

# Evaluation of the Output of the process and Quality Gateways in TATA Motors

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## ABSTRACT

*The report of Evaluation of the Output of the process and Quality Gateways in TATA Motors, discusses the importance of businesses processes in delivering outcome based on individual business goals and objectives. Furthermore, Author explains the interrelationship between the different processes and function of the organizations with the example of TATA Motors. Along with the processes, the quality gateways utilized by TATA Motors has been evaluated.*

*The report revolves around the integrated facilities which includes many components that are manufactured on the site, where the assembly takes place along a highly efficient assembly line.*

*The assembly line include Manufacturing facilities of various plants, shops or departments, each serving special functions. From casting and stamping to final assembly, many of the machines used for processing and product transfer have hydraulic control systems. These systems include implementation of written loss prevention and control program. Using an overview as a guide in designing and evaluating components of the program particular attention is paid to planning, safety, and evaluation of output.*

*The study highlights ways and procedures followed by TATA Motors that are unique only to the company. The procedures focused in this text have presented TATA Motors with world-class R&D and design centers with top manufacturing technology. The company has developed a deep understanding of customer's needs and has been able to successfully translate them into desirable products that are appreciated by their customers. Their focus has been on the excellence in manufacturing processes and carrying them out in every step in the manufacturing process from design to production to assembly with the highest standards of quality. The above table describes the interrelationship seen between different functions/departments and various processes seen in the factory.*

**Keyword:** - TATA Motors, Quality Gateways, Output, Manufacturing Techniques

## 1. Introduction

Tata Motors is a part of USD 100 billion Tata group founded by Jamsetji Tata in 1868. Sustainability and the spirit of 'giving back to society' is a core philosophy and good corporate citizenship is strongly embedded in TATA's DNA. Tata Motors is India's largest automobile company. The company brings to the customer a proven legacy of thoughtful leadership with respect to customer-centricity and technology. They are successfully driving the transformation of the Indian commercial vehicle landscape by offering customers leading edge auto technologies, packaged for power performances and lowest life-cycle costs. Their automobiles are designed for superior comfort, connectivity and performance. What keeps them at the forefront of the market is their focus on future-readiness and their pipeline of tech-enabled products. Their design and R&D centers located in India, the UK, Italy and Korea strive to innovate new products that achieve performances that will fire the imagination of GenNext customers (tatamotors.com, 2018) [1].

## 2. Interrelationship between the functions and different processes of TATA Motors

TATA Motors have been striving for perfection and high priority target. TATA like any other organizations have functions also known as departments and processes to meet the set target. Departments at TATA represent sections

of their company that are examined individually. These departments/functions are units of the company. However, they are not organized around specific business activities, but have a role to play in every related process.

TATA Motor's private and commercial vehicles are backed by world class R&D and design centers with top manufacturing technology. The company has developed a deep understanding of customer's needs and has been able to successfully translate them into desirable products that are appreciated by their customers. Their focus is on excellence in manufacturing that their facilities can carry out every step in the manufacturing process from design to production to assembly with the highest standards of quality. The above table describes the interrelationship seen between different functions/departments and various processes seen in the factory.

### **2.1 Evaluation of Interrelationship between the functions and different processes of TATA Motors**

TATA Motors is known to have a focus on the introduction of exciting mobility solutions and keeping customers central to their organizational plans. This journey is seen in their every department and processes.

When it comes to TATA fulfilling its mission and vision statement, it is seen the organization has instilled its values and work ethics in every department. This instillation changes the way a department works in every organization. Similarly, TATA is viewed to have its departments work a certain way in order to achieve its set goals.

With the help of its research and development department, development of enterprise level vehicle diagnostics system for achieving speedy diagnostics of complex electronics of modern vehicles has been made possible. Research and development has taken the initiative in telematics has further spanned into a fleet management, driver information and navigation systems, and vehicle tracking system using GNSS (Global Navigation Satellite Systems). To further get closer to their vision, the organization has taken initiatives in the area of vehicle electronics such as engine management systems, in-vehicle network architecture and Multiplexed Wiring, Electronic Stability programs etc. which could possibly be deployed on their future range of vehicles. Likewise, various new technologies and systems have improved safety (gov.uk, 2018) [4], performance and emissions of different product range which are under implementation in passenger cars and commercial vehicles (hse.gov.uk, 2018) [3]. Through these innovations, TATA fulfills its vision of being passionate in anticipating and providing the best vehicles to exhilarate the customers globally.

The Board takes responsibility for the overall process of risk management in the organization. Through an Enterprise Risk Management programme, each Business Unit addresses opportunities and the attendant risks through an institutionalized approach aligned to the Company's objectives. This is also facilitated by internal audit. The business risk is managed through cross functional involvement and communication across businesses. The results of the risk assessment and residual risks are presented to the senior management. The Audit Committee reviews reports covering operational, financial and other business risk areas.

This caters to their vision of achieving sustainable performance while delivering exciting innovations. The goal behind the risk management function operating throughout processes is to find solution to enhance the quality of life.

The traditional factory of TATA Motors is called to be more efficient than other factories due to its production lines. At TATA, the production process is divided between three assembly line each line is well planned with sophistication containing about forty to forty-five work stations. Due to a continuous assembly line, the vehicle (end product) enters with components only and exits with the final products. It has high degree of automation involved, this minimizes manual labor. The materials are placed very close to the line to decrease travelling time.

2.2 Difference between Manufacturing techniques adopted by TATA and other plants

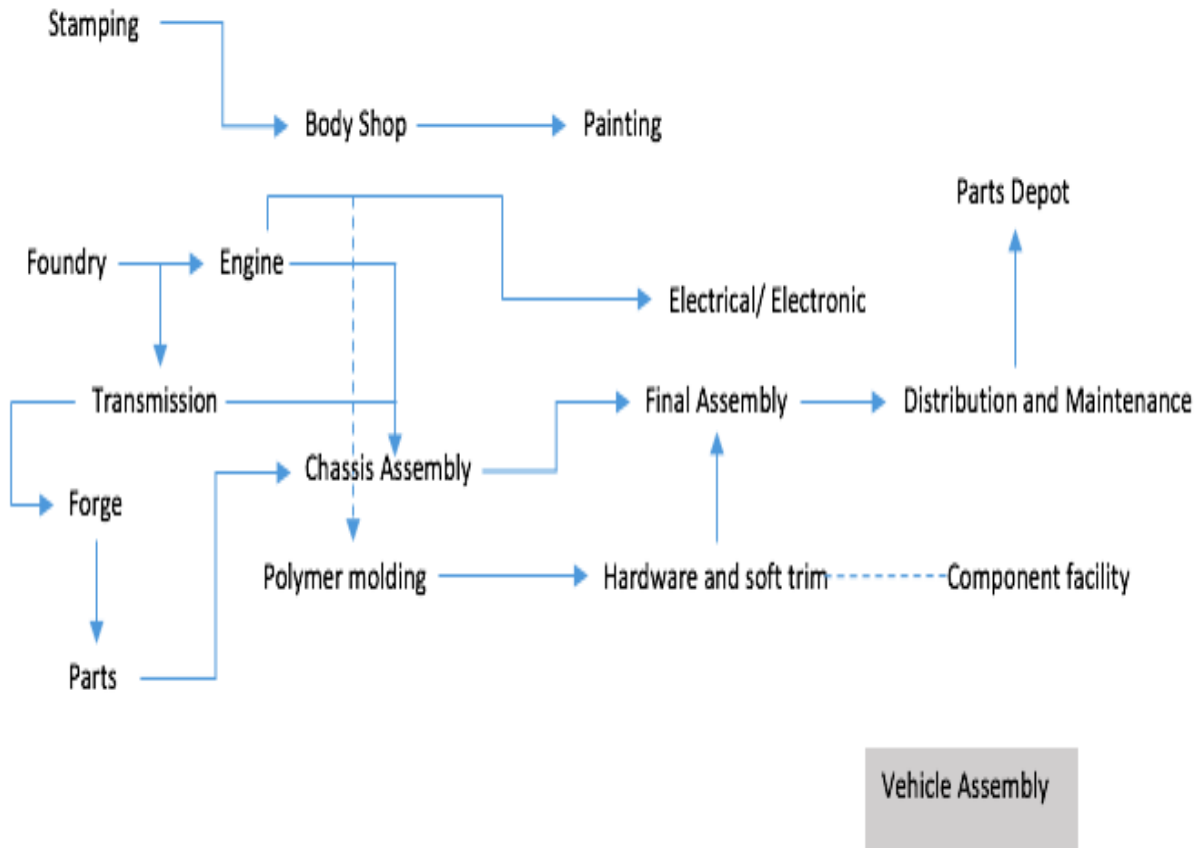
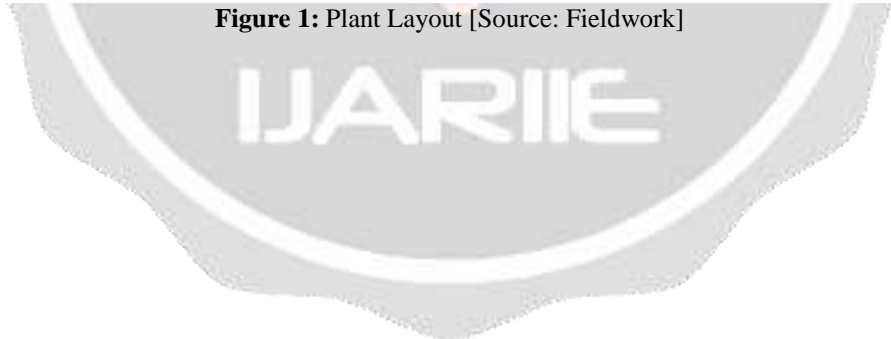
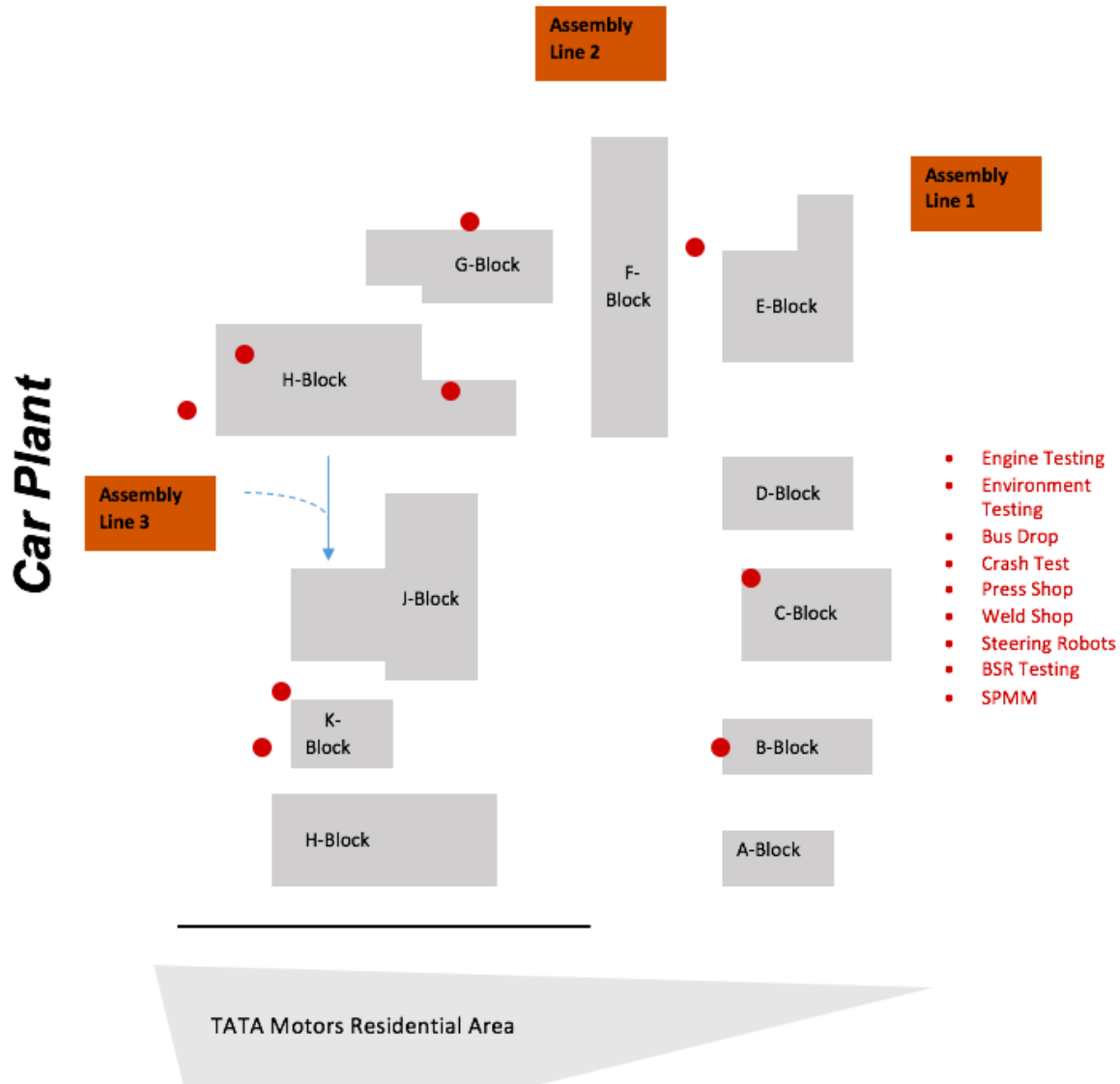


Figure 1: Plant Layout [Source: Fieldwork]





**Figure 2:** TATA Motor's Plant floor plan [Source: Fieldwork]

How to use the figure for better understanding:

- Assembly Line 1 contains 'A-Block' to 'E-Block' workstations.
- Assembly Line 2 contains 'F-Block' to 'G-Block' workstations.
- Assembly Line 3 contains 'H-Block' to 'K-Block' workstations.
- The Assembly line begins at 'A-Block' ends at 'H-Block'.
- The arrows display one workstation being used for the production of many other products.
- The red dots near the workstations determine the processes each workstation is responsible for.
- The original plant consists of more than 40 workstations however, the figure shows only 11 workstations for simpler understanding.

TATA Motors in the second image uses different equipment and processes and the level of automation are really high tech. it reduces the error of human intervention, high automation leads to better safety and few incidents of accidents happening. By doing this the quality is improved by a good amount. At every station, the material is

prepared in advance, the person on the line does not have to keep looking for materials. Benefits of this production line are having very few chances of error and high degree of accuracy.

The first figure shows an example of a layout of another plant. The layout shows multiple workstations cramped in a workplace without any sequence. This can cause the assembly line stations to remain underutilized or over utilized, this can cause the plant to experience bottlenecks and efficiency issues. One more reason the line may be poorly balanced is because it was based on industry timing standards and documents which did not accurately reflect the real task timing at each station. Due to plant following various paths, the communication between the station can become difficult. This can further cause a delay in movement of finished goods from one station to another. Movement in between the stations with unclear pathways increases the chances of accidents leading to low motivation among the employees.

Unlike other plants the assembly line at TATA Motors is flexible. As the assembly line receives high level of investment allowing the organization to recruit skilled labor is one of the many reason that make the plant unique. The line can take other products and not just the product the line was primarily built for, making the line highly flexible to change. There are about 10-15 other products than can be made on one line. Through this efficient process, the plant can concentrate on cost cutting.

### 3. Evaluation of the output

TATA Motor's business is segmented in automotive operations and all other operations (safari.tatamotors.com, 2016) [2]. The Company's automotive operations are further subdivided into Tata and other brand vehicles and Jaguar Land Rover (tatamotors.com, 2018). The Company's automotive segment operations include all activities relating to the development, design, manufacture, assembly and sale of vehicles including vehicle financing, as well as sale of related parts and accessories. The acquisition of the Jaguar Land Rover business has enabled the Company to enter the premium cars market in developed markets such as the United Kingdom, the United States, Europe and China as well as several emerging markets such as Russia, Brazil and South Africa. Going forward, the Company expects to focus on profitable growth opportunities in its global automotive business through new products and market expansion. Within automotive operations, the Company continues to focus on integration and synergy through sharing of resources, platforms, facilities for product development and manufacturing, sourcing strategy and mutual sharing of best practices.

With the help of their quality output the company has been able to establish a strong position in the Indian automobile industry by launching new products, investing in research and development, strengthening its financial position and expanding its manufacturing and distribution network. The Company has increased its presence in the global automotive markets and enhanced its product range and capabilities through strategic acquisitions and alliances. The Company aims to position itself as a major international automotive company by offering products across various markets by combining its engineering and other strengths as well as through strategic acquisitions. All these operations and strategic decision have lead TATA to satisfy their mission and vision of providing their customers with good quality products, to satisfy the demand and open markets to new possibilities.

#### 3.1 Evaluation of Quality Gateways

TATA Motors believe the foundation of its growth has been a deep understanding of economic conditions, an idea of customer needs and the ability to translate deep these understandings into desirable products through research and development. The ERC in India and Jaguar Land Rover engineering and development operations in the United Kingdom have identified areas to leverage the facilities and resources to enhance the product development process and achieve economies of scale. These advantages were obtained due to evaluations of quality gateways done internally within the company. Furthermore, the Company has a wholly-owned subsidiary, Tata Motors European Technical Centre PLC, or TMETC, in the United Kingdom, which are engaged in automobile research and engineering. The company is inspected to carry out business functions while adopting value adding processes to the already existing quality gateway functions. The following particulars presents detailed information of the quality gateway functions and value adding processes implemented in the functions of the company.



- Research and Development

- Quality Gateway Functions: The Company is mainly focused on specific areas of research and development and engineering by which it can strengthen its HorizoNext Philosophy, a three-horizon strategy. Their strategy changes according to the type of the car the plant is producing. In the case of passenger cars, more emphasis is paid on creating stunning designs, connectivity and pleasurable driving experience.

Therefore, the research and development portfolio is aligned towards developing technologies, core competence and skill sets in these specific domains to secure impactful delivery of the future product with leading product attributes. The Company uses a three-horizon strategy for managing its engineering and technology initiatives. The first-horizon involves researching products that it is currently working on to bring to the market. The second-horizon involves researching known technologies that the Company may not be entirely familiar with at the present time but are needed for future products. Finally, the third-horizon is for 'blue sky' research projects and projects aimed at fostering a culture of innovation in the company.

The Company has constantly adopted new technologies and practices in the digital product development domain to improve the product development process. This has led to better front loading of product creation, validation and testing, which results in greater likelihood of timely delivery and ensuring that new products are properly developed from the beginning.

- Value Adding Process:
- Three Horizon Strategy
- Development portfolio is aligned towards developing technologies, core competence and skill sets
- Three-horizon strategy for managing its engineering and technology initiatives
- Adoption of new technologies

- Intellectual Property

- Quality Gateway Function: The Company creates, owns, and maintains a wide array of intellectual property assets throughout the world that are among its most valuable assets. The Company's intellectual property assets include patents, trademarks, copyrights designs, trade secrets and other intellectual property rights. The Company proactively and aggressively seeks to protect its intellectual property in India and other countries. The Company owns a number of patents and it has applied for new patents which are pending for grant in India, as well as in other countries. The Company obtains new patents as part of its ongoing research and development activities.

The Company owns registrations for a number of trademarks and have pending applications for registration of these in India, as well as other countries. The registrations mainly include trademarks for its vehicle models and other promotional initiatives. The Company uses the "Tata" brand, which has been licensed to the Company by Tata Sons Limited. The Company believes that establishment of the "Tata" word mark and logo mark, in India and internationally, is material to its operations.

- Value Adding Process:
- TATA own, creates and maintains most of its intellectual property assets.
- The company owning a number of patents.
- Company owns registration for a number of trademarks

- Raw Materials

- Quality Gateway Function: The Company has long-term purchase agreements for some critical components such as transmissions and engines. The Company has established contracts with some commodity suppliers to cover its own as well as its supplier's requirements in order to moderate the effect of volatility in commodity prices. The Company has also undertaken special initiatives to reduce material consumption through value engineering and value analysis techniques.

As part of the Company's strategy to become a value for money vehicle manufacturer, it has undertaken various initiatives to reduce its fixed and variable costs. The Company uses an e-sourcing initiative to procure supplies through reverse auctions. The Company uses external agencies such as third-party logistics providers. This has resulted in space and cost savings. The Company's initiatives to leverage information technology in supply chain activities have resulted in improved efficiency through real-time information exchanges and processing with its suppliers.

The Company has established a sixteen-step supplier quality process in order to ensure the quality of outsourced components. The Company has formalized the component development process using Automotive Industry Action Group guidelines. The Company also has a programme for assisting suppliers from whom the Company purchases raw materials or components to maintain quality.

The Company also maintains a stringent quality assurance programme that includes random testing of production samples, frequent recalibration of production equipment and analysis of post-production vehicle performance, as well as an ongoing dialogue with supplier partners to eliminate production defects.

- Value adding Process:
  - The company has long-term purchase agreement with their suppliers
  - Reduction in material consumption through and value analysis techniques
  - E-sourcing initiatives to procure raw materials and components to reduce variable costs
  - Sixteen-step supplier quality process
  - Maintenance of quality assurance programme

- Suppliers

- Quality Gateway Function: The Company has an extensive supply chain for procuring various components. The Company also outsources many manufacturing processes and activities to various suppliers. In such cases, the Company provides training to external suppliers who design and manufacture the required tools and fixtures. The Company sources certain highly-functional components such as axles, engines and gear boxes for its vehicles from strategic suppliers.

The Company has long-term purchase agreements with its key suppliers. The Company has established contracts with certain commodity suppliers to cover its own and its supplier's requirements to mitigate the effect of high volatility in commodity prices.

The Company has established processes to encourage improvements through knowledge sharing among its vendors. TATA Motors imports some components that are either not available in the domestic market or when equivalent domestically available components do not meet its quality standards. The Company also imports products to take advantage of lower prices in foreign markets.

- Value Adding Process:
- Extensive supply chain to procure various components
- Outsourcing manufacturing processes and activities
- Providing training to external designing suppliers and manufacturers.
- Internal production of highly-functional components
- Long-term purchase agreements with their suppliers
- Mitigation plan for high volatility in commodity prices
- Processes to encourage improvements through knowledge sharing among vendors
- Importing of products to take advantage of lower prices in foreign markets

#### 4. CONCLUSION

Product quality is an important part of TATA's business. Keeping this in mind TATA leaves no gap in the market unoccupied. They have skilled research and development team who anticipates future changes to design product that can benchmark best products in the world. They manufacture automobile with variants that are accepted in India as well as other foreign countries. This allows the company to instill features in advance winning them first mover advantage over their competitors in many cases.

Their most powerful aspect that differentiates them from their competitors is their service. The organization has great services, they have service workshop every 40-50 km. Every quality aspect described above ties strongly with their existing vision, mission and value system that they appraise. This makes the organization a highly successful one due to the coordination the company promotes internally and externally with their customers.

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