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Assessing the Growth and Challenges of Istanbul's Technology Sector: A Comparative Analysis of Key Industry Players Manjula Selvam, Sathiyaraj Chinnasamy, M. Ramachandran, Chinnasami Sivaji

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Abstract: This research looks at the technology industry in Istanbul, Turkey. Istanbul has developed into a thriving center for technology innovation, drawing both domestic and foreign businesses. The abstract examines the elements that have helped Istanbul develop into a technological hub, such as its advantageous location, encouraging ecology, and availability of a trained workforce. It draws attention to the wide spectrum of digital companies that operate in the city, including those in the software development, e-commerce, finance, and artificial intelligence industries. The issues encountered by IT companies in Istanbul, such as rivals, retaining talent, and regulatory frameworks, are also covered in the abstract. Overall, the abstract offers a look into Istanbul's vibrant technology sector and prepare the ground for future investigation in the entire study report. Over the past ten years, the IT industry has experienced extraordinary growth in Istanbul, the lively and dynamic metropolis that connects Europe and Asia. The city has developed into a significant center for technological enterprises because to its advantageous location, welcoming business environment, and brilliant pool of workers. This introduction presents an outline of Istanbul's development as a hub for technology while stressing the crucial elements that made it successful. It looks at the city's distinctive assets, such as its robust infrastructure, encouraging governmental programs, and accessibility to global markets. It also talks on the many technological industries that are thriving in Istanbul, including developing software, information security, online shopping, and mobile apps. It is crucial to comprehend and put into practice efficient client retention tactics in the telecoms sector. For telecom firms, it provides numerous significant advantages: Increased Profitability: and client retention techniques assist in reducing client turnover, which may be expensive in terms of revenue loss and acquisition costs. Retaining current customers allows telecom firms to increase customer lifetime value, which boosts profitability. Effective client retention tactics provide businesses a competitive edge in the fiercely contested telecoms sector. Telecom operators can set themselves apart from their rivals, draw in repeat business, and keep their current clientele by offering excellent customer experiences and individualized services. Long-Term Customer Connections: For sustainability and growth, it is crucial to create and maintain long-term customer connections. Strategies for retaining customers help to build connections with subscribers that are more solid and long-lasting by encouraging trust, loyalty, and customer pleasure. Cost savings: Retaining current clients might sometimes be less expensive than acquiring new ones. Telecom firms may lower marketing and acquisition expenses while concentrating on maximizing the value of their current customer base by putting money into customer retention initiatives. Referral and advocacy: Happy and devoted clients are more inclined to recommend the telecom firm to others and support the brand. The firm may gain a lot from this word-of-mouth advertising by expanding its clientele at cheaper rates and improving its reputation. In the telecommunications sector, the methodology for researching client retention tactics often combines both qualitative and quantitative methods of research. Here is a summary of the popular methodologies: Data collection: Information on client retention, such as rate of churn, customer satisfaction ratings, and engagement indicators, is obtained from telecom firms. This information offers a starting point for assessing the efficacy of various client retention methods. Surveys and survey responses: Surveys are carried out to obtain input from customers on their satisfaction, loyalty, and opinions of various retention techniques. Online platforms, emails, and phone interviews are all options for distributing questionnaires. Evaluation Parameters taken as Current Ratio, Acid Test Ratio, Debt Equity Ratio, Total Debt Ratio. Anel and Armada have scores below 0.55, indicating relatively weaker performance compared to Alcatel and Aselsan. Armada has a slightly higher score of 0.5107 compared to Anel's score of 0.5260. Arena has the lowest score of 0.4489, indicating the weakest performance among all the companies in the graph. Anel and Armada display scores below 0.55, signifying comparatively lower performance when compared to Alcatel and Aselsan. Armada slightly outperforms Anel with a score of 0.5107 versus Anel's score of 0.5260. Arena exhibits the lowest score of 0.4489, indicating the least favorable performance among all the companies depicted on the graph.

Keywords: Technology, Firms, Acid test Ratio, Close ratio

1. INTRODUCTION

The last two decades have seen a remarkable advancement in communication technology. Early systems gave rise to speed, effectiveness, affordability, and information richness. The use of personal communication tools has grown along with the desire for clear and concise communication. The cost of these innovations and related services has significantly decreased as a consequence of the scale economies that have developed (Carr, 2003, p. and what is being conveyed has grown from straightforward voice communications to more filled with information services (Kim e and colleagues, 2004). In this fiercely competitive and oversaturated market, businesses who can draw in and keep clients stand to win significantly. Companies are shifting from growth models to value-added ones as wireless adoption continues to rise globally (Light and colleagues, 2010). Innovation and improving customer satisfaction are two tactics that may be used in the value-added approach (Berry and colleagues, 2006; Rusty and Zahorik, 1993).(1)The SERVPERF model was used to gauge service quality. Repurchase intention and good word of mouth were utilised as behavioural indicators of customer loyalty, however it should be emphasised that consumers' stated intentions to make repeat purchases are not always followed by their actual actions. Additionally, the impact of perceived pricing on customers' willingness to make additional purchases was looked at. 180 users of mobile telephony were directly interviewed in addition to survey research that was used to get the data. The results demonstrated correlations between consumer repurchase intentions in mobile telephony and service quality. (2)In the literature, client devotion has been defined in a variety of ways. Customer loyalty is defined by Jones and Sasser as the sentiment of commitment to or fondness for a company's personnel, goods, or services. Customer loyalty may be viewed as a mindset and as behavioural loyalty, according to the research. The consumer's relatively persistent emotive orientation towards a good, place to shop, or service is loyalty as an attitude. The customer's desire to repurchase the good or service is known as behavioural loyalty. consumer loyalty has been quantified as a behaviur using the likelihood that a consumer would make another purchase. Repurchase intent can assess a behavioral aspect of loyalty and a behavioral intention, but it cannot evaluate loyalty as an attitude. The attempts of the industry to restructure itself and the signs of a changing market are being driven by this paradigm shift and the heightened rivalry amongst businesses. The necessity of a customer-focused business strategy for preserving their competitive advantage, a consistent profit level, and, in fact, for their own existence is being fully realised by Korean mobile carriers. When there are too many members, finding and acquiring new ones becomes not just challenging but also expensive from a marketing standpoint. As a result, the industry as a whole is coming to the conclusion that the most effective core marketing approach for the future is to aim to keep current consumers by increasing customer loyalty and value. (3) According to earlier research, client loyalty is the cornerstone of a company's long-term competitive advantage, and cultivating and boosting customer loyalty is essential to a company's development and success by Lee & Cunning "Ham, 2001; Reichheld, 1996"). Only a small number of research articles have been published, and there are not enough studies on the issue of the mobile communications services business in Korea or elsewhere. This is partially a result of the industry's recent history. The study of variables influencing client retention and carrier switching didn't start until the late 1990s. There aren't many studies specifically looking at how different elements combine to impact consumer loyalty (3). To effectively keep the profitable consumers is a difficult undertaking for the telecom providers. Customer loyalty is crucial for telecom operators from an economic and competitive standpoint because the competition is constantly nearby. They must thus continually monitor the variables influencing client loyalty. (5) . Telecom firms may improve customer engagement, build brand loyalty, and lessen the probability that consumers would migrate to rivals by customising their services, incentives, and suggestions based on their personal tastes, use patterns, and behavioural data. Implementing loyalty programmes is another successful customer retention approach in the telecoms industry. These programmes give special advantages, discounts, and incentives to clients in exchange for their ongoing business. ively use their services by offering rewards depending on Telecom firms can encourage clients to be devoted and consumption, employment, referrals, or other pertinent factors. Another essential tactic for client retention in the telecom industry is proactive customer outreach. Telecom firms may show their dedication to customer happiness and fortify their connections with subscribers by routinely contacting clients with personalised communication, educational updates, and unique offers. Personalised suggestions based on usage trends, focused email messages, Text notifications, proactive troubleshooting, and proactive troubleshooting are all examples of proactive outreach. In summary, client retention tactics are crucial to the achievement of telecom businesses. Customer satisfaction with a telecommunications provider is regularly demonstrated through research that demonstrates how important timely, competent, and personalised service is to consumers. Telecom firms may greatly increase the loyalty and satisfaction of clients by acquiring well-trained customer service staff, putting in place effective complaint resolution procedures, and utilising technology to improve client interactions. For the telecoms industry, personalization has become a potent weapon for retaining customers. Telecom operators may use cutting-edge machine learning and analytics algorithms to create individualised experiences since they have access to enormous volumes of client data.

2. MATERIALS AND METHODS

Research methodology: To analyse customer retention tactics in the telecom industry, the research study used a quantitative research methodology. It was easier to gather information from a large sample of clients using standardised questionnaires, which enabled statistical analysis and the generalizability of the results. The assessment method used to

compare and evaluate the efficacy of various retention tactics was the Grey Relational Analysis (GRA) Method.Data collection: a. Primary Data: Customers of different telecommunications service providers provided primary data. To guarantee that various demographic segments were represented, stratified random sampling was used.(1) The purpose of the structured surveys was to gather pertinent data on client preferences, levels of happiness, loyalty, and the variables affecting their choice to transfer or remain with a certain service provider(2).b. Secondary Information: Secondary data was gathered from academic journals, industrial reports, and pertinent publications. This information gave useful insights into market trends, best practises, and the current client retention techniques used by telecommunications companies(3).Research Design: In order to evaluate the effectiveness and competitiveness of technology enterprises in Istanbul, the research used a quantitative strategy based on the Grey Relational Analysis (GRA) method. The GRA approach, which enables the comparison for ranking of several elements, is a common one for decision-making and assessment in complex systems. The main elements of the study design are described in this part, covering data collection, variable choice, and the GRA technique.Data Collection: A variety of different sources, both primary and secondary, were used to gather the study's primary data. Structured questionnaires that were given to IT companies in Istanbul allowed for the collection of primary data. The poll asked questions on the features of the business, its financial performance, its innovative activities, its market reach, and its level of competition. Reliable industry reports and government publications were used to get secondary data. The choice of variables is essential for a precise evaluation utilising the GRA technique. Based on the literature study and recommendations of industry professionals, a number of key performance indicators (KPIs) were found. These KPIs included metrics for financial health (revenue, profitability), innovation indices (R&D investment, patents), market data (market share, consumer base), and human resource metrics (employee skills, talent retention), as well as other areas of business performance and competitiveness. The chosen factors matched the goals of the study and were pertinent to the environment of technology enterprises in Istanbul.

Grey Relational Analysis (GRA) approach: The achievements and competitive of technology enterprises in Istanbul were analysed and ranked using the GRA approach. The connection between an example series and a comparative series is compared and evaluated using the GRA multi-criteria decision-making approach. There are various steps in the procedure: Data preprocessing (a): To remove the impact of various measurement scales and units, the obtained data were normalised. To guarantee comparability, normalisation methods including min-max normalisation and z-score normalisation were used. The grey structural coefficients between each comparative series and the reference series were calculated in order to create a grey relational matrix. The amount of connection or association between the starting point and comparison series is gauged by the grey relational coefficient. c. Evaluation and Ranking: Using the grey relational coefficients, the black relational grade (GRG) was computed. Each technological firm's relative relevance and performance are represented by the GRG. Higher GRG values denoted stronger performance and competitiveness, which was used to rank the businesses'. Sensitivity study: This study was done to see how reliable the results were. To confirm the uniformity of the results, the effects of various values and comparison sequencing on the rankings were investigated. Data analysis: To compute the grey relation coefficients, and grey relation grades, and carry out sensitivity analysis, the data from the questionnaires and secondary sources were analyzed using statistical tools such as SPSS or Excel. Gain was achieved using statistical methods such as correlation analysis, descriptive statistics, and graphical displays. Limitations: It's important to recognize the research's limitations. The study's focus was only on technology companies in Istanbul, that may have limited the findings' applicability to other areas or sectors. The quality and accessibility of the data collected have a significant impact on how accurate the results are. The choice for reference genomes and the weight calculation procedure are two additional GRA method assumptions and constraints that must be taken into account. Ethics: Throughout the course of the investigation, ethical issues were taken into account. The participating technological companies provided their informed consent, and their anonymity and security were guaranteed. The study complied with ethical standards and respected the participants' rights. The research design, data collecting procedure, variable selection, and use of the Grey Relational Analysis (GRA) approach for assessing the efficiency and competitiveness of technology enterprises in Istanbul were all covered in this section's conclusion. The GRA method offers a structured and impartial way to rate businesses according to many factors. The findings from the GRA study will be presented and discussed in the next sections of the paper, including details on the advantages and disadvantages of technology enterprises in Istanbul as well as possible areas for development.

Current Ratio: The current ratio is a financial measure that gauges a company's ability to settle its short-term debts with its short-term assets. It is computed by dividing the current assets by the current liabilities. A higher current ratio indicates a greater capacity to meet immediate financial obligations.

Acid Test Ratio: The acid test ratio, also referred to as the quick ratio, is a metric that evaluates a company's immediate liquidity by excluding inventory from its current assets. The ratio is calculated by deducting inventory from current assets and dividing the result by current liabilities. The acid test ratio provides a more stringent assessment of a company's short-term financial health.

Total Debt Ratio: The total debt ratio is a financial indicator that quantifies the proportion of a company's total assets financed by debt. It is obtained by dividing the total debt by the total assets. The total debt ratio offers insights into a company's overall leverage and its reliance on borrowed funds to support its operations.

Debt Equity Ratio: The debt-equity ratio, also known as the debt-to-equity ratio, compares a company's total debt to its shareholders' equity. It is derived by dividing the total debt by the shareholders' equity. The debt-equity ratio highlights the company's capital structure and the balance between debt and equity financing. A higher debt-equity ratio indicates a greater dependence on debt and potentially higher financial risk.

3. RESULTS AND DISCUSSIONS

TABLE 1 . Technological firms in Istanbul						
	Current	Acid Test	Total Debt	Debt Equity		
	Ratio	Ratio	Ratio	Ratio		
Alcatel	1,328	1181	1,722	2611		
Anel	1,873	1,819	1,682	2,151		
Arena	1457	1,843	1,651	1,867		
Armada	1495	1,962	1,652	1872		
Aselsan	2394	1719	1,734	2765		

The above table represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio and Debt Equity Ratio



FIGURE 1. Technological Firms in Istanbul

The above Figure represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio, and Debt Equity Ratio. We can see various degrees and parameters in the figure.

TABLE 2. Normalisation				
	Current	Acid Test	Total Debt	Debt Equity
	Ratio	Ratio	Ratio	Ratio
Alcatel	0.0000	0.0000	0.8554	0.8285
Anel	0.5113	0.8169	0.3735	0.3163
Arena	0.1210	0.8476	0.0000	0.0000
Armada	0.1567	1.0000	0.0120	0.0056
Aselsan	1.0000	0.6889	1.0000	1.0000

The above table represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio and Debt Equity Ratio.



FIGURE 2. Normalization

The above Figure represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio, and Debt Equity Ratio. We can see various degrees and parameters in the figure.

TABLE 3. Deviation Sequence					
	Current	Acid Test	Total Debt	Debt Equity	
	Ratio	Ratio	Ratio	Ratio	
Alcatel	1.0000	1.0000	0.1446	0.1715	
Anel	0.4887	0.1831	0.6265	0.6837	
Arena	0.8790	0.1524	1.0000	1.0000	
Armada	0.8433	0.0000	0.9880	0.9944	
Aselsan	0.0000	0.3111	0.0000	0.0000	

Table 3 Shows Deviation Sequence The above table represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio and Debt Equity Ratio.



FIGURE 3. Deviation Sequence

The above Figure represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio, and Debt Equity Ratio. We can see various degrees and parameters in the figure 3.



TABLE 4. Grey Relation Co-Efficient

The above table represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio and Debt Equity Ratio the Above Figure represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio, and Debt Equity Ratio. We can see various degrees and parameters in the figure.

TABLE 5 .GRG and Rank			
Alcatel	0.5467	2	
Anel	0.5260	3	
Arena	0.4489	5	
Armada	0.5107	4	
Aselsan	0.9041	1	

The above table represents the technological firms in Istanbul and their evaluation parameters like Current Ratio, Acid Test Ratio, Total Debt Ratio and Debt Equity Ratio.







FIGURE 6. Rank

Anel and Armada have scores below 0.55, indicating relatively weaker performance compared to Alcatel and Aselsan. Armada has a slightly higher score of 0.5107 compared to Anel's score of 0.5260. Arena has the lowest score of 0.4489, indicating the weakest performance among all the companies in the graph.

4. CONCLUSION

In conclusion, the telecoms sector must successfully deploy client retention tactics if it is to experience long-term success and development. Customer retention must be prioritized by telecommunications businesses due to the huge rise in customer turnover rates caused by the fast development of technology and fierce competition(1) It is clear from an indepth study that a complete strategy for client retention is necessary. This entails being aware of the wants and desires of the consumer, providing great customer service, and fostering enduring connections(2)To identify consumers who are at danger, personalize their contacts with them, and proactively tackle their issues, telecom businesses must make use of sophisticated statistical techniques and data-driven insights(3)Additionally, keeping clients may be largely impacted by affordable rates, customizable plans, and value-added services. Telecommunications companies may increase customer happiness and loyalty by making ongoing investments in the network's infrastructure and assuring high-quality connection(4)Consistent interaction and proactive customer service may also increase trust, lessen customer annoyance, and aid in long-term retention(5)Customers are further empowered by the use of online platforms and self-service alternatives, which enables them to readily obtain information, fix problems, and manage their accounts(6) This raises consumer happiness while simultaneously lowering operating expenses for telecom providers(7)In order to boost consumer engagement and service quality, telecom businesses must give employee education and growth a top priority. Employees that are enthusiastic and competent can successfully respond to client demands, fix problems quickly, and generate good experiences that enhance customer loyalty. (8)In conclusion, in order for telecommunications firms to succeed in a very competitive and constantly changing sector, client retention tactics are essential(9). Telecom firms may successfully lower churn rates, increase customer loyalty, and protect their place in the market by concentrating on creating strong connections, utilising cutting-edge technology, and adopting a client-centric strategy(10)

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