

## Understanding ISO's 9001 Benefits and its relationship with the perspectives of the balanced scorecard

**Ali mohammad Mansouri jamshidi**

Department of Management and Accounting, College of Humanities, Hamedan Science and Research Branch, Hamedan, Iran  
E-mail: alimohammadmansourijamshidi@yahoo.com

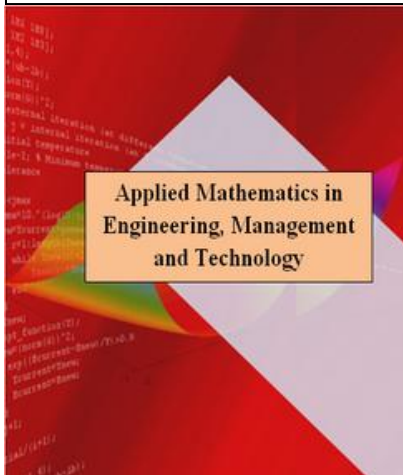
**Alireza Slambolchi**

alireza.slambolchi@gmail.com

Faculty Member of Management, Islamic Azad University Hamedan Branch, Hamedan, Iran

**Vahid Khasheei Varnamkhaasti**

Assistant Professor in Department of Management, Allameh Tabataba'i University, Tehran, Iran  
khashei@atu.ac.ir



### ABSTRACT

Many companies invest great efforts into achieving appropriate organization and through it better quality of products and services. They try to achieve this in a systematic way following the standard ISO 9001.

The purpose of the paper is to clarify the purpose of implementation of ISO 9001 and, in relation to this purpose, to analyze different possible benefits resulting from its implementation. The paper emphasizes that in accordance with its conformance purpose, ISO 9001 is successful in building conformance capability and that by using ISO 9001 practices companies can also benefit in relation to production economics through improved process efficiency and to other competitive capabilities. This paper tries to find reasons and justification for the ISO9001 based quality management system and balanced scorecard.

**Keywords:** ISO 9001, standard, quality management system, balanced scorecard

### Introduction

In recent years, society and customers, have shown concerns about the performance of products or/and services that are achieved. These concerns have forced companies to rethink their strategies assigning more importance to quality standards. The certification according to the ISO 9001 standard is a recognition of products and/or services conformity, customer satisfaction and continuous improvement.

The quality of service/product had become an important research topic because of its relation to costs, profit, customer satisfaction, customer service, driver marketing, financial performance and strategy (Dick, 2002; Pires, 2004).

The high quality is an important and interesting topic in many different industries and even among ordinary people. Quality as a word has transformed from the final product quality to the quality of work processes, and finally through processes to the quality awareness in all levels of the companies. To achieve the nowadays required high quality, quality management systems have been developed. To set quality management systems in different countries to the same level there are global standards and certifications for QMS.

The effective implementation of ISO 9001 quality management system (QMS) has been internationally recognized in the last two decades as a competitive advantage for various types and sizes of work organizations. Therefore, ISO 9001 standard is a document that consists of a set of criteria purposely made for small, medium, and large enterprises to demonstrate their abilities to achieve a basic level of quality by formalization and documentation of their quality management systems (Beattie et al., 1999).

Implementation of the ISO9001 defined as a set of quality standards that are determined as being necessary for manufacturers and service organizations to be effective competitors can be used by management of the companies to improve performance and higher quality output.

## Literature Review

### History and definition of Quality

Quality is considered to be a competitive weapon in the marketplace. Quality engenders competitive advantage by proving products that meet or exceed customer needs and expectations (Lee and Zhou, 2000). Quality is defined using different perspectives as it is still a subjective goal that has indefinable characteristics (Kazan et al., 2006). An early definition for quality is presented by Juran (1974) who defines quality as “fitness for use”. Juran’s definition originates mainly from customer’s perspective in defining quality. It is the customer who determines whether the received products or services satisfy his or her needs. Reeves and Bednar (1994) similarly agrees with this definition and define quality as excellence, value, conformance to specifications, and meeting or exceeding customers’ expectation. The term “fitness for use” defined by Juran (1974) is also included in the quality definition presented by Reeves and Bednar (1994). Thus, the customer perspective with respect to quality is the master key that should be understood while determining any term for quality or definition of quality. Garvin (1987) sees quality as a multidimensional construct. He describes quality as having eight dimensions which include: performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality. There are more definitions of quality in chronological order with various authors’ names.

NO.	Definition	Name of Authors
1.	Quality is meeting the customer requirements	Oakland, 2003
2.	Conformance to specifications	Crosby, 1996
3.	Quality is the ability to satisfy the needs and expectations of the customers	Bregman and Klesfsjo, 1994
4.	To practice quality control is to develop, design, produce and service a quality product which is most economical, most useful, and always satisfactory to the customer	Ishikawa, 1989
5.	There are eight dimensions of quality as defined from the customer’s view point namely, performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality	Garvin, 1987
6.	Quality should be aimed at the needs of the consumer, present, and future	Deming, 1986
7.	Fitness for use	Juran, 1974
8.	The total composite product and service characteristics of marketing, engineering manufacture, and maintenance through which the product and services in use will meet the expectations of the customers	Feigenbaum, 1991
9.	The standard of something as measured against other things of a similar kind; the degree of excellence of something	Oxford dictionary, 2014

### Background and History of the ISO 9001 standard

ISO (International Organization for Standardization) is the world’s largest developer of voluntary International Standards. Basically ISO is a Greek word meaning “Equal”. Unfortunately, many people even today misunderstand the word ISO, thinking it is an abbreviated term for some three long words. However, there is a word with a semi-similar abbreviation, International Organization for Standardization, which cannot logically be equivalently abbreviated to "ISO". It is best close to an IOS abbreviation. International organization for standardization (IOS) is the international authority body responsible for issuing various quality standards, one of which is the ISO 9001 standard for the quality management system. Quality management system (QMS) is a set of interconnected processes designed and executed for the purpose of meeting customer requirements. ISO 9000 standard document has undergone several changes and amendments for last two decades. The first standard was published in 1987. From 1987 until today the standard has been revised three times. In other word

ISO develops and publishes several standards to several kinds of industries and organizations. The ISO 9000 is a family of the quality management standards. There are many standards in the ISO 9000 family, including:

- ISO 9001:2008 - sets out the requirements of a quality management system
- ISO 9000:2005 - covers the basic concepts and language
- ISO 9004:2009 - focuses on how to make a quality management system more efficient and effective
- ISO 19011:2011 - sets out guidance on internal and external audits of quality management systems.

In spite of the continually updated version of the ISO 9001 standard requirements, starting from the first version in year 1987 until the latest one issued in the year 2011, and its widespread application in many different countries, there are still ambiguities whether ISO 9001 has helped organizations achieve actual performance improvements.

The ISO 9001 quality management system is based on eight principles (ISO, 2010). These principles, the fundamentals of any quality-oriented work organization, are the following:

1. Customer focus
2. Leadership
3. Involvement of people
4. Process approach
5. System approach to management
6. Continual improvement
7. Factual approach to decision making
8. Mutually beneficial supplier relationship

Starting with customer focus, where the definition implies that work organization depend on their customers and therefore organizations shall understand the current and future customer needs, and to be able to meet customer requirements, and strive to exceed the customer expectations. Customers are the bloodstream of any organization. The customer focus principle is addressed and reflected in the ISO 9001 standard requirements by: communication with customers; care for customer property; the determination of customer needs and expectation ;appointment of a management or operations representative; and finally a top management commitment.

The second quality principle is leadership which implies that leaders should establish the unity of purpose and direction for the organization. This is where motivation should be enhanced by leaders of the organization. They are responsible for creating a work environment with employees motivated toward the achievement of business or operations objectives for the organization. This principle is reflected in the standard by setting up organization objectives, such as planning, internal communication, and creating and effective work environment.

The third quality principle is concerned with the involvement of people. Involvement of people implies that all employees are essential and their full involvement enhances productivity and benefits to the organization.

The fourth quality principle is based on a process approach. This principle focuses on how an organization deals with its production and business operations regardless of the operations system complexity. Thus, the effectiveness and efficiency of any production or business operations can be measured with the implementation of this quality principle, a process approach. This quality principle can be found from the standard and reflected by identifying processes, defining process inputs and outputs, and providing the infrastructure, information and resources for processes to function.

The fifth quality principle is a system approach to management. This principle implies that all processes are interrelated and interconnected to meet the organization's business goals. Goals are achieved effectively through full understanding of organization processes. This principle is reflected in the standard through: establishing, implementing, and maintaining the management system; interconnecting and interrelating processes; and establishing measurement processes.

The sixth quality principle is a continual improvement. This definition of 'continual' brings the concept to the ISO 9001 users that a process shall be planned, developed, and implemented to encounter the changes that may

occur in the QMS or at least to keep the customers satisfied. The continual improvement principle is reflected in the standard through: improvement processes, identifying improvements, and reviewing documents and processes for opportunities of improvement.

The seventh quality principle is a factual approach to decision making. This principle basically drives the organization toward taking the appropriate corrective and preventive actions based on factual data analysis and not on emotions or self-opinions. This principle is reflected in the standard through: management reviews; monitoring tools to obtain facts; control of measuring devices; analysis to obtain facts from information; records for

documenting facts; and approval based on facts.

The last quality principle is mutually beneficial supplier relationships. This principle justifies that the final quality of a product delivered to the customer is also influenced by external processes rather than the organization's internal operation processes. The principle is addressed in the standard through: control of suppliers; evaluation of suppliers; and analysis of the supplier data.

### **ISO 9001 and its relation to TQM**

In business field, TQM and ISO 9001 systems are considered to be similar at the level of quality practices. Several researchers, Ahire et al. (1996), Dale et al. (1994) and Flynn et al. (1994), Martinez-Lornte et al. (2000), have defined the common eight dimensions that are common in the ISO 9001 standard and TQM practices and these are exactly the same as the eight ISO 9001 principles.

Though similarities exist between the two quality systems, other researchers also see the differences that exist between them and these are summarized as below :

1. One of the TQM pillars (Deming, 1982), the continuous improvement, is proactive in TQM, rather than being passive in the ISO 9001 standard requirements (Lee et al., 1999; Zhu and Scheuermann, 1999).
2. Customer focus principle in the ISO 9001 standard is an application of procedures focused on the fulfillment of design and production requirements, while it is considered to be the king of TQM work environment (Lee et al., 1999)
3. Workforce and employee participation is paid more attention and focused on the TQM practices than in the ISO 9001 application (Tummala and Tang, 1996; Gotzamani and Tsiotras, 2001).

### **The Balanced Scorecard**

Commonly used quality tools are, based on Cavinato & Kauffman (1999),

- ISO 9001,
- The Balanced Scorecard,
- Business Process Reengineering,
- Total Quality Management (TQM),
- Quality Circles,
- Benchmarking and
- Statistical Process Control.

ISO 9001 is a generally noticed quality monitoring standard, which gives guidance and tools to achieve quality requirements and monitor quality process of the company. ISO 9000 standard family consists of several sub-standards, which concentrate on terminology, requirements and for instance audit requirements. (International Organization for Standardization, 2013)

The most commonly used framework for performance measurement, is the Balanced Scorecard (BSC) (Susilawati et al., 2013; Neely et al., 2001). The BSC was created in 1992 by Robert S. Kaplan and David P. Norton. The BSC is based on four different perspectives that provide an organization's performance measures and four management processes that contribute to linking long-term strategic objectives with short-term actions.

BSC sets measures originally on four perspectives:

- Financial
- Customer
- Internal process
- Employee learning and growth

It is not uncommon to change, add or reduce these perspectives: it all depends the on the purpose which BSC is build.

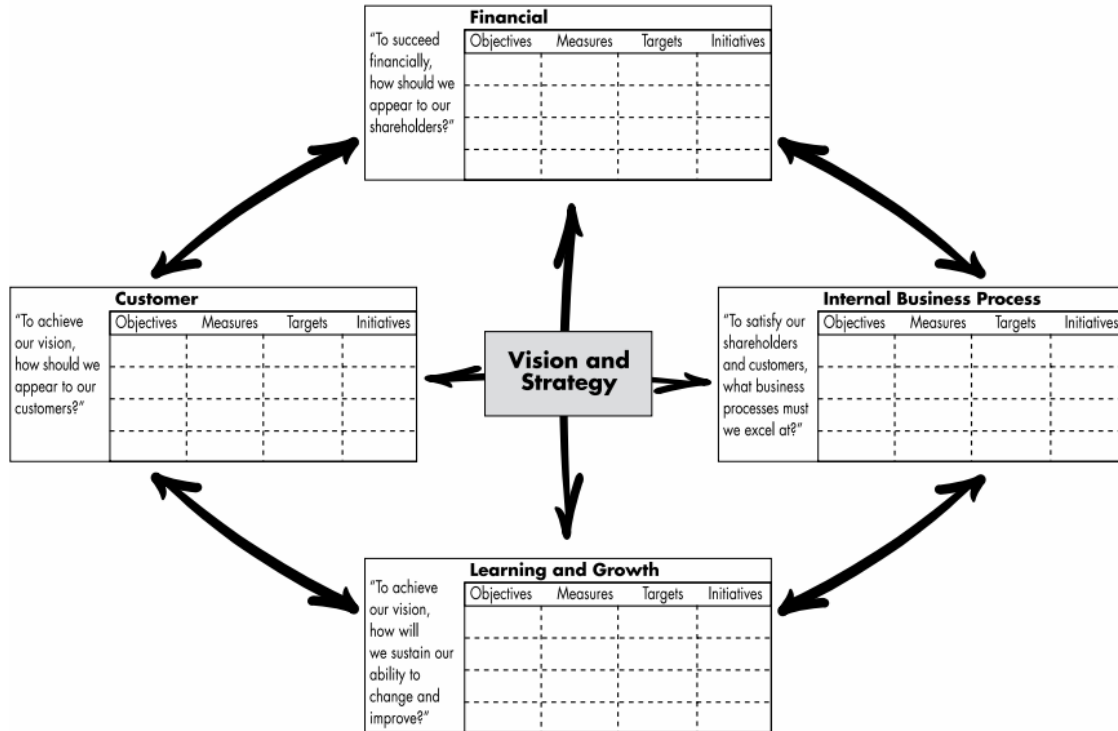


Figure 1 - The four perspectives of the balanced scorecard (Kaplan & Norton, 2007)

## Customer Perspective

### How do customers see us?

The customer perspective focuses on the customers' opinion for the company, and how the company wants to be viewed by its customers (Norreklit, 2000). The satisfaction of the customers is a priority to many businesses, especially nowadays where the business environment is even more competitive (Kaplan and Norton, 1992), and can also act as a very important key performance indicator on the efforts of the business to be successful (Anderson and Sullivan, 1994).

## Internal Business Perspective

### What must we excel at?

The internal business perspective focuses on the activities an organization undertakes to satisfy its customers. For example, in a manufacturing organization, assembly of a product is an internal business process.

## Innovation and Learning Perspective

### **Can we continue to improve and create value?**

The innovation and learning perspective focuses on the capabilities and skills that the company must excel at to achieve superior internal business processes that create value for customers and shareholders. Some of the performance measures that might be used to measure innovation and learning include employee education and skill level, employee satisfaction and retention rates.

### **Financial Perspective**

#### **How do we look to shareholders?**

The financial perspective is the last perspective of the model of BSC. This perspective refers to the financial view of a company as presented to its shareholders and whether the strategy, implementation and execution of the company are contributing to bottom line improvement (Kaplan and Norton, 1992).

However, the Balanced Scorecard (BSC) has become an important player on the market of Performance Management Systems (PMS's) (Kaplan & Norton, 1992). The Balanced Scorecard doesn't only have financial measures, but also indicators concerning customers, internal processes and learning and growth (Kaplan & Norton, 1996). Malino and Selto (2001) found indirect relationships between the BSC and organizational performance.

There are several reasons why a Balanced Scorecard can be useful for a business needs, for example; The renewed focus on the customer and process quality has caused many organizations to track and communicate measures on customer's satisfaction and complaints as well as product and process defect levels. Elimination of waste and defects; ceasing doing repetitive work, rescheduling engineering change of orders; gaining of greater integration among suppliers, and internal operations. The employees of the company or organization are the source of improvements in terms of quality, productivity and customer service. Improvements can only benefit a company when they can be translated into improved sales, reduced operating expenses or higher asset utilization.

### **Relationship between Balanced scorecard and ISO 9001**

Karlöf and Lövingsson (2007) describe a balanced scorecard as a simple and pedagogical structured tool to handle important management aspects like customer satisfaction, employee satisfaction, process lead time etc. The balanced scorecard methodology goes back to fundamental key concepts in e.g., TQM: customer defined quality, continuous improvement, employee empowerment and measurement based management and feedback and it was first introduced in an article by Kaplan and Norton in 1994. It is not only a measurement system, but a management system, an approach to strategic management based on four perspectives: financial, learning and growth, customer, and business process. The balanced scorecard suggests an organization to, relative to each of the four perspectives, develop metrics, collect data and analyze it (Arveson (1998)). To more closely describe the four perspectives in a balanced scorecard it is important to have in mind one critical consideration in performance improvement. It is the creation and use of performance measures and indicators: e.g. characteristics of products, services and processes, selected to represent what leads to improved customer, organizational and financial performance.

In other hand eight principals of ISO 9001 are: customer focus, leadership, employee involvement, process approach to activities and resources, system approach to management, continuous improvement, and strategic supplier and customer partnerships. The most important principle in all systems is customer focus; how customers perceive quality and what are their quality expectations. Why does customer satisfaction matter? There are two reasons. Customer satisfaction shows whether we are doing the right things and whether we are doing them in the right way. The increase in customer satisfaction will also affect on economic returns, i.e. profitability, market share, and return on investment .

Many article have been written about ISO 9001 and the ISO 9000 series certification and financial improvement of companies. Some author come to the conclusion that there is direct link between ISO 9001 certification and financial improvement of companies (Beira&Sarsfield,2002;Kirche,&Khumawala,2002;Sellers&Nikolau,2002;Wayhan,ChowChua,Goh,

&Wan,2003;Naser,Karbhari,&Mokhtar,2004;Dimara,Skuras,Tsekouras,&Goutsos,2004;).Most of the empirical research that studied ISO benefits has identified a positive impact on what researchers usually called internal efficiency, which include: clearer definition of their processes and responsibilities that have resulted in reduction in product defects, rejections and claims; reduction in rework and warranty cost (Sun 2000; Santos and Estanciano 2002; Gotzamani and Tsiotras 2002).

However as mentioned above, ISO practices affect different competitive capabilities, and through them they also can have an impact on competitive advantage, customer satisfaction, sales, and profitability. But what this impact would be depends on the competitive strategy of the company, i. e. whether conformance and other capabilities on which ISO implementation had an effect represent order winners or qualifiers within the company. Each of the possible situations would lead to different consequences regarding ISO's impact.

## Conclusion

There is a considerable amount of published quality surveys worldwide. This paper refers only to few interesting ones that can be linked to other content of this paper. Collis and Montgomery (1997)suggested that the implementation of practices (i.e., quality) such as ISO 9001 can raise organizational performance and result in real competitive advantage. This makes the organization to view quality as a very competitive weapon that should be adopted and implemented as a competitive strategy for playing a major role in creating, sustaining, and maintaining the competitive advantage of a given work organization. Commitment to product quality and customer satisfaction programs are essential for companies to compete against competitors.

Many ISO9001 surveys show importance of the certification and the quality management systems. It cannot be denied that the ISO9001 certification improves quality of the company products or services. But the ISO9001 also improves other areas in the company like customer satisfaction. The improved internal operations of company, like documentation and communication, are one clear benefit of the QMS. Defining the mode of the operation and internal processes is one important part of the ISO9001 standard and improvement at these areas is obvious. All these achieved improvements enable fundamentals for good quality that should be the final target of the QMS.

ISO 9001 literature focuses its attention mainly on the advantages of certification for the organization taking into account the improvements in productivity, the motivations that lead to certification, and customer satisfaction analysis. All research papers have overall positive results for the ISO9001 and the certification. Really negative results were not commonly available. Even critical reader has to believe that the ISO9001 QMS has positive effect to the business and it improves company performance at several areas. Other indirect benefits like improved profitably or productivity cannot be clearly linked to the benefits of the quality management system. In other word there has been an important potential internal benefit for organizations that have implemented the standard. In its origin, ISO 9001 standard was also concerned with efficiency in an indirect way, by assuring deliveries as promised.

Requirements of the ISO 9001 standard are documented based on eight quality management principles. These principles are: 1) customer focus; 2) leadership; 3) involvement of people; 4) process approach; 5) system approach to management; 6) continual improvement; 7) factual approach to decision making; and 8) mutually beneficial supplier relationship (International Organization for Standardization, 2008b).When using the BSC, measures are selected for four different perspectives: Customer, Internal Business, Innovation & Learning and Financial. This should lead to a balanced set of measures that drive performance in the future. BSC is a good approach if it is intended to have measures which are linked together and to have them as a scorecard to make it easy to follow whole organizations performance with one look.

## References

Ahire, S.L., Golear, D.Y. and Waller, M.W., (1996). Development and validation of TQM implementation constructs. *Decision Sciences*, 27(1), 23-56.

Anderson, E. W., & Sullivan, M. W. (1994). The Antecedents and Consequences of Customer Satisfaction for Firms. *Marketing Science*, 12(2), 125-143. <http://dx.doi.org/10.1287/mksc.12.2.125>.

Arveson, P., (1998), What is the Balanced Scorecard?, Balanced Scorecard Institute.

Beattie, K.R., Sohal, A.S.,(1999). Implementing ISO 9000: a study of its benefits among Australian organizations, *Total Qual. Manage.* 10 (1) , 95–106.

Beira,G.,&Sarsfield,C.J.(2002).The reaction of the Portuguese stuck market to ISO 9000 certification. *total quality management*,13(4),465-474.

Bregman, B. and Klefsjo, B. (1994), “Quality, from Customer Needs to Customer Satisfaction”, London: McGraw-Hill.

Collis, D.J., Montgomery, C.A., (1997). *Corporate Strategy: Resources and Scope of the Firm*. Irwin, Chicago, IL.

Chow-Chua,C.,Goh,M.,&Wan,B.t.(2003).does ISO 9000 certification improve business performance. *International journal of quality & reliability management*,20(8),936-953.

Crosby, P.B. (1996), “Quality is Still Free: Making Quality Certain in Uncertain Times”, McGraw-Hill.

Dale, B. G., R. J. Boaden and D. M. Lascelles (1994), *Total quality management: an overview*, in: B. G. Dale, ed., *Managing quality*, Prentice Hall International, 3-40.

Deimara,E.,Skuras,D.,Tsekouras,K.,&Goutsos,S.(2004).Strategic orientation and financial performance of firms implementing ISO 9000,*The International journal of quality & Reliability management* ,72-89.

Deming, W. Edwards. , (1986). *Out of the Crisis*. Cambridge, MA: MIT Center for Advanced Engineering Studies.

Dick, G.; Galimore, K. e Brown, J. C. (2002). Does ISO 9000 accreditation make a profound difference to the way service quality is perceived and measure? *Managing Service Quality*, 12: 1, 30-42.

Feigenbaum, A. (1991), “Total Quality Control”, 3rd Ed. McGraw-Hill, Inc.

Flynn, B.B.; R.G. Schroeder, S. Sakakibara (1994): “A framework for quality management research and an associated measurement instrument”, *Journal of Operations Management*, Vol. 11, p. 339-366.

Garvin, D.A. (1987), “Competing on the eight dimensions of quality”, *Harvard Business Review*, Vol. 65 No. 6, pp. 101-109.

Gotzamani, K.D., George D. Tsiotras. (2001).An empirical study of the ISO 9000 standards’contribution towards total quality management”, *International Journal of Quality &Reliability Management*, Vol. 21, No. 10, pp. 1326-1342.

Ishikawa, K. (1989), “Introduction to Quality Control”, JUSE Press, Tokyo.

International Organization for standardization (2008b), "ISO –quality management principles", available at : [www.iso.org/iso](http://www.iso.org/iso).

ISO, 2010, ISO9001 Ohjeita PK yrityksille – Kuinka toimia ISBN 978-952-242-127-2.

Juran, J. M. (1974), *Quality control handbook*, London: McGraw-Hill.

Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard - Measures that drive performance.

*Harvard Business Review*, 70(1), 71-79.

Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: translating strategy into action*.Boston: Harvard Business School Press.

Kaplan, R.S., Norton, D.P. (2007). Using the Balanced Scorecard as a Strategic Management System. *Harvard Business Review*, July-August.

Karlöf, B. and Lövingsson, F. H., (2007), *Management från A till Ö – Förklaringar till 150 begrepp och modeller*, Tryckeri Elanders, Stockholm.

Kazan, H.; Ozer, G. ; and Cetin, A. (2006), “Insight from research: the effect of manufacturing strategies on financial performance”, *Measuring Business Excellence*, Vol. 10 No. pp. 14-26.

Lee, C. Y. and Zhou, X. (2000),”Quality management and manufacturing strategies in China”, *International Journal of Quality and Reliability Management*, Vol. 17 No. 8, pp. 876-898.

Martínez Lorente, A.R., F.W. Dewhurst, A. Gallego Rodríguez (2000): “Relating TQM, marketing and business performance: an exploratory study”, *International Journal of Production Research*, Vol. 38, No. 14, pp. 3227-3246.

Mary A.Malina, Frank H.Selto.(2001),communicating and controlling strategy: An empirical study of the effectiveness of the balanced scorecard, *business ethics quarterly*.



- Naser, K., Karbhari, Y., & Mokhtar, M. Z. (2004). Impact of ISO 9000 registration on company performance: Evidence for Malaysia. *Managerial Auditing Journal*, 509-516.
- Neely, A., Adams, C., Crowe, P. (2001). The performance prism in practice. *Measuring Business Excellence*, 5(2), 6-12.
- Norreklit, H. (2000). The balance on the balanced scorecard – a critical analysis of some of its assumptions. *Management Accounting Research*, 11, 65-88. <http://dx.doi.org/10.1006/mare.1999.0121>
- Oakland, J. (2003), *Total Quality Management: Text with Cases*. 3rd ed. Butterworth Heinemann.
- Oxford dictionary. (2014). Available at : <http://www.oxforddictionaries.com/definition/english/quality>, Date of data acquisition 8-Nov-2014.
- Pires, A. R. (2004). *Qualidade – Sistemas de gestão da qualidade*. (3ª edição). Lisboa: Edições Sílabo. Raisinghani, M. S., H. Ette, R. Pierce, G. Cannon, and P. Daripaly. 2005.
- Six Sigma: Concepts, tools, and applications. *Industrial Management & Data Systems* 105 (4): 491–505.
- Reeves, C. A. and Bednar, D. A. (1994), "Defining quality: alternatives and implications", *Academy of Management Review*, Vol. 19 No. 3, pp. 419-445.
- Sellers, R., & Nicolau, J. L. (2002). The stock market's reaction to quality certification: Empirical evidence from Spain. *European Journal of Operational Research*, 142(3), 632-641.
- Susilawati, A., Tan, J., Bell, D., Sarwar, M. (2013). Develop a framework of performance measurement and improvement system for lean manufacturing activity. 3rd International Conference on Trends in Mechanical and Industrial Engineering (ICTMIE'2013) January 8-9, Kuala Lumpur, Malaysia.
- Tummala, V. M. Rao, C. L. Tang (1996): "Strategic quality management, Malcom Baldrige and European quality awards and ISO 9000 certification: Core concepts and comparative analysis", *International Journal of Quality & Reliability Management*, Vol. 13, No. 4, pp. 8-38.
- Wayhan, V. B., Kirche, E. t., & Khumawala, B. M. (2002). ISO 9000 certification: the financial performance. *Total Quality Management*, 13(2), 217-231.
- Zhu, Z., L. Scheuermann (1999): "A comparison of quality programmes: Total quality management and ISO 9000", *Total Quality Management*, Vol. 10, No. 2, pp. 291-297.