

Exploring Manufacturing Competencies of a Tractor Manufacturing Unit (A Case Study)

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Article Info

Article history:

Received 29 December 2013

Received in revised form

10 January 2014

Accepted 20 January 2014

Available online 1 February 2014

Keywords

Competitive

Competitiveness

Aggregate

Competency

Explores

Significance

Abstract

The tractor industry of India is one of the most important industries. With arrival of certain new brands like new Holland, John Deere, etc. the global market place has become increasingly competitive in recent time and industries are facing tough challenge of improving products and thus customer base. The competitiveness among industries is an important issue. Competency development is a vital tool to enhance the competitiveness of industries. Based, on aggregate performance of a firm, it comprehensively explores the varying importance of manufacturing competencies and drives of industrial competitiveness. Hence by, exploring the manufacturing competencies of a tractor industry, one can reflect the competitiveness of tractor manufacturing industry as a whole. This study presents various factors of manufacturing competencies affecting industrial competitiveness as the significance of these competencies is increasing day by day in tractor manufacturing industry.

1. Introduction

This paper considers technological competencies and the extent to which they remain industry-specific over time. We define a technological competency as the ability to create and use a particular field of technology effectively, which is gained through extensive experimentation and learning in its research, development and employment in production. This empirical paper draws upon the notion of technological path-dependence at the industry level and finds that industry-specific competencies have endured strongly over the twentieth century — industrial sectors patent most in their corresponding technological fields, and differences in overall technological profiles remain quite marked. Today's manufacturing entities face a myriad of challenges. They are tasked with getting products to market faster, lowering costs while improving quality and increasing customization, and competing in aglobalised world all the while finding winning approaches to improve product innovation. [1]

Easynet's innovative solutions and global

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network support manufacturer's needs in a variety of ways:

- **Collaboration-** Helps Manufacturers Bridge the operational and strategic gaps with their vendors, streamlines supply chains, and create the efficiencies which reduce costs and improve revenue.
- **Globalization-** Creates new opportunities for global commerce outside of domestic markets through shared information such as product enquiries, orders, materials requirements, and sales and technical support.
- **Mass Customization-** A trend driven by consumers searching for individuality. Manufacturers are forced to adapt processes and react efficiently to changes in demand.

With our vertically aligned specialists, we are able to understand these challenges that your business faces and more. Partnering with industry leaders in the manufacturing field, Easynet are able to offer you the solution your business needs. Companies must develop and manage production networks that are lean and flexible enough to operate cost-effectively in these uncertain times. Key challenges include increasing the efficiency of shop-floor

operations, improving overall equipment effectiveness, managing global networks, and aligning the objectives of manufacturing with other key functional areas. To succeed, companies must answer questions such as these:

- Have we aligned our manufacturing capabilities with our overall business strategy?
- Does our global production network fully optimize costs and scale?
- Are we in sourcing and outsourcing the right things?
- Can we improve utilization and gain capacity without adding cost?
- How can we improve demand management and production planning and increase flexibility in these uncertain times?

The U. S. economy is influenced by global competition, rapidly changing technology, and a move to sustainable and environmentally sound practices. The workforce must constantly learn and adapt to new skill requirements for American businesses to remain competitive. Workers must demonstrate that they have the right skills to enter and compete in today's labor market. The purpose of this paper is to throw light on the nature and determinants of the technological competencies of the world's largest firms. These are of increasing interest to practitioners, and to theorists, who are seeking to explain why firms provide different ranges of goods and services, why they diversify at different rates and in different directions over time, and what makes them competitive.[2] Their

technological competencies have the following characteristics:

1. They are typically multi-field, and becoming more so over time, with competencies ranging beyond their product range, in technical fields outside their 'distinctive core'.
2. They are highly stable and differentiated, with both the technology profile and the directions of localized search strongly influenced by firms' principal products.
3. The rate of search is influenced by both the firm's principal products, and the conditions in its home country. However, considerable unexplained variance suggests scope for managerial choice.

1.1 Building Blocks for Competency Models

There is a wealth of information available for the development and use of competency models. To simplify the process, competency modeling experts reviewed the literature as well as past competency models developed for a wide range of corporations and government agencies. They identified the competencies most commonly referenced as contributing to success in the workplace, and incorporated the findings in a single reference source that can be used to guide efforts to construct competency models. This reference consists of a set of "building blocks" for competency model development, which is referred to as the Building Blocks Model. Each building block is a competency area defined by key behaviors. The building blocks are grouped by type and are arranged in tiers.

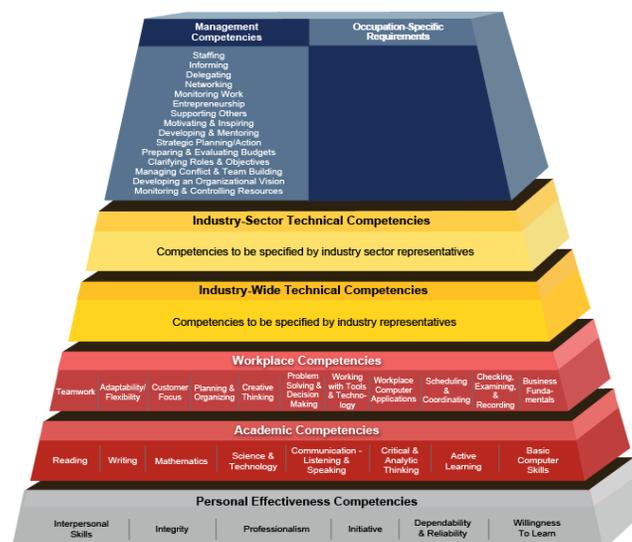


Fig. 1. Building Blocks for Competency Models

Tier-1 is to be filled in with the competencies specific to a sector within an industry.

Tier-2 is to be filled in with industry-wide competencies.

Tier-3 Workplace Competencies represent motives and traits, as well as interpersonal and self-management styles.

Tier-4 Academic Competencies include cognitive functions and thinking styles.

Tier-5 Personal Effectiveness Competencies are often referred to as soft skills.[3]

1.2 Why Competencies?

As global business competition shifts from efficiency to innovation and from enlargement of scale to creation of value, management needs to be oriented towards the strategic use of human resources.

Under these circumstances, the ability of companies to effectively carry out competency based human resources management (HRM) is becoming more and more crucial for their survival. A competency based HRM system captures the differing worth of individual contributors, facilitates multiple career paths and allows flexibility in reward-related decisions, which are important to address with the changing nature of organizations.

The field of competency development is growing in popularity with administrative management in businesses and agencies worldwide. One important reason to collect data and build competency models is that they are powerful decision-making tools. [4]

- The best way to understand performance is to observe what people actually do to be successful rather than relying on assumptions pertaining to trait and intelligence.
- The best way to measure and predict performance is to assess whether people have key competencies.
- Competencies can be learnt and developed.
- They should be made visible/accessible
- They should be linked to meaningful life outcomes that describe how people should perform in the real world.[5]

For example, one application of competency models with potentially long-term benefits is employee selection. Using competency-based interviewing techniques, hiring managers can determine if an individual has the knowledge and skills needed to be effective in the future.

2. Methods and Factors

2.1 Methodology

- Detail literature review shall be carrying out to study the significance of manufacturing competencies.
- Case study will be conducted in selected tractor manufacturing unit in north India.

2.2 Objectives

- To explore manufacturing competencies in tractor industry.
- To analyses the impact of manufacturing competency on success of tractor industry.[6]

2.3 Manufacturing Competencies

A competency is the ability to apply or use a set of related knowledge, skills, and abilities to perform critical work functions or tasks in a defined work setting. Competencies often serve as the basis for skill standards that specify the level of knowledge, skills, and abilities required for success in the workplace as well as potential measurement criteria for assessing competency attainment. To implement management subjects in a company always means to combine professional sector specifications with generally accepted concepts. Therefore we assure comprehensive sector know-how within our core competencies to provide an ideal combination of method and professional knowledge for successful projects. Furthermore it is a central success factor and requirement for each our consultants to respond to the individual challenges of each company environment and to convert this into direct project success.

- Applies basic engineering principles and the appropriate technical solution to a problem
- Applies principles of engineering science and technology, techniques, procedures and equipment to the design and production of various goods and services
- Applies the basics of electricity
- Identifies and selects the appropriate hand or small electric tools or diagnostic equipment for the work
- Solves problems where a variety of mechanical, electrical, thermal or fluid faults could be at fault.[7]

2.4 Manufacturing Competency Factor

2.4.1 Product Concept (Idea Generation)

- creativity
- innovation
- invention

- evolution

2.4.2 Product Design & Development

- computer aided design (technology)
- product life cycle
- finite element method
- finite element analysis
- simulation & modeling
- aesthetics
- ergonomics
- technical specifications

2.4.3 Process Planning

- computer aided process planning
- machine selection
- material selection
- statistical process control
- demand order information

2.4.4 Raw Material

- material availability
- import
- inventory
- warehousing
- transportation
- automated equipment

2.4.5 Production & Control

- computer aided manufacturing
- precision knowledge
- green manufacturing
- system integration
- robotics
- hydraulics & pneumatics
- assembly
- finishing
- process control

2.4.6 Quality Control

- Inspection
- product testing
- life cycle analysis[8]

2.5 Case Study of Escort

Indian tractor market is through a very crucial period. Being the largest tractor market in the world in unit terms; it is going to witness tremendous competition it has not seen till now. The key concern for Escorts in this war of competition, are:

- Adverse Govt. policies.
- Economic slowdown.
- High competition.
- Recession in global economy.
- Fluctuations in exchange rates.
- Low farm mechanization practices.

- Inadequate credit practices being promoted.
- Farm income getting stabilized.

These factors have to be overcome to push the tractor sales. The other players competing with Escorts are M&M, EICHER, SONALIKA, NEW HOLLAND STANDARD etc. M&M which is one of the toughest competitors to ESCORTS have gained much higher popularity and market share. The reason behind is that farmers in India prefer low fuel consuming tractor [9].

2.5.1 Company Flashback

The company pioneered farm mechanism in 1948 by launching Escorts Agricultural Machines Limited by taking the franchise from the U.S.O. based Minneapolis Moline, Wisconsin only to market tractors, implements, engines and other farm equipment. In 1960 started its own manufacturing from Fakirabad. Today, escort agri machinery group has a nationwide network with over 600 dealers, 100 parts stockiest and 30 area offices. Their national share stands at 20%. The company has developed its own in-house state-of-the-art technology R&D facility. The main focus of the R&D facility is to develop new and better products - products that can offer improved performance with lower fuel consumption and least maintenance and parts requirements.

2.5.2 Objectives

- To assess satisfaction level of customer regarding fuel efficiency
- To know satisfaction level regarding quality, maintenance etc
- To assess whether customers are satisfied with price of the farmtrac tractors
- To know influencing factor to purchase the farmtrac tractors.

2.5.3 Strategy

Strategy is art of troop leader; office of general, command, generalship is a high level plan to achieve one or more goals under conditions of uncertainty. Strategy becomes ever necessary when it is known or suspected there are insufficient resources to achieve these goals. Strategy is also about attaining and maintaining a position of advantage over adversaries through the successive exploitation of known or emergent possibilities rather than committing to any specific fixed plan designed at the outset. The Escorts new jai kisan series recognizes the new market order for varied needs of the Indian farmer, changing tractor uses for specialized applications and usage of modern and heavy-duty implements & attachments, thereby offering wider options for agricultural,

infrastructure as well as specialized applications for land development activities.

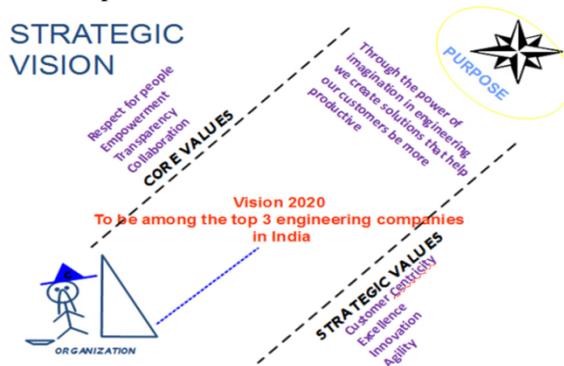


Fig: 2. Strategic vision

The company strategic values define how we will achieve the envisioned future. These must be embedded into our manner of thinking and ways of work.

- **Customer centricity**
Acute sensitivity to the needs and experiences of the customer shall guide all that we do.
- **Excellence**
We will strive to achieve and surpass world class standards in all that we do.
- **Innovation**
We will use the power of technology and imagination to deliver solutions to the customer's needs.
- **Agility**
We will operate in our markets with the ability to change direction and position with nimbleness and speed. [10]

2.5.4 Work Culture

The escort limited seeks to create a culture where each employee, vendor, and dealer feels himself responsible and integral part of the enterprises. The work culture at Escort is open and participative. Learning is encouraged in the company. This governs its approach to business and relationships within the organization. It has designed its management structure in response to the needs of quick decision making and operational flexibility even through hierarchies and designation does exit. It is a highly informal organization where communication moves in all direction, decision-making is quick and to a large extent delegated. Every member respects 5 S formulas also:-

1. Seri
2. Seiton
3. Seiso
4. Seiketsu

5. Shitsuke

5S stands for the first five letters of the Japanese words:

1SSeiri sorting out, clearing, segregation, proper selection, remove the waste.

2SSeiton Systematic arrangement, keeping things at proper place, a place for everything and everything in its place.

3SSeiso cleaning (spick and span) quality by the cleanliness. Keep clean all area, equipment and work place.

4SSeiketus standardizing, environment, cleanliness, light, noise, punctuality. (order and save time) respect of rules.

5SShitsuke maintain discipline and standards to maintain above.

The 5s are also five operations to keep a good behavior for every work place 5s program started in Escort Limited from December 2000 achieving clean floor and organized racks is not an end in itself. The ultimate goal of housekeeping through 5s is to reduce the cost of product by increasing productivity and contributing to total quality. [11]

2.5.5 Manufacturing competencies of tractor Industry

At escorts agri. machinery, the catalyst for the next wave of farm mechanization has brought about two large customer centric initiatives to the fore at escorts new products and variants that are aligned with changing and emerging applications & end usages and the shift of escorts from being a standalone tractor manufacturer to being a complete farm solution provider. Today's manufacturing entities face a myriad of challenges. They are tasked with getting products to market faster, lowering costs while improving quality and increasing customization, and competing in a globalised world all the while finding winning approaches to improve product innovation. Easynet's innovative solutions and global network support manufacturers needs in a variety of ways.

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2.5.6 Company's Design Performance

In line with its consistent focus on Indian agricultural growth, your company invested significant (over one year) engineering and product development effort to launch the escorts 'jai kisan series'. This is a path-breaking initiative that recognizes the new market order for varied needs of the Indian farmer, changing tractor usage for specialized applications and use of modern and heavy-duty implements and attachments, thereby offering wider options for agricultural, infrastructure as well as specialized applications for land development activities. Promoting the thought behind this innovation through its slogan 'ab kaamjaisa, tractor waisa', the new initiative has been launched in the markets of Punjab, Haryana, Rajasthan and Uttar Pradesh. The new jai kisan range of tractor series offers a differentiated product portfolio catering to specific application needs of various agro-climatic

zones in the country and offering improved product features and performance. The new Escorts 'Jai Kisan Series' comes in five new categories ValueMaxx, LoadMaxx, AgMaxx, InfraMaxx and SuperMaxx.

The tractor evolved in the second half of the 19th century and first half of the 20th into its present, conventional, two wheel drive form and four wheel drive variation. This form owes much to history but also the fact that it is an inherently logical arrangement.

- Designers followed early tractor designs that were simply replacements for horses or other draught animals.
- The layout takes advantage of the transfer of weight to the main driving wheels at the rear, as the drawbar pull on the tractor increases.
- The layout is inherently stable in the horizontal plane because the implement commonly being pulled behind the tractor tends to follow the latter and to pull it into straight line operation. [12]
- Rear mounted implements offer a minimum of offset loading and moment in the horizontal plane this contrasts with, for example side mounted implement.

2.5.7 Financial Result

Table 4.4: Financial result

Sr.no	Income an profit/loss	Year ended 30.09.2011 (in crores)	Year <u>endede</u> 30.09.2010 (in crores)
1.	Net sales & business incomes	3,251.49	
2.	Total expenses	3,076.96	2,764.77
3.	Profit before interest, depreciation, <u>amortisation</u> & exceptional items (1-2)	174.53	2,533.47
4.	Interest & finance charges	25.51	231.30
5.	Cash profit before tax (3-4)	149.02	11.74
6.	<u>Depreciation & amortisation</u>	38.91	219.56
7.	Profit/Loss before Tax & exceptional items (5-6)	110.11	43.47
8.	Exceptional income/expense	9.49	176.09
9.	Tax & deferred tax	(19.47)	11.93
10	Profit after tax	120.09	50.47
			137.55

2.5.8 Process Planning

Process planning is a key element in project management that focuses on selecting resources for use in the execution and completion of a project. In a manufacturing setting, this aspect of planning also includes establishing the general sequence of steps

that begin with the acquisition of materials and end with the creation of a finished product. Process planning is often closely associated with project planning, although the specific functions of each tool are used differently in the overall strategic planning. While both process planning and project planning are necessary to give form and focus to any

project, each procedure fulfills specific needs. Process planning helps to create the general process necessary to reach an ultimate goal, such as the creation of a product or the development of a marketing campaign. Project planning looks at each of the steps or processes identified in process planning and defines the specific actions that must take place in order for each of the processes to be completed successfully. In a sense, a process plan.[13]

2.5.9 Quality Control

Quality control for short is a process by which entities review the quality of all factors involved in production. This approach places an emphasis on three aspects.

- Elements such as controls, job management, defined and well managed processes performance and integrity criteria, and identification of records
- Competence, such as knowledge, skills, experience, and qualifications
- Soft element such as personnel, integrity, confidence, organizational culture, motivation team spirit, and quality relationships.

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Controls include product inspection, where every product is examined visually, and often using a stereo microscope for fine detail before the product is sold into the external market. Inspectors will be provided with lists and descriptions of unacceptable product defects such as cracks or surface blemishes. [10]

3. Conclusion

The case study was prepared at Escort Limited Agri Machinery Group Faridabad plant. It has been analyzed that the sales have improved with an improvement in competitiveness of manufacturing unit. Following conclusions have been made

- The manufacturing unit is technically sound and is fully equipped with the latest machinery.
- Profit of the manufacturing unit has been improved.
- Market share has enhanced.

4. Future scope

The work can be carried out in other areas of India. The work can be extended in other automobile sectors. Strategy issues can be studied with this work. [14]

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