



**Marketing and Software Development Problems Faced by Software Companies (Strategic Model for Small Software Firms)**

**Dr. Dharm Bir Singh**  
Director, *Lord Krishna College of Management, Ghaziabad*      dharmbirs@yahoo.com



**Mohita Maggon**  
Faculty, Department of Management Studies, NIET, Greater Noida

**Phase-II: Empirical Article**

ABSTRACT

Information technology is one of the fastest spreading technologies in the world in terms of its usage and production. The Information technology is a very broad term, which is used for a host of technologies such as hardware and software technologies. The paper is based on study of problems faced by software companies in Northern region. It is worthwhile to examine the key issues for IT sector such as operational, software development and marketing so as to make comprehensive recommendations that can further accelerate the growth of this industry. The study also attempts to present a comprehensive view of the strategies being currently adopted by different application software companies. For the sake of present study, it has been assumed that the application software has not been developed and marketed in Northern India as it has been developed and marketed in other parts of India.

KEYWORDS

- Software Development
- .Micro Era
- Strategic Dependence

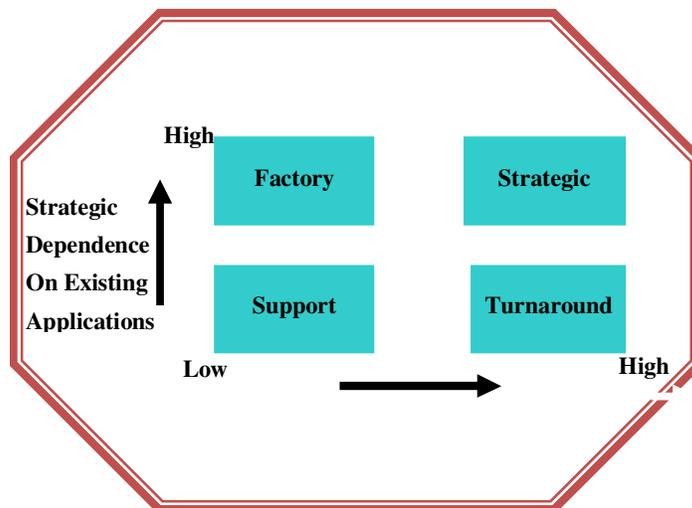
Introduction

1. Software Development: A Business Perspective

The stage model developed by Richard Nolan (1974) was originally developed to help managers understand the role and evolution of computers in their organization. It evolved from the discovery that plotting the annual expenditures on IT of an organization over time formed a classic “S-shaped” curve – the familiar learning or experience curve. Nolan had suggested following eras for the software organization:

Data Processing Era	: 1960 – 1980 (Industrial economy)
The Micro Era	: 1975– 1995 (Period of creative destruction)
The Network Era	: 1995–2010 (Era of transformed enterprise)

The theory holds that every organization must traverse the stages of learning in a sequential manner. The theory also leads to a contention that by managing the pathway through the stages integration and maturity can be achieved more efficiently, more effectively and perhaps more rapidly. An IT strategic grid was developed by Cash, et al. (1983) as below:



Strategic Impact of Planned Expenditure

Some of the observations of the above matrix could be summed up as:

1. Organizations in the support quadrant could at best use IT for cost reduction
2. Organizations in the Factory Quadrant can use IT for bringing in Efficiency
3. Organizations in Turnaround Quadrant are looking for managerial effectiveness through customer satisfaction
4. Organizations in Strategic Quadrant would use IT for bringing in cost competitiveness, cost leadership and strategic weapon.
5. Organizations would make an attempt to move from left half of the grid to the right half of the grid and their target destination being strategic Quadrant.

On the basis of the above observations it may be inferred that most of the organizations would use IT in general and application software in particular for bringing in effectiveness and efficiency. As a corollary of this inference, it is quite natural to assume that there should be market for application software in a country like India. As described earlier the application software is used in different user organizations for various support activities. Nirupam Bajpai et al. (1999) have highlighted following factors of competitiveness for Software Industry in India:

1. **Indian Edge:** A number of western companies seriously consider India as the first option when they have to outsource software development and services. According to a survey of World Bank, 82% American companies prefer software development or outsourcing from India. As per the NASSCOM study in year 2002, more than 158 companies out of the fortune 500 companies outsourced their software from India.
2. **Large Manpower Pool:** India today has the second largest English speaking scientific manpower pool in the world, second only to the USA. It also has a growing bank of 3.5 Million technical personnel. The quality of technical training is comparable to the best in the world.
3. **High Growth:** Indian software sector has been growing at the rate of 50% twice to the software industry of USA.
4. **Performance:** Indian software industry has grown as well as diversified and is committed to providing high quality and state of art technologies to today's global information industry.

5. **Quality:** In a report in the New York Times (Jan. 1994) Edward A Gargan noted that the Indian software industry is breaking new ground. The maturity of the Indian software industry in terms of quality can be measured from the fact that already 50 Indian software companies have acquired ISO 9000 certification. The Indian software industry has the maximum of ISO 9000 certified companies in the world for the software sector.
6. **Costs:** Indian software industry is successful because of low manpower costs.

Despite above-mentioned factors and India's success in software industry, the share of Indian software industry in the world's software and services industry is less than 1%. A study to examine the reasons behind this is therefore required. The study attempts to examine the software industry in the northern region to provide certain options that may help bridge the gap between the present position and the potential that could further be harnessed for India in the software sector. There may be multiple problems and trouble areas faced by the software companies of northern region; however, we have considered only marketing and software development related problems. The basic purpose is to present an empirical evidence and analysis that contributes to a better understanding of the issues associated with the marketing and development problems so that it may provide a basis for overall strategy formulation.

## 2. Objectives of Study:

The specific objectives of the study are:

- To concentrate on overall scenario of application software development and marketing strategy of IT companies of region
- To explore the major characteristics of development and marketing strategy as adopted by Software Industry in less IT developed areas (Such as Uttar Pradesh)
  - To explore the strategy adopted by different companies and firms, registered and operating in northern region with special reference to U. P. It is to be further explored as to what the specific development and marketing problems are faced by them and how to overcome them.

## 3. Research Design:

**a. Objective of the Study:**

In the present study only marketing and software development related problems have been examined. Further, the marketing problems have been divided into four basic marketing mix problems viz. Product, Price, Place and Promotion. While analyzing the Software Development related problems, only those issues have been considered which provide technology - human interface. Therefore the factors such as training and development, quality and technological support from respective agencies have been considered. The general problems such as recession, poor strategy and performance of software industry have also been considered.

**b. The Data Type and Source:**

The software companies of organized sector in northern region, especially in Delhi and Uttar Pradesh have been considered. For this purpose, the member companies of NASSCOM have been considered as population. The data to be used for this study is primary in nature and have to be gathered by means of structured questionnaires.

**c. Population and Sample Size**

As mentioned above, the companies, who are members of NASSCOM (National Association of Software Companies), form the population in this case. Although, the application software may attract unorganized sector as well, because of low level of investment and low number of workforce requirements, only organized sector has been covered, due to time and resource constraints.

- Total Number of member companies of NASSCOM in northern region : 150
- Total Number of companies developing application software in the region : 70
- Total No. of companies having turnover more than 25 million Rupees : 50
- Total No. of companies having turnover less than 25 million Rupees : 20

We have taken 21 companies from the population of 50 companies having turnover of more than 25 million

Rupees, whereas 11 companies have been taken from a population of 20 companies with a turnover of less than 25 million Rupees. The population of 70 companies is thus divided in two broad strata and the companies have been selected randomly from each stratum leading to a total sample size of 32 companies.

**d. Hypotheses:**

The various hypotheses which have been tested under the study are mentioned below.

Hypothesis #1 "The Software Companies of Northern India face problems in product features".
Hypothesis #2 "The Software Companies of Northern India face problems in pricing the products"
Hypothesis #3 "The Software Companies of Northern India face problems in distribution channel"
Hypothesis #4 "The Software Companies of Northern India face problems in product promotion"
Hypothesis #5 "The Software Companies of Northern India produce quality software"
Hypothesis #6 "The Software Companies of Northern India have quality workforce"
Hypothesis #7 "The Software Companies of Northern India send their developers for advanced training"
Hypothesis #8 "The Software Companies of Northern India get good governmental support"
Hypothesis #9 "The Software Companies of Northern India formulate good development strategy"
Hypothesis #10 "The Software Companies of Northern India face unpredictable market behaviour"
Hypothesis #11 "The Software Companies of Northern India are at location disadvantage"
Hypothesis #12 "The Software Companies of Northern India face problem of brain drain"
Hypothesis #13 "The Software market in Northern India is price sensitive"

**4. Findings of the Study**

The statistical analysis of the data collected through survey of the software companies has thrown significant light on certain aspects. Interestingly some of the hypotheses were rejected as an outcome of analysis. To minimize the biases in the data appropriation a number of statistical tests have been conducted. In some instances the results have varied. Z

test, as such, was administered for all the software companies, both small and big in order to draw major inferences. The Chi Square test and ANOVA were further conducted for testing the effect of various attributes on small and big companies. The findings are summarized as below:

i. According to the Z test software companies of northern region face problems in product features. ANOVA reveals that the problems faced by small and big companies are different.

ii. Z test shows that all software companies of northern India included in the sample face problems in pricing of the products. Chi Square further confirms that both small and big companies face this problem.

iii. According to Z test the software companies of northern region don't face any problems in terms of distribution channel. However according to ANOVA the nature of distribution problems, if any, are different for small and big companies. Chi square test also confirms it.

iv. According to Z test the software companies of northern region don't face any problems in promoting their products. ANOVA test establishes that the response of small and big companies is similar in this regard. However Chi Square test points out that the nature of problems pertaining to promotion is different for small and big companies. The findings from ANOVA and Chi Square test are therefore contrary to each other. The ANOVA takes into consideration all the factors influencing the outcome whereas the Chi Square takes into account the attribute under test. Thus Chi Square averages out the general response; ANOVA considers the relative effect of respective outcomes.

v. The Z test establishes that the software companies of northern India, included in the sample don't produce quality software. According to Chi Square test the smaller companies don't apply standard quality techniques, whereas on the contrary the big companies apply standard quality techniques like ISO 9000, CMM etc. Further, according to the data collected the big companies face the problems of brain drain, causing heavily on the quality of software produced.

vi. The Z test confirms that software companies of northern India have quality manpower. Thus we may accept that the software companies try to recruit best manpower. ANOVA also points out that software

companies whether big or small have recruited quality manpower. According to the Chi Square test the big companies send their developers for the superior training, which itself shows that the companies not only have quality manpower but they aim to upgrade their skills also.

vii. According to Z test the software companies of northern India send their software developers for superior training. However Chi square test reveals that the response of small and big companies on this issue is opposite to each other. This is quite logical to assume that the amount of risk and investment perceived in the training and development of the software developers would be different for small and big companies. This has also been consolidated further by ANOVA.

viii. According to Z test the software companies of northern India included in the sample do not get good government support. However Chi Square test establishes that small and big companies respond in similar manner on this issue. Here one can safely assume the following:

- a. The Government support is missing
- b. The companies don't want govt. support
- c. The tough rules, regulations and red tapes demotivate the companies towards government support.
- d. Government support is not enough.

ix. As per inference of the Z test the software companies of northern India, included in the sample don't formulate good software development strategy. This has been further established by ANOVA, which points out those both small and big companies don't formulate good development strategy.

x. According to Z test the software companies of northern India operate in unpredictable market. The response of small and big companies on the market behaviour has been similar, which has been confirmed by Chi Square test. In fact this may be associated with the formulation of developmental strategy. Since the software companies operate in an unpredictable market it is logical to assume that they are not able to make good developmental strategies.

xi. As per Z test the software companies of northern India are at location advantage. This has also been confirmed by Chi Square test, which states that both small and big companies accept that they are at geographical advantage. The reasons for this are given below:

- Delhi based companies consider themselves at location advantage.
- Noida based companies think that they are at location advantage.
- The only Lucknow based company may think that it is at location disadvantage. Single data item cannot influence the behaviour of complete data group; therefore this type of finding is there.

xii. According to Z test the software companies of northern India face the problems of brain drain. The ANOVA has further confirmed it. Both the small and big companies face the problems of brain drain.

xiii. According to Z test the software market in northern region is price sensitive, which has been further established by ANOVA and Chi Square tests. We can safely accept that both small and big companies are operating in a price sensitive market.

#### **5. Strategic Marketing & Software Development Mix for Small Software Companies:**

We would now like to suggest a strategic marketing and software development model for small and big companies, in the light of facts gathered and inferences drawn as a result of various statistical tests. (Singh, D B, 2004)

#### **Product Strategy for the Small Companies**

Around 80% of the small software companies included in our survey have faced problems in product features. However, only 1/3rd of the respondent companies have conducted a market research on products and market. The software companies implement quality, quite subjectively. The small companies contend that the customers compare their brands with the competing brands. According to companies more product features are demanded at lower prices. Apart from this, small companies further stress that the customers demand high level of customization.

Looking into the above product related problems currently faced by the small software companies, it may be suggested that the companies should conduct a market research for product type and market size. Since the amount to be spent on commercialization is usually large and the same may not be feasible for small companies, it is strongly recommended that the companies should focus only in specific regions. The small companies should not consider the option for product diversification. Moreover, the companies must

consider quality of product as the most important feature to be offered to customers.

#### **Pricing Strategy for the Small Companies**

80% of the small software companies included in the sample have faced the problem of pricing. Currently the software companies are facing with three problems of pricing the application software. These are:

1. Customers' preference for lower prices
2. There is no functional or direct relationship between quality and price
3. There is no benchmark available in the market for pricing the product.

One of the reasons why, the smaller software companies are facing problems in pricing is attributed to the intangibility of the product itself. Secondly the companies follow the principles and practices of pricing of goods therefore they are either cost based or market based. Application software possesses more characteristics of services than mere goods; therefore different methods of pricing may be followed.

- The pricing strategy for the smaller software companies should be such that the demand fluctuations may be successfully handled.
- Smaller companies should also take into account the cost of tangible clues of intangible application software product.
- Smaller software companies should adopt the pricing strategy in such a manner that can effectively handle the competition within the geographical boundary and the time zone. Here we would suggest that the smaller companies should operate in a niche market.

#### **Distribution Strategy for the Small Companies**

A little more than 20% of the small software companies face problems in the channel. The channels of distribution for smaller software companies, as per facts gathered, are very short and direct. In most of the cases it is from Business to Customers (B to C) or at best one agent or middleman can be added to it. This is the reason why the smaller software companies have not faced any problems arising out of distribution channel. In respect of smaller software companies, direct selling sales channel is the only method through which the application software can be offered to the end customers at lower prices. However the smaller companies may also consider Internet as an intermediary for their services.

#### **Promotion Strategy for the Small Companies**

80% of the smaller software companies face problems in promoting their products. The main reason for this is the budgetary constraints. According to the survey the companies have given two main reasons for the problems faced in promotion of the software product:

1. Lack of marketing professionals
2. Traditional media is costly and hence it is not possible for the smaller companies to adopt that media.

Critical examination of the facts reveals that the lack of funds stops the smaller companies in selecting the electronic or print media. The smaller companies may therefore adopt one of the following strategies:

1. Development of personal relationship with the customers, which will result in customer delight.
2. Demonstration of strong impression of competency, honesty and sincerity so as to win the confidence of the potential buyers through road shows, exhibitions and awareness seminars.
3. Using indirect selling technique for example acting as a buying consultant for the potential buyers.
4. Creating and maintaining a fine image by positive word of mouth.

All the above strategies don't involve much cost. The smaller companies facing the problems of resource crunch in the path of product promotion would find the above promotional strategies quite helpful.

#### Infrastructure Strategy for the Smaller Companies

When we take up the issue of infrastructure especially in the context of software development we mean the following:

1. Physical facilities available
2. Power back up available
3. Hardware/ Software available
4. Communication facilities available.

50% of the software companies, as per survey, face problems of insufficient infrastructure. The main reason behind this could be attributed to lack of funds for plough back in infrastructure facilities. The appropriate strategy, in this respect, for the smaller companies, could be, to reinvest certain fixed percentage of the revenue in the up gradation of the available infrastructure. The latest software and hardware should be purchased for the software development. It is suggested that at least 20% of the total revenue should be reinvested in the infrastructure updating. This figure is suggestive and has got its genesis in the normal rate of depreciation of computer infrastructure as shown by software companies in their balance sheets.

#### People Strategy for the Small Companies

33% of the smaller companies face the problem of good software developers. When this problem is coupled with brain drain from the region it becomes fiercer. The reason for this problem is low remuneration to the developers in the existing companies and better prospects for them in competing companies. In any typical software company employees are essentially the contact personnel with the customers. Therefore software developers should be motivated enough as customer conscious employees. Smaller companies according to the survey results can create conducive internal environment among all the employees through:

1. Supportive management methods
2. Better personnel policies
3. Better planning and control procedures

The smaller software companies must realize that the software developers are the first market of the company. Application software must be fully developed and internally accepted before it is marketed. The employees should be offered the ESOP and other fringe benefits as available in the other companies of the same size. The growth prospects and the reward system of the smaller companies should be reviewed, as the success of any application software is directly proportional to the intellectual creativity of the software developers involved. This will not only help small companies to retain their employees but also help them to establish as a better software company.

#### Process Strategy for the Small Companies

20% of the smaller software companies, included in the survey, have encountered the problems in software process management. Since the application software is an intangible product, the processes decide about the delivery of the product. Some of the following issues pertaining to processes especially in the context of smaller companies need be addressed:

1. Operations Planning: detailed specifications of each module
2. Scheduling: Detailing the timings at which the software development should be completed by agreed delivery promises within available resources and with their economic utilization.
3. Quality Control: As already mentioned the smaller software companies are not adopting standard quality techniques, effective and standard quality control techniques such as ISO and SEI – CMM should be adopted.

Government Support Strategy for the Small Companies  
Around 80% of the small software companies according to survey admit that they have not received any support from the respective government or related agencies. Many reasons could be cited for it, by software companies. Nonetheless, it is recommended that the smaller software companies must opt for government support in all technical and financial matters. This will further help the companies to remove the problems arising out of lack of funds and technical infeasibility of certain software projects.

**Conclusion:**

We have made an attempt to enlist the main marketing and software development problems faced by application software companies of northern region. However the list may not be exhaustive. We have also tried to explore a relationship between marketing and software development. On the basis of a pilot survey (Before the current extensive survey) null hypotheses were established and at that point of time it was manifested that the nature of problems faced by small and big companies should be different. The data analysis and inferences thereof have further confirmed this. However we have dealt the case of Small Software Companies separately and differently than that of Big Software Companies. We have provided a strategic model for small software companies that could serve as the basis for developing a strategic model for big software companies.

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