

# **Total Quality Servitisation: The Blurring Boundaries Between Manufacturing and Services Companies through Knowledge Management, Total Quality Management and Just In Time**

Wakhid Slamet Ciptono<sup>1)</sup>, and Shita Lusi Wardhani<sup>2)</sup>

1)Gadjah Mada University, Faculty of Economics ([wakappm@indosat.net.id](mailto:wakappm@indosat.net.id))

2)School of Business and Economics 'YKPN'

## **ABSTRACT**

The purpose of this study was to examine the relationships between environmental factors of Just In Time which include workers, managers, suppliers strategicly integration, and the practicing of Total Quality management in manufacture industry in Indonesia. Quality performance of company was described into three models dimensions of performance: TQM practices' dimensions model and JIT practices' model and the combination of these two models into knowledge management practices.

This research was conducted to provide information to the executive companies, while the data of industry manufactures were obtained from the Directory Top Companies In Indonesia which published in 1996/1997. One hundred and fifty questionnaires were mailed to a randomly selected sample of manufacture companies (which have already got the ISO 9001 certification). One hundred and seventeen were returned due to moved/no forwarding address or business no longer in operation that caused by the economy crisis. Thus 33 questionnaires were returned for a response rate of 20 percent. The outcome of this research shows a negative relationship between environmental factors of TQM + JIT and the quality performance of the company.

Key words: Total Quality Servitisation, TQM, JIT, Knowledge Management

## **Introduction**

Continuous Product, Process, People Improvement and Innovation (CP<sup>3</sup>I<sup>2</sup>) or Kaizen program is a global commodity. Everybody is implementing and developing it. Winning attributes for a global commodity are high level of effectiveness and high level of efficiency as the double whammy effect of being quality fanatic. In the case of the CP<sup>3</sup>I<sup>2</sup> program, high level of effectiveness and efficiency that focusing on the agility based competition, is the spirits or grand paradigm of the Global Service and Manufacturing Management. The agile service and manufacturing management should try to grasp the windows of opportunity to "leap frog" their rivals (competitors, complementors, substitutors, and collaborators). By acting better, smarter, and more proactive than rivals, the agile service and manufacturing management can dictate performance in the global marketplace and market space.

The growing interdependence and networking of global free and fair trade systems has broadened the role of global service and manufacturing management in **coopetation or complementary or collaborative or parenting advantages** (not just focused on developing comparative and competitive advantages that have created the cut-throat competition). The intensified global collaborative environment -- large number of new rivals, information technology innovators and inventors, removal of nations barriers and emergence of the global village positioning and is followed by many discontinuous and turbulent changes which drive all nations in the world entering the era of dynamic teaming, virtual enterprising and knowledge networking

In fact, the true ambiguity of the future millennium is creating new challenges as well as great opportunities in global service and manufacturing management. In many situations, old paradigms of service and manufacturing management (a little q philosophy: Partial Quality Service or Manufacturing Management/PQSM or PQMM) for positioning global business in relation to domestic service and manufacturing management are proving inadequate. So, every nation (including Indonesia, of course) should consider to repositioning its old paradigms into new paradigms (a BIG Q Philosophy/Total Quality Service and Manufacturing Management or Total Quality Servitisation/TQS\*) in order to stay in the global competitiveness environment. The grand paradigm in service and manufacturing businesses is **AGILITY**—how business firms are implementing intraorganizational coopetition strategies to achieve four dimensions of agile collaboration:

1. Enriching the customers (both internal and external)
2. Cooperating to enhance global competitiveness
3. Organizing to master change and uncertainty
4. Leveraging the impact of continuous people improvement through knowledge and information management.

Adapted from Fliedner and Vokurka, 1997.

## **Literature Review**

### **Total Quality Servitisation (TQS\*) Based Strategic: Fast Response Organization (FRO) and Faster Learning Organization (FLO)**

According to Perry et al (1993), real time strategy updates strategic thinking by incorporating new, real time information technologies into the logic of strategy. There are two models of strategy in order to be Real Time or Proactive Organization: Fast Response Organization (FRO) and Faster Learning Organization (FLO). According to Noori and Radford (1995), organizations that can compete along all six dimensions of global competitiveness are referred to as Fast Response Organization (FRO). By definition a FRO is built around the six dimensions of competition: flexibility, time (Time Based Competition), quality (the Big Q philosophy), dependability (trust management), service, and cost. Fast Response Organizations actively embody the Continuous Process Improvement/Innovation in the blurring process between

manufacturing and services (the TQS\*). Noori and Radford said that this linkage is important, for it makes it easy to differentiate organizations living the TQS\* based strategic from those paying lip service to it. FROs must have successfully implemented the TQMS\*, and successful implementation of TQS\* must result in Fast Response Organization (Noori and Radford, 1995). Based on the FRO strategy, the keys to success are: less rework (doing things right or better the first time--good, clean, and capable bureaucracy--a good management is the art of making difficult things simple, not simple things difficult: efficiency based competition), a more effective organizational structure (doing right or better things: effectiveness based competition).

In most models of Faster Learning Organization (FLO) or corporate greening, organizations progress from a reactive to a proactive (real time) stance toward environmental issues (Post and Altman, 1992). More recently, models based on theories of organizational learning and change associate the development path to greening with the ability of an organization to learn (Post and Altman, 1992). At the lower end of the development process, learning is reactive; an organization takes corrective action and adjusts its behavior in response to external forces, such as accidents or regulations. At the higher end, learning is proactive; an organization is structured for innovation with respect to environmental performance and often uses it to gain complementary and collaborative or parenting advantages (Dechant and Ribbens, 1995). FLO provides the work smart atmosphere (Total Quality of Worklife) that an organization learn if its members acquire knowledge (brain intensive) that recognize as potentially useful to the world class organization--today knowledge is power (Waitley, 1995).

Since Total Quality Servitisation (TQS\*) strategy is basically the same as business development strategy, therefore research activities in this case is the processes to gather or collect, analyze, and evaluate significant data or information in order to develop a strategic business development plans based on knowledge. There are 3 (three) phases of business development processes as an integral part of relationship marketing or total quality marketing: the Agile Marketing Research Phase, the Pursuit Research Phase, and the Capture Research Phase.

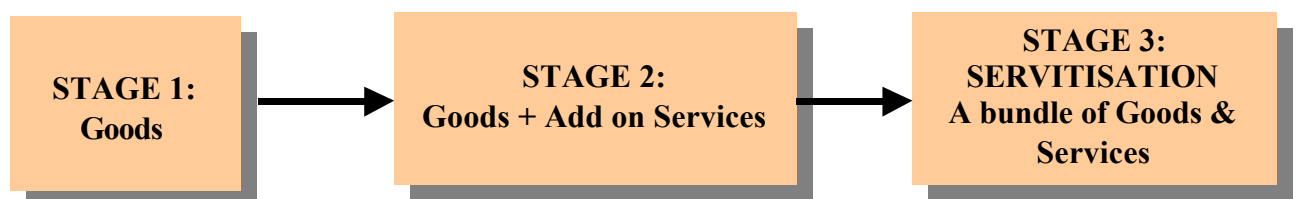
Krajewski and Ritzman (1996) point out that “to remain global collaborative, a service or manufacturing organization, as a whole, must be nimble enough to embrace dynamic changes. A service or manufacturing organization that does so sometimes is called a learning service or manufacturing organization.” It means that it is the agile organization (both profit and nonprofit organizations) that has adopted the advanced system (the balancing between high-tech and high-touch positioning) in order to adapt global changes. Not only does it focus on checking goals but it also reevaluates what has already been performed by the organization. Globalization requires every industry to perform well by producing products and services with the value-added and value-in-use processes. No organization is completely safe; in order to survive, organizations have to be responsive to changes in marketplace and market space. The responsiveness will make organizations survive in the fittest and lead to customer loyalty and mania for a long time period. Servitisation Management should response to these needs. Servitisation Management should provide an overview of strategic and tactical alternatives, advances in methodology of research and technology, breakthroughs in managerial/conceptual,

human relations, and technical skills--based on the blurring boundaries between manufacturing and services. The comprehensive analyses of an integrative organizational approach by introducing a new paradigm, the "Total Quality Servitisation" can be used to accomplish its never ending improvement and innovation program in all key functions and interdependency (networking) relationships.

Total Quality Servitisation is the management of quality in a bundle of goods and services as a result of of the blurring boundaries system between manufacturing and service businesses and the understanding that continuous process and positioning (value-added and value-in-use processes; high-tech and high-touch positioning) improvement and innovation is an essential component of a collaborative organization to ensure their mutual survival and success (GPQC, 1993 with modification).

**Figure 1: From GOODS to SERVITISATION**

**Servitisation is the blurring boundaries between manufacturing and services.**



Source: Looy, et. al., 1998

The growing interdependence and networking of global free and fair trade systems has broadened the role of global service and manufacturing management in **coopetation or complementary or collaborative or parenting advantages** (not just focused on developing comparative and competitive advantages that have created the cut-throat competition). The intensified global collaborative environment -- large number of new rivals, information technology innovators and inventors, removal of nations barriers and emergence of the global village positioning and is followed by many discontinuous and turbulent changes which drive all nations in the world entering the era of dynamic teaming, virtual enterprising and knowledge networking (the Fifth Generation of the Global Management Evolution: the Knowledge Management Era).

## The Definition of Knowledge Management:

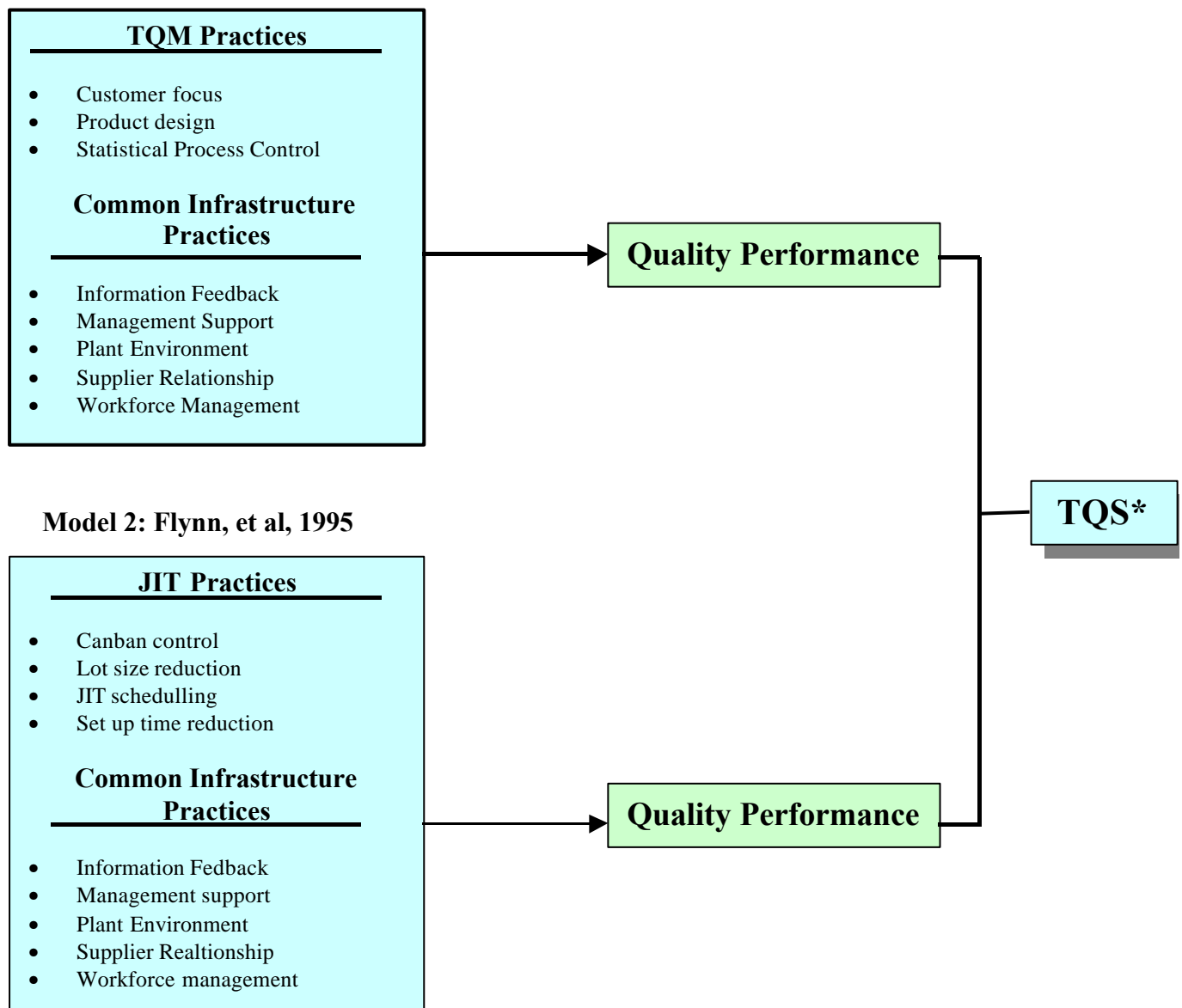
Knowledge Management caters to the critical issues of organizational adaptation, survival and competence in face of increasingly discontinuous environmental change. Essentially, it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity human beings (Malhotra, 1998).

Knowledge is a process of synthesis in which information is compared to other information and combined into meaningful links. There are four basic levels of knowledge: facts, concepts, rules, and heuristics (Tuthill and Levy, 1992).

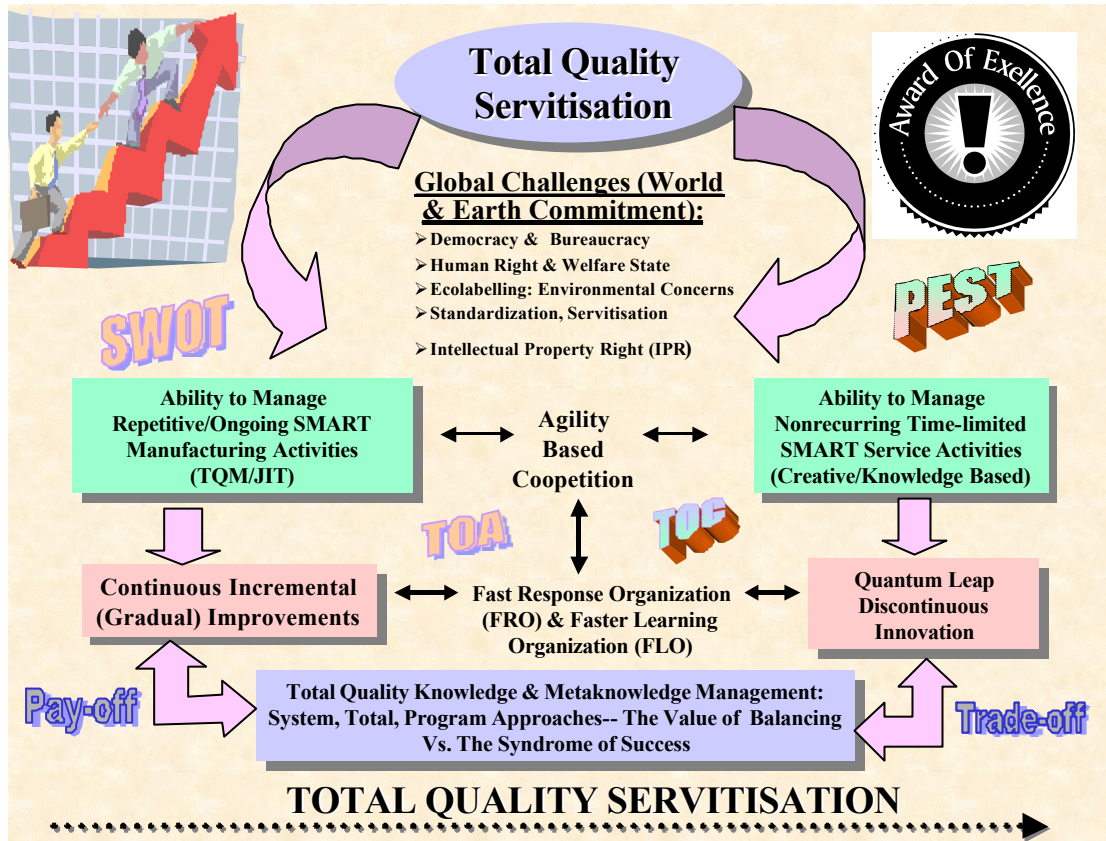
## Research Model

**Figure 2**

**Model 1: Flynn, et al, 1995**



**Figure 3:  
Total Quality Servitisation (TQS\*)**



Source: Adriano De Maio, et al., 1994 with modification

Note:

TOC	: Theory of Constraints
TOA	: Theory of Advantages
SWOT	: Strength, Weaknesses, Opportunity, Threat
PEST	: Politics, Economics, Social, Technology
TQS*	: Total Quality Servitisation

## Results

**Table 1**  
**Regression analysis the practicing of TQM to quality performance**

<b>Independent Variables:</b>	<b>b</b>	<b>P Value</b>	<b>R2</b>
Customer focus (X1)	0,8153	0,0337*	0,45
Product Design (X2)	0,1419	0,3143	
Statistical Process control (X3)	-0,0319	0,9187	
Information Feedback (X4)	0,0652	0,6691	
Management support (X5)	-0,1606	0,5461	
Plant Environment (X6)	0,3935	0,0686**	
Supplier Relationship (X7)	0,1911	0,3130	
Workforce Management (X8)	-0,2519	0,0532**	
Constant	1,9821		

F=2,446; p=0,043

\* p < 0,05

\*\* p < 0,10

### **Regression model:**

$$Y = 1,9821 + 0,8153 + 0,1419X2 - 0,0319X3 + 0,0652X4 - 0,1606X5 + 0,3935X6 + 0,1911 X7 - 0,2519 X8$$

**Table 2**  
**The Regression analysis the impact of Just-In-Time to quality performance**

<b>Independent Variables:</b>	<b>b</b>	<b>P Value</b>	<b>R2</b>
JIT Scheduling (X9)	0,1662	0,4195	0,39
Kanban Control (X10)	0,1347	0,4276	
Lot Size Reduction (X11)	0,0517	0,7372	
Set up time reduction (X12)	0,6549	0,0640**	
Information Feedback (X4)	0,5116	0,7552	
Management support (X5)	0,0001	0,9997	
Plant environment (X6)	0,2695	0,1673	
Supplier Relationship (X7)	0,1999	0,3689	
Workforce Management (X8)	-0,2934	0,0378*	
Constant	2,2972		

F=1,60477: p=0,1725

\* p < 0,05

\*\* p < 0,10

### Regression Model:

$$Y = 2,2972 + 0,1662 X_9 + 0,1347 X_{10} + 0,05167 X_{11} + 0,6549X_{12} + 0,5116X_4 - 0,0001 X_5 + 0,2695X_6 + 0,1999X_7 - 0,2934 X_8$$

### Reference

- Badiru, A.B. 1990 (March). A system approach to total quality management.
- Bicheno, J. 1991. *Implementing JIT: How to cut out waste and delay in any manufacturing operation*. Kempston, Bedford, England: IFS Publications.
- Brown, K.A. & Mitcell, T.R. 1991. A comparison if jut-in-time and batch manufacturing: The role of performance obstacles. *Academy of Management Journal*, 34: 906-917.
- Cohen, J., & Cohen, P. 1983. *Applied multiple regression/correlation analysis for the behavioral science*. Hliisdale, NJ: Erlbaum.
- Cole, R.E. 1981. The Jappanese lesson in quality. *Technology Review*, 83(1): 29-40.
- Cooper, D.R. & C. William Emory. 1995. *Business Research Methods*. 5<sup>th</sup> edition. Richard D. Irwin Inc.
- Courtney, High, jane Kirkland, and patrick Viquerie. Nov-Dec 1997. Strategy Under Uncertainty. *Harvard Business Review*
- Dilworth, J.B. 1996. *Operation Management*. 2th edition. USA: Mc. Graw Hill.
- Dixon, L., & Anne Miller Porter. 1994. *JIT II revolution in buying and selling*. 1 st edition. USA: Purchasing Magazine, Cahner Publishing Company.
- Fliedner, Gene and Robert Vokurka. 1997. Agility: The Next Competitive Weapon. *APICS-TPA*. January edition.
- Flynn, B.B, Sadao Sakakibara, & Roger G. Schroeder. 1995. Relationship between JIT and TQM: Practices and Performance. *Academy of Management Journal*, 38 (5): 1325-1360.
- Garvin, D.A. 1983. Quality on the line. *Harvard Business Review*, 61(5): 64-75.
- GPQC (Georgia Productivity Quality Center, USA). 1993. Total Quality Management: Principles, Concepts.



- Golhar, D.Y., & C.L. Stamm. 1991. the just in time philosophy: a literature review. *International Journal of Production Research*. 29 (4): 657-676.
- Gunn, T.G. 1987. *Manufacturing for competitive advantage: Becoming a world class manufacturer*. Cambridge, MA: Ballinger.
- Hair, J.F. Jr., Rolph E. Anderson, Ronald L. Tahtam & William G. Black. 1995. *Multivariate data analysis with readings*. 4<sup>th</sup> edition. Prentice Hall International Inc.
- Hall, R.W. 1983. *Zero inventories*. Homewood, IL: Dow Jones-Irwin.
- Hall, R.W. 1987. *Attaining manufacturing excellence*. Homewood, IL: Business One Irwin.
- Hartley, J.R. 1992. *Concurrent engineering*. Cambridge, MA: Productivity Press.
- Looy, Bart Van, Roland Van Dierdonck, and Paul Gemmel. *Services Management: An Integrated Approach*, London: Pitman Publishing.
- Maio, Adriano De, Roberto Verganti, and Mariano Corso. 1994. A Multi-Project Management Framework for New Product Development. *European Journal of Operations Research*. 178-191
- Malhotra, Yogesh. 1998. Knowledge management for the New World of Business. @BRINT Institute.
- Meril, P. 1995. ISO 9000 on the road to total quality. *CMA Magazine*, 21-24.
- Mc. Closkey, L.A., & Collett, D.N. 1993. TQM: A Basic Text. Methuen, MA: COAL/OPC.
- Newman, Brian (Bo) and Kurt W. Conrad. 1999. A Framework for Characterizing Knoeledge Management Methods, Practices, and Technology. *The Knowledge Management Forum*. 1-18
- Parisher, J. W. 1995. ISO 9000 documentation a TQM journey in the making. *National Productivity Review*. 77-85.
- Porteus, E.L. 1986. Optimal lot sizing, process quality improvement and setup cost reduction. *Operation Research Journal*, 34(1): 137-144.
- Ramarapu, Narender K., Satish Mehra and Mark N. Frolick, A comparative analysis and review of JIT “implemtenion” research. *Journal of Operation and Management*. 15 (1): 39-49.

Stalk, G., & Hout, T.M. 1990. Competing against time: *How time-based competition is reshaping global markets*. New York: Free Press.

Schonberger, R.J. 1986. *World class manufacturing: The lessons of simplicity applied*. New York:Free Press.

Sugimori, Y., Kusunoki, K., Cho, F., & Uchikawa, S. 1977. Toyota production system and kanban system: Materialization of just-in-time and respect for human system. *International Journal of Production Research*, 15:553-564.

Suzaki, K. 1987. *The new manufacturing challenge*. New York: Free Press.

Tuthill, Steven G. and Susan T. Levy. 1992. Knowledge-Based System: A manager's Perspective. Blue Ridge Summit, PA: Division of TAB Book.

Vuppalapati, Kiran. 1995. JIT and TQM: A case for joint implementation. *International Journal of Operation & Production Management*. 15 (1): 84-84.

Wardhani, Shita Lusi. 1999. The Impact Study of Practicing Total Quality Management and Just In Time To Quality Performance. No Publication.