness to recommend the operator, and intention to continue using the services operationalized as well.

Several statistical methods were used with R software for data processing and analysis in order to test these hypotheses. Each approach was chosen in accordance with its applicability to the study's goals and the European Customer Satisfaction Index model's conceptual framework.

First, customer perceptions of the study's primary constructs: perceived service quality, perceived value, customer satisfaction, and customer loyalty, were compiled using descriptive statistics. Thus, in order to assess the overall level and degree of variation of customer evaluations, mean and standard deviation estimates were calculated for each item and latent construct.

Cronbach's alpha coefficients of each construct applied to each of the variables of the measurement instruments were presented as test of reliability of the measure. The questionnaire items test in accordance with theoretical construct are consistent and are reliably distributed, evidenced by their relatively high coefficients of reliability. An investigation to test whether the adapted questionnaire from the European Customer Satisfaction Index model could obtain an accurate impression of the customers' perceptions in the specified domain, was conducted in form of exploratory factor analysis. The Kaiser–Meyer–Olkin index and Bartlett's test of sphericity were employed to test the suitability of the dataset for factor analysis before factor extraction. The validity of the measurement framework was confirmed with the analysis of the factor solutions, which discovered idiosyncratic latent dimensions that closely match with theoretical constructs and accounted for most of the total variance.

Then the relationships between perceived service quality, perceived value, customer satisfaction, and customer loyalty were explored through a Pearson correlation analysis. The strength as well as the direction of the relationships between the constructs were assessed with the help of Pearson correlation coefficients. Results provided preliminary evidence to support the proposed hypotheses, as perceived service quality and satisfaction were positively related, and those pertaining to satisfaction and loyalty were strong and statistically significant. Multiple regression models were also estimated to help test the research hypotheses and ascertain main determinants of customer satisfaction and loyalty. Customer loyalty was expressed as a function of satisfaction and specific service quality components, while customer satisfaction was expressed as a function of perceived service quality dimensions and perceived value. The effect of each predictor was estimated by standardized regression coefficients and potential multicollinearity between independent variables was assessed through calculation of variance inflation factors. The questionnaire participants gave informed consent for their participation before they finished the survey, they engaged only voluntarily to participate, and responses were collected anonymously to ensure data integrity and confidentiality.

Results and discussions

The primary empirical findings of the study are presented and discussed in this section, with an emphasis on the implications of the findings for current research in the field of mobile telecommunications services as well as the validation of the suggested research hypotheses.

An overview of the sample structure and respondents' overall opinions about mobile services is given by the descriptive analysis. According to Table 1, the gender distribution of the sample is well balanced, thus minimizing the risk of gender-related bias and supporting the external validity of the results.

Table 1. Distribution by gender

Gender	N	Percentage (%)
Female	155	51.7
Male	144	48.0
Prefer to not say	1	0.3
Total	300	100%

Source: Authors' own research.

All latent constructs have high mean values, with scores higher than 6 on a seven-point Likert scale, as shown in Table 2. In terms of perceived service quality, perceived value, customer satisfaction, and customer loyalty, these results show a generally favorable assessment of the operator. Despite the generally positive evaluations, perceived service quality shows the greatest relative variability, indicating that users' experiences are not totally uniform.

Table 2. Descriptive statistics for latent construct

Construct	N	Mean	Std. Dev.	Min	Max
Operator image (IM)	300	6.17	0.75	1.00	7
Customer expectations (EXP)	300	6.24	0.71	1.00	7
Perceived service quality (PQ)	300	6.03	0.70	2.27	7
Perceived value (PV)	300	6.06	0.67	2.33	7
Customer satisfaction (CS)	300	6.05	0.67	1.67	7
Customer loyalty (CL)	300	6.06	0.65	2.00	7

Source: Authors' own research.

Significant variations between elements of the service experience are revealed by a more thorough analysis of perceived service quality dimensions (Table 3). The dimension pertaining to coverage and availability has the lowest mean score and the highest standard deviation, while network quality, digital services, and customer support receive comparatively high and consistent evaluations. Even in an environment where customer satisfaction is high, this result shows that network coverage is the main area of vulnerability from the customers' point of view.

Table 3. Descriptive statistics for latent construct

Perceived service quality dimension	Mean	Std. Dev.
Network quality	6.07	0.70
Coverage and availability	5.97	0.79
Digital services and applications	6.00	0.76
Customer support and auxiliary services	6.04	0.69

Source: Authors' own research.

According to Table 4, the differentiated analysis by type of residence also shows the importance of geographic aspects in impacting service perceptions. Consumers residing in large

cities describe the best perceptions of coverage quality, while ratings diminish gradually in rural areas and small cities. Coverage scores were lowest among respondents from rural areas, which means the existence of structural barriers to mobile network access outside of large urban areas.

Table 4. Perceived coverage quality by type of residence

Type of residence	Mean (PQ – Coverage)	N
City > 200,000 inhabitants	6.20	140
City 50,000–200,000 inhabitants	5.81	108
City < 50,000 inhabitants	5.76	39
Rural area	5.42	13

Source: Authors' own research.

The findings show that coverage and availability continue to be important factors in determining the overall service experience, despite the fact that customers typically express high levels of satisfaction and loyalty. These findings are particularly relevant in the post-pandemic world, with increased mobility from the users and more mobile data usage and the growing dependency on consistent and reliable connectivity.

The results demonstrate that coverage and availability still drive service experiences regardless of the high customer satisfaction and loyalty expressed by customers. The mention of coverage and signal stability as potential sources of dissatisfaction provides a relevant foundation for interpreting the subsequent inferential analyses.

The internal consistency of measurement scales was checked prior to testing of proposed relationships to ensure the reliability of the research instrument. Cronbach's alpha coefficients were obtained to estimate the reliability of the scale of each latent construct. The reliability of each construct is high (all the constructs have high alpha values significantly higher than the recommended cut-off of 0.70 in Table 5). These results corroborate the instrument's appropriateness for multivariate statistical analysis and confirm that elements of each construct are measuring the same underlying theoretical concept in a meaningful manner.

Table 5. Internal consistency of the analyzed constructs

Construct	Number of items	Cronbach's Alpha
Operator image (IM)	3	0.924
Customer expectations (EXP)	3	0.970
Perceived service quality (PQ)	11	0.983
Perceived value (PV)	3	0.975
Customer satisfaction (CS)	3	0.980
Customer loyalty (CL)	3	0.971

Source: Authors' own research.

The Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity were employed to assess the appropriateness of the data prior to the exploratory factor analysis (EFA). KMO index was higher as measured at 0.943 showing better sampling adequacy. Bartlett's test was significant ($\chi^2 = 16,509.18$; $df = 325$; $p < 0.001$), indicating that the correlation matrix differentiates significantly from an identity matrix. The results suggest that the data are suitable for factor analysis. A strong general factor between the eigenvalue distribution and the steep initial drop in

the scree plot indicates that respondents are likely to assess the quality, value, satisfaction and loyalty of service in an integrated fashion. First, the number of the factors was explored using parallel analysis (200 iterations), as shown in Figure 1.

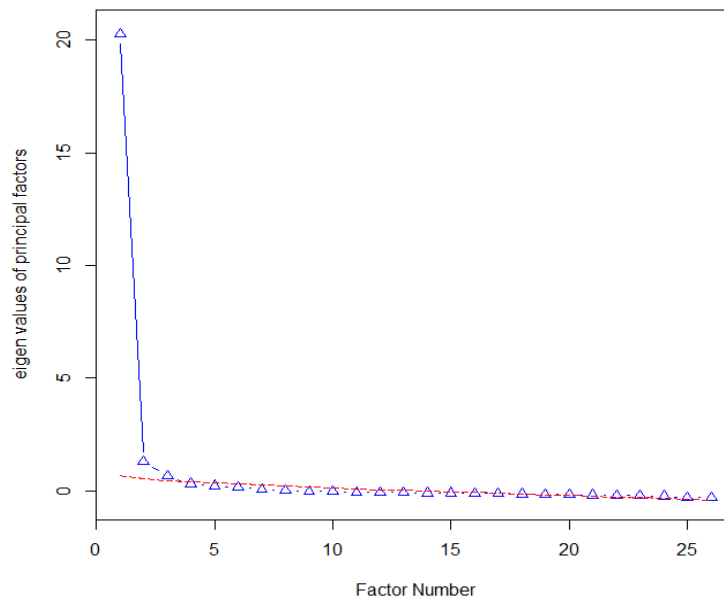


Figure 1. Parallel Analysis

Source: Authors' own research.

A three-factor solution was proposed in parallel analysis, but a six-factor solution consistent with the theoretical framework of the European Customer Satisfaction Index (ECSI) was retained for further analysis. The psych package in R was applied for exploratory factor analysis (EFA) using the Minimum Residuals (minres) extraction method with oblimin rotation. An oblimin rotation was performed given the expected correlations between ECSI dimensions. Model fit indices exhibited poor fit (TLI = 0.629; RMSEA = 0.248) but the one-factor solution explained 78% of the variance.

Conversely, the six-factor solution had a better (but still moderate) fit explaining approximately 92% of the variance (TLI = 0.805; RMSEA = 0.179; RMSR = 0.01). The construct validity of the measurement tool was verified by the factor loadings, as the majority of items load strongly on their theoretically corresponding factors. Following oblimin rotation, Table 6 shows the dominant factor loadings for each item in the six-factor solution to facilitate interpretation of findings. To highlight the relationships between the data reported and the theoretical constructs of the ECSI, only the highest loading per item is shown.

Table 6. Main factor loadings (EFA, oblimin rotation)

Item	Dominant Factor	Loading
IM1	MR5 (Image)	0.76
IM2	MR5	0.88
IM3	MR5	0.71
EXP1	MR2 (Expectations)	0.76
EXP2	MR2	0.81
EXP3	MR2	0.80

Item	Dominant Factor	Loading
PQ5	MR3 (Network quality)	0.74
PQ8	MR4 (Digital services)	0.62
PQ9	MR4	0.66
PQ10	MR4	0.56
PQ11	MR4	0.59
PV1	MR1 (Perceived value)	0.43
PV2	MR1	0.54
PV3	MR1	0.63

Source: Authors' own research.

Data on items related to Image (IM) and Expectations (EXP) have clearly high loadings, confirming the internal consistency of these dimensions. Since they are most likely to load on the same dominant factor, there was significant overlap between Perceived Value (PV) and Customer Satisfaction (CS).

The results suggest that value and satisfaction are interrelated to the participants of the study, which reflects a general evaluation of the service encounter. Perceived Quality (PQ) is measured by various factors corresponding to different subdimensions, including coverage, network performance, and digital support services. Technically related items (such as coverage versus network stability) demonstrate moderate cross-loadings showing that users perceive technical service offerings as part of the same package as opposed to discrete segments of the whole.

Combining items pertaining to perceived value, satisfaction, and loyalty, the first factor (MR1) captures the general relationship between the customer and the mobile operator and can be interpreted as a general evaluation factor.

In line with methodological guidelines of factor stability, one factor (MR6) was excluded from further analysis, as it was defined by a single item.

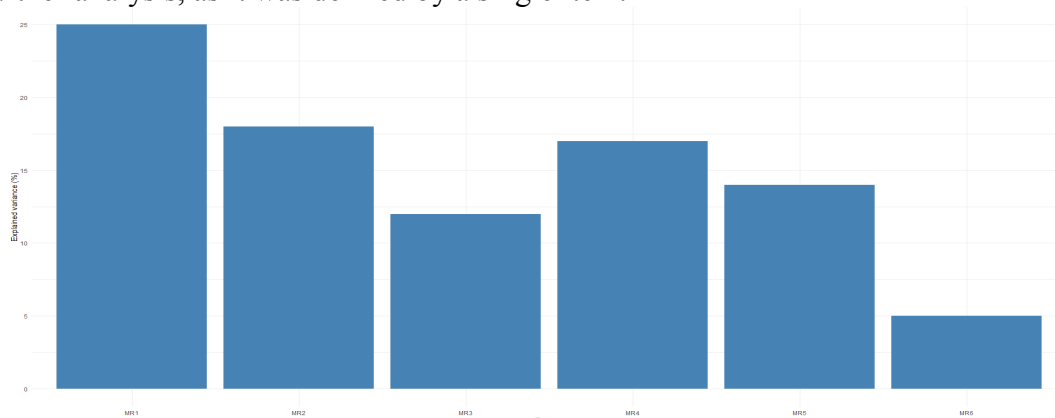


Figure 2. Distribution of variance

Source: Authors' own research.

As seen in Figure 3, the cumulative variance explained by the factors identified (with six-factor solution) comes to approximately 92%. This distribution points to the goodness of the retained factorial structure for the subsequent analysis.

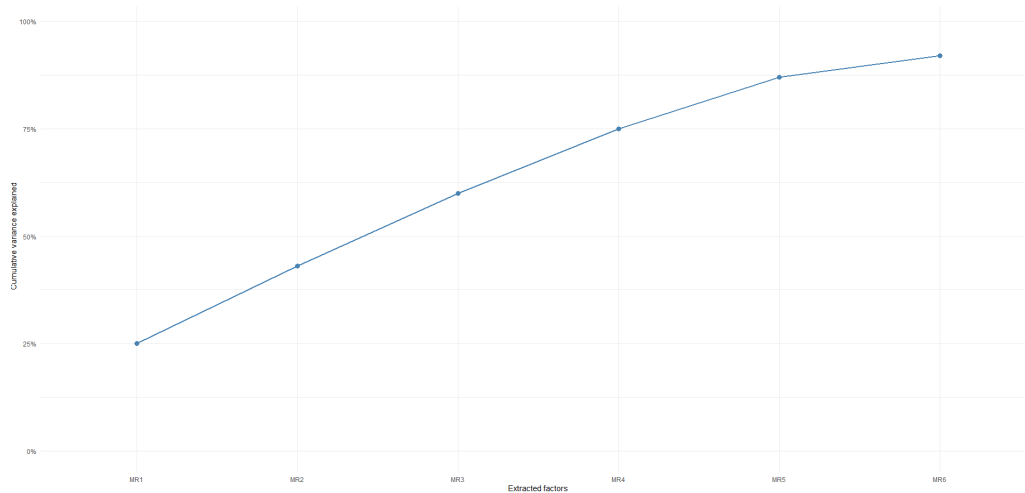


Figure 3. Cumulative variance explained by the six-factor solution

Source: Authors' own research.

Correlations of the extracted factors are shown in Figure 4. The heatmap displays moderate to high positive correlations regarding the majority of the latent dimensions with coefficients between 0.26 and 0.75. Because factor independence would not be appropriate in this case, these results support the use of an oblique rotation (oblimin).

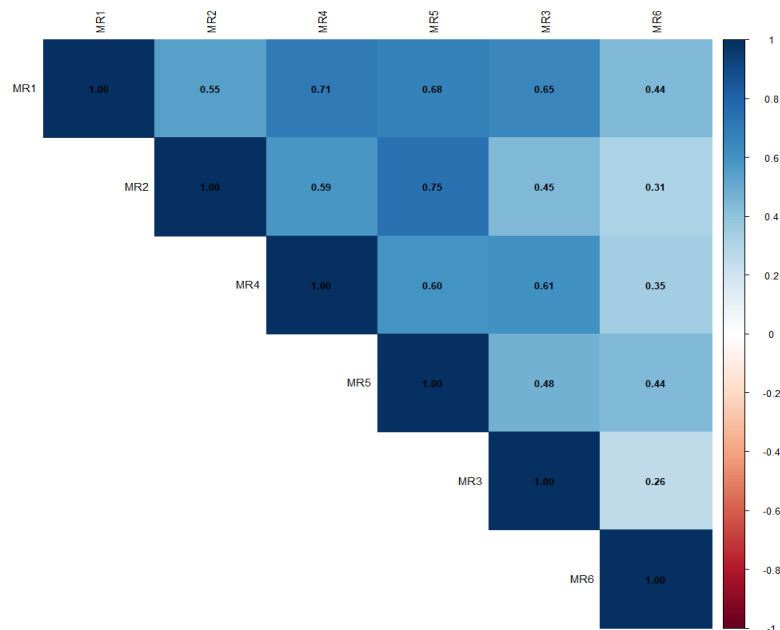


Figure 4. Correlations between extracted factors (oblimin rotation)

Source: Authors' own research.

Pearson correlation analysis was performed to explore associations at the relationship levels at the main constructs in the study. The results indicate there is very strong and positive correlation for each construct, and for each correlation, the coefficient is statistically significant ($p < 0.001$). Customer Satisfaction (CS, $r = 0.901$) and Perceived Value (PV, $r = 0.902$) are found to have a strong and significant correlation with Perceived Quality (PQ) in which this means that the

technical performance of mobile services has a considerable effect on the total judgments of customers. Also, the model also confirms the theory for the European Customer Satisfaction Index model, that happy customers are more likely to stay with the service (strong association between customer satisfaction and customer loyalty is CL, $r = 0.903$).

Additionally, there is a significant correlation between Image (IM) and Expectations (EXP) and Customer Satisfaction ($r = 0.797$ and $r = 0.751$, respectively), indicating that perceptual and reputational factors have a significant impact on the overall service evaluation. These findings support the interdependencies of the ECSI constructs and support the cohesion of a relational structure of perceived quality, value, satisfaction and loyalty. The correlation analysis presented in Figure 5 shows strong and statistically significant associations between the examined constructs but it is not possible to assess the relative contributions of each factor or to make conclusions regarding causality. In the following section, multiple regression analysis is used to determine the important factors affecting customer satisfaction and loyalty.

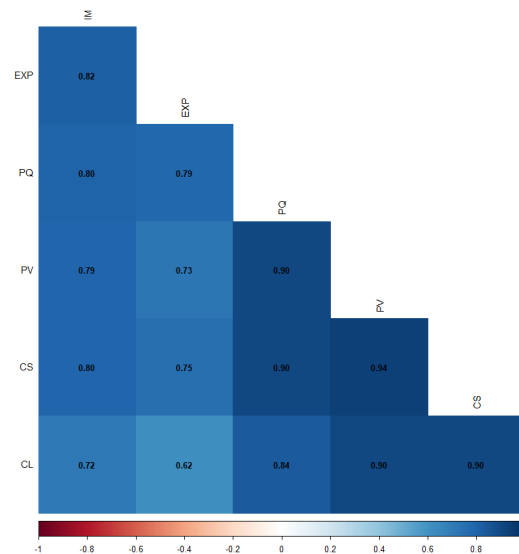


Figure 5. Pearson correlations between ECSI constructs

Source: Authors' own research.

According to accepted methodological guidelines, multiple regression models were estimated (Hair et al., 2019). To evaluate the explanatory power of the suggested models, standardized coefficients (β), statistical significance levels, coefficients of determination (R^2), and global F-tests were examined.

A multiple regression model was estimated using Perceived Quality (PQ) as the dependent variable and Image (IM) and Expectations (EXP) as the independent variables in order to investigate the factors influencing perceived quality of mobile telecommunications services:

$$PQ = \beta_0 + \beta_1 \cdot IM + \beta_2 \cdot EXP + \varepsilon, \quad (1)$$

where PQ is perceived quality, IM is operator image, EXP is customer expectation, β_0 is the intercept of regression model, β_1 and β_2 are the estimated standardized regression coefficients of the independent variables and ε is the error term. Latent constructs are operationalized by computing composite scores as the average of the respective Likert-scale items (7-point scale) for each variable. Both independent and dependent variables were thus subjected to continuous

treatment. The high explanatory power of the model ($R^2 = 0.693$) shows that image and expectations explain approximately 69.3% of the variance in perceived quality.

The model shows a high explanatory power ($R^2 = 0.693$). Perceived quality is explained by image and expectation for about 69.3%. Overall, the model is statistically significant ($F(2,297) = 335.6, p < 0.001$). Both predictors have a positive and significant impact on perceived quality. The image has the biggest influence after expectations ($\beta = 0.394, p < 0.001$). The results show that the brand reputation and pre-consumption expectations have a significant impact on consumers' evaluations of service quality. A second multiple regression model was estimated to identify the factors affecting Customer Satisfaction (CS). The model includes Perceived Value (PV) and the subdimensions Network Quality ($PQ_{network}$), Coverage ($PQ_{coverage}$), Digital Applications (PQ_{apps}) and Support Services ($PQ_{support}$) of perceived quality as predictors.

$$CS = \beta_0 + \beta_1 \cdot PV + \beta_2 \cdot PQ_{support} + \beta_3 \cdot PQ_{network} + \beta_4 \cdot PQ_{coverage} + \beta_5 \cdot PQ_{apps} + \varepsilon, (2)$$

where CS is customer satisfaction, PV is perceived value, $PQ_{support}$ is perceived quality of support services, $PQ_{network}$ is perceived network quality, $PQ_{coverage}$ is perceived network coverage, and PQ_{apps} is perceived quality of digital applications. β_0 is the intercept, β_1 - β_5 are the estimated standardized regression coefficients, ε is the error term.

The model is statistically significant ($F(5,294) = 588.7, p < 0.001$) with good explanatory power ($R^2 = 0.909$; adjusted $R^2 = 0.908$). Perceived value ($\beta = 0.590, p < 0.001$) and support services ($\beta = 0.374, p < 0.001$) were the most prominent factors affecting satisfaction. Network quality has a lesser but significant effect ($\beta = 0.120, p < 0.05$). The lack of statistically significant effects of coverage and digital applications shows that the levels of satisfaction in the analyzed sample of companies are not significantly differentiated by these dimensions:

$$CL = \beta_0 + \beta_1 \cdot CS + \beta_2 \cdot PV + \beta_3 \cdot PQ_{coverage} + \beta_4 \cdot PQ_{network} + \varepsilon, (3)$$

β_0 is the intercept, β_1 - β_4 are the estimated standardized regression coefficients, ε is the error term. CL is customer loyalty, PV is perceived value, $PQ_{network}$ is perceived network quality, $PQ_{coverage}$ is perceived network coverage. The model explains a large part of the variance in loyalty ($R^2 = 0.846$; adjusted $R^2 = 0.844$) and the model is statistically significant ($F(4,295) = 405.1, p < 0.001$). The most important factor that influences loyalty is customer satisfaction ($\beta = 0.478, p < 0.001$), followed by perceived value ($\beta = 0.396, p < 0.001$). Coverage has a moderately positive effect ($\beta = 0.213, p < 0.05$) while network quality has a small but significant negative coefficient ($\beta = -0.146, p < 0.05$). This opposite effect could be explained by the fact that people in regions with comparatively better network performance have higher expectations and therefore are more sensitive to service interruptions.

In summary, the regression analysis shows that perceived economic value, relational support and technical performance jointly influence customer experience in the telecom industry.

Conclusion

This research combines technical, perceptual and relational aspects of an ECSI-based model to investigate the determinants of perceived quality, customer satisfaction and loyalty in the Telecom industry. The results indicate that while network performance is still a requirement for a good user experience, it is not sufficient alone. Overall customer satisfaction is primarily a function of the perceived value and the quality of interactions with the operator, particularly in the auxiliary services and customer support.

Customer retention is based on an integrated experience that takes into account the economic, functional and relational aspects, not only the technical attributes, as shown by the

empirical analyses that find a strong and positive relationship between customer satisfaction and loyalty. All the research hypotheses developed in this study were confirmed empirically. In particular, it was found that customer satisfaction had a strong positive impact on customer loyalty (H3), perceived quality had a significant positive impact on customer satisfaction (H1), and perceived value had a positive impact on customer satisfaction (H2).

This research provides an all-encompassing strategy to enhance the quality of the service from technological level to customer relationship management and value-based pricing system that have very practical implications for mobile network operators. Furthermore, the article aims to add to the literature by empirically testing the existing service levels and satisfaction models in reference to the Romanian mobile telecommunications market. Problems of the study were the use of self-report measures and cross sectional data, therefore inferring causality not available longitudinally. Future research directions such as longitudinal studies, cross-national comparison or the combination of objective networking performance indicators and perceptual factors may provide research directions on the relationship between QoS and QoE.

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Appendix – Customer Perceptions of Mobile Telecommunications Service Quality Questionnaire

Response scale (for all items):

- 1 – Strongly disagree
- 2 – Disagree
- 3 – Somewhat disagree
- 4 – Neither agree nor disagree
- 5 – Somewhat agree
- 6 – Agree
- 7 – Strongly agree

SD1. Gender:

- Male
- Female
- Prefer not to say

SD2. Age group

- 18–25
- 26–35
- 36–45
- 46–55
- 56–65
- Over 66
- Prefer not to say

SD3. Education level

- Lower secondary education
- Upper secondary education
- Post-secondary education
- Higher education

SD4. Current occupational status

- Employed
- Student
- Unemployed
- Retired
- Other

SD5. Type of locality of residence

- Rural area
- City with fewer than 50,000 inhabitants
- City with 50,000–200,000 inhabitants
- City with more than 200,000 inhabitants

SD6. Main use of mobile services

- Voice calls
- Mobile internet
- Streaming / applications
- All equally

1. Operator Image (IM – Image)

IM1. My mobile telecommunications operator is innovative in the services it provides.

IM2. My mobile telecommunications operator has a good image among customers.

IM3. My mobile telecommunications operator is involved in social responsibility activities.

2. Customer Expectations (EXP – Expectations)

EXP1. I expect my mobile telecommunications operator to provide high-quality services.

EXP2. I expect the services provided to meet my daily needs.

EXP3. I expect the operator's staff to be prompt and efficient in resolving problems.

3. Perceived Service Quality (PQ – Perceived Quality)

A. Network and Technical Service Quality

PQ1. Voice services operate reliably, without frequent interruptions.

PQ2. Call quality is good in most situations.

PQ3. The mobile internet connection is fast enough for my daily activities.

PQ4. Mobile internet services operate reliably, without frequent disruptions.

PQ5. Mobile internet services function well even while I am on the move (e.g., in a car or on public transport).

B. Coverage and Availability

PQ6. The mobile network provides good coverage in the areas I frequently use.

PQ7. I rarely experience signal problems in areas that are important to me (home, workplace, daily routes).

C. Data Services and Applications

PQ8. Video streaming services (YouTube, Netflix, etc.) run smoothly on the mobile network.

PQ9. Online applications and digital services operate without significant delays.

D. Support and Auxiliary Services

PQ10. My operator provides high-quality technical support when problems occur.

PQ11. The operator's mobile application is easy to use and functions properly.

4. Perceived Value (PV – Perceived Value)

PV1. The price of the services is fair relative to the quality provided.

PV2. The services offered by the operator represent good value for the money paid.

PV3. Compared to other operators, my mobile services offer a favorable balance between price and quality.

5. Customer Satisfaction (CS – Customer Satisfaction)

CS1. Overall, I am satisfied with my mobile telecommunications operator.

CS2. My operator meets the expectations I have of a mobile service provider.

CS3. Compared to an ideal operator, I am satisfied with the services I currently use.

6. Customer Loyalty (CL – Customer Loyalty)

CL1. I intend to continue using this operator's services in the future.

CL2. I would recommend this operator to friends, family, or colleagues.

CL3. I would remain a customer of this operator even if prices increased slightly.