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Using EB-QFD to achieve competitive advantages for world class manufacturing

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A B S T R A C T

This paper introduces a tool named EB-QFD used for electronic business planning in strategic issues. Nowadays, the challenges of manufacturing sectors for achieving global competition will depend on their speed to change from domestic to world class manufacturing organizations, also the rapid global deployment of electronic business, information technology and their benefits have required managers to make decision, which look for a balance world class manufacturing factors with strategic business goals. To ensure that selected e-business strategies meet world class manufacturing requirements, organizations should simultaneously explore and communicate the relationship between world class manufacturing and electronic business. Electronic business planners can achieve competitive advantages through the implementation of an integration of quality function deployment (QFD) with electronic business (EB) called EB-QFD. This study is based on data collected from an Iranian auto parts manufacturing company and the implementation of EB-QFD. In this research, EB-QFD contains two parts named EB-WHATs as needs of Electronic Business and EB-HOWs as resources for EB-WHATs. Statistical analysis points that there are positive relationships between using EB-WHATs and EB-HOW and world class manufacturing factors as competitive advantages. We used electronic business systems for EB-WHATs and resource based view (RBV) for EB-HOWs.

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1. Introduction

Manufacturing strategies are concerned with key decision about the specific roles implemented in an attempt to gain competitive advantage (Dangayach & Deshmukh, 2000). The rapid changes in business environment due to its unique characteristic, the raise of international competition among companies, shrinkage of markets, and diffusion of the information technology (IT) through organizations have put pressure on business to continually review and adopt their traditional manufacturing strategy. In fact, there is a constant search for new ways to achieve a competitive advantage through new manufacturing techniques. Therefore, increasing knowledge and coordination in company's processes, which crosses its manufacturing functions becomes the primary requirement of many companies seeking a competitive advantage (Salaheldin & Eid, 2007). Although, in

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particular, there are some practices organizations should adopt to achieve high performance and this has long been a focus of research in operations management. The resource-based and capability-based views of sustainable competitive advantage have recently highlighted operations as an important source of resources and capabilities, which are valuable, rare, inimitable, and sticky (Winter, 2003; Eisenhardt & Martin; 2000; Teece et al., 1997). According to Porter (1985), competitive strategy can be understood as the activities a company uses to achieve a sustainable competitive advantage in particular industry. These activities are determined by the strategic decisions where the company is attempting to be different from competitors. However the challenges of manufacturing sectors competition are transforming from to change domestic environment to global market, in which managers are under pressure to deliver increased productivity and efficiency (Hayens,1999). The purpose of this study is to determine the impacts of the EB-QFD implementation by manufacturing organizations. Specifically, this article attempts to answer the following questions:

- What is EB-QFD?
- Why is EB-QFD used?
- Can usage of EB-QFD help organization for electronic business planning to achieve competitive advantages and How?

2. The concept of QFD

There are many definitions for QFD, basically, it is a method for understanding customer outcomes and developing comprehensive product specifications (Killen, et al., 2005). Essential characteristics are customer orientation, team approach and a way of concisely structuring communication and linking together information (Govers, 1996). QFD is a technique for product or service development, brand marketing, and product management. The primary purpose of the QFD approach is to help planners in focus on the characteristics of the product or service from the viewpoints of market segments. Furthermore, it is a concept and mechanism for translating customer needs into product by the various stages of product planning, engineering and manufacturing (Celik,et al.,2009). The process of QFD contains one or more interlink matrices where the first is called house of quality (HOQ). In this phase the stakeholder needs to the system are identified" WHATs", the company's competitive priorities are incorporated, and then the needs transforming into technical measures are known as "HOWs" (Chan & Wu, 2005). The weights assigned to the WHATs' are placed to the right of the matrix, the amount of each technical response HOWs for achieving each WHATs are given priorities at the bottom of the HOQ shown in Fig 1. The HOQ displays the voice of customer or stakeholder along the left and the team's technical solutions to the stakeholders needs along the top (Masui, et al., 2003, Cohen, 1995, Zhang, et al.,1999).

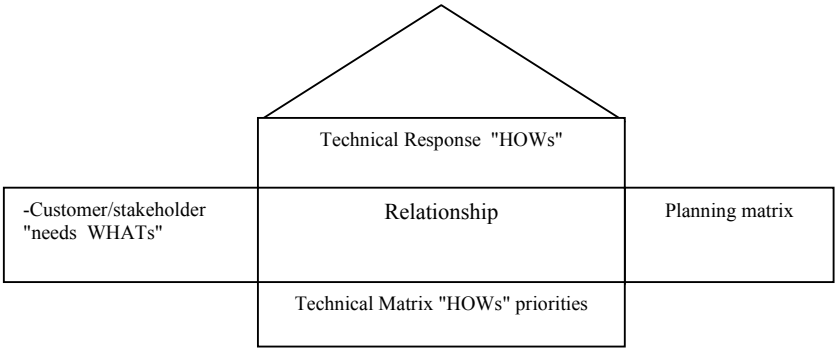

Fig. 1. House of Quality

2.1 Using QFD with other approaches

Jiang et al. (2007) discussed about the development of QFD and its combination with various design methodologies and numerical analysis methods, which also became a research trend. They referred to other researchers' area in three main aspects as following:

(1) QFD combined with TRIZ (Russian theory of inventive problem solving), Pugh concept selection, and Taguchi methods, in order to strengthen more the effectiveness of QFD in product design and process design.
(2) QFD combined with different numerical analysis methods, such as fuzzy sets, AHP(analytic hierarchy process),and neural network, in order to strengthen more the accuracy of QFD in weight determination and numerical analysis.
(3) The research of QFD application, such as QFD combined with strategic management and policy management, and QFD's key successful factors in practice.

2.2 Strategic planning with QFD

QFD tools and principles are traditionally used for product development but they are considered as an appropriate method for the development of business strategy (Walker, 2002). When QFD is implemented in strategic planning, we have different perception of this concept, the customers' requirements can be interpreted as the corporate or business requirements, QFD team consists of top management, functional level management for formulation and engineering for action plan. Therefore, in strategic planning, the QFD project risk is generally higher than in product design.Table1 highlights these differences (Crowe & Cheng, 1996).

Table1
Fundamental differences between product design and strategic planning

	Product design	Strategic planning
Input data	Customers' requirements	Corporate and business strategy
Number of translation Phases	Four clearly defined phases	Multiple phases
Information nature	Static	Dynamic
Translation data	Easy to define and quantify	Difficult to define and quantify
Evaluation scale	Specific target values for each design attribute	Strategic objectives and goals
Team members	Implementation engineers	Top management, functional level managers and implementation engineers
Output	Specific process for manufacturing the product	Manufacturing initiatives, tactical policies and detail tasks
Project risk	Generally lower	Generally higher

3. Electronic Business(EB)

Electronic business is a concept, which maintains many definitions in practice and in the literature. In the last decade, Electronic Business (e-business or EB defined as business activities conducted over the Internet) has been one of the most important IT innovations (Xu, et al., 2004).

Electronic Business is a new business model, which transform key business process between business partners, supplier, customer, employees, regulatory parties and communities (Criag & Jutla, 2001). E-business supports strengthening business processes and business partners, employees, and customer relationships by using electronic media (Schubert & Hausler, 2001).

3.1 Electronic business development

Industry analysts have predicted that e-business applications can facilitate the exploitation of intangible knowledge and relational assets such as intellectual capital and customer relationships. Consequently, many contemporary organizations are realizing that new considerations must be brought to bear in assessing e-business investment (Bharadwaj & Tiwana, 2005). Developing e-business capability is an important responsibility because it is not only rapidly changing the way that companies buy, sell and deal with customer, but also it is becoming a more integral part of its business strategies (Abu-Musa, 2004). Ihlstrom and Nilsson(2003) used e-business to describe how corporation utilize information technology to conduct business and gain competitive advantage.

Although there is no common agreed definition for competitive advantage, it can be viewed as the unique position that the company develops compared with its competitors.

3.2 Benefits of e-business

E-business represents new avenue for continuous competitive advantage. Fillis & Wanger (2005) argued about a number of benefits resulting from using e-business such as having more ability for improved internal communications, development of business relationships, logistic, competitive advantages, cost saving, collaboration, information search, marketing and sales promotion and so on. E-business is about business innovation, about serving new and changing markets. E-business has the potential to redefine the existing business infrastructure organizations and to re-evaluate the way in which they do business. It has capability in re-engineering business process across the boundaries that have traditionally separated suppliers from their customers. E-business reduces operational costs since electronic information tends to be more accurate, more timely and easily available. Another benefit of e-business could be that higher efficiency obtained in business transactions due to fast and accurate processing of information (Lal, 2002).

4. Manufacturing strategy

A considerable issues on manufacturing strategy has been offered since the area was initiated by Skinner. Skinner (1969, 1974) introduced manufacturing strategy as the description of how a company intends to compete in the marketplace and identified the manufacturing task as one that needs to make internally consistent choices that reflect the company's competitive priorities to support the corporate strategy and competitive environment. While a company's competitive strategy places specific demands on the manufacturing function, at the same time, the company's manufacturing strategy should be specifically designed to accomplish the goals of the company's competitive strategy. A firm competitive strategy drives its manufacturing strategy leading to operations decisions, which result in some desired performance (Amoako-Gyampah & Acquaah, 2008). Various researchers have interpreted manufacturing strategy over the last 20 years. According to Dangayach and Deshmukh (2000) some of the necessary definitions of manufacturing strategy are summarized in Table 2.

Table 2
Definitions of Manufacturing Strategy

Author Definition	Definitions
Hayes & Pisano(1994)	In today's turbulent competitive environment, a company more than ever needs a strategy, which specifies the kind of competitive advantage particulates how that advantage it is seeking in the marketplace and is to be achieved.
Hills(1987)	This represents a coordinated approach, which strives to achieve consistency between functional capabilities and policies and the agreed current and future competitive advantage necessary for success in the marketplace.
Hayes & Wheelwright (1984)	A sequence of decisions that over time enables a business unit to achieve a desired manufacturing structure, infrastructure, and set of specific capabilities.

4.1 World class manufacturing (WCM)

Hayes and Wheelwright (1985) first introduced the term world-class manufacturing to describe how organizations could achieve a global competitive advantage by manufacturing capabilities as a strategic weapon. Becoming a world class manufacturing organization is a common industrial goal. It means being the best in the world in the specific sector of industry or being in a position to compete in a global market. In order to achieve such WCM goals, organizations try to implement improvement program (Muda & Hendry, 2002). In fact world class organizations respond customer needs through emphasizing on High Quality, High Flexibility, High Delivery speed, Low Cost and High Innovation programs to gain competitive advantages. Some competitive factors in WCM are presented in Table3.

Table 3
Competitive Factors in WCM

WCM Competitive Factors	Sources
High Quality, High Delivery Speed, Low Cost, High Flexibility, High Innovation	Eid, 2009; Brown, et al., 2007; Al Falah, et al., 2003; Muda & Hendry, 2002; Dangayach & Deshmukh, 2000

4.2 What is EB-QFD?

EB-QFD or Electronic Business-Quality Function Deployment is an integrated tool that can help organization for electronic business planning in their strategies to gain competitive advantages through it. It is combined with electronic business systems in order to responding organizations requirements.

4.3 Why isEB-QFD used?

1. There are few researches in application of QFD for planning in IT and electronic business field and competitive strategies issues.

2. QFD is usually applied for planning but in this article we used it as a basis for categorizing and planning in parallel as a flexible tool named EB-QFD.

4.4. EB-QFD Model

According to the research literature, the process of QFD contains one or more matrices; first we suggest EB-QFD contains one matrix that has two parts; EB-WHATs and EB-HOWs. EB-WHATs refer to electronic business systems (are shown in Table 4) and EB-HOWs refer to needed resources for EB-WHATs. To find EB-HOWs, Resource Based View (RBV) is used.

Table 4
Electronic Business Systems (Needs of Electronic Business)

EB Systems (EB-WHATs)	Sources
Enterprise Resource Planning(ERP) Supply Chain Management(SCM) Customer relationship Management(CRM) Knowledge Management(KM) Computer Aided Design & Manufacturing(CAD,CAM)	Wu & Zhong, 2009; Lai & Chen, 2009; Lee, 2003; Malhotra, 2000; Moodley, 2002; Oyelaran, et al., 2004

5. Resource Based View (RBV)

The resource based view prescribes that firm resources are the main driver of firm performance. The Resource Based View (RBV), a dominant theory in the strategic management literature, asserts that firms gain and sustain competitive advantages by deploying valuable resources and capabilities (Barney, 1991; Melville et al., 2004). RBV provides theoretical basis for research of competitive advantage of IT resources (Yang, et al., 2010). Some studies in this field have been shown in Table 5.

Table 5
Research review about IT resources based on RBV

Needed resource for electronic business systems(EB -HOWs)	Sources
IT management and managerial skills Awareness of top managers and commitment IT technologies IT infrastructure Capital and IT investment IT experts	Luftman,et al., 2006; Zhu & Kraemer, 2005; Marchand, et al., 2000; Mata & Barney, 1995; Zhao, et al., 2008; Phan, 2001; Wang & Cheung, 2004; Powell & Micallef,1997; Bharadwaj, 2000; Thouin,et al., 2008

6. Conceptual model

In this model, we want to Investigate the effect of using EB -QFD on world class manufacturing factors as illustrated in Fig 2.

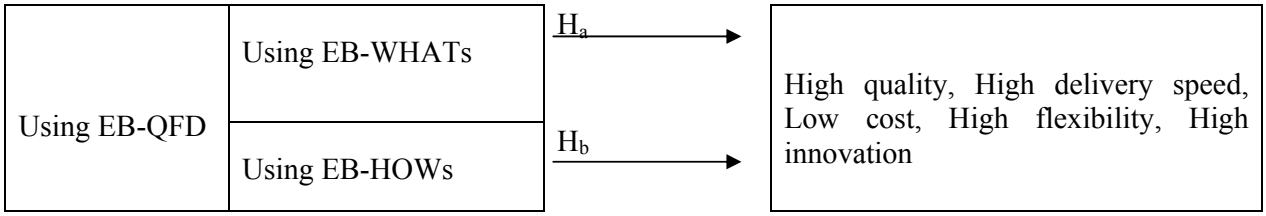

Fig. 2. The Conceptual Model

Hypothesis

H_a: There is a positive relationship between using EB-WHATs and WCM Factors.

H_b: There is a positive relationship between using EB-HOWs and WCM Factors.

6.1 Methodology

The research was conducted in an Iranian auto parts manufacturing company. The main tool for collecting data is questionnaire that was distributed among managers, supervisors and engineers in functional levels who were familiar with IT and WCM factors. For evaluating the importance weightings of the questionnaire scales applied in seven points: highly important, very high, high, medium, low, very low, negligible. Questionnaire is designed in two parts for statistical analysis and QFD practices.

6.2 Statistical analysis

Normal distribution of data is analyzed by Kolmogorov-Smirnov test, hypothesis measured by T-test and for finding variables priorities QFD practice is used.

Kolmogorov-Smirnov test for analyzing normal distribution of data

H_1: EB-QFD has a normal distribution in the sample.

H_2: EB-QFD does not have a normal distribution in the sample.

According to the hypothesis measuring, P=0.161 □α= 0.05, then H_1 cannot be rejected, therefore variable EB-QFD has a normal distribution in the sample that is shown in Table 6.

Table 6
Kolmogorov-Smirnov Test

		Using EB-QFD
N		57
Normal Parameters	Mean	5.1057
	Std. Deviation	.27182
	Kolmogorov-Smirnov Z	1.122
	Asymp. Sig. (2-tailed)	.161

6.3 Examining hypotheses by T-test

The following shows the null hypothesis against the alternative one when the level of significance is five percent. As we can observe the null hypothesis of the first question of the survey is rejected.

$$\begin{cases} H_{a0}: \mu \leq 4 \\ H_{a1}: \mu > 4 \end{cases}$$

Table 7 shows the mean, standard deviation, standard error and mean difference for the first hypothesis.

Table7
T-test for finding relationship between EB-WHATs and WCM factors

Using EB-WHATs	Test Value = 4					
	N	Mean	Std. deviation	Std. Error Mean	Mean Difference	Sig.
	57	5.2982	.27590	.03654	1.29825	.000

Similarly, we test the second hypothesis when the level of significance is set to five percent as follows,

$$\begin{cases} H_{b0}: \mu \leq 4 \\ H_{b1}: \mu > 4 \end{cases}$$

Table 8 shows the mean, standard deviation, standard error and mean difference for the second hypothesis.

Table 8
T-test for finding relationship between EB-HOWs and WCM factors

Using EB-HOWs	Test Value = 4					
	N	Mean	Std. deviation	Std. error Mean	Mean difference	Sig.
	57	4.9132	.32171	1.29825	.91322	..000

According to the support of H_{a1} and H_{b1} results indicate that there is a positive relationship between using EB-WHATs and WCM Factors (M=4.9132 $\mu = 4$, P<α= 0.05), and also there is a positive relationship between using EB-HOWs and WCM Factors (M=5.2982 $\mu = 4$, P<α=0.05).

6.4 QFD Practices for variables ranking

The relationship scores between variables are collected from questionnaires. The total relationship score is defined as:

$$TRS_j = \sum W_i M_{ij} \qquad N_j = \frac{TRS_j}{\max TRS},$$

where Mij is the strength of the relationship among the i^{th} WCM factors and the j^{th} using EB-WHATs; Wi,the importance of the i^{th} WCM Factors. As QFD practices; the output of the matrix I is the input of the matrix II.

6.5 Matrix I Analysis of importance weightings of using EB-WHATs

		Using Electronic Business systems(EB –WHATs)				
WCM Factors	Level of importance	Using ERP	Using SCM	Using CRM	Using KM	Using CAD,CAM
High Quality	6.263	4.614	4.4643	5.7719	6.333	6.0175
High Delivery Speed	6	5.7018	5.7143	5.5789	5.8246	6.2105
Low Cost	6.052	4.1754	4.2679	4.1579	4.7080	4.9298
High Flexibility	5.631	5.614	5.5375	5.8070	5.7193	6.0351
High Innovation	5.315	4.228	4.0375	5.2281	6.3684	5.3684
Total Relationship Score(TRS)		142.463	140.837	155.273	169.122	167.302
Normalization(N)		0.842	0.832	0.918	1	0.989

6.6 Matrix II Analysis of importance weightings of using EB-HOWs

		Using EB – HOWs					
Using EB –WHATs	Relationship Score	IT technologies	IT infrastructure	IT management and managerial skills	Awareness of top management and commitment	Capital and IT investment	IT experts
Using ERP	0.842	6.052	6.736	5.526	6.368	6.473	5.736
Using SCM	0.832	5.842	6.473	5.052	6.263	6.368	6
Using CRM	0.918	5.789	6.315	4.684	6.210	6.315	5.421
Using KM	1	6	6.105	6	6.473	6.368	5.368
Using CAD,CAM	0.989	5.894	6.684	4.210	6.210	6.631	5.894
Total Relationship Score(TRS)		27.099	29.567	23.320	28.888	29.471	25.995
Normalization(N)		0.92	1	0.789	0.977	0.997	0.879

7. Conclusion

Since E-Business is causing organizational transformation and improving performance for achieving competitive advantages, there is a need to know more about the implementation and relationship within an organization to reach the necessary objectives, successfully. In this paper we analyzed the using of EB-QFD for gaining competitive advantages as the World Class Manufacturing factors through electronic business planning in a big Iranian auto parts manufacturing company. Drawing upon Electronic Business Systems and RBV; EB-QFD contains EB-WHATs and EB-HOWs. Statistical analysis shows that there is a positive relationship between using EB-WHATs and WCM factors and also there is a positive relationship between using EB-HOWs and WCM factors, which lead to have positive relationship between using EB-QFD and WCM competitive factors. For variables ranking, QFD practices proposes that using KM and IT infrastructure have the most weighting score that company planning may focus on these variables more than others. Ranking of variables are shown in Fig. 3 and Fig. 4.

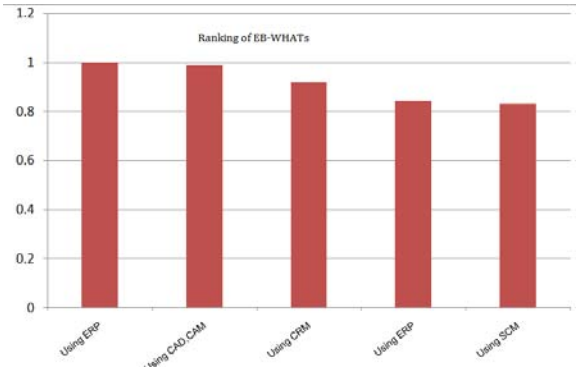

Fig. 3. Diagram of EB-WHATs ranking for electronic business planning result from QFD practices

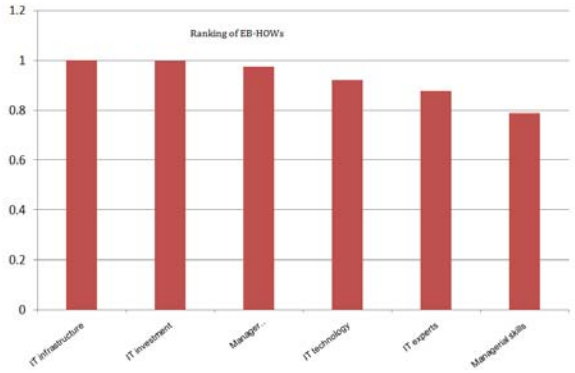

Fig. 4. Diagram of EB-HOWs ranking for electronic business planning result from QFD practices

As QFD is a planning tool that has ability to be combined with other management and engineering issues; EB-QFD is a startup for further researches in electronic business and IT area, and can be a basis for planning and categorizing other electronic business system that are common in other industries. EB-QFD can be used more in details for organizations that want to plan directly in one or more than one electronic business system according to their goals in the markets.

References

Abu-Musa, A. A. (2004). Auditing e-business: new challenges for external auditors. *Journal of American Academy of Business*, 4(1), 28-41.

Al Falah, K., Zairi, M., Ahmed, A.M. (2003). The role of supply-chain management in world-class manufacturing: An empirical study in the Saudi context. *International Journal of Physical Distribution & Logistic Management*, 33(5), 396-407.

Amako-Gyampah, K., & Acquaah, M. (2008). Manufacturing strategy ,competitive strategy and firm performance: An empirical study in a developing economy environment. *International Journal of Production economics*,111, 575-592.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120

Bharadwaj, A.S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *Management Information System Quarterly*, 24(1), 169-196.

Bharadwaj, A.S., & Tiwana, A. (2005). Managerial assessments of e-business investment opportunities: A field study. *IEEE Transaction on Engineering Management*, 52(4), 449-460.

Brown, S., Squire, B., & Blackmon, K. (2007). The contribution of manufacturing strategy involvement and alignment to world-class manufacturing performance. *International Journal of Operation& Production Management*, 27(30), 282-302.

Celik, M., Cebi, S., Kahraman, C., & Er, I.D. (2009). An Integrated fuzzy QFD model proposal on routing of shipping investment decision in crude oil tanker market. *Expert Systems with Applications*, 36(3), 6227-6235.

Chan, L. & Wu, M. L. (2005). A systematic approach to quality function deployment with a full illustrative example. *Omega: The International Journal of Management Science*, 33, 119-139.

Cohen, L. (1995). *Quality Function Deployment: How to make QFD work for you*. Addison-Wesley Publishing Company, MA, USA.

Craig, J. & Jutla, D. (2001). *E-business Readiness: A Customer-Focused Framework*. Addison-Wesley, Boston, MA.

Crowe, T. J. & Cheng, C.C. (1996). Using quality function deployment in manufacturing strategic planning. *International Journal of Operations & Production Management*, 16(4), 35-48.

Dangayach, G. S., & Deshmukh, S.G. (2000). Manufacturing strategy: Experiences from select Indian organization. *Journal of Manufacturing System*, 19(2), 134-148.

Eid, R. (2009). Factors affecting the success of world class manufacturing implementation in less developed countries. *Journal of Manufacturing Technology Management*, 20(7), 989-1008.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: what are they?, *Strategic Management Journal*, 21(10/11), 1105-1122.

Fillis, I., & Wagner, B. (2005). E-business development: an exploratory investigation of the small firm. *International Small Business Journal*, 23(6), 604-634.

Govers, C.P.M. (1996). What and how about quality function deployment. *International Journal of Production Economic*, 46/47, 575-585.

Hayes, R.H., & Wheelwright, S.C. (1984). *Restoring Our Competitive Edge: Competing Through Manufacturing*. John Wiley & Sons, New York.

Hayes, R.H., & Pisano, G.P. (1994). Beyond world class: The new manufacturing strategy. *Harvard Business Review*, 72(1), 77-86.

Haynes, A. (1999). Effect of world class manufacturing on shop floor workers. *Journal of European Industrial Training*, 23(6), 300-309.

Hill, T. J. (1987). Teaching manufacturing strategy. *International Journal of Operations and Production Management*, 6(3), 10-20.

Ihlstrom, C. & Nilsson, M. (2003). E-Business adoption by SMEs: Prerequisites and attitudes of SMEs in a Swedish network. *Journal of Organizational Computing and Electronic Commerce*, 13(3/4), 211-23.

Jiang, J. C., Shiu, M. L.,Tu, M. H. (2007). Quality function deployment(QFD) technology designed for contract manufacturing. *The TQM Magazine*, 19(4), 291-307.

Killen, C. P., Walker, M., Hunt, R.A. (2005). Strategic planning using QFD. *International Journal of Quality & Reliability Management*, 22(1), 17-29.

Lai, J.U., & Chen,W. H. (2009). Measuring e-business dependability: The employee perspective. *The Journal of System and Software*, 82(6), 1046-1055.

Lal, K. (2002). E-Business and manufacturing sector: a study of small and medium-sized enterprises in India. *Research Policy*, 31,1199-1211.

Lee, J. (2003). E-manufacturing fundamental, tools, and transformation. *Robotics and Computer Integrated Manufacturing* , 19(6), 501–507.

Luftman, J., Kempaiah, R.M., Nash, E. (2006). Key issues for IT executive. *Management Information System Quarterly*, 5(2), 81-99.

Malhotra,Y. (2000). Knowledge management for e-business performance: Advancing information strategy to internet time. *Information Strategy: The Executive Journal*, 16(4), 5-16.

Marchand, D.A., Kettinger, W.J., & Rollings, J.D. (2000).Information orientation: people, technology and bottom line. *Sloan Management Review*, 41(4), 69-80.

Masui, K.S., Kobayashi, T., Inaba, A. (2003). Applying quality function deployment to environmentally conscious design. *International Journal of Quality & Reliability Management*, 20(1), 90-106.

Mata, F.J., Fuerst, W.L., & Barney, J.B. (1995). Information Technology and sustained competitive advantage. *A Resource- Based analysis, MIS Quarterly*, 19(4), 487-505.

Melville, N., Kraemer, K., & Gurbaxani,V. (2004). Information technology and organizational performance: An integrative model of IT business value. *MIS Quarterly*, 28(2), 283-322.

Moodley, S. (2002). E-Business in South African apparel sector: A utopian vision of efficiency?, *The Developing Economy*, 40(1), 67-100.

Muda, S. & Hendry, L. (2002). Proposing a world class manufacturing concept of the make to order sector. *International Journal of Production Research*, 40(2), 353-373.

Oyelaran, B., Lal, O., Lal, K.(2004). *Sectoral pattern of E-business Adoption in Developing Countries*. UNU-INTECH Discussion Paper.

Phan, D. D. (2001). E-Business management strategies: A business to business case study. *Information Systems Management*, 18(4), 61-69.

Porter, M. (1985). *Competitive advantage: Creating and Sustaining Superior Performance*. Free Press, New York.

Powell, T. C., & Dent-Micallef, A.(1997).Information technology as competitive advantage: The role of human, business, and technology resources. *Strategic Management Journal*, 18(5), 375-405.

Salaheldin, S.I., & Eid, R. (2007).The implementation of world class manufacturing techniques in Egyptian manufacturing. *Industrial Management & Data Systems*, 107(4), 551-566.

Schubert, P., & Hauler, U. (2001). *E-government meets E-Business: A Portal Site for Startup companies in Switzerland*. Proceeding of the 34th Hawaii International Conference on System Science.

Skiner, W. (1969). Manufacturing missing link in corporate strategy. *Harvard Business Review*, 47(3), 136-145.

Skiner, W. (1974).The focused factory. *Harvard Business Review*, 52(3), 113-122.

Teece, D.J., Pisano,G., & Shuen, A.(1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.

Thouin, M.F., Hoffman, J.J., & Ford, E.W. (2008).The effect of information technology investment on firm level performance in the health care industry. *Health Care Management Review*, 33(1), 60-68.

Walker, M.N. (2002).Customer driven breakthroughs using QFD and policy deployment. *Management Decision*, 40(3), 248-256.

Wang, S., & Cheung,W. (2004).E-business adoption by travel agencies prime candidate for mobile e-business. *International Journal of Electronic Commerce*. 8(3), 43-63.

Winter, S.G.(2003).Understanding dynamic capabilities, Strategic Management journal, 24(10), 991-995.

Wu, J.N., & Zhong,W.J. (2009).Application capability of e-business and enterprise competitiveness: A case study of the iron and steel industry in China. *Technology in Society*, 31, 198-206.

Xu, S., Zhu, K., & Gibbs, J. (2004).Global technology, local adoption: A cross-country investigation of internet adoption by companies in the United States and China. *Electronic Markets*, 14(1),13-24.

Yang, Y., Wang, R., & Li, J. (2010). *Research on IT Resources Fuzzy C-Mean Clustering Based on Resource Based View*. IEEE.7th International Conference on Fuzzy Systems and Knowledge Discovery(FSKD).

Zhang, Y., Wang, H.P., & Zhang, C. (1999). Green QFD-II: A life cycle approach for environmentally conscious manufacturing by integrating LCA and LCC into QFD matrices. *International Journal of Production Research*, 37(5), 1075-1091.

Zhao, J., Huang, W.H., & Zhu, Z. (2008).An empirical study of e-business implementation process in China. *IEEE Transaction on Engineering Management*, 55(1), 134-147.

Zhu, K., & Kraemer, K. (2005).Post – Adoption Variations in Usage and value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry. *Information Systems Research*, 16(1), 61-84.