

## **LEAN MANUFACTURING STRATEGY: IS IT A “HUMANE” APPROACH ?**



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This article is set to argue whether lean manufacturing strategy is a “humane” approach to the management of organisations. The main theme of this paper is to present arguments regarding the effects lean manufacturing has in a lean organisation in terms of the impact to workers and the organisation as a whole. Dimancescu et al. (1997) argues that the glue binding the main organisational elements (i.e. strategy, structure, process, roles & responsibilities) together is the sense of long-term purpose and values communicated to the whole organisation by its leaders<sup>1</sup>. Dimancescu et al. (1997) further exemplifies using a disastrous incident that effective communication leadership brought all employees in a company to act as a unified team in reacting to the calamity they unexpectedly faced. Effective leadership is vital for a cultured lean organisation to manage and ‘bind’ people together to work in a unified way and to look after each other.

Lean Manufacturing can be looked as means to introduce Teamworking. The author believes that teamworking is essential part of a human’s daily life and by this it means that a person can be more successful both at work and socially through teams (groups). This statement can be argued through a recent research that shows more advanced systems of teamworking which can raise levels of worker job satisfaction and labour productivity<sup>2</sup>. Advanced form of teamworking in a lean organisation may be in the form of multi-skilling and job rotation (job enrichment). Concept of Lean Manufacturing does encourage transfer of workers from one job to another in rotation. With their jobs enriched, workers can enjoy incremental growth in the level of responsibility, complexity, autonomy and discretion in decision-making.

Furthermore, recent study by Niepce & Molleman (1996) suggests that the principles of human values in a lean environment emphasises the satisfaction of the needs of employees and stresses on the importance of a high level of quality of working life<sup>3</sup>. Niepce & Molleman (1996) stresses that lean production does not emphasise a fundamental redesign of jobs to make them more appealing and concludes that quality of working life in lean production firms is not low. It was argued that lean production in

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<sup>1</sup> Dan Dimancescu, Peter Hines & Nick Rich (1997), *The Lean Enterprise; Designing and Managing Strategic Processes for Customer Winning Performance*, pp. 23-29, New York, AMACOM.

<sup>2</sup> Source: European Industrial Relations Observatory Online (EIROOnline), [www.eiro.eurofound.ie/1997/07/feature/UK9707151E.html](http://www.eiro.eurofound.ie/1997/07/feature/UK9707151E.html) (1997).

<sup>3</sup> Willem Niepce & Eric Molleman (1996), A Case Study: Characteristics of Work Organization in Lean Production and Sociotechnical Systems, *International Journal of Operations & Production Management*, Vol. 16, No. 2, pp. 77-90, MCB University Press.

Japan has been successful, as in Japan, values and norms towards quality of working life seem to differ from those that are supported in the West. Furthermore, assumptions concerning work and human values are not necessarily the same for Japan and the West. In Japan, the need for social relations seems to be more intense than the need for personal achievement and independence. Niepce & Molleman (1996) further argued that conversely, in Western countries, personal growth needs often exceeds the need for social relationships. The need for autonomy is stronger than the need to belong to a group. Thus, this leads to relatively more attention being paid to work content.

Lean Manufacturing does empower employees to take ownership of their machines and production equipment. However, problems can occur while introducing empowerment whereby workers may raise concerns over the increase in responsibilities. This is inline with recent survey carried out by Sam Houston State University small businesses to study employee empowerment<sup>4</sup>. The survey indicated that there is lack of discretionary power experienced by the employees. Problems arise mainly when their recommendations are not listened to or implemented. Workers interpreted empowerment as means to shouldering more responsibility for less reward and it was thought as a cost cutting exercise. However, management of an organisation must outline the benefits of empowerment by establishing that communications can be improved as well as effective use of people by de-layering and using minimal supervision. By incorporating empowerment, employees will have greater motivation, their talent can flourish and jobs will be more secure. This can be considered as a benevolent (humane) approach.

According to Kaizen Institute's recent case study, Gemba as defined by Kaizen Institute is where value is added and where problem solving is delegated i.e. in the real workplace<sup>5</sup>. According to Bokern (2000), always go to the shop floor (Gemba) first and talk with the workers (operators) and usually the workers will show what kind of support they need to perform a better job and in return to achieve cost savings for the organisation. Hohmann (2001) argues that kaizen activities can be carried out endlessly, but only Kaizen on 'the real place' is likely to yield some efficient improvements<sup>6</sup>. Hohmann further argues that the workplace is often left out and not recognised as the means to generate revenue, as far more emphasis is placed on such sectors as financial management, marketing, sales and product development. Therefore it is always 'humane' to go to shop floor level first when defining an action plan and gain a thorough understanding of workers perception of lean manufacturing and the impact it has on their daily duties.

Furthermore, an inhumane aspect of lean manufacturing in an organisation is the amount of stress involved in understanding the major lean principles to enable employees to work in teams. Boer et al. (2000) argues that turning shop floor teams into

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<sup>4</sup> Source: [www.sbaer.uca.edu/Research/1994/SSBIA](http://www.sbaer.uca.edu/Research/1994/SSBIA)

<sup>5</sup> Source: Bokern J. (2000), *Go to Gemba First*, Kaizen Institute ([www.kaizen-institute.com/case-a.htm](http://www.kaizen-institute.com/case-a.htm))

<sup>6</sup> Source: HC Online Engineering Forum ([http://members.lycos.fr/hconline/kaizen\\_us.htm](http://members.lycos.fr/hconline/kaizen_us.htm))

Kaizen Teams can be a lengthy and painful process<sup>7</sup>. Boer explains that inconsistencies between top-down control and bottom up learning are inevitable and must be managed carefully and openly to get the right balance in view of the company's particular industry and environmental situation and specific organisational conditions.

Furthermore, idea of developing teams in a lean organisation is supported by the recent findings of Delbridge & Barton (2002)<sup>8</sup>. The findings show consistency with industries that have adopted team working as a widespread response to development in contemporary manufacturing and clearly outline the distinction between production teams and groups that are formed specifically for problem solving and continuous improvement activities. This is important in differentiating between production and continuous improvement teams to leverage duties and reduce vast amount of individual workload in applying lean manufacturing in organisations. A recent article featured on Business Week Online does support the argument that lean concepts can help in securing jobs as well<sup>9</sup>. The article stresses that workers (Boeing) do not have to walk long distances to fetch tools, parts or blueprints and this has made workers job easier whereby walking long distances used to wipe out two hours of the worker's day. Furthermore, the article sets to point out that Boeing was losing business due to its rival, Airbus. Using lean techniques, Boeing started retooling its most complex manufacturing practises while shaking the complications out of its supply chain process. With the idea of 'selling' the philosophy to its workforce, Boeing aimed to use lean manufacturing to leapfrog ahead of Airbus assembly practises. The goal was to implement gigantic moving assembly lines, which were first of their kind in the commercial aircraft industry and this could speed up production by 50% and restore profit margins.

Referring back to lean operations itself, Lean operations results in higher employee satisfaction, as work environment become cleaner, more organised, safer and greater employee involvement is encouraged. This idea is supported by a recent study (Nicholas, 1998) where the study shows that Japan was able to make significant manufacturing gains because the workers had responsibility for improvement and were trained and coaxed to seek out problems and resolve them<sup>10</sup>. Lean operations helps employees and management to create a 'journey' to lean by realisation of zero waste, zero defects and zero incidents. Waste comes in many forms and one of the main forms is from a poorly designed manufacturing process that requires parts to be moved from one side of the building to another resulting in wasted time, movement and wasted capacity. Womack & Jones (1996) reviews the work done by Taiichi Ohno (1912-1990) on seven types of waste (*muda*)<sup>11</sup>. These wastes can be described as waste from overproduction, waiting,

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<sup>7</sup> Boer H., Berger A., Chapman R., Gertsen F., *CI Changes: From Suggestion box to Organisational Learning*, Ashgate, Aldershot, 2000.

<sup>8</sup> Delbridge R. & Barton H. (2002), Organising for Continuous Improvement: Structures & Roles in Automotive Components Plant, *International Journal of Operation & Production Management*, Vol. 22, pp. 680-692

<sup>9</sup> Stanley Holmes (2001), *Boeing Goes Lean*, Business Week Online, 4 June 2001, [www.businessweek.com](http://www.businessweek.com)

<sup>10</sup> John Nicholas (1998), *Competitive Manufacturing Management*, Boston, McGraw-Hill.

<sup>11</sup> James P. Womack & Daniel T. Jones (1996), *Lean Thinking; Banish Waste and Create Wealth in Your Corporation*, London, Simon & Schuster UK.

processing, transportation, motion, inventory and re-work. Workers can identify these wastes in their workplace with lean manufacturing concepts and implement a way forward to **reduce fatigue** due to wasteful activities. One such way of identifying these waste are by Value Stream Mapping (VSM) which enables realisation of the complete picture of manufacturing material and information flow as a product makes its way through the whole process. In a recent Value Stream Management study (Hines et al. 2000), it was found that generally out of 100%; only 1% is actually Value Adding (VA) activities and 49% is Non-Value Added (NVA) activities<sup>12</sup>. The rest (50%) are Necessary but Non-Value Adding (NNVA) and one such example are inspection activities. Thus reducing wasteful activities (NVA) can actually help workers to work in a more simplified and structured manner.

Lean Manufacturing does help to reduce or even eliminate 'blame culture'. An inhumane environment is where workers tend to blame each other for defective products. To keep the production in control, automation (*Jidoka*) and mistake proofing (*Poka-yoke*) are key elements of lean concepts applied in industry. The ultimate aim of using these techniques in the production process is not to pass a defective product downstream. Lean Manufacturing encourages workers to devise practical use of automation to mistake-proof the detection of defective products and encourages workers to solve defect problems on the spot. This not only empowers workers to produce good products but at the same time helps to reduce or eliminate the 'blame' culture of passing defects through to next worker in the production lines who may have to carry out excessive re-work on the defective parts. Nicholas (1998) reviews the work done by Ohno where each worker had been given powers to halt the entire line by pulling a cord and to fix the problem immediately. By doing this, workers can start solving problems on the spot and will slowly begin to notice significant drop in number of defects, increase productivity and above all this creates job satisfaction.

Interestingly, however effective Kanban production pull system is, there are still limitations in an inhumane (uncivilised) way. A recent case study (Cusumano, 1994) shows suppliers that deliver components through the application of Kanban cards (frequent physical exchange of parts delivery tickets to 'Just In Time' assembly lines) did not work well in congested urban areas<sup>13</sup>. This is due to the fact that as more factories in Japan adopted this practise, traffic worsened to the point where the Japanese government mounted a media campaign encouraging companies to reduce the frequency of their parts deliveries. The case study further stresses that traffic congestion pollutes the environment and wastes time while people are stranded in traffic and in manufacturing plants waiting for components to arrive. Furthermore, Cusumano (1994) also argued that increase in product variety through lean manufacturing concept of

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<sup>12</sup> Hines, P, Lamming R., Jones D., Cousins P. & Rich N. 2000, *Value Stream Management*, pp. 60-65, London, Prentice Hall.

<sup>13</sup> Michael A. Cusumano (1994), *The Limits of Lean*, *Sloan Management Review*, pp. 27-32. . (Obtained from Coventry University Management of Lean Organisation Lecture Notes).

small-lot production has caused some problems. Too much product variety has caused environmental concerns. Typical case is where due to product variations, Japanese automakers have been introducing replacement of existing models every four years in addition to continually expanding their product lines. Coupled with Japanese government regulations and mandatory fees or maintenance charges, consumers were encouraged to replace their vehicles every four or five years. Due to the high domestic demand for cars there was a need to dispose of all the replaced vehicles and problem lied with how to recycle automobile materials effectively. Without proper recycling, environmental concerns were getting deeper.

Recent case study (Berggren, 1994) has shown constructive comparisons between Lean manufacturing (in NUMMI) and group working (in Volvo – Udevalla Plant)<sup>14</sup>. It showed a major difference where Udevalla plant focused the plant on job redesign and “humanistic manufacturing” whereas NUMMI (Lean) contributed to a limited job redesign and thus causing failure to adapt to ergonomic conditions to long-term human requirements. The case study further emphasised that Udevalla plant benefited (although was not performing as efficiently as NUMMI) from empowerment whereby workers could question proposed assembly line systems or methods and develop innovative solutions. NUMMI on the other hand had workers that were not highly skilled and were incapable of contributing towards process improvements. This was the major trade-off for NUMMI (Lean Manufacturing) that due to standardisation, this resulted in poor ergonomics coupled with uncomfortable and sub-efficient ways of working. However, on the contrary NUMMI did benefit from different aspects of Lean Manufacturing. Compared to Udevalla, NUMMI (Lean) had high performance teams and management aimed at supporting production teams with problem solving expertise and it was able to become an effective learning organisation. Udevalla plant lacks the skills to translate its impressive individual learning to organisational performance.

However, a recent publication (Adler & Landsbergis, 1997) argues on impact that lean production has on workers health<sup>15</sup>. In the discussion, Dr. Paul Adler stresses that workers at NUMMI (Lean Production Facility) suffered ergonomics problems not because the lean production system of work design was so regimented but because this system was not implemented properly. The arguments stresses that lean production type work organisation, based on detailed standardisation and short work cycles can considerably degrade ergonomic outcomes if it is implemented poorly and without sufficient safeguards for workers health. However, the publication also points out major contributions the workers unions has done and these includes:

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<sup>14</sup> Christian Berggren (1994), NUMMI vs. Udevalla, *Sloan Management Review*, pp. 37- 45. (Obtained from Coventry University Management of Lean Organisation Lecture Notes).

<sup>15</sup> Job Stress Network (1997), A Dialogue Between Paul Adler and Dr. Paul Landsbergis on “Lean Production”. (Obtained from Coventry University Management of Lean Organisation Lecture Notes).

- Improved staffing through a Temporary Assignment Pool of workers to fill in for absent or injured workers
- Fairer access to training
- Increased transfers between departments
- Joint committees on health & safety, ergonomics and training
- The right to elect or recall team leaders
- Team leaders duties in contract
- Increasing work loads due to absenteeism is forbidden
- Temporary assignments offered to workers on the basis of seniority
- Some limits on line speeds and job standards
- Ergonomics programs
- No reprisal for reporting injuries

Womack & Jones (1996) argues that Toyota managed to deal with a key weakness of its system i.e. the failure to evaluate the actual level of human effort involved in each production job and not just its feasibility within a given cycle time<sup>16</sup>. Work teams were asked to precisely determine the amount of fatigue and stress caused by each motion and then summarising for each job, Toyota for the first time could talk objectively about the level of effort required. This permitted the company to make jobs comparable (or adjusting the effort level for older workers or those with physical problems) and to answer the critics that claimed lean production system demanded impossible work pace from workers. Furthermore, if unacceptable levels of stress and fatigue are discovered, the work team 'Kaizened' the activities to redesign jobs and develop simple automation systems.

In a recent article entitled *Change Management-ignore your people and your lean journey will run out of gas*, Berger (2002) argues that one of the greatest challenges management faces in implementing lean manufacturing is ensuring that real behavioural changes takes place at all levels of the organisation otherwise without a solid change management programme, their plant will revert back to old and familiar ways<sup>17</sup>. Workers tend to see that lean manufacturing leads to job losses and therefore in an 'humane' way, management must see the world through the eyes of those being asked to embrace the lean initiative as Berger (2002) advises. Berger (2002) also stresses the following 10 points to be considered when embracing the lean initiatives as an educated way, which can be summarised as:

- Development of a shared vision that clearly identifies how lean manufacturing initiative supports that vision.

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<sup>16</sup> James P. Womack & Daniel T. Jones (1996), *Lean Thinking; Banish Waste and Create Wealth in Your Corporation*, pp. 238-241, London, Simon & Schuster UK.

<sup>17</sup> Source: David Berger (2002), *Change Management; Ignore your people and your lean journey will run out of gas*, Advanced Manufacturing Magazine, ([www.advancedmanufacturing.com/January02/lean.htm](http://www.advancedmanufacturing.com/January02/lean.htm))

- Ensuring that there is strong management commitment and ensuring actions are consistent with words.
- The lean implementers must understand the nature of change and carry out regular reviews to understand workers needs.
- Senior Managers should completely focus themselves on the lean programme and given adequate training.
- Sufficient time for implementation is given.
- Performance measurement systems in place to define what a successful lean implementation looks like.
- Create communications plan that provides regular updates to everyone combined with a feedback mechanism for those managing the lean program.
- Education and training must be provided with details of the nature and benefits of the changes anticipated.
- Anticipation of resistance to change and a plan developed for managing the resistance.
- Rewards for early adopters of lean manufacturing.

Recent paper by Kinnie et al. (1998) that discusses issues of downsizing related to lean manufacturing and lean organisation<sup>18</sup>. Kinnie et al. (1998) stresses on statements made by various other authors that downsizing was perceived as one way of achieving leanness. Lean came to be associated with using less personnel and hence downsizing came to be seen as a way to become lean regardless of the question whether or not originally Japanese ways of working were used in the new lean organisation. Further arguments were made on the fact that downsizing is invariably promoted under the guise of improving productivity and reducing organisational complexity, which are both desirable attributes of lean organisation. Further findings of Kinnie et al. (1998) that shows the main reason for de-layering is to reduce costs (Ezzamel et al., 1993) although other reasons include reducing bureaucracy, speeding up communications and improving responsiveness to customer demands. This argument is further strengthened by the fact that lean concepts that includes the use of TQM and JIT is accompanied by the introduction of new technology which itself may involve job losses and new working practises (Wilkinson et al., 1996).

Recent scholars have argued about major differences between lean manufacturing and mass production in terms of human resources. Forza (1996) argues that in order to be able to function in a lean system, all the resources being used in the production process have to be foreseeable and reliable and above all, they have to be totally subservient to production needs. Success of the company's adoption to JIT (Lean Manufacturing) depends totally on the willingness of workers to collaborate<sup>19</sup>. Forza (1996) further

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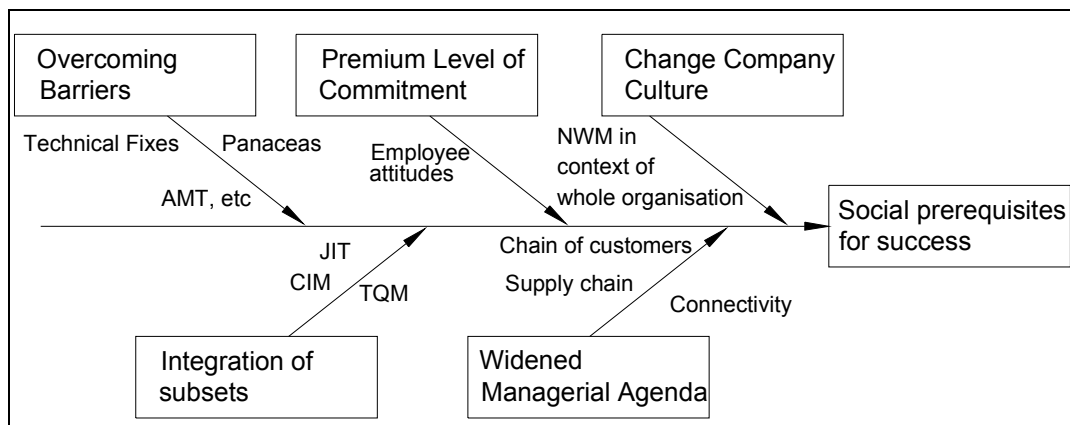
<sup>18</sup> Nicholas Kinnie, Sue Hutchinson & John Purcell (1998), Downsizing: is it always lean and mean? *Personnel Review*, Vol. 27, No. 4, pp. 296-311.

<sup>19</sup> Cipriano Forza (1996), Work Organisation in Lean Production and Traditional Plants; What Are The Differences? *International journal of Operations & Production Management*, Vol. 16, No. 2, pp. 42-62

argues that work organisation in lean production deals with more than job design as it emphasises management styles, skills, values and aims to incorporate job design into the organisation’s employment strategy. This shows that recruitment and workers job design is characterised by cooperativeness, group problem solving and attitude control in the social organisation of work which comprises of a sophisticated control system of employee behaviour. In a particular job in a lean production system, employee involvement is important and according to the findings of Forza (1996) this can manifest particularly through:

- The right duty of the workers to interrupt production flow whenever they notice anomalies or defects.
- The exchange of positions within the work group and the habit of “giving each other a hand” in moments of difficulty.
- The adaptation of work team to variations in job duties and in the production flow.
- The commitment of each worker to the continuous improvement of each production factor.

Keeping on track with the complications that has been caused by the impact of lean manufacturing on human resources, recent publication does consider that lean manufacturing (part of New Wave Manufacturing – NWM, which also includes TQM and JIT) gives consideration to human resources issues<sup>20</sup>. Harrison & Storey (1996) argue that there are five areas of social prerequisites that need to be satisfied for the success of NWM, which includes lean production (LP). This can be summarised as:



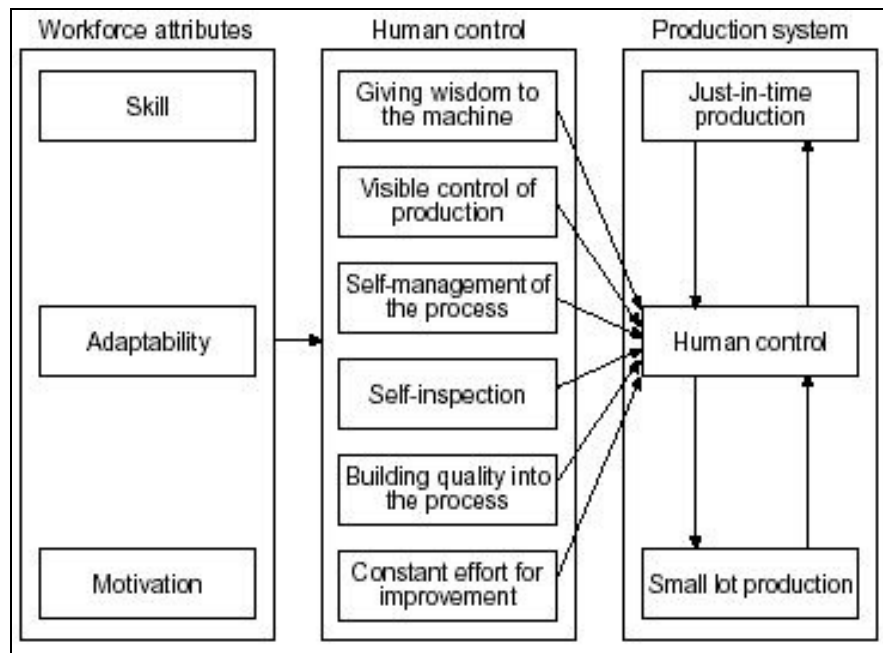
**Figure:** Social Prerequisites for the success of NWM & LP

The first is to overcome the barrier of treating NWM (includes lean production) approaches as simply a series of technical fixes; second, the need to improve integration; third, the need for premium levels of commitment from employees; fourth, the need to widen the managerial agenda beyond the firm to encompass the entire supply chain;

<sup>20</sup> Alan Harrison & John Storey (1996), *New Wave Manufacturing Strategies; Operational, Organisational & Human Dimensions*, *International Journal of Operations & Production Management*, Vol. 16, pp. 63-76



fifth, the need for a change in company culture. However, Harrison & Storey (1996) stresses that organisation and human resources issues are at least given some attention during the implementation phase of NWM strategies. Furthermore, the paper also discusses the Shimada's (1993) concept of humanware, which defines the integration, and interdependence of machinery and human relations. The article points out that Shimada regards humanware as a useful concept to differentiate between different types of production systems. The model shown below implies a close co-ordination between hardware (machines and systems) and the principles and practise of social organisation.



**Figure:** Japanese "humanware" model

Although the model is built around hypothesised inter-connections, Harrison & Storey (1996) argues that Shimada (1993) postulates that three indispensable attributes (skill, adaptability and motivation) must be developed in the workforce, and that these provide the foundations for the enhancement of "human control". In turn it is argued that human control is one of the three key features of the Japanese production system i.e. lean production. When workers attributes are taken into account in the lean production system design, the author believes that this is a humane approach and it is particularly important for any organisation to bear this in mind when confronting with human resources issues.

Too often management commitment to lean manufacturing and issues on training workers to be skilled in the concepts of lean manufacturing fades away too quickly. The main question lies in the thought that if it is humane or not to spend money investing in workers who are some day going to mould the company in becoming a competitive manufacturer. Boyer (1996) argues that commitment to JIT and TQM in name only is not

beneficial as it takes a supporting commitment to develop the underlying capabilities of the workforce and the manufacturing infrastructure<sup>21</sup>. Boyer (1996) further studies arguments made by Hayes & Pisano (1994) that most companies “focus on the form of their organisational assets – for example the mechanics of JIT or TQM – rather than on their substance, the skills and capabilities that enable a factory to excel and make it possible for various improvement programmes to achieve their desired results”. Therefore, lean organisations can become humane by realising that skills and knowledge embodied in the workers are critical elements for lean production. Focus must be put on analysing the relationship between a company’s commitment to lean production and the actions taken by management to develop the skills, knowledge and training of its workforce.

In summary, it can be concluded that many organisations find that lean manufacturing actually helps to improve productivity while workers feel that lean manufacturing concepts increases their workload, thus it is an inhumane approach. Others think that lean manufacturing actually helps a worker to achieve career growth and increase their skills, thus is a humane (civilised) approach. As this paper discusses many elements of lean manufacturing concepts, it is obvious that majority of the concepts discussed have both positive and negative impacts to the organisation as a whole, as an organisation is built on people.

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<sup>21</sup> Kenneth K. Boyer (1996), An Assessment of Managerial Commitment to Lean Production, *International Journal of Operations & Production Management*, Vol. 16, No. 9, pp. 48-59.