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**RESEARCH ARTICLE**

# ANALYSIS OF CAPITAL MARKETS TO IDENTIFY THE POTENTIAL OPPORTUNITIES FOR TATA CONSULTANCY SERVICES

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**ABSTRACT**

Capital Markets across the world are flourishing and lot of investment is being done to improve the market infrastructure. Clearing and Settlement is the post trading process which is now undergoing a lot of changes to reduce the transaction cost both in domestic and cross border settlements. The regulatory institutions for securities in each country/region are coming up with different standards to harmonize and standardize the clearing and settlement space. Harmonization results in reduction in cost and interoperability. These financial institutions are looking for a vendor who can give them the solution with these standards at a lower cost and lesser time. Hence the IT firms should be more proactive and position their product according to the market needs. By analyzing the current trends and challenges in the market, they can identify the possible opportunities and come up with the solution even before the customers approach them. This study also would help them to design their marketing strategy in clearing and settlement space. The geography wise trends help them to design the strategy for each market separately. The study also analyses whether there is correlation between number of trades in a particular region and the IT spending in that region. If correlation is present between them, then by analyzing the trend in number of trades, share volume and trade value one can say what will be the IT spending in that region. Qualitative analysis of the current trends and challenges are very important for an IT industry because the trends, regulations are some of the factors which drive the change. Hence the current trends and challenges are analyzed and areas opportunity for TCS is identified and recommendations are given finally.

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## INTRODUCTION

### About the organization

Tata Consultancy Services (TCS) is a software services and consulting company headquartered in Mumbai, India. TCS is the largest provider of information technology and business process outsourcing services in India. The company is listed on the National Stock Exchange and Bombay Stock Exchange of India. TCS is a flagship subsidiary of one of India's largest and oldest conglomerate company, the Tata Group, which has interests in areas such as energy, telecommunications, financial services, manufacturing, chemicals, engineering, materials, government and healthcare. Tata Consultancy Services was established in the year 1968 and is a pioneer in the Indian IT industry. Despite unfavorable government regulations like the License Raj the company succeeded in establishing the Indian IT Industry. In the early 1970s, Tata Consultancy Services started exporting its services. In 1981, TCS set up India's first software research and development center, the Tata Research Development and Design Center (TRDDC). On 9 August 2004, TCS became a publicly listed company, much later than its rivals, Infosys, Wipro and Mahindra Satyam. There are around 1, 50,000 employees working in TCS across the branch offices, which are located in 46 countries. TCS is the first software giant to cross the 1 billion US $ in revenue. The current revenue per year is greater than 7 billion US $. TCS provides reliable and secure systems that address market changes quickly, develop profitable customer relationships, and secure new opportunities to stay ahead of competition. It also provides comprehensive, end-to-end, domain-led business process solutions that enable Banking and Financial Services institutions to focus on their core financial services competencies. TCS Financial Solutions, a strategic business unit of Tata Consultancy Services, enables transformation in financial services through a superior and holistic suite of solutions for banks, capital market firms, insurance companies, and diversified financial institutions. Each solution in the TCS BaNCS family is designed to run as a scalable and robust service, completely integrated with existing business models, enterprise infrastructures and technology architectures. TCS BaNCS aspires to be better than established benchmarks, which is why they have embedded an Alpha ("α") consciously and prominently within their brand. The ability to foster rapid time-to-market with new products allows them into nimble competitors with scalable offerings. TCS consistently turn in impressive benchmark results, with a fine-tuned, highly-scalable technology architecture that supports financial institutions with the highest capacities for transaction volumes, peak transactions per second, numbers of users and branches and transaction history size. These benchmark results

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scale down as well as up, so that financial institutions can exceed their competition at any size. The Co-Innovation Network is a true partnership that serves as a framework for sharing best practices and innovation, and ensures that all their customers 'Experience Certainty' and the brightest of futures. TCS BaNCS enables transformation in financial services through a superior and holistic suite of solutions for banks, capital market firms, insurance companies, and diversified financial institutions. Each solution in the TCS BaNCS family has been designed to run as a scalable and robust service, fully integrated with existing business models, enterprise infrastructures and technology architectures. TCS with its collaborative and innovative approach provides the financial services organizations,

1) A competitive advantage and provide differentiated solutions to their customers.
2) Increased operational efficiency and agility.
3) Certainty in delivery.

TCS BaNCS is a globally recognized industry leader, with its solutions consistently ranked in top positions by industry experts.

**Objectives of the study**

There are three main objectives for this study. They are,

- To analyse the trends and challenges in the Clearing and settlement space, this would help TCS to understand the current market trends and standards.
- To help TCS prepare a marketing strategy based on the market analysis.
- To analyse the market opportunities and suggest TCS whether to invest more to enhance the product.

## RESEARCH METHODOLOGY

It is very complex and difficult to collect primary data for this analysis; hence only Secondary data is used for the research. The findings and analyses in this report are based on analysts' reports, opinions and secondary research on market trends and challenges.

**Analysis of trends in Capital Markets**

The quantitative analysis of the data from the stock market helps us to identify the recent trends in the stock market and also the correlation between the variables which affect the stock markets. Majority of the factors which influence a clearing house or Central securities depository to go in for a technology change or enhancement are qualitative. For example, the change in rules by the market regulator, introduction or change in standards, performance of competitor and competition are some of the factors which influence the market participant to go for new IT solutions. These factors are purely qualitative and cannot be converted to quantitative data for analysis and if done it will lose its relevance. Hence compared to the quantitative data analysis, the qualitative analysis play a significant role in framing the market strategy for TCS and also for any company which provides IT solution in this space. To buy securities or sell securities, trading is the first step in the process. This closely followed by the post trading process which includes Clearing and Settlement. Hence an impact in trading will also affect clearing and settlement space. The institutions which offer clearing and settlement for the securities traded generate revenue by way of commission which they charge for each transaction or amount of money involved or number of shares traded. If there are large number transactions then these clearing and settlement institutions earn more profit. The cost per trade also comes down when there are large number of transactions being processed. This is because of the fixed cost involved in running these institutions. The fixed cost is distributed over the trade volume and hence when the volume of trade is large the cost per transaction comes down. Also if these factors such as the number of trades, number of listed companies increases then the market participant who executes the trade , clears and settles the trade would need technology change to improve the speed and also to accommodate those huge volumes. For each and every security traded in the exchanges, clearing and settlement follows. Hence the trend in trades executed and volume of shares traded shows a clear picture of the trends and future of the clearing and settlement space.

**Analysis of Correlation**

Correlation is the measure of association between two variables. The correlation coefficient value tells how much a variable is related to the other variable. If the value is 1 then there exists a perfect linear relationship between those variables. If it is less than 1 and greater than zero, then there is a positive correlation, else if it is less than zero then there is negative correlation between them.

Correlation analysis is done between the number of trades and the IT spending, to find whether there is an association between these two variables. This analysis is done for three geographical regions to find out whether the association between the number of trades in those regions and the IT spending in those regions are similar. Europe, North America and Asia are the three regions which are taken for analysis. Here IT spending is taken as the dependant variable (Y) and the number of trades is taken as the independent variable (X).

**Table 1. Correlation Coefficient for Europe**

| X | Y | Xi - Xavg | Yi - Yavg | (Xi-Xavg) *(Y-Yavg) | (Xi-Xavg)² | (Yi - Yavg)² |
|---|---|---|---|---|---|---|
| 232.30 | 23.61 | -162.58 | -0.57 | 92.02 | 26431.50 | 0.32 |
| 309.08 | 23.86 | -85.80 | -0.32 | 27.11 | 7362.20 | 0.10 |
| 461.05 | 24.11 | 66.17 | -0.07 | -4.37 | 4378.02 | 0.00 |
| 535.50 | 26.10 | 140.62 | 1.92 | 270.56 | 19774.61 | 3.70 |
| 436.47 | 23.20 | 41.59 | -0.98 | -40.59 | 1729.90 | 0.95 |

Average of X = 394.88; Average of Y= 24.18; Sxy = 86.18; Sx = 122.4
Sy = 1.13; Correlation Coefficient (rxy) = 0.63

**Interpretation**

The correlation coefficient tells that there is positive linear relationship between the number of trades and the IT spending in Europe.

**Table 2. Correlation Coefficient for North America**

| X | Y | Xi - Xavg | Yi - Yavg | (Xi-Xavg)* (Y-Yavg) | (Xi-Xavg)² | (Yi - Yavg)² |
|---|---|---|---|---|---|---|
| 2295.61 | 28.00 | -2387.13 | -4.28 | 10212.14 | 5698383.08 | 18.30 |
| 2581.88 | 32.00 | -2100.86 | -0.28 | 584.04 | 4413626.45 | 0.08 |
| 3965.47 | 33.29 | -717.27 | 1.01 | -725.88 | 514478.24 | 1.02 |
| 7829.97 | 36.30 | 3147.22 | 4.02 | 12658.14 | 9905020.21 | 16.18 |
| 6740.78 | 31.80 | 2058.04 | -0.48 | -983.74 | 4235524.79 | 0.23 |

Average of X = 4682.7; Average of Y= 32.28; Sxy = 5436.17; Sx = 2488.32;
Sy = 2.99; Correlation Coefficient (rxy) = 0.73

### Interpretation

The correlation coefficient tells that there is positive linear relationship between the number of trades and the IT spending in North America.

**Table 3. Correlation Coefficient for Asia**

| X | Y | Xi - Xavg | Yi - Yavg | (Xi-Xavg)* (Y-Yavg) | (Xi-Xavg)² | (Yi - Yavg)² |
|---|---|---|---|---|---|---|
| 821.52 | 9.04 | -694.99 | -2.00 | 1392.75 | 483006.36 | 4.02 |
| 1074.96 | 10.04 | -441.55 | -1.00 | 443.31 | 194963.70 | 1.01 |
| 1532.59 | 11.04 | 16.08 | 0.00 | -0.06 | 258.68 | 0.00 |
| 1933.66 | 12.30 | 417.15 | 1.26 | 523.94 | 174013.96 | 1.58 |
| 2219.81 | 12.80 | 703.30 | 1.76 | 1235.00 | 494631.35 | 3.08 |

Average of X = 1516.51; Average of Y= 11.04; Sxy = 898.73; Sx = 580.27; Sy = 1.56; Correlation Coefficient (rxy) = 1.00

### Interpretation

The correlation coefficient tells that there is a perfect positive linear relationship between the number of trades and the IT spending in Asia.

### Simple regression analysis

A simple regression analysis is done to find out how far a factor or variable affects the dependent variable. In this case the dependent variable is the IT spending by the financial institutions. Number of trades is one of the factors that affect the dependent variable. There are other external variables which affect the IT spending, but either the data is not available or they qualitative data and hence not considered for simple regression. The aim of this analysis is to find how far the independent variable i.e. the number of trades affects the dependent variable IT spending by financial institutions. The analysis is done for three different regions separately. The analysis is done using the SPSS tool.

**Model Summary of Europe**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .628[a] | .394 | .193 | 1.01255 |

a. Predictors: (Constant), Trades

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 2.003 | 1 | 2.003 | 1.954 | .257[a] |
| | Residual | 3.076 | 3 | 1.025 | | |
| | Total | 5.079 | 4 | | | |

a. Predictors: (Constant), Trades

b. Dependent Variable: ITspending

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 21.893 | 1.695 | | 12.915 | .001 |
| | Trades | .006 | .004 | .628 | 1.398 | .257 |

a. Dependent Variable: ITspending

### Interpretation

R is the correlation coefficient which says that there is a positive correlation between number of trades and IT spending in Europe. The $R^2$ value is 0.394; this tells that 39.4 % of the level of variability in the IT spending is explained by the variation in number of trades. The linear equation which explains the influence independent variable on dependent variable is

$Y = AX + B$

$Y = 0.006 X + 21.893$

The independent variable significantly affects the dependent variable by 62.8 %. Hence the increase in trade will lead to increased IT spending by the financial institutions in Europe. Thus TCS has more opportunity in the future, since the projection in the following sections shows increase in trades in the coming years.

## NORTH AMERICA

### Interpretation

R is the correlation coefficient. Here R is 0.730 which says that there is a positive correlation between number of trades and IT spending in North America. The $R^2$ value is 0.533; this tells that 53.3 % of the level of variability in the IT spending is explained by the variation in number of trades. The linear equation which explains the influence independent variable on dependent variable is

$Y = AX + B$

$Y = 0.001 X + 28.167$

The independent variable significantly affects the dependent variable by 73 %. Hence the increase in trade will lead to increased IT spending by the financial institutions in North America. Thus TCS has more opportunity in the future, since the projection in the following sections shows increase in trades in the coming years.

**Model Summary of North America**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .730[a] | .533 | .377 | 2.36078 |

a. Predictors: (Constant), Trades

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 19.088 | 1 | 19.088 | 3.425 | .161[a] |
| | Residual | 16.720 | 3 | 5.573 | | |
| | Total | 35.808 | 4 | | | |

**a. Predictors (constant) variable, dependent variable – IT spending.**

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 28.167 | 2.460 | | 11.452 | .001 |
| | Trades | .001 | .000 | .730 | 1.851 | .161 |

**Model Summary of North America**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .730[a] | .533 | .377 | 2.36078 |

a. Dependent Variable: ITspending

## Asia

### Interpretation

R is the correlation coefficient. Here R is 0.995 which says that there is almost a perfect positive correlation between number of trades and IT spending in Asia. The $R^2$ value is 0.991; this tells that 53.3 % of the level of variability in the IT spending is explained by the variation in number of trades.

The linear equation which explains the influence independent variable on dependent variable is

$Y = AX + B$

$Y = 0.003 X + 6.995$

The independent variable significantly affects the dependent variable by 99.5 %. Hence the increase in trade will lead to increased IT spending by the financial institutions in Asia. Thus TCS has more opportunity in the future, since the projection in the following sections shows increase in trades in the coming years.

**Model Summary of Asia**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .995[a] | .991 | .988 | .17339 |

a. Predictors: (Constant), Trades

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 9.595 | 1 | 9.595 | 319.141 | .000[a] |
| | Residual | .090 | 3 | .030 | | |
| | Total | 9.685 | 4 | | | |

a. Predictors: (Constant), Trades, b. Dependent variable – IT

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 6.995 | .240 | | 29.205 | 1.000 |
| | Trades | .003 | .000 | .995 | 17.865 | 1.000 |

a. Dependent Variable: IT spending

## Trend in number of IPO's

To analyze the trends in the number of IPO's, the data needed is the total number of IPO's that are issued in the stock exchanges across the world. But it is very difficult to get this data for all the stock exchanges; hence a few major stock exchanges for which data is available are taken for analysis. The table below shows the number of IPO's issued in each of the selected stock exchanges from 2005 to 2009 and 2010 data till April.

**IPO's Issued**

| Year | Euronext | LSE | NYSE | NASDAQ |
|---|---|---|---|---|
| 2005 | 77 | 308 | 73 | 69 |
| 2006 | 146 | 362 | 53 | 91 |
| 2007 | 143 | 316 | 77 | 89 |
| 2008 | 78 | 155 | 12 | 11 |
| 2009 | 42 | 82 | 29 | 27 |
| 2010 | 30 | 53 | 26 | 30 |

Source: World Federation of Exchange.

**No. of Trades (all figures in millions)**

| Year | Euronext | LSE | Deutsche Börse | Nasdaq | NYSE | BSE | NSE |
|---|---|---|---|---|---|---|---|
| 2005 | 78 | 66 | 88 | 1,077 | 1,219 | 257 | 565 |
| 2006 | 105 | 95 | 109 | 1,318 | 1,264 | 328 | 747 |
| 2007 | 155 | 161 | 145 | 1,645 | 2,321 | 480 | 1,052 |
| 2008 | 192 | 202 | 142 | 3,779 | 4,051 | 566 | 1,368 |
| 2009 | 168 | 166 | 103 | 3,996 | 2,744 | 589 | 1,630 |

*Source: World Federation of Exchanges*

## Trend in Number of Trades

To analyze the trends in the number of trades, the data needed is the total number of trades that are executed in the stock exchanges across the world. But it is very difficult to get this data for all the stock exchanges; hence a few major stock exchanges are taken for analysis. The table below shows the number of trades executed in each of the selected stock exchanges from 2005 to 2009.

## Projection for the next five years

Method of least squares has been used to project the data for the next five years.

Linear Equation: $y = a + bx$

Where $a = \sum y / n$ and $b = \sum xy / \sum x^2$

**No. of Trades(all figures in millions)**

| Year | Euronext | LSE | Deutsche Börse | Nasdaq | NYSE | BSE | NSE |
|---|---|---|---|---|---|---|---|
| 2010 | 219 | 230 | 136 | 4,853 | 4,071 | 715 | 1,898 |
| 2011 | 246 | 261 | 143 | 5,683 | 4,655 | 805 | 2,174 |
| 2012 | 272 | 291 | 149 | 6,514 | 5,238 | 895 | 2,449 |
| 2013 | 299 | 322 | 155 | 7,344 | 5,822 | 986 | 2,724 |
| 2014 | 325 | 353 | 161 | 8,174 | 6,406 | 1,076 | 2,999 |

## IT Spending in Financial services

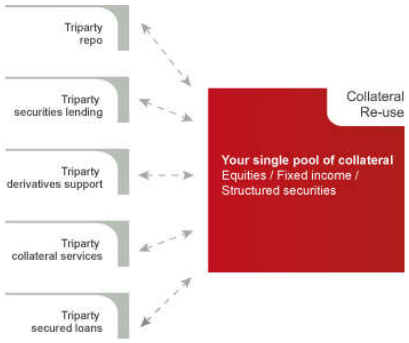
**IT spending (all figures in USD Billions)**

| Year | North America | Europe | Asia Pacific | Rest of the World |
|---|---|---|---|---|
| 2008 | $119.7 | $133.0 | $83.3 | $19.9 |
| 2009 | $115.0 | $126.5 | $85.9 | $19.8 |
| 2010 | $118.2 | $128.6 | $90.2 | $20.4 |
| 2011 | $123.4 | $132.9 | $95.8 | $21.2 |
| 2012 | $128.8 | $141.0 | $101.7 | $22.1 |
| 2013 | $129.0 | $139.1 | $105.4 | $22.4 |
| 2014 | $131.7 | $141.4 | $110.1 | $23.0 |

## Opportunities for TCS

### 1) Tripartite Collateral Management Services

Due to the move towards interoperability of Clearing houses and Depositories there are a lot of opportunities in the tripartite services. Efficient tripartite collateral management can make a significant contribution to the overall performance of a company. There can be a single pool of Collateral of different instruments that can serve the various purposes such as REPO, Securities Borrowing and Lending, Derivatives and Cash clearing and Secured Loans. Clear stream and Euro Clear Bank are providing such service, acting as neutral tripartite service agents. Asian Exchanges will also require similar services when the ASEAN linkages and interoperability starts its full functioning. Tripartite collateral management will increase in use as market participants seek efficient and proven solutions to mitigate risks and counterparty exposures through cross collateralization and collateral reuse.



### 2) Maintenance of centralised reference data and standardisation

Effective management of reference data is critical to achieving STP. Basically, if the trade is agreed and automated but the data is not correctly deciphered at the time of matching, the trade will be thrown into exception processing, delaying the trade and making it more prone to failure. White most firms are looking into investing into STP solutions. There is a need for delivery of high quality reference data solutions for reducing risk and total cost of ownership.

### 3) Support of messaging standards and protocols

The financial institutions and the regulatory organizations are planning to harmonize the entire operations in securities and investment in Europe. Particularly they are focused on clearing and settlement space where there are planning to reduce the transaction cost. This involves introduction of XML based standard messaging protocols. All the institutions involved in post trading process will have adhere to these standards and hence have to revise their infrastructure. The change will involve lot of money for the next few years and they are looking at IT firms who can provide this at a very attractive price and in lesser time with quality. Slowly this standardization of markets will go beyond Europe and provides great opportunity for IT firms.

### 4) Full automation in communication and data gathering

Days are gone when quotes and bids are shouted in stock markets, negotiated and settled. Everything is automated across all financial services and the financial institutions are vying at Straight through Processing (STP) in securities and investment space. There will more involvement of IT to achieve STP.

### 5) Cross Border transaction and Interoperability

In Europe, there are three different platforms (T2S, Link Up Markets and Euroclear Single Platform) currently developed which are competing each other to provide low cost Cross border trading and settlement for the financial institutions in Europe. The market participants in other markets such as Africa and Asia are looking to join any of these to market their securities in other markets with lower processing cost. To connect their system to T2S or Link up Markets or Euroclear, the financial institutions have altered their existing system. This would provide more revenue to the IT firms which are competing in this space.

### 6) Emerging Markets

The following figure shows the current position of the capital markets around the world. McKinsey institute predicts that there are bigger opportunities for the emerging market to grow in future. Hence TCS has huge opportunity to sell its solution in this emerging market which are at their nascent stage.

## Recommendations

- TCS is one of the largest IT solutions and consultancy firm which has a presence in 46 countries which are mostly the mature markets, except a few countries like India and South Africa. TCS should venture into new territories and also expand its operation in countries where there are potential opportunities.
- The products which TCS offers for financial services are excellent with good capacity, speed and reliability. But TCS should come up with innovative products which would differentiate TCS from its competitors.
- The products currently in the market execute millions of data in milli seconds. But the customers are demanding for sub-milli second speed, hence TCS should quickly come up with a solution before its competitors comes up with one.
- TCS can explore opportunities for enhancing the performance of their product through cloud computing technology, which is not currently offered in any of the current product.
- Instead of driven by the market, TCS should drive the market for changes.
- The financial institutions are asking for low cost implementation of the solution, hence TCS should work out a plan where they can offer the solution at the lowest cost possible, which adds value to the customer.
- Third Party collateral management system is yet to evolve and TCS should come up with a solution for them, which can be sold for a premium, because TCS can enjoy the monopoly for sometime till the competitors come up with a solution.
- Common reference data is more spoken among the financial institutions and might be the next big change that will drive the industry. The Product offered by TCS already has this functionality of storing the reference data. But this will be part of the client system and not accessible by other systems. This come up with the products and is onetime payment for the clients. But when the Central reference data is implemented, the customers would be charged as per usage. Hence TCS should position this product such a way that it reduces the cost of operation for the customer.
- The time taken to implement a solution is on average 8 months to one year for financial services. TCS should come up with lesser implementation time and reduce the cost for their customers.
- Innovative solutions and products are needed in the cross border transactions and interoperability. TCS as a market leader should drive this.
- TCS is currently one of the biggest players in the market, to expand its operations it should acquire or enter into partnership with any of the leading solution providers or participants of those regions to drive the growth.

## Conclusion

Though the financial crisis has affected all the sectors including the securities and investment sector, the 2010 figures shows little confidence that the markets are reviving. In just 4 months (Jan – April 2010) there is much progress when compared to 2009 data. Though the data analysis shows a downward trend after 2007, the 2010 projection shows that there is an increasing trend. With the regulatory organizations

trying to harmonize the markets and the financial institutions trying to lower the processing cost, there is enough opportunity for IT in capital markets. It is also estimated that the year 2011-12 is a major hit for the spending in IT for financial services. TCS has a growing demand for its current position. The demand the supply position is in equilibrium and the chances for improvement will also be high.

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