Operations Control Final Assessment

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The Nissan Sutherland Factory

**Introduction**

In a review of the case study “Planning for quality and productivity, A Nissan case study” several key operational and control factors are listed that contributed to Nissan's Sunderland plant. The Sunderland plant was selected by Nissan’s UK operation for several reasons. Nissan is a benchmark company having success in many of today’s processes such as, Total Quality Management (TQM), Quality Culture, Communication, Lean Processes, Just-In-Time (JIT) inventory systems, and Kaizen which works towards continuous improvement by increasing efficiency and eliminating waste much like Six Sigma. The case study first submitted by Dr. Anjali Mishra professor of psychology at U.C. Davis & Dr. Sarita Srivastav professor of sociology at Queens University is available at businesscasestudies.co.uk (Mishra, 2017). However, the original article written in 2004 by The Times is still available to be viewed (Times, 2004). The success of a company using factors that increase quality and take the time to do it right the first time goes against the fast and cheap model that many corporations have taken. Many manufacturers buy substandard materials to save money, then try and cut corners in an attempt to supply very affordable products and still retain profit margins. While this works for first run products, external failure proves to be at an expense level that disqualifies this structure for any business seeking longevity. When repeated failures occur many firms cut losses by limiting repair of external failures, this, in turn, leads to poor customer satisfaction which leads to bankruptcy. Total quality management works better because customer satisfaction goes up. For instance companies like Apple, LG, and GE have great customer service reviews. That knowledge leads consumers to purchase their product more often. LG is successfully manufacturing and selling flat-panel TVs, although, there are failures that occur. Polaroid, on the other hand, almost lost it all and was forced into a realignment. I had one of those TVs, and I can tell you customer service was horrible. The screen went out, they charged me $300 for a new on, then sent the wrong one, and when I called them for an exchange, they said that all sales were final and that I would have to purchase another screen for 300 dollars more. Needless to say, I will never buy another Polaroid product. Today Polaroid has downsized choosing not to own where houses, or production companies (Kurschner, 2015)*.* The importance of quality in production is necessary for longevity. Quality in processes is how that is done. Nissan can be used as a benchmark in many areas. In order to retain success in business today TQM, Six Sigma, JIT, are necessary in the value chain for profitability and longevity.

**Facility Layouts**

Location, location, location. Most business owners will tell you that location is everything. What is needed for the business is what defines the location needed for success. If speaking a coffee shop a location with great access from mainstream traffic is desirable. When speaking of a car manufacturing company one might want to have access to skilled people, power accessibility, and several options for cargo transportation. Indeed these are just the things that made the city of Sunderland attractive to Nissan. In 1984 Nissan choose Sunderland for its 300 acer factory campus (Mishra, 2017). The city had a history of manufacturing but at that time an overabundance of unemployed skilled workers. In addition, government added financial incentives and made sure electric requirements were available To sweeten the deal Sunderland was a causeway of transportation with a great rail system, centrally connected roads and highways, and the Port of Tyne for cargo. This made for a recipe for success. With a wide selection of shipping alternative JIT would be possible. The abundant skilled worker supply would make TQM and Kaizen possible, and all that was left was to create the structure of communication and culture of quality.

Facility layouts, in general, was centered around production processes. High output at low average cost, still plays a part in high-quality car manufacturing. But instead of cutting corners and using sub-par materials Nissan decided to use Lean processes taking away any process not adding value. Streamlining work, so step are not repeated and taking advantage of technology in order to speed up the manufacturing process while retaining quality. Production flow is supported by three main fabrication shops with support areas. The top three are body assembly, painting, and final assembly. Supporting these are: the press shop which produces panels for the vehicles, the plastics shop which makes the fenders and bumpers, the castings shop making all the engine parts, the engine shop which assembles all engines, inserts oil, coolant, and fuel, and finally the axle shop that produces and joins axels to engines in final assembly. Looking above one sees the linear process structure. This structure allows for quality control in that each department inspects the work of the last, as well as its own before handing the product off to the next step in the process. Continuous flow processes spawn a variety of jobs across the three main areas.

**Production Methods**

Production Methods in Operations Control include such things as Lean Six Sigma,

Just-in-Time (JIT), Inventory Control, Total Quality Management (TQM), and Material

Requirements Planning (MRP). Lean Six Sigma is a practice that banks on a collaborative effort by an entire team to improve quality and operation by removing waste while allowing only 3.4 defects per million. One way operations can be improved is by implementing JIT. Just-in-Time inventory structures reduce inventory and costs by ordering only the materials that are currently required in the production process in such a way that they arrive just in time to be used reducing storage time to a minimum. By doing JIT where house space is not needed, degradation from storage does not happen, and capital is released for other uses. The downside of JIT is that the possibility of stock outages increases if orders do not arrive on time production slows, which in turn, may cost money in lost sales. Automated Inventory control is great for business that use a perpetual inventory review system. On the other hand, today many companies are turning over inventory management to the vendor. Inventory system sync up with vendor systems for vendors to keep track of inventory and when needed inventory is sent to the store and actually put on the shelves by the vendor. This type of vendor managed inventory works very well with JIT. Inventory storage becomes the responsibility of the vendor and waste is illuminated for item not being outdated while in storage. Another need when speaking of JIT is Material Requirement Planning (MRP). MRP can be used in retail facilities especially with the seasonal items, but its biggest use is in production. In production JIT and MRP go hand in hand since only by knowing at which point of the production certain items are needed. By knowing which materials are needed at each stage of production a schedule for incoming and outgoing needed material can be arranged that allows JIT to function optimally. Lastly, Total Quality Management (TQM) is a great way to implement Lean Six Sigma.

TQM is really more of a culture than a process. One might even call it the culture of quality. It begins with the leadership and works its way through every team member leaving no member unaccounted. It is imperative that quality becomes the focus from top to bottom of the firm or production line. Quality is broken down ensure on every step of production. The first thing that happens at each new step of production is an inspection to ensure quality. This keeps each department accountable for the quality of their step and all steps previous to them. The goal is not to make the item as cheap as possible but to have strict quality requirements that are ensured time and time again. In the past, it was felt that profits were made by pumping out as many inferior cheap products as possible. Today it is understood that this leads to firms closing their doors and failing. While it cost more to produce quality return customers will more than make up for the added expenditures in producing it. Since the customer ultimately determines the level of quality TQM is said to be customer-focused. Other principles of TQM include total employee involvement, commitment to continual improvement, the use of integrated systems and technological advances; communication is quality controlled using only fact-based decision making, production is process-centered and using a strategic and systematic approach using such processes as Six Sigma, MRB, and JIT.

In comparison, TQM seems far superior to the standard make-to-stock production method (GTP, 2011). Stocking large quantities of inventory can be very expensive. In addition, there is a risk that inventory will be damaged or become outdated while in storage. Lastly, make-to-stoke system are “push” systems where salespeople are often on a mission to sell customers whatever is overstocked. Make-to-order and mass customizations systems are generally “pull” systems. Pull systems have the benefit that a customer usually gets exactly what they want without compromising for what is “in stock.” On the flip side, make to stock has the benefit of mass production and taking advantage of price reductions in the cost of material due to fluctuations in the market, or even reduction due to quantities ordered. The only problem is how much of that savings will be eaten up by storing the items long term until sold. Make to order, and JIT have the benefits of lower storage costs, and the customer can benefit from the availability of customization. In addition, long-term contracts can be made with vendors which may bring down material costs to prices competitive with those a firm may receive by purchasing a large quantity order.

In the case study, the Nissan Corporation centered on several of these, in fact, many believe Nissan to be a leading benchmark firm in the implementation and success of many of the production processes that have been discussed. The processes used by Nissan are MRP or “Continuous Flow Production” as they put it, JIT, TQM, something like Six Sigma called “Kaizen” for continuous quality improvement, and a dedication to training and employ advancement (Nissan, 2017). It is amazing that the old styles of making it cheap and sell it to everybody was put aside for reasons other than profit. In the beginning, Japanese companies established and began to pioneer success in these production methods, not because of potential profit but because they simply lacked the monetary resources to do in the traditional manner (Lakhe, R.R. & Kamla, S. R. & Mohanty R.P., 1993). Japanese companies were forced to develop their own methods of Total Quality Control (TQC) which is basically another name for TQM. TQC processes are based on the teachings of Deming and Juran. Japanese firms began shaping these processes to suit their own culture and operating environment (Ishikawa, 1990).

**Controls**

Since the plant at Southerland uses a continuous flow production method, the production flow draws on specific areas one at a time until final assembly. The three main production shops in Southerland are body assembly, painting, and final assembly. Each of these areas implements TQM steps (referred to in the last paragraph) to ensure quality. Another control that Nissan used is MRP and scheduling machinery work at specific levels leaving headroom if demand requires ramping up production. A further control is employee scheduling. Two sift patterns are normally at work on normal days this allows for proper maintenance and upkeep of machinery although three shifts are available if demand requires. A third control is a commitment to use the latest technology. The Southerland plant uses highly advanced technology with sophisticated robotics and computer integrated manufacturing methods to produce a carefully scrutinized production process that reduces errors to Six Sigma levels or at least an absolute minimum. The last order of defense is still human. Attitudes towards work are based on sharing responsibility with employees on every step. Training for specialized machines, black belts in Six Sigma, Certifications in TQM, and pride in quality and company flow from the top down to even man on the floor. Overall operations would not function at all without the controls that have been set in place as everything is strategy and culture based. One might argue that culture in Japan is one that is conclusive to such a work environment. To forward something of lesser quality is a family shaming offense. Only today other companies have followed suit such as Modex and Eere Energy. This proves that the company culture is the main provider of success, not the national culture. The controls that have been placed inside the process is one of the defining elements of that culture. Employees have pride in their work, in their product, and in their company. The company puts people first and quality second and this creates a sense of loyalty and family.

**Quality Assurance**

The role of quality assurance impacts people as well as production methods. “We will continuously seek improvements in all our actions” (Nissan, 2017). A quote directly from The Times 100 shows commitment to Kaizen. Kaizen is applied anywhere, anytime, and anyplace. Kaizen supersedes Six Sigma in that it specifies an ongoing commitment to finding ways to improve quality, performance, and strategies. No item is safe. Everyone at Nissan is responsible for thinking finding a better ways that increase quality, value and job satisfaction. Not only is quality monitored and checked at every station, but the continual search is on to improve all aspects. The facilities and layout of the entire production line is laid out in a way that quality is at the center. The picture on page four shows how each station is supported by the next.

**Conclusion**

It is apparent that through this case study a lesson of quality is worth the cost is to be learned. The time of producing cheap and push it on others is not only disrespectful to the customer but has revealed itself to be a death sentence to most firms. The Southerland plant is the biggest car manufacturing plant in Japan, and it is going strong. Another highlight of this case study is how well PRM, JIT, TQM, continuous flow, make to order, vendor automated inventory systems, Six Sigma, and Kaizen work together. Lastly, a feel for the importance of job satisfaction and training for employees is revealed to have long-lasting benefits such as improved quality and low turnover.

All this has impacted my mind in the way I think about business. While I may not be able to apply much at my current employ, my entrepreneurial endeavors of the future are definitely impacted. I am already imagining ways of using JIT and TQM in my future companies. A juice bar, for instance, may benefit a lot from JIT as fresh produce is a must. While at the school I work at personal service may improve my later endeavors are much more likely to benefit. I feel I am beginning to understand business concepts on a greater level.

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