EXPLORING MANUFACTURING COMPETENCIES OF A TWO WHEELER MANUFACTURING UNIT

Chandan Deep Singh¹*, Jaimal Singh Khamba², Rajdeep Singh³ and Navdeep Singh⁴

Department of Mechanical Engineering, Punjabi University Patiala – 147002, India.

¹email id: er.chandandeep@gmail.com
²email id: jskhamba@gmail.com
³email id: rajdeepsingh.87@gmail.com
⁴email id: navdeep079@gmail.com

*corresponding author

Keywords- Competitiveness, Manufacturing Competency, Two-wheeler Manufacturing Unit

Abstract-The two wheeler industry of India is one of the most dependable industries as every person has at least a two wheeler with him, if not any four wheeler. Earlier there were scooters like Bajaj Chetak, Priya but with evolution of motorcycles like splendor, splendor+, etc. the scooter market started declining but with arrival of gearless scooters like Honda Activa, Scooty Pep, etc. the market place has become increasingly competitive in recent time and industries are facing tough test of improving products and thus market share. 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 two wheeler industry, one can reflect the competitiveness of two wheeler 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 two wheeler manufacturing industry.

Introduction
This research is about the competencies existing in manufacturing industries. As a result, R&D and technology executives are increasingly being asked to define the core technical competencies of their companies; unfortunately, they often fail to come up with convincing answers. This is not surprising, as the best methods of employing the thinking in organizations have not been elucidated. The method described here is applicable to almost all core competencies, whether they are technical or non-technical in nature and whether they are currently available to the company or will need to be developed in future. It will allow many organizations to put core competency thinking into practice – to great competitive advantage- without necessary struggle and disruption to business activities. [14]
The term “competency” refers to a combination of skills, attributes and behavior that are directly related to successful performance on the job, which are considered important for all staff of the Organization, regardless of their function or level. Competencies are important both for the Organization and for staff. Competencies are forward-looking. They describe the skills and attributes staff and managers will need in order to build a new organizational culture and meet future challenges. They help organizations clarify expectations, define future development needs, and do more focused recruitment and development planning. Competencies provide a sound basis for consistent and objective performance standards by creating shared language about what is needed and expected in an Organization. In most circumstances, competent persons are appointed to specific areas of the workplace, and their competence can be demonstrated by means such as:

- Workplace training,
- Formal and informal qualification’s
- Experience gained over periods of time under direct supervision of a competent person performing the task.

Demonstration of competence can also be met by the use of teams to develop and demonstrate competence. It is also important that all persons appointed should know, understand and operate within the limits of their own individual competence. ‘Competence development’ involves a firm’s measures to develop their present competence status, and includes both traditional teaching and learning methods (such as courses or literature) as well as more action-learning and on-the-job oriented methods (such as work rotation or networking). Organizational market performance’, is here understood as a firm’s performance on the market as compared to its own specific line of industry. [8]

“A firm’s competitiveness is a set of differentiated technological skills, complementary assets, and organizational routines and capacities that provide the basis for a firm’s competitive capacities in one or more businesses”

![Figure 1 Competency characteristics](image)

In common dictionaries the meaning is often explained by (sufficient) skills, capability, authority and qualification. Scientific literature emphasizes knowledge as an important component of competence, but also suggests components such as aptitude, attitude, commitment and motivation. Definitions are normally also related to specific tasks or a specific context. [27]

**Competency Model**

A competency model is a collection of multiple competencies that together define successful performance in a defined work setting. A model provides a clear description of what a person needs to know and be able to do – the knowledge, skills, and abilities – to perform well in a specific job, occupation, or industry.
Competency and Skill Standard
A competency is the capacity to draw upon and apply a set of related knowledge, skills, and abilities to successfully perform a work role, function, or task. Competencies often serve as the basis for skill standards that specify the level of knowledge, skills, and abilities required for success in the workplace. Skill standards in turn form the basis for measurement criteria to assess competency attainment. A competency model differs from a set of skill standards in that skill standards define levels of skills (or competencies) required in a given job or role, while competency models typically do not. [27]

Competitive Priorities
The competitive priorities are listed in below. Basically, competitive priorities are the operating advantages that a firm’s processes must possess to outperform its competitors.

- **Cost:** Lowering prices can increase the demand for products or services, but it also reduces profit margins if the product or service cannot be produced at a lower cost.
- **Quality:** Quality is a dimension of a product or service that is defined by customer. Today, more than ever, quality has important market implications. As for operations, two competitive priorities deal with quality: high performance design (It is the determination of the level of operations performance required in making a product or performing a service) and consistent quality (It is the measurement of the frequency with which the product or service meets the design specifications).
- **Time:** as the saying goes “Time is Money”. Some companies do business at internet speed while others thrive on consistently meeting delivery promises. These competitive priorities deal with time: fast delivery (The time elapsed between receiving a customer’s order and filling it), on-time delivery (measurement of the frequency with which delivery time promises are met), and delivery speed (Measurement of how quickly a new product or service is introduced, covering the elapsed time from idea generation through final design and production).
- **Flexibility:** Flexibility is a characteristic of a firm’s operations that enables it to react to customer needs quickly and efficiently. Some firms give top priority to types of flexibility: customization (The ability to satisfy the unique needs of each customer by changing product or service designs) and volume flexibility (The ability to accelerate or decelerate the rate of production quickly to handle large fluctuations in demand). [15]

Need for Present Work
To study and propose manufacturing competencies that contributes to the competitiveness and success of two wheeler manufacturing unit, especially in north India.

Objectives
1. To synthesis the concept of manufacturing competencies two wheeler manufacturing unit.
2. To explore the manufacturing competencies in two wheeler manufacturing unit.

Manufacturing Competencies
Competencies refer to skills or knowledge that lead to superior performance. These are formed through an individual/organization’s knowledge, skills and abilities and provide a framework for distinguishing between poor performances through to exceptional performance. Competencies can apply at organizational, individual, team, and occupational and functional levels. Competencies are individual abilities or characteristics that are key to effectiveness in work. Competencies are the
characteristics of a manager that lead to the demonstration of skills and abilities, which result in effective performance within an organizational area. [1]

Once the job requirements have been clarified (and competencies provide a framework for doing this), then competency interviewing helps interviewers look for evidence of those requirements in each candidate. For people already in jobs, competencies provide a way to help identify opportunities for growth within their jobs. [9]. Competencies are not "fixed"—they can usually be developed with effort and support (though some are harder to develop than others). Employees and their managers together can identify which competencies would be most helpful to work on to improve the employee’s effectiveness. They can then integrate that into a learning plan that may include on-the-job experience, classroom training, or other developmental activities. [12]

Factors of Manufacturing Competencies
Competencies in the area of manufacturing involving steps like conceptualization, designing, development, process planning, raw material, production and control and quality control.

Creativity
Creativity can be defined as the tendency to produce or recognize ideas, possibilities or alternatives that may be useful in solving difficulties and communicating. Creativity is the ability to think up and design new inventions, produce works of art, solve problems in new ways, or develop an idea based on an original, novel, or unconventional approach. Ability to produce something new through imaginative skill, whether a new solution to a problem, or a new artistic object or form. The term generally refers to a richness of ideas and originality of thinking. Psychological studies of highly creative people have shown that many have a strong interest in apparent disorder, contradiction, and imbalance, which seem to be perceived as challenges.

Innovation
Innovation is the basic driving force behind entrepreneurship and the creation of small businesses. When an individual comes up with an idea that has not previously been explored, he or she may be able to turn that idea into a successful business venture. "Ideas are the fuel that keep entrepreneurial fires blazing," Of course, not every new idea has the potential to become a successful business. And in many cases, individuals with good, marketable ideas fail to come up with the capital needed to turn their ideas into reality. But innovation is still a necessary first step for small business success in many instances. Moreover, entrepreneurs cannot afford to stop innovating once they have established a successful business. Innovation applies not only to new business and product ideas, but also to the internal workings of a company.

Evolution
Evolution is a process of gradual, progressive change and development, as in a social or economic structure with the passage of time. a process in which something passes by degrees to a different stage (especially a more advanced or mature stage); "the development of his ideas took many years"; "the evolution of Greek civilization"; "the slow development of her skill as a writer.

Computer Aided Design
Computer-aided design (CAD) is the use of computer systems to assist in the creation, modification, analysis, or optimization of a design. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a
database for manufacturing. CAD may be used to design curves and figures in two-dimensional (2D) space; or curves, surfaces, and solids in three-dimensional (3D) space. CAD is an important industrial art extensively used in many applications, including automotive, shipbuilding, and aerospace industries, industrial and architectural design.

**Aesthetics**

Aesthetics is the branch of philosophy which deals with the nature of art and of artistic judgment. There are two traditional views concerning what constitutes aesthetic values. The first finds beauty to be objective, that is, inherent in the entity itself. The second position holds that beauty is subjective, in that it depends on the attitude of the observer. Immanuel Kant argued that judgments of taste, as he called aesthetic judgments, rest on feelings, which, though subjective, have universal validity. The instrumental theory of value, an extension of subjectivism, holds that the value of art consists in its capacity to produce an aesthetic experience.

**Ergonomics**

Ergonomics is the process of changing the work environment (equipment, furniture, pace of work, etc.) to fit the physical requirements and limitations of employees, rather than forcing workers to adapt to jobs that can, over time, have a debilitating effect on their physical well-being. Companies of all shapes and sizes have increasingly recognized that establishing an ergonomically sensitive work environment for employees can produce bottom-line benefits in cutting absenteeism, reducing health care costs, and increasing productivity. The most progressive of these firms have after careful analysis of the workplace environment and the tasks that their employees have to perform taken steps to modify that environment (whether in a shop floor or an office) to better fit the physical needs and abilities of workers.

**Process Planning**

Process planning involves determining the sequence of operations to perform to manufacture a part given its description and the specification of the resources in the workshop. It should take into account both technological and economic considerations, some of which are hard constraints and some preferences. This knowledge often represents both the experience and know-how of engineers/specialists, which differ from one company to another. Many approaches have been proposed for automating process planning which focus on generating a single plan that is optimal with respect to some predefined criteria.

**Production And Control**

Once the entrepreneur has taken the decisions regarding the product design and production processes and system, his next task is to take steps for production planning and control, as this function is essentially required for efficient and economical production. One of the major problems of small scale enterprises is that of low productivity small scale industries can utilize natural resources, which are otherwise lying. Small scale sector can play an important role, similar to the one played by small scale industries in other developed countries. Planned production is an important feature of the small industry. The small entrepreneur possessing the ability to look ahead, organize and coordinate and having plenty of driving force and capacity to lead and ability to supervise and coordinate work and simulates his associates by means of a program of human relation and organization of employees, he would be able to get the best out of his small industrial unit.

**Precision Knowledge**

The degree of refinement in the performance of an operation, or the degree of perfection in the instruments and methods used to obtain a result. Precision relates to the quality of an operation by
which a result is obtained, and is distinguished from accuracy, which relates to the quality of the result. the marksman has achieved a uniformity, although it is inaccurate. This uniformity may have been achieved by using a sighting scope, or some sort of, the analysis of precision can be misleading if a certain degree of precision is implied but not actually attained.

Quality
If a product fulfils the customer’s expectations, the customer will be pleased and consider that the product is of acceptable or even high quality. If his or her expectations are not fulfilled, the customer will consider that the product is of low quality. This means that the quality of a product may be defined as “its ability to fulfill the customer’s needs and expectations. Quality needs to be defined firstly in terms of parameters or characteristics, which vary from product to product. For example, for a mechanical or electronic product these are performance, reliability, safety and appearance. For pharmaceutical products, parameters such as physical and chemical characteristics, medicinal effect, toxicity, taste and shelf life may be important. For a food product they will include taste, nutritional properties, texture, shelf life and so on.

Case Study at Honda Motorcycle & Scooter India, Private Limited
Being the leader in product and process technologies in the manufacturing sector, two wheeler industry has been recognized as one of the drivers of economic growth. During the last decade, well directed efforts have been made to provide a new look to the automobile policy for realizing the sector's full potential for the economy. Aggressive marketing by the auto finance companies have also played a significant role in boosting automobile demand, especially from the population in the middle income group. Honda is the world's largest manufacturer of two wheelers. Its symbol, the Wings, represents the company's unwavering dedication in achieving goals that are unique and above all, conforming to international norms. These wings are now in India as Honda Motorcycle & Scooter India Pvt. Ltd. (HMSI), a wholly owned subsidiary of Honda Motor Company Ltd., Japan. These wings are here to initiate a change and make a difference in the Indian two wheeler industry. Honda's dream for India is to not only manufacture two wheelers of global quality, but also meet and exceed the expectations of Indian customers with outstanding after sales support. Following its separation from erstwhile partner Hero Group, Japanese auto major Honda, through its subsidiary Honda Motorcycle & Scooter India (HMSI), is pursuing its India strategy with renewed vigour. The company has been in the market for over a decade now, and its independent foray in the world’s second largest two-wheeler market is knitted around a strong product and production strategy, with an eye on claiming the top spot in years to come

Company Profile
The HMSI factory is spread over 52 acres, with a covered area of about 85, 815 square meters at Manesar, Gurgaon district of Haryana. The foundation stone for the factory was laid on 14th December 1999 and the factory was completed in January 2001. The initial installed capacity was 100,000 scooters per year, which has reached 6,00,000 scooters by the year 2007 and motorcycle capacity shall be 4,00,000 per annum. The total investment outlay for the initial capacity was Rs. 215 crores and now the accumulated investment is 800 crores.

Company Strategy
HMSI(Honda Motorcycle & Scooter India, Private Limited) operates on a principle, which is followed worldwide by all Honda companies. Maintaining a global viewpoint, we are dedicated to supplying products of the highest quality, yet at a reasonable price for worldwide customer satisfaction. Honda's philosophy is based on the company's guiding principle.
Respect for the Individual
Honda recognizes and respects individual differences. The respect for individual stems from the following three points: Initiative, Equality, Trust. It is the contribution from each individual in the company that has made our company what it is today and that, which will take us into the future.

The Three Joys
In line with Honda's Philosophy, HMSI conducts all its daily activities in pursuit of the following joys:

- The joy of manufacturing high quality products.
- The joy of selling high quality products.
- The joy of buying high quality products.

Technologies used at HMSI
1. Cutting-edge technology and the spirit of Honda
2. Combi Break System
3. Honda Matic Transmission
4. Automation

Quality
Honda provides excellent quality for their products. Numerous checks during the manufacturing process ensure that every part meets the required quality. An interesting process at the facility is where the engines merge with the frame assembly line. The built-up engine is transferred to a lift, which takes it underground and is then transferred through a belt to another lift on the frame assembly line, from where it comes up to an operator. The operators then begin the integration process of the body and power train. Having automated this process saves significant amount of time and adds efficiency to the process. The engineers ensure implementation of the most efficient manufacturing practices, and in the best way possible for the Indian market.

Conclusion
The case study was prepared at Honda manufacturing unit at Manesar, Gurgaon district of Haryana. During this work, manufacturing competencies have been investigated. It has been analyzed that the sales have improved with an improvement in competitiveness of manufacturing unit.

Following conclusions have been made after preparation of the case study:
1. The manufacturing unit is technically sound and is competent with the latest machinery.
2. Profit of the unit has been improved.
3. Market share has enhanced.

Based on the above study, the following aspects for future work have been presented:
1. The work can be carried out in other areas of India.
2. The work can be extended in other automobile sectors.
3. Strategy issues can be studied with this work.

References
[1] Anders Drejer (2001) How can we define and understand competencies and their development? *The journal Technovation* 21
[2] Athey, T. R., & Orth, M. S. (1999). Emerging competency methods for the future. *Human Resource Management*. 
[3] Cardy, R. L., & Selvarajan, T. T. (2006). Competencies: Alternative frameworks for competitive advantage. Business Horizons.

[4] Caroline mothe, Bertrand Quelin (2000) Creating Competencies Through Collaboration. The Case of Eureka R&D Consortia. European Management Journal Vol. 18.

[5] Eric Bonjour, Jean-Pierre Micaelli. (2010) ‘Design Core Competence Diagnosis: A Case From the Automotive Industry’, IEEE Transactions on Engineering Management, Vol 57, pp 323-337.

[6] Erik Schlie, George Yip (2000) Regional Follows Global: Strategy Mixes in the World Automotive Industry. European Management Journal Vol. 18.

[7] Felicia Fai a, Nicholas von Tunzelmann (2002) Industry-specific competencies and converging technological systems: evidence from patents. Structural Change and Economic Dynamics

[8] G.S. Dangayach, S.C. Pathak, A.D. Sharma.(2006) ‘Advanced Manufacturing Technology: A Way of Improving Technological Competitiveness’. International Journal of Global Business and Competitiveness, Vol. 2, No 1, pp 1-8.

[9] John P. Millikin, Peter W. Hom, Charles C. Manz. (2010) ‘Self-management competencies in self-managing teams: Their impact on multi-team system productivity’, Elsevier Publisher, vol 21, pp 687-702.

[10] K. Pavitt(1990) What We Know About the Strategic Management of Technology, California Management Review Reprint Series 32 17-26. [40] R.D. Pearce, The Internationalization.

[11] Krisztina Demeter. (2002) ‘Manufacturing strategy and competitiveness (International Journal of Production Economics’, Elsevier Science B.V, pp 205–213.

[12] Kwasi Amoako-Gyampah, Moses Acquaah. (2008) ‘Manufacturing strategy, competitive strategy and firm performance: An empirical study in a developing economy environment’, International Journal of Production Economics, Elsevier B.V 111, pp 575-592.

[13] Lei, D., Hitt, M. A., & Bettis, R. (1996). Dynamic core competencies through metal earning and strategic context. Journal of Management.

[14] Mark R. Gallon, Harold M. Stillman, David Coates. (1999) ‘Putting Core Competency thinking into practice’, RTM Journal, pp 1-12.

[15] Monica Sharma, Rambabu Kodali. (2008) ‘Development of a framework for manufacturing excellence’, Measuring Business Excellence, Emerald Group Publishing Limited, vol 12 no. 4, pp 50-66.

[16] P. Pari and K. Pavitt,(1990) Large Firms in the Production of the World’s Technology: An Important Case of Non-Globalization, Journal of International Business Studies.

[17] Qingyu Zhang , Mark A. Vonderembse , Jeen-Su Lim (2003) Manufacturing flexibility: defining and analyzing relationships among competence, capability, and customer satisfaction. Journal of Operations Management 21.

[18] Sanjib K. Dutta. (2007) ‘Enhancing competitiveness of India Inc. International Journal of Social Economics’, Emarald Group Publishing Limited, Vol. 34 No. 9, pp 679-711.

[19] Sajee B. Sirikrai , John C.S. (2006) ‘Tang Industrial competitiveness analysis: Using the analytic hierarchy process’, Journal of High Technology Management Research, Vol 17, pp 71-83.

[20] T. Laosirihongthong, G.S. Dangayach (2005) A Comparative Study of Implementation of Manufacturing Strategies in Thai and Indian Automotive Manufacturing Companies. Journal of Manufacturing Systems Vol. 24.

[21] T.S. Nagabhushana, Janat Shah. (1999) ‘ Manufacturing priorities and action programmes in the changing environment’, International Journal of Operations and Production management, MCB University Press, Vol. 19 No. 4, 1999, pp 389-398.

[22] WANG Zhi-yu, QIU Yan-lin, GUI Shi-he(2006).Quality competence:a source of sustained competitive advantage’. Journal of china universities of posts and telecommunications vol 13 no 1.

[23] Yu ting lee. (2010) ‘Exploring high-performers’ required competencies’. An International
[24] Yonggui Wang, Hing-Po Lo, Yongheng Yang. (2004) ‘The constituents of core competencies and firm performance: evidence from high-technology firms in china. Journal of Engineering and Technology Management’, Elsevier B.V, vol 21, pp 249-280.

[25] Yonggui Wang, Hing-Po Lo, Yongheng Yang (2004) The constituents of core competencies and firm performance: evidence from high-technology firms in china. J. Eng. Technol. Manage.

[26] Yonggui Wang, Hing-Po Lo, Yongheng Yang (2004) The constituents of core competencies and firm performance: evidence from high-technology firms in china. Y. Wang et al. / J. Eng. Technol. Manage. 21.

[27] http://www.slideshare.net (accessed on January 12, 2013)