

# Predictions from an Empirical Study in the Turkish Mobile Telecommunications Market on the Determinants of Mobile Customer Churn

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**Abstract:** Acquiring new customers compared to holding the existing ones is costlier and more troublesome for businesses, so customer retention is of great importance in today's intensely competitive environment. It is crucial in customer relations management to identify and analyse customers whose loyalty decreases and who tend to leave, and prevent churn through various methods under resource constraints. This issue is especially prominent in the mobile communication market. This paper uses a binomial logit model based on a survey with 637 mobile users in Turkey to determine the factors affecting customer churn and how they find their effect. Results indicate that, among various factors, network quality, billing, tariff level, tariff plan, and education level are the determinants affecting customer churn and associated with the intention to switch. Our findings demonstrate implications for both managers and rule-makers in the mobile telecommunications sector.

**Keywords:** Churn, Subscriber loss, Churn prediction, Switching, Customer retention.

## Introduction

Recently, many previously monopolized network services have been liberalized and deregulated at the retail and wholesale levels. One of the main areas affected by this approach is the mobile telecommunication market. It is expected that globally 5.7 billion people or 70% of the population will use mobile phones by 2025. In 2020, mobile technology and services created \$4.4 trillion in economic value. As countries reap the benefits of a more widespread mobile service adoption resulting in increased productivity and efficiency, this number will rise to about \$5 trillion by 2025 (GSMA, 2020a). The majority of the rising number of mobile

Internet users are mobile-only users who do not have access to a computer. This exponential increase implies a massive expansion of the application and digital content business into markets ([GSMA, 2020b](#)).

Nowadays, customer churn management is a considerable worry for telecommunications service providers, and it is becoming more of a problem as the competition intensifies. With the help of supportive regulations in the mobile telecommunications market, the focus of mobile carriers has switched from attracting new subscribers to maintaining existing ones and drawing users away from competitors. In this new context, consumers' willingness and ability to compare market offers and switch to better services drive the suppliers' motivations to compete for existing users ([Lejeune, 2001](#)).

It is necessary to understand the elements that drive consumer decisions, how they differ among customers and the elements' roles, such as service satisfaction levels, consumer attributes, services plan and previous mobile switching experience, on mobile churn decisions to create advanced marketing strategies in a tough market like mobile telecommunications ([Kim & Yoon, 2004](#); [Ahn, Han & Lee, 2006](#); [Garcia-Marinoso & Suarez, 2019](#); [Jain, Khunteta & Srivastava, 2020](#)).

This paper explores a literature review of mobile churn, an overview of the Turkish mobile market, and presents the theoretical framework. The paper's main contribution is to add to the growing body of empirical research on the switching factors by using data based on a survey of 637 mobile users, containing a collection of individual and service variables unique to the mobile telecoms industry. In the following, the research method, sample and findings are expressed with the discussion and conclusions.

## Literature Review

A high amount of customer turnover may be a desirable aspect of a well-functioning market, since it indicates both consumers' ability to make choices and to exercise those choices. On the other hand, customer churn is a severe concern that can cut into a company's revenues and profitability ([Keaveney, 1995](#)). Therefore, research into switching service providers continues unabated ([Ascarza, Netzer & Hardie, 2018](#); [Gerpott & Ahmadi, 2015](#); [Glady, Baesens & Croux, 2009](#); [Keramati & Ardabili, 2011](#)).

The ratio of customers departing divided by the total number of customers (churn/total customers) in a given period is defined as customer churn rate ([Mozer et al., 2000](#)). Businesses track consumers who switch their service providers regularly ([Sharma & Panigrahi, 2011](#)). Telecommunication markets are complex ([Garcia-Marinoso & Suarez, 2019](#)), and customers are prompted to switch their service providers for a variety of reasons ([Ahmed & Linen, 2017](#)),

including more than just unhappiness with the services ([Óskarsdóttir et al., 2016](#)). Preventing loyal customers from switching operators and ensuring that newly acquired customers form long-term connections with the operator will have a favourable impact on the operator's revenues and profitability ([Huang, Kechadi & Buckley, 2012](#); [Burez & Van den Poel, 2007](#); [Keaveney, 1995](#); [Ferreira, Telang & De Matos, 2019](#)).

Lambrecht & Skiera ([2006](#)) showed that customers with flat tariffs are less likely to churn than prepaid service plans, which has similar results to the study by Karacuka, Haucap & Heimeshoff ([2011](#)) on prepaid and post-paid customers price elasticity. Another research with Zambian mobile users revealed that poor customer services, network quality, tariff plans and billing are the main factors affecting customer churn ([Banda & Tembo, 2017](#)).

Some researchers suggest that the main factors influencing churn are service quality and pricing ([Kim, 2005](#); [Kim & Yoon, 2004](#); [Calvo-Porrá, Faiña-Medín & Nieto-Mengotti, 2017](#)), while others revealed that brand image, service plan types (prepaid & post-paid), data usage, customer services, value-added services, promotions, customer satisfaction levels and previous churn experience are also affecting customer decisions to leave their service provider ([Mahajan, Misra & Mahajan, 2017](#); [Shujaat, Ahmed & Syed, 2015](#); [Garcia-Marinoso & Suarez, 2019](#)).

Karacuka, Catik & Haucap ([2013](#)) analysed the data of 2,105 individuals from a survey conducted by Telecommunications Authority of Turkey and found that, in addition to the country-level network size, network characteristics and consumer preferences with respect to quality, coverage, tariffs, customer services and firm image also affect the choice of mobile network.

The present research contributes to the existing literature with a survey of 637 Turkish mobile operator users, including demographic, customer satisfaction level, past churn experience, service plan and user-specific data. It also aims to explore determinants of mobile churn in the Turkish mobile telecom sector to give clear insights for both managers and policymakers into churn management.

## A Brief Overview of Turkish Mobile Market

Mobile telecommunication services in Turkey were launched in 1994 with two operators, Turkcell and Telsim. These two operators largely dominated the market until 2000, and the mobile subscriber base has reached over 16 million under this duopoly structure. By 2000, Aria and Aycell launched mobile services to create an oligopoly market. However, they could not generate an efficient subscriber base and merged into the new brand Avea by 2004. Currently, there are three leading mobile telecommunications service providers in Turkey with

the purchase of Telsim by Vodafone in 2005. As shown in Table 1, by the end of 2020, Turkcell has 40.3%, Vodafone has 31.6%, and Avea has a 28.1% market share in the Turkish mobile market ([Kar, 2018](#); [BTK, 2021](#)).

**Table 1. Market shares of Turkish key mobile operators in terms of subscriber numbers**

	1994	2002	2008	2010	2013	2019	2020
Turkcell	78.1%	67.3%	56.2%	54.2%	50.5%	40.5%	40.3%
Telsim <sup>a</sup>	21.9%	25.4%	25.2%	27.0%	28.6%	31.1%	31.6%
Avea	-	-	18.5%	18.8%	20.9%	28.4%	28.1%
Aria <sup>b</sup>	-	5.1%	-	-	-	-	-
Aycell <sup>b</sup>	-	2.1%	-	-	-	-	-

<sup>a</sup> Vodafone acquired Telsim at the end of 2005.

<sup>b</sup> Aria and Aycell merged into Avea in 2004.

In 2020, mobile operators generated some \$5.3 billion of revenues and invested \$1.32 billion in infrastructure. By the first quarter of 2021, there are 83 million mobile subscribers in Turkey with a penetration rate of 99.9%, lower than countries such as Finland, Portugal, Denmark, Austria, Sweden and Germany (average 149.2%). Post-paid users form 66.3% of the mobile market and have more than two times ARPU (Average Revenue Per User) than prepaid consumers ([BTK, 2021](#)).

Mobile number portability in Turkey was announced at the end of 2008; since then, regulators are pursuing policies to facilitate switching service providers with shorter porting periods (6 days) and fair fees. It has been agreed between the operators that separate 15-minute periods are required for the deactivation of the number to be transported at the donor operator and for the activation at the receiving operator. In this case, the communication interruption of the subscriber will be an average of 15 minutes. The time zone of the day for this interruption will be determined by the operators, considering the preference of the subscriber. The ported number will have the same functionality after the activation of the ported carrier. One of the issues that will come to the agenda with the number portability regulation is that a subscriber who initiates a call to a ported number will not know which operator the number is at. In order to prevent possible tariff and billing problems, operators that initiate calls are obliged to issue a distinctive warning tone for the calling subscriber which lasts 1.6 seconds ([NTS, 2021](#)).

Approximately 13 million numbers were ported in 2020 and, within the first quarter of 2021, Vodafone successfully gained 63,000 subscribers from Avea and Turkcell. Switching mobile carriers while keeping the same mobile number provides many advantages for customers and increases competition; however, it poses a substantial risk for mobile operator revenues. Currently, operators in the Turkish mobile market force termination terms that generate a penalty for ceasing services. On the other hand, fierce competition in the market results in

some operators paying the cancellation charges on behalf of the customer. Table 2 shows mobile churn rates in Turkey in 2020 ([BTK, 2021](#)).

**Table 2. Churn rates<sup>c</sup> of mobile operators in 2020**

	January	April	July	October	December
Turkcell	2.5%	2.3%	2.5%	2.2%	2.6%
Vodafone	2.2%	1.5%	1.9%	1.8%	5.4%
Avea	2.1%	1.5%	2.5%	2.2%	4.3%

<sup>c</sup> number of switched customers / average total subscribers in the term

The Information and Communication Technologies Authority (BTK) in Turkey periodically reports customer satisfaction statistics received via an online complaint management system. According to BTK, network and service quality (30.3%) is the leading issue decreasing customer satisfaction, while subscription processes (30%), billing (23.2%), lock-in contracts/penalties (9.5%) and tariffs/promotions (7.0%) are the additional factors. BTK reports support that these factors are important determinants of customers' intention to switch operators in Turkey ([BTK, 2021](#)). Such factors remain as the main complaint areas that operators need to resolve to increase customer satisfaction ([Kim & Yoon, 2004](#); [Kim, 2005](#); [Lunn & Lyons, 2018](#); [Garcia-Marinosa & Suarez, 2019](#)).

## Research Methodology

The mobile users' probability of switching current operator is modelled using a binomial logit model relating factors including mobile carrier service attributes, demographic variables and user-specific characteristics, such as past churn experience and service plans. The methodology of the model makes use of studies carried out by Kim and Yoon ([2004](#)), Garcia-Marinosa & Suarez ([2019](#)) and Uner, Guven & Cavusgil ([2020](#)). The required data for the econometric model is obtained from an online survey of 637 random participants conducted in 2021.

Respondents were asked to indicate their satisfaction levels regarding different factors using a Likert scale with the following categories: 1 very unsatisfied; 2 unsatisfied; 3 neither satisfied nor unsatisfied; 4 satisfied; and 5 very satisfied. In addition, the participants were asked for their tariff types (prepaid or post-paid), contract profiles, and whether or not they have changed operators in the last year. According to Uner, Guven & Cavusgil ([2020](#)), data usage has a substantial effect on churn and increased data usage lowers the probability to churn. Thus, we ask our participants how often they use social media applications. We take the dependent variable as the intention for churning in the next one year, with the value set to "1" for churn and "0" for no churn.

Table 3 illustrates the coding of the variables to measure the relationship between predictors and the probability of churn.

**Table 3. Description of variables**

Variable	Description
Customer Satisfaction (CS): Billing (CS1), Tariff level (CS2), Network/Call quality (CS3), Customer services (CS4), Promotions/Products (CS5)	1: very unsatisfied, 2: unsatisfied, 3: not satisfied nor unsatisfied, 4: satisfied, 5: very satisfied
Gender	1: male 2: female
Age	1:16-24, 2:25-34, 3:35-49, 4:50-64, 5: ≥65
Education level	1: secondary or below, 2: tertiary or above
Employment	1: full time, 2: part time, 3: retired, 4: unemployed
Current Operator	1: Operator 1, 2: Operator 2, 3: Operator 3
Tariff plan	1: post-paid, 2: prepaid
Termination clause	1: yes, 2: no
Social media usage on mobile phone (daily)	1: never, 2: rarely, 3: sometimes, 4: often, 5: always
Switching experience	1: subscriber with past switching experience 0: otherwise

## Estimation Results and Discussion

Some selected empirical findings are represented in Table 4. Of the respondents, 82.9% use post-paid tariff plans, while 69% include a termination clause; 47.5% of the participants always use social media daily indicating extensive data usage for the operators. The question to measure the previous churn experience gets 18.9% positive answers.

**Table 4. Descriptive statistics**

		n	%
Tariff plan	Post-paid	527	82.9%
	Prepaid	109	17.1%
Termination clause	Yes	439	69.0%
	No	197	31.0%
Social media usage on mobile phone (daily)	Never	11	1.7%
	Rarely	25	3.9%
	Sometimes	126	19.8%
	Often	172	27.0%
	Always	302	47.5%
Switching experience	No	516	81.1%
	Yes	120	18.9%

The research yielded some intriguing findings on the factors that influence churn decisions of Turkish mobile subscribers. We used a binary logistic regression to predict the factors that

affect churn intention, and then ran various robustness tests to ensure that the model fit was good and the overall model is statistically significant. For the research's dependent variable (churn), Table 5 lists significant independent variables and their respective contributions to the model, together with insignificant ones. To interpret the results, odds ratios higher than one imply a positive relationship between independent and dependent variables.

**Table 5. Estimation results: odds ratios (robust standard errors in parentheses)**

<b>Variables</b>	<b>Churn</b>
CS1: Billing (ref: very satisfied) very unsatisfied unsatisfied not satisfied nor unsatisfied satisfied	7.035*** (.689) 5.889*** (.557) 3.694*** (.445) 2.384** (.425)
CS2: Tariff Level (ref: very satisfied) very unsatisfied unsatisfied not satisfied nor unsatisfied satisfied	4.577*** (.492) 1.641 (.459) 1.474 (.396) .846 (.412)
CS3: Network/Call Quality (ref: very satisfied) very unsatisfied unsatisfied not satisfied nor unsatisfied satisfied	7.695*** (.501) 2.615** (.475) 2.122* (.408) .763 (.397)
CS4: Customer Services (ref: very satisfied) very unsatisfied unsatisfied not satisfied nor unsatisfied satisfied	2.056 (.630) .899 (.579) 1.298 (.526) 1.393 (.497)
CS5: Promotions/Products (ref: very satisfied) very unsatisfied unsatisfied not satisfied nor unsatisfied satisfied	1.700 (.522) 1.385 (.489) 1.196 (.454) 1.155 (.436)
Gender (ref: male)	.721 (.240)
Age (ref: 16-24) 25-34 35-49 50-64 65 and above	1.668 (.349) 1.786 (.357) 1.353 (.502) 3.141 (.971)
Education Level (ref: Secondary or below)	1.753** (.273)
Employment (ref: full time) Part time Retired Unemployed	.777 (.426) 1.245 (.557) 1.470 (.325)
Operator (ref: Operator 1) Operator 2 Operator 3	.393*** (.308) .556** (.268)
Tariff Plan (ref: Prepaid)	.420** (.380)
Termination Clause (ref: yes)	1.559 (.279)

Variables	Churn
Social Media Usage (ref: never)	
Rarely	.979 (1.021)
Sometimes	1.268 (.850)
Often	1.116 (.845)
Always	1.931 (.832)
Switching Experience (ref: yes)	.720 (.278)
Observations	637
Nagelkerke R <sup>2</sup>	.408
Log Likelihood	568.171

\*Significant at 10%. \*\* Significant at 5%. \*\*\* Significant at 1%.

Estimation results show that the probability of a subscriber churning is dependent on the level of subscriber satisfaction with service attributes that include call quality, tariff level, and billing. The estimated odds ratios for satisfaction levels were greater than one and significant; this means that unsatisfied customers are more likely to switch their providers (Uner, Guven & Cavusgil, 2020). Relative to being very satisfied, being very unsatisfied with the previous mobile service in terms of network quality and billing increased the odds of switching providers more than sevenfold. Customers who are very unsatisfied with tariff levels are four times more likely to churn. As one might assume, the quality of the consumer experience influenced switching decisions, with the odds ratios for consumer satisfaction having the most significant impact.

As expected, post-paid tariff users are less likely to churn and prepaid customers are more likely to change their mobile carrier, considering the ease of ceasing the services.

Termination clause, daily social media usage and switching experience are not found to be significant variables affecting churn decisions. As anticipated, operators in Turkey are willing to bear the expenses of churn penalties while winning new subscribers.

Finally, variables related to socio-economic and socio-demographic information, such as age, gender and employment, are not good predictors of switching behaviour. However, in contrast to the findings of Garcia-Marinoso & Suarez (2019), higher education level has a positive effect on mobile churn.

## Conclusion

Like many other services or goods, mobile consumers tend to stick with their current service provider unless they discover a severe problem or are dissatisfied with the services provided by that operator. When the customer churn rate is high or continues to climb over time, the company must take immediate action, since an unhappy customer can quickly become a lost one. Negative word of mouth and unfavourable reviews can ultimately affect total brand value, in addition to the financial impact of a consumer leaving the operator. For this reason alone,

it makes sense to reach out to customers who are on the verge of switching carriers and repair their connections. It is also worth noting that keeping a current client costs less and gives more value than getting a new one ([McIlroy & Barnett, 2000](#); [Lejeune, 2001](#); [Catalan-Matamoros, 2012](#); [Saleh, 2017](#); [Güven, 2018](#)).

Our study shows that mobile users' satisfaction level with the service provider is the most potent motivator of switching; dissatisfied customers are more likely to switch next year. Operators should provide excellent services, especially for call quality and billing, rather than applying alternative methods to boost retention rates like penalty clauses. Operators should focus on identifying dissatisfied customers with the highest likelihood of churning and enhance their products. Mobile carriers should step up their efforts to keep major consumers and introduce churn management programs to increase loyalty. The present paper corroborates that consumer satisfaction is the most significant factor for mobile churn decisions ([Kim & Yoon, 2004](#); [Calvo-Porrá, Faña-Medín & Nieto-Mengotti, 2017](#); [García-Marinoso & Suárez, 2019](#)).

The mobile industry has thrived in an unregulated environment. However, regulatory authorities in many countries are increasingly scrutinizing it as the mobile network becomes a vital part of the national telecommunications system. Our study shows that more regulatory scrutiny is required on the retail side of the mobile industry, mainly focusing on the factors affecting customer satisfaction. In this direction, regulatory bodies could regularly publish quality parameters of operators to improve mobile operator service levels, set challenging targets for mobile network quality, introduce supportive regulations for network investments, or make decisions to ensure network sharing among operators. Furthermore, regulatory bodies may enact legislation to protect mobile customers from bill shock, and construct a web page that lists all of the offers made available to users, making tariffs easier to grasp.

Given client sentiments regarding the telecom business, losing customers is likely to be costlier than in other industries. Companies must become more aware of this fact and interact with customers more regularly to better understand their behaviour.

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