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Strategies for Business Growth in Robotics and Automation

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Received: 5 April 2015 Accepted: 3 May 2015 Published: 15 May 2015

Abstract

Managing technology integrated with operations strategies is a challenging task and has prime importance in a firm?s business strategy formulation. Today technology and disruptive manufacturing methodologies can make the difference between a winning or losing competitive strategic alternative. This research work is targeted towards the formulation of winning strategies including analysis on technology and operations strategies for business growth with focus on robotics and automation. Also included is a practical illustration of a company in real time who have identified and successfully implemented robotics and automation as their prime business growth area. How the formulation of correct strategies brought business growth and success to the organization has been studied and enunciated. Also developed is an advanced Gap Analysis framework which is basically a Dimensional Map to identify the strengths and weaknesses of the factors affecting business growth of the organization. Also, this helps in identifying those factors which needs strategic reinforcement. In conclusion we obtain a prediction factor list to identify the winning operations, technology and business strategies adopted by leaders in the Robotics and Automation industry for business growth.

Index terms— technology strategy, operations strategy, business strategy, business growth, robotics and automation, dimensional map.

1 Introduction obotics and Automation

??RAA]

has touched almost all aspects of industrial applications from Welding, Assembly automation, Painting, Pharmaceutical, Packaging, Spot Welding, Food & Beverages, FMCG, Healthcare, Rehabilitation and many more sectors. Apart from the manufacturing industry, robotics also finds its niche place in defence and power sectors. The nuclear sectors are extensively using robotics for material handling, inspection and maintenance needs. The myriad of high technology applications are not limited to those mentioned above.

India is on the fast track of becoming an international manufacturing hub. Manufacturing alone contributed to about 79% of FDI investment and 27% of **??**DP (2006). The 17 th PWC Annual global CEO survey **??**2014) indicates that 80% believe that technological advances will take place in their industries within the next five years. This economic growth is expected to see an unprecedented acceptance of the applications of robotics and automation in the Indian industry.

Operations are under increasing pressure as a result of low cost competition, stricter environmental legislation and falling skills within industry. With the added pressure to improve levels of productivity, quality and safety for better business, adoptable sustainable manufacturing practices present a cost-effective route to improve economic, environmental and general plant performance.

Today industry is increasingly getting competitive and the pressure of performing repetitive activities consistently is increasing day by day. Industry today is convinced with the Return on Investment and payback periods justification of using robotics for many types of jobs and is willing to invest in the same to reap their advantages.

Management of robotics assisted automation also makes strategic management complex due to the various social issues that crop up in terms of workforce displacement, specialised education and training that needs to be imparted to meet technological needs, right man for the right job has never been so much more complex, international competition to meet the needs of automation of emerging markets. All this calls for a systematic and step by step approach to strategy formulation. This can be achieved by integrating Technology and Operations Strategy with Business Strategy for business growth in robotics and automation.

2 II.

Objectives a) Linking of various Technology, Operations and Business Strategies for companies in Robotics and Automation business. b) To arrive at a Conceptual framework for companies in Robotics and Automation to show the extent to which various factors affect the various strategies. c) To test whether this platform satisfies a company case with respect to application in Robotics and Automation business. d) Check the efficacy of the framework by taking up a case study on Robotics and Automation e) To conclude whether it is a wise strategic decision to invest in a Robotics and Automation business.

III.

3 Literature Review

Although the formulation of robust operations and technology strategies has been the primary focus of various research papers, the integrated approach of linking various strategies like Technology Strategy, Operations Strategy and Business Strategy for companies in the Hi-Tech field of robotics and automation have posed multiple challenges and have relatively churned out less literature. This field has generated a myriad of allied papers which draw our attention to the numerous ways in which the different industries approach these issues. But there are rarely any hardcore papers on this subject which go to the root of the facts and provide a ready reckoner data, making this an interesting research topic.

This literature review covers surveying of over 300 national and international papers spanning the research field over a period of 20 years. Shane, 2007).

In order to achieve sustainable competitive advantage, according to Porter, firms must adopt one of the three generic strategies, namely, cost leadership, differentiation and focus (Mas Bambang Baroto et al, 2012). While no strategy can be universally effective, technology is becoming an important factor for serious consideration. However, since opportunities created by advanced technologies, such as computer integrated manufacturing (CIM), Robotics and Automation, etc., are open to all competitors within the same industry, how a firm should capitalize them is not only a technological issue but also a strategic issue. In the increasingly volatile business environment, the process of finding a solution able to resolve both issues satisfactorily has been described as a journey into the unknown. To survive the journey, innovation is becoming crucial (Lee Zhuang, 1995). Based on the author's personal interest and professional approach the same conclusions have been arrived at after conducting a detailed study on this topic.

4 b) Operations Strategy

How to formulate and implement a winning Operations strategy has been addressed very well so far for both domestic and foreign markets. Competitive strategy has also been dealt with by various authors to define the role operations strategy plays in a company's business strategy and manufacturing programs showing how programs such as quality management, six sigma, agile manufacturing, and supply chain management fit within the operations strategy (John Miltenburg, 2005). These tools help companies not only to plan and execute, but also monitor, learn, test, and adapt their strategic assumptions and practices to achieve sustainable success (Scott Shane, 2007). The manufacturing function requires a strategy to ensure a match, or Congruence, between the company's markets and the existing and future abilities of the production system. Manufacturing strategy generally addresses issues including (John Miltenburg, 2005):? Manufacturing capacity ? Production facilities ? Use of technology ? Vertical integration ? Quality ? Production planning/materials control ? Organisation

There is a common belief that manufacturing is an important part in corporate success. And yet, there is a lack of understanding of how manufacturing success is linked to corporate success. "It is quite possible for a firm to be successful with a bad manufacturing strategy and fail with a good one. In other words, manufacturing matters, but not unconditionally" To establish a link between manufacturing success and business success, it must be first determined how manufacturing strategy relates to three areas (Skinner W, 1969)

5 c) Linking Technology and Operations Strategy

Operations contributes 6.7 trillion pounds (10.93 USD) to the global economy. Many European countries including UK are strategizing to enhance their High Value Manufacturing [HVM] base and investments in order to be able to meet their Balance of Payments [BOPs] requirements. UK's Strategic landscape document have identified 22 competencies to ensure support is focused on where there is the greatest potential to deliver high value economic impact across multiple global market sectors. HVM is a leading edge technical knowledge and expertise to the creation of products, production processes, and associated services which have strong potential to bring sustainable growth and high economic value to a country. Activities may stretch from R&D at one end to

recycling at the other. Fig. **??** shows that such potential is characterised by high R&D intensity and high Growth. (Technology Strategy Board (TSB) UK, 2012-15).

6 "Fig 4 about here"

It has been realised that developing competitive advantage by using technology alone is unlikely to be sustainable. These technologies are also weapons of the competition, and have to be coupled with effective market and manufacturing strategies in order to win **??**Clark, 1989, Hong Liu andPeter Barrar, 2008).

7 d) Integrating Operations with Business Strategy

(R.Michael Donovan, 2011, Sohrab Khalilli et al, 2013) One paper seeks to examine empirically from a contingency perspective the influence of business strategy on the relationship between operations strategy and business results. (Maria Oltra and Luisa Flor, 2010).

In order to survive, thrive, and create real value in increasingly competitive global markets, organizations are adopting increasingly complex strategies. And even when they choose the right and the most brilliant strategies, the battle is only half won -if that. As companies try to execute on more and more intricate strategies across larger, more complicated, and widely dispersed operations, they confront challenges of a magnitude well beyond their past experience.

Although strategy execution is clearly an issue of high importance, there is also ample evidence that organizations find it difficult to fully deliver on their strategic and operating plans. Bain & Company director Chris Zook, in the book "Profit From the Core: Growth Strategy in an Era of Turbulence," notes the following startling statistic: In the decade between 1988 and 1998, only one out of every eight companies was able to deliver at least 5.5 percent real growth in revenues and earnings every year while covering its cost of capital. First, converting a strategy into results usually requires the coordination of disparate people and processes through activities including -but not limited tostrategy development, strategic and operational planning, budgeting, talent management, initiative management, forecasting, and technology.

On top of people's failure to understand that strategy and operations truly need to be linked, the second truth one has discovered over the years is that coordinating these disparate elements requires a performance management process that links strategy to operations and demands that all parts of the organization work in concert to deliver performance.

8 e) Aligning Technology With Business Strategy

Technology based approach is recommended for flexible automation user in the selection and implementation of business strategy (Raghavan Parthasarthy and Prakash Sethi, 1992). Flexible automation includes robotics and automation. Technology Strategy, like any functional strategy has two purposes. On one hand it is the translation of the overall strategy of the organization into a coherent set of long term instructions of investments, which are active in technology development. But at the same time it is also the development of technology based opportunities or options for the organization to steer future developments, i.e. provide the capabilities that enable the organization to shape its future (de Meyer and Loch, 2008).

9 f) Managing Technology and Operations Strategy with Business Strategy

The findings reported in one other paper are that of improvements of operational performance can only be achieved by aligning technological innovation effectiveness with Operational effectiveness. Confirmatory factor analysis [CFA] was used to examine structural relationships between the set of observed

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Volume XV Issue IX Version I ( )

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The limitations of prior studies are that there are only a handful of hardcore papers and fewer practical case-studies which have dealt with the influence of strategies for business growth in Robotics and automation. Virtually this is still a greenpasture and thus carries huge potential for further research.

12 IV. Research Methodology and Study

After a detailed literature review of over 300 national and international journal papers from various sources, a Critical to X (CTX) (Amitabha **??**axena In this research the broad goal is Sustained Business Growth in Robotics and Automation (RAA) and we drill down from this broad goal to specific, measurable dimensions (factors) and sub-factors that can be used to improve performance of the RAA firms. Figure **??** gives a typical CTX Tree which was derived after literature review phase was completed. "Fig. **??** We selected the scale and units for the various factors and conducted the DOE-Survey and rated the various factors that affected the corresponding strategies

and their interactions. The rating of the various factors was recorded using Likert scale from 1 to 5 (with 1 indicating Strongly disagree and 5 indicating Strongly Agree). The responses from the Survey Questionnaires were tabulated as shown in Table **??** of Annexure A. The number of respondents that provided inputs for the survey were 109. The respondents were top management officials like CEOs, CFOs, CTOs, COOs, Directors, VPs, GMs, etc chosen from RAA businesses organizations. Now, the Dimensional Map was drawn by marking the discrete responses on the scale shown on the map. The Gap between the outer line which corresponds to 5 on the Likert scale and the level of a given factor shows the level of agreement of experts in the field of Robotics and Automation on the factors that affect the corresponding strategies in order to sustain business growth. As seen in Fig. **??** Robotics and Automation falls under high R&D intensity and high business growth area. Hence this linking of operations and technology strategies helps to answer the question "Why RAA is an attractive proposition for investment?".

The step by step Research methodology adopted in this research is shown in Annexure-3.

The answers to the survey questionnaire are recorded in a tabular form and their summary is shown in Annexure-1, Table **??**.

V.

13 Results

a) The Dimensional Map derived for firms involved in Robotics and Automation [RAA] helps to identify those strategic factors according to the CEOs, COOs, CFOs, CTOs and other top management officials which affect the relevant strategy verticals or their interactions. [See **??**ig 2]. b) Test of Hypothesis 1 was carried out for the verticals. Null Hypothesis 1 was stated as "Not all the verticals of strategies are equally important" Test of Hypothesis using Pareto diagram indicated that "all the verticals of strategies are equally important", the same was verified using Chi-square as a nonparametric test. See Annexure-2 for details. c) Hypothesis 2 was stated as "Not all the questions of important verticals are equally important". Testing of Hypothesis using Pareto diagrams yielded that all the questions of important verticals are equally important for "Business Strategy", "Linking Operations Strategy with Technology Strategy" and "Aligning Operations with Business Strategy". See Annexure 2 for details. The same result is depicted in the Dimensional Map-Fig. **??**.

14 VI.

15 Discussion

India is a growing market as far as Robotics and Automation field is concerned and will need a lot of India centric research to be taken up by industries and

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Strategies for Business Growth in Robotics and Automation academia in order to meet the forth coming challenges in this field. Hi-Tech areas which includes High value manufacturing and RAA are growing at around 4% globally whereas in India the growth rate is almost 3 to 4 times higher. The Epi-centre of this growth is shifting to India and China leaving a lot of work to be done by researchers in this field. Today in many of the industries we see islands of automation and this needs to be looked at from the consolidated point of view. The cost benefit analysis of such an implementation has to be worked out in greater details by the industrial engineering team along with accounting teams to reap future benefits. There is also the aspect of social implication of introduction of RAA in Indian Industry that needs to be taken into account (which is often neglected) while automation is taking centre-stage. Building strategies for business growth has never been so much more challenging that it is now due to the Another field of research which has taken revolutionary standing in the countries like Japan, USA, South Korea, China and now India is that of Low cost Automation. Gnashing your teeth because your firms' hefty investments in RAA generate weak returns makes no sense and we need to take the baton and move on. By taking well managed and well informed decisions to avoid any fiascoes of humungous losses due to overinvestment in advanced technology areas without considering the ROI and payback calculations can be a deterrent to the company's' growth.

The introduction of the rupees 10000 million revolutionary concept of adoption by GE Multimodal Manufacturing facility at Chakan near Pune, India is clearly a winning strategy. Here the company has strategized its efforts on building flexible automation platforms which could be used across the product lines of GE such as Energy, Aviation, Oil & Gas and Transportation. This energy efficient effort is in line with the current governments much popularized "Make in India" initiative. Below we discus a practical case study of a company Viva Automation which is in the business of Robotics and Automation and how their young and dynamic CEO brought exponential business growth to the company in a record time in spite of economic slowdown.

17 a) Case-Study:-Viva-Automation's Survival-Madan

Mohan's Revival, (Vijay Kumar Dharmadhikari and PC Basak, 2015 from ET Cases) Industry 2008-2011 was facing turbulent times and mostly Automotive, Engineering, Steel, Infrastructure, and related industries were

under economic slowdown. Business was tough and many companies were laying off their staff and some were even closing shops. Investments were not forthcoming and no new ventures were being initiated across the sectors.

Viva Automation was involved in the field of Robotics and Automation. Viva was at cross roads, it had not grown substantially in the last 8 years since 2003 and it's turnover was hovering around the rupees 40 million mark for the past 8 years. The number of employees in this company as of 2011-12 were 25 with diverse skill sets. The management were not sure how to deal with this stagnated situation. The low growth rate had caused a climate of low morale among the employees. Customers were not considering repeating orders on this company. Economic slowdown had struck and survival of the fittest was the watch word of the industry. Management were unable to decide whether to divest from this current business, the recession loomed large and employee turnover was on the rise.

The past experiences of the company about their financial performances were not very satisfactory. Viva Automation saw a string of new leaders and most did not have a strong vision to grow this business in the right direction. The kind of projects executed mainly were those of selling of components used in robotics and automation industry namely motors, drives, controllers, some automation solutions were provided for cement, steel, textile, Automotive industries, and some non-critical mechanical and electronic components were provided by taking up outsourced job works from these industries. This direction of business helped little to develop the skill sets of their employees to those levels which were required to be able to take up high end robotics and automation industry projects with exponential returns. The Business Growth Areas in focus too were very diverse and in coherent.

Viva Automation did not grow substantially during the period 2003 to 2011. There was a strategic need to relook at the strategic intent of the company. The business model followed by the company was quite unique. The project planning was distributed among the employees based on availability of the employees at the time of execution of the project. There were many occasions when employees were shuffled between projects as per convenience of the then leader. Also there were situations when the project leaders were also asked to take up other responsibilities of other new projects that were won. Delivery dates were quite often not met and customer satisfaction suffered. Customers who repeated did so only on the good will gained due to personal relations with some of the employees and managers. Time and again customer complaints were not attended to on a fast track. Customers were slowly shifting to the competitors of Viva. There was no after sales service process and no focus was placed on CRM [Customer relationship management].

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Strategies for Business Growth in Robotics and Automation

January 2011 saw the dawn of a new era in the Viva Automation. A new dynamic CEO Mr. Madan Mohan took the reins of the Company. He had worked in diverse automation industries in the US and returned for good after a long stint in the field of Robotics and Automation. He had also managed diverse portfolios like R&D, Manufacturing Engineering, After Sales Service, Customer Relationship Management and Assembly Lines Automation abroad. This is when the new leader who very well knew the rules of the game and had handled similar situation in the past and was willing to put his buck and bets on those areas that he considered were least affected by recession and had the potential to grow in the near future. On the basis of experience he had gained by applying some serious thought to studying in depth the current Business model of the company and he came Madan Mohan, took reins of Viva Automation, when the company was in deep trouble. After discussing with employees and analysing the past trends in the company, Madan was deliberately looking for answers to the difficult questions faced by top managers: How to face recessionary trends in the industry? How to come out as clear winners against stiff competition? How to design effective business models for exponential growth? How to make the right choice of business growth areas? How to survive the business in these difficult times?

The first thing that was done by this dynamic leader was to interview all the employees and find out the domain expertise of the current employees and took up the arduous task of preparing a revolutionary Business Plan 2011 -2014 for Viva. He studied the current Business Growth Areas in depth and set out to identify other newer Business Growth Areas that could bring in new business and help the company to grow exponentially. He also chalked out new business models for the company with a revolutionary outsourcing model and aggressive partnering with leaders in the fields of interest.

As part of the Business Plan Madan set out to define a new Vision and Mission for the company. Viva Automation continued to work with their current customers on the current Marketing platforms [i.e. those projects that continued fetching orders]. These were the projects which also provided funds (hence were the cash cows) to some of the other projects. The company also identified those areas where it had to exit out of those markets which were not giving a steady flow of returns, taking away unnecessary resources and also were a volatile business.

The CEO did a detailed analysis of his team's strength and areas of improvements. He arranged for training of the staff to improve on the Domain Expertise of the Viva Automation. He introduced the staff to those areas which were most required in the new scenario of tie-ups with the various national and international partners he had chosen to spear head into the market with new vigour and focus.

Madan identified five Business Growth Areas [BGAs] based on Scope, Market Trends, Viva Automation's approach and buttressed the action plans with strategic initiatives.

Viva Automation used the concurrent Engineering methodology to meet the time to market requirements. Madan performed a proper Gap analysis to understand the weaknesses of taking up any particular project. The types of projects that required an Enterprise level of management were not taken up because he knew the company was not ready yet for these kind of projects. Only those projects that require Task, Project Oriented, and Program Oriented Management were taken up. He was confident that this would increase the success rate of the company's execution and start meeting the time to market goals successfully.

Viva Automation by shifting focus to those potential Business Growth Areas which were involved in those industrial sectors that were least affected by recession like Defence, Pharmaceuticals, Food and Beverages, Energy (Nuclear in particular), Textile, Medical, Research, etc the company ensured that it did not place all its eggs in one basket. Each sector was like a new S curve and focus on these ensured a high probability of success in at least a few of them. Thus Viva Automation achieved exponential growth in spite of the economic slow-down.

As can be seen so far the focus of the company was on the factors such as Technology, Quality, Responsiveness, Delivery, Cost, and Innovation. These were the clear competitive factors which made this company a winner against its competitors.

Madan thought to take Viva Automation to the next level of growth there were many hard decisions that had to be taken. The current scenario vis-a vis the scenario prior to 2011 clearly indicated the radical shift in the approach to the company's business strategy. The aggressive tie ups with market leaders helped this Viva Automation to ride the rising wave in business growth areas which were least affected by the slow down. By focusing on proper planning and execution Viva Automation involved in the Robotics and Automation business stood out to be a clear winner among its competitors. This company grew exponentially from 40 million rupees company to a

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Strategies for Business Growth in Robotics and Automation phenomenal 300 million rupees company between 2011 and 2014 paving a roadmap for many a start up Automation companies.

20 VII.

21 Conclusions

a) The concept of dimensional map depicted in Fig- **??** is essentially a pictorial representation of an advanced SWOT analysis and helps to derive those strategies that can put a company involved in RAA business on track to sustained business growth.

b) The strategic responses of the top management of a company in the RAA business that are leaders in the field and focus of such companies on which of the factors that affect sustained business growth help us to conclude "what are the winning strategies that make such companies leaders in their field". [1] [2]

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Figure 1:

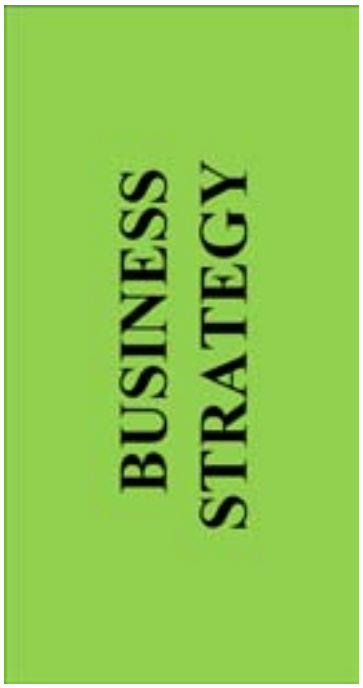
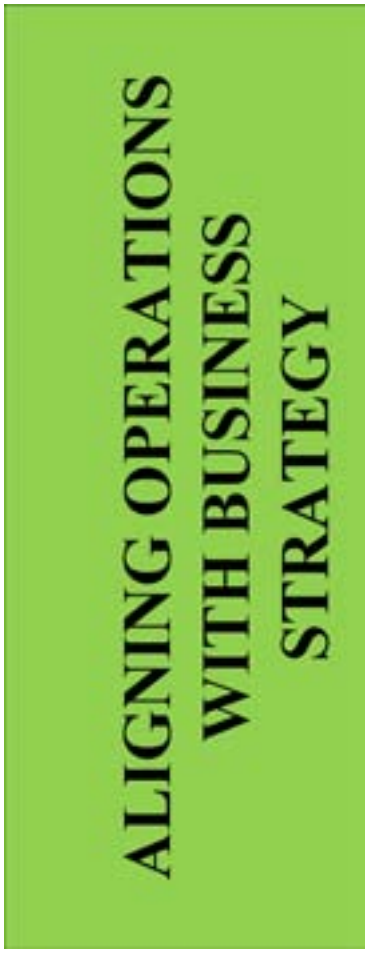


Figure 2:

Figure 3: Global

Figure 4: Global



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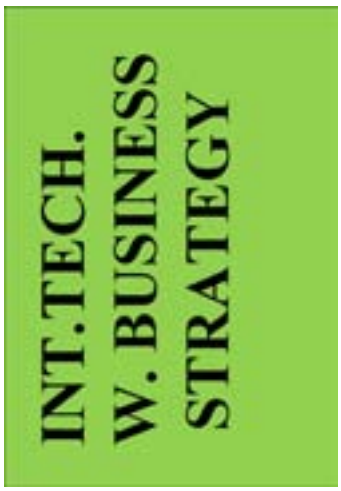

Figure 7:

Figure 8:

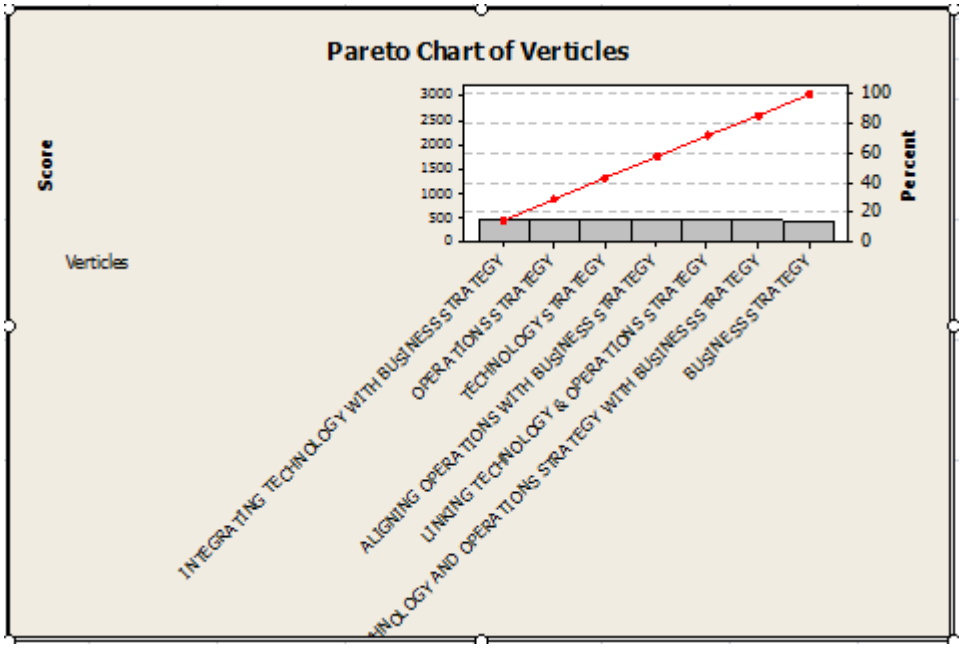
Pareto Chart of Verticles
Score
Percent
Verticles
3000
2500
2000
1500
1000
500
0
100
80
60
40
20
0
INTEGRATING TECHNOLOGY WITH BUSINESS STRATEGY
OPERATIONS STRATEGY
TECHNOLOGY STRATEGY
ALIGNING OPERATIONS WITH BUSINESS STRATEGY
LINKING TECHNOLOGY & OPERATIONS STRATEGY
BUSINESS STRATEGY

Figure 9:

Little, 2001 and Hector Montiel Campos et al, 2009).Technology entrepreneurs examines technology strategy from perspective of various established companies, gives a balanced theoretical and practical view of this subject (Scott

This literature review gives a fundamental approach to the various keywords used in the literature namely Technology Strategy, Operations Strategy, Business Strategy, Linking Technology and Operations Strategy, Integrating Operations with Business Strategy, Aligning Technology Strategy with Business Strategy, Managing Technology and Operations Strategy with Business Strategy, Business Growth in Robotics and Automation.

a) Technology Strategy, (Vijay Kumar Dharmadhikari And Pc Basak, 2015)

In today's fast paced competitive environment technology becomes a central component of strategy making process. Integration of technological concerns into business strategies of organizations is facilitated with global perspectives on the subject. Books and research papers published on technology strategy have addressed economic, organizational as well as cultural implications of technology, (R. Rumelt, 2004). Strategy-technology integrated companies have shown better financial and operational performance. Strategies of technology leadership and market orientation were also associated with enhanced financial performance, (M. Schneiderjans, Q. Cao, 2009). The evolution of technology strategy has been dealt with in a lucid and step by step manner in this book (Ricardo Santa et al, 2010). How Technology based firms address and approach formulation of technology strategy to gain competitive advantage in turbulent markets has been covered by many authors. (Arthur D

strategy managers for

Figure 10:

Figure 11:

In the above equations,
E(x1) is a measure of "Operations Strategy",
E(x2) is a measure of "Technology Strategy",
E(x3) is a measure of "Business Strategy",
E(x4) is a measure of "Linking Technology with Operations Strategy",
E(x5) is a measure of "Integrating Operations with Business Strategy"
E(x6) is a measure of "Aligning Technology with Business Strategy"
E(x7) is a measure of "Managing Technology and Operations Strategy
With Business Strategy"

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Y = g(x1, x2, x3, x4, x5, x6) Eq (1)

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Where, x1 = Operations Strategy x2 = Technology Strategy x3 = Business Strategy x4= Linking Technology with Operations Strategy x5 = Integrating Operations with Business Strategy x6 = Aligning Technology with Business Strategy x7 = Managing Technology and Operations Strategy with Business Strategy Y = Sustained Business Growth in Robotics and Automation E(x1) = f (A, B, C, D, E) ie E(x1) = f (Quality, Flexibility, Speed, Technology, Cost) Eq (2)

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E(x2) = h (W, X, Y, Z) ie E(x2) = h (Market Structure, Technological Characteristics, Business Stra

E(x7) = p (1, 2, 3, 4, 5, 6, 7, 8)

[Note: © 2015 Global Journals Inc. (US) 1 i.e. E(x7) = p (Robotics & Automation Strengths of Scope and Change, The Strategies of RAA reflect scope flexibility choices, Business Strategies Involves Speed-Flexibility and Quality Leadership Choices, RAA has Direct Automated Links between Technical Core and Operations Constituencies, RAA Organization is of Team Type, Diversified Skills In Shop Floor Personnel, Concurrent Engineering is applied in RAA Firm, Uses Project Teams for functional Co-ordination at Operational Level) Eq (8)]

Figure 12:

Strategies for Business Growth in Robotics and Automation
c) How investment in the field of RAA is an attractive Annexure -2
proposition for a company? Is answered in this research. Table -1 Test of Hypothesis-1
d) The case study illustrates how a company can strategically position itself in SCORE SCORE
the wake of economic slowdown? Also enhances our understanding about how MARKE-
it can come out as clear winner by sustaining and successfully building strate- 545 DUCED
gies in turbulent STRATEGY VERTICALS FACTOR AFFECTING THE % TO
CORRESPONDING STRATEGIES 1. ROBOTICS AND AUTOMATION 425 5
Null Hypothesis 1 -Verticals Score (RAA) STRENGTHS OF SCOPE AND 15.09682
CHANGE BUSINESS STRATEGY 460
times, (Vijay Kumar Dharmadhikari, 2011) . VIII. Limitations of this Research 418 4
2. BUSINESS STRATEGIES OF RAA REFLECT SCOPE FLEXIBILITY 14.67017
CHOICES OPERATIONS STRATEGY 447 TECHNOLOGY STRATEGY 443 14.53889
? Assembly Automation Solutions a) This research does not consider the effects of scale of the organization
? Machine Tool Solutions
? Turnkey Solutions
? Contract Manufacturing Solutions
? Standard Products

[Note: A Annexure -1 © 2015 Global Journals Inc. (US) 1 42 Year 2015]

Figure 13:

Conclusion 1 from the Pareto is that the Null Hypothesis-2 is true.ie Not all the questions of important verticals are equally important for "Business Strategy" vertical, "Linking Operations Strategy with Technology Strategy" vertical and "Aligning Operations with Business Strategy" vertical. We verified the above hypothesis using the Chi square as a parametric test. The same is demonstrated in the Dimensional Map Fig. **??**.

On-"Managing Technology and Operations Strategy with Business Strategy", "Operations Strategy", "Technology Strategy" and "Integrating Technology with Business Strategy".ie All questions of important verticals are equally important. The same was verified using Chi Square as a non-parametric test. Given below for example is the pareto for Technology Strategy (TS) Vertical. Likert Scale used in the Survey Questionnaire 1 -Strongly Disagree that a given factor affects the corresponding strategy 2 -Disagree that a given factor affects the corresponding strategy 3 -Neither agree nor disagree that a factor affects the corresponding strategy 4 -Agree that the relevant factor affects the corresponding strategy 5 -Strongly agree that the relevant factor affects the corresponding strategy Note:-1) For the scores recorded from survey see Annexure-1, Table **??**.

2) A, B, C, ...,Z and 1, 2, 3, ...14 are factors affecting the corresponding strategy and are shown in Annexure -1, Table **??**.

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[Harvard Business Review Press] , *Harvard Business Review Press*

[International Journal of Production Research] , *International Journal of Production Research* 47 (10) p. .

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[Pearson Prentice] , Hall Pearson Prentice . New Jersey.

[Arthur D Little ()] , Arthur D Little . *Strategy and Technology* 2001.

[Rumelt ()] , R Rumelt . *Strategy, Structure, and Economic Performance* 2004. Harvard Business School Press.

[Shane ()] , Scott Shane . *Technology Strategy for Managers and Entrepreneurs* 2007.

[Kumar Dharmadhikari and Basak ()] 'Aligning Technology Strategy with Business Strategy for Sustained Growth of a Hi-Tech Company'. Vijay Kumar Dharmadhikari , Basak . *International Journal for Management Research and Business Strategy* 2015. 4 (2) .

[Schneiderjans and Cao ()] *Alignment of Operations Strategy, information strategic orientation, and performance: an empirical study*, M Schneiderjans , Q Cao . 2009.

[Everett et al. ()] 'Assessing Operations Management from a Strategic Perspective'. E Everett , Paul M AdamJr , Swamidass . *Journal of Management* 1989. 15 p. .

[Zhuang ()] 'Bridging the gap between technology and business strategy: a pilot study on the innovation process'. Lee Zhuang . *Management Decision* 1995. 33 (8) p. .

[Kumar Dharmadhikari ()] 'Building Strategies in Turbulent Times'. Vijay Kumar Dharmadhikari . *SAMVAD* 2011. III p. .

[Kumar Dharmadhikari and Basak ()] *Case Study-Viva Automation's Survival-Madan Mohan's Revival", ET Cases [The Economic Times Cases-from Timesgroup*, Vijay Kumar Dharmadhikari , Basak . `www.etcases.com` 2015. India.

[Thomas and Saaty ()] *Decision Making with Dependence and Feedback-The Analytic Network Process*, . L Thomas , Saaty . 1996. Pittsburgh: RWS Publications.

[Montgomery ()] *Design and Analysis of Experiments*, M , Douglas C Montgomery . 2007. John Wiley, India. p. . (5 th Edition)

[Donovan ()] R , Michael Donovan . *Connecting Business Strategy and Operations*, 2011.

[High Value Manufacturing Strategy -UK Government Strategic Plan ()] *High Value Manufacturing Strategy - UK Government Strategic Plan*, 2012 to 2015.

[Mas Bambang Baroto Madi Bin Abdullah Wan ()] *Hybrid Strategy: A New Strategy for Competitive Advantage*, Mas Bambang, Muhammad Baroto, Madi Bin, & Hooi Lai Abdullah, Wan (ed.) 2012.

[Phusavat et al. ()] 'Information requirements for managerial decisions in manufacturing'. Kongkiti Phusavat , Rapee Kanchana , Binshan Lin . *Business Process Management Journal* 2009. 15 p. .

[Prasad et al. ()] 'International operations strategy: current efforts and future directions'. Sameer Prasad , Sunil Babbar , Jaideep Motwani . *International Journal of Operations & Production Management* 2001. 21 p. .

[Miltenburg ()] *Manufacturing Strategy*, John Miltenburg . 2005. New York: Productivity Press.

[Skinner (1969)] 'Manufacturing-Missing Link in Corporate Strategy'. Skinner . *Harvard Business Review* 1969. May 1969.

[Sohrab Khalili Shavarini et al. ()] 'Operations Strategy and Business Strategy alignment model (Case of Iranian Industries)'. Hossain Sohrab Khalili Shavarini , Jamshid Salimian , Mahmood Nazemi , Alborzi . *International Journal of Operations and Production Management* 2013. 33 (9) p. .

[Oltra et al. ()] 'Operations strategy configurations in project process firms'. M J Oltra , C Maroto , B Segura . *International Journal of Operations & Production Management* 2005. 25 p. .

[Parthasarthy and Sethi ()] Raghavan Parthasarthy , S Prakash Sethi . *The Impact of Flexible Automation on Business Strategy and Organizational Structure*, 1992. 17 p. .

[Liu and Barrar ()] 'Performance implications of strategy-technology connections: an empirical examination'. Hong Liu , Peter Barrar . *Journal of Manufacturing Technology Management* 2008. 20 p. .

[Saxena ()] *Six Sigma Black Belt Training-Introduction to DOE and Full factorial DOE*, Amitabh Saxena . 2010. Anexas Consultancy. A group Company of Anexas Denmark

[Diaz Garrido et al. ()] 'Structural and infrastructural practices as elements of content operations strategy. The effect on a firm's competitiveness"'. M L Diaz Garrido , F Garcia Martin Pena , Muina . *International Journal of Production Research* 2007. 45 (9) p. .

[Yudoko ()] 'Sustainable Operations Strategy-A conceptual Framework'. Gatot Yudoko . *The 3 rd Technology and Operations Management*, 2012.

[Arnoud De ()] 'Technology strategy and China's Technology capacity building'. Meyer Arnoud De . *Journal of Technology Management in China* 2008. p. .

[Héctor Montiel Campos et al. ()] 'Technology Strategy and new Technology Based Firms'. Itxaso Héctor Montiel Campos , Del Palacio , Aguirre . *Journal of Technology Management & Innovation* 2009. 4. Francesc Solé Parellada, José Pablo Nuño de la Parra (Issue 4)

[Kleiner (2010)] *The evolution of Technology Strategy*, Art Kleiner . 2010. Jan 4 2010. (Published)

[María et al. ()] 'The moderating effect of business strategy on the relationship between operations strategy and firms' results'. J María , M Luisa Oltra , Flor . *International Journal of Operations & Production Management* 2010. 30 p. .

[Santa et al. ()] *Understanding the impact of strategic alignment on the operational performance of post implemented Technological Innovations*, Ricardo Santa , Ram Vemuri , Mario Ferrer , Phil Bretherton , Paul Hyland . 2010.