

## A Research on the Quality Management Maturity of E-commerce Platforms

Yujie E<sup>a\*</sup>, Hongtao Wang<sup>b</sup>

Institute of Economics and Management, China Jiliang University, Xueyuan Street, Hangzhou, China

<sup>a</sup>724167104@qq.com, <sup>b</sup>htwang369@sina.com

\*Email: 724167104@qq.com

**Keywords:** E-commerce platforms, quality management, maturity

**Abstract:** This paper aims to identify some existing issues in the quality management on e-commerce platforms and to establish the quality maturity model to cope with the problem. The level of the quality management on the platform is divided into five stages, i.e. initial, repeatable, defined, capable and efficient, respectively. The level of maturity is measured by the method of quality management maturity, thereby to identify the level of e-commerce platform quality management and to improve the quality of e-commerce platform management. The paper concludes that there are still weaknesses in the model, therefore requiring further improvement.

### 1. Introduction

The advancement of the Internet has introduced immense changes to the social trend. The rapid development of logistics has rendered online shopping indispensable to individual life. Hence, the status of e-commerce platforms has ascended, while many competitive business entities and individual dealers have entered the platform and thereby reaped substantial profits. Statistics shows that in 2017, the total volume of national business transactions on e-commerce platforms reached 29.16 trillion yuan, with a year-on-year growth of 11.6%, wherein the amount of transactions on products and services was 21.83 trillion yuan and increased by 24.0% compared with the last year. The e-commerce platform has acquired much experience from such problems as product quality, payment, and information asymmetry. According to the data presented by the mediation platform on e-commerce consumer disputes, the amount of complaints that were settled in 2017 increased by 48.02% than the last year; the growth accelerated particularly in the second half of the year. Hence, it is urgently required to improve the quality management on e-commerce platforms, thereby enhancing their profitability.

With China increasingly valuing quality, a growing number of enterprises have endeavored to obtain ISO9001 certification; nevertheless, the process has been rather slow for e-commerce platforms. In 2015, it was suggested in National Quality Assurance and Inspection Conference as well as National Certification and Accreditation Conference that the country would prioritize the certification of e-commerce norms, the acceleration of e-business certification and accreditation policies, along with the desirable improvement of e-business norms[9]. Quality Management in E-commerce--Terminology was published in 2017, which determined the terms and definitions of e-commerce quality management.

E-commerce norms have been far from mature, and consequently, a quality management maturity model for the e-commerce platform can be established to evaluate the overall environment of the platform and clearly show the level of quality management, whereby to improve and innovate management approaches. It is required to prioritize customers and ensure that the platform can cater to their needs and improve consumer satisfaction. In so doing, effective quality management on e-commerce platforms will be achieved; better and faster development of e-business will be ensured.

## 2. National Certification Commission

### 2.1. Foreign Research

Philip B. Crosby invents Maturity Grid in Quality Is Free, wherein he divides the maturity level into five stages, i.e. initial, repeatable, defined, capable and efficient[1]. The purpose of this model is not merely to help report organizational performance, but to stimulate enterprises to improve themselves. The overall score of a company should be judged by three employees, the QA manager, general manager and an assistant outside the organization, respectively.

From then on, people have put an increasing emphasis upon quality management and investigated its maturity, thereby suggesting that the quality management maturity of a company develops from lower to higher levels. Between 1984 and 1991, McKinsey & Co, based on the quality management of foreign enterprises and quality performance investigation, divided the level of quality management into four stages, i.e. examination, quality assurance, prevention and perfection[8], respectively. According to the concept and techniques of quality management, Garvin classified the level of quality management into four stages, i.e. examination, quality control, quality assurance and strategic quality management[5]. Keki R. Bhote based on the corporate evaluation of quality management, categorized quality management into four phases, i.e. ignorance, awakening, implementation and world class[6]. Saad and Siha studied the evolution of quality from lower to higher levels, and thereby suggested the five stages of quality management, i.e. quality control, quality assurance, complete quality control, complete quality management, global quality management[12]. Patti et al. hold that quality management maturity equals the corporate level of the quality management; the higher the level is, the greater the quality management maturity of an enterprise becomes[10].

ISO9000, authorized by International Standard Organization, reaches every facet of quality management, including some well-known ISO standards. All these standards target to ensure that products and services can continually cater to consumers' needs and provide guidance and supports to improve companies and organizations. ISO9004:2000, more stringent than ISO9001, stipulates quality system maturity, so as to enhance the effectiveness and efficiency of quality management system and to improve the potential of organizations. ISO9004 [2] divides quality maturity into five stages, i.e. the lack of regular methods, the methods of being passively reflected, stable and regular systematic methods, continuous improvement and optimal operational methods (see table 1). This standard, compared to ISO9001, satisfies consumers and product quality standards at a higher level, including stakeholders and organizational performance.

Table 1 ISO9004-2000 Quality Maturity Standard.

Maturity level	Performance level	Guide
1	the lack of regular methods	There is no systematic method at the stage. Poor results or no results.
2	the methods of being passively reflected	There is questionable and Corrected method at the stage. The company receives the least improved result data.
3	stable and regular systematic methods	Process-based systematic approach. The company is in the early stages of system improvement. There is an improvement trend.
4	continuous improvement	The process improvement method is adopted in this stage. Improved results are good and continuous improvement.
5	optimal operational methods	Strengthening the process of comprehensive improvement at this stage. The best results are obtained from the improvement of enterprises.

### 2.2. Domestic Research

Zhen He et al. have analyzed China's quality management on the manufacturing industry [17],

by which they have discovered that albeit the domestic manufacturing sector follows ISO9000 to establish its quality management system, but is far from sufficient; there are some weaknesses in management groups, corporate culture, quality management methods and system, therefore requiring the continuous improvement to enhance the level of manufacturing quality management.

China Association for Quality and Beijing Broadcasting Institute [3] surveyed 600 domestic enterprises to depict the status quo of China's manufacturing and service businesses. The research shows that though the country has endeavored to promote complete quality management and ISO9000 international quality control standards, the overall level of corporate quality management has been relatively low; there are substantial weaknesses in the establishment and implement of quality strategies, the identification and scarification of consumer needs, the design and development of new products. The study also suggests that there are two areas, i.e. the certification and implementation of quality management system for service businesses as well as the level of enterprises receiving and promoting advanced quality management concepts, are inferior to manufacturing companies.

Yeung, A.C.L. et al. have conducted their research in the University of Hong Kong, taking 225 electronic enterprises as research objects and analyzing their quality management level in terms of manufacturing businesses[14]. The study suggests that senior leaders' awareness of quality management influences the corporate level of quality control and that the quality management levels of different companies are under various kinds of quality control systems. They have categorized the corporate quality management system into four types, i.e. undeveloped quality system, structural quality system, environment-adapting quality system and strategic quality system.

Xiande Zhao[13], based on the empirical classification of quality control system that has been used in the Chinese service business, has compared the quality management system developed by the service sector with the previous classification generated in the study of manufacturing businesses. According to Baldrige's cluster analysis of quality management practices, the researcher has found four modes therein, i.e. undeveloped, adapted, strategic, and soft quality system. The study offers experience and evidences for the possible relationship between quality control practices, organization background and performances, thereby contributing to the contingency theory of quality control.

Criteria for Performance Excellence is completed by virtue of domestic and overseas outstanding performance management methods and experience. It combines China's business management and aims to score seven aspects of an enterprise, i.e. leadership, consumers and markets, strategies, process management, resources, evaluation, as well as analysis, improvement and results, thereby to appraise companies' quality management thoroughly and systematically.

Managing for the sustained success of an organization, similar to Criteria for Performance Excellence, provides guidelines for organizations to achieve the sustained success by quality management, so as to help organizations adapt to the harsh, complicated and ever-changing environment [15]. The standard includes in the Appendix the five levels of maturity management with the explanation for each level; however, it does not offer the method to grade enterprises.

Some scholars, including Li Li, have studied the quality management of manufacturing businesses, employed Crosby's quality maturity model, provided surveys by establishing structural equation model, built SEM by using AMOS, thereby constructing the quality management maturity model of manufacturing companies. Li Li classifies quality management into the study of soft quality and hard quality[7]. Yan Li has investigated the manufacturing sector in Shanxi Province, and applied clustering and comparative analysis to evaluate companies' quality management maturity[16]. Dongming Xu concludes five types of companies with different levels of quality management maturity, i.e. the underdeveloped company, awakening company, operational company, self-aware company and advanced company [4]. Qin Su et al. have interviewed some entrepreneurs in Shanxi Province, and thereby categorized quality management maturity into four levels, reflecting the various degrees of current Chinese enterprises in terms of quality management and pinpointing some weaknesses thereof [11].

### 3. Maturity Level of E-commerce Platforms and Structural Relation

By studying Crosby's quality maturity model, the management maturity model of the e-commerce platform can be designed as Figure 1, wherein the level of maturity successively increases from the first stage to the fifth. The copyright form is located on the authors' reserved area.

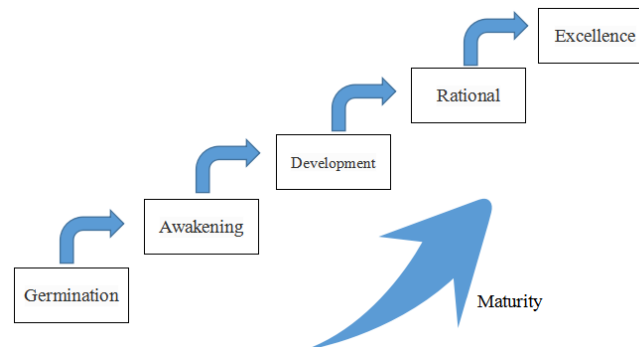


Figure 1 The level of the quality management maturity of e-commerce platforms.

Stage one: Germination. In the first stage the manager in e-commerce platforms is unconscious of the significance of quality management and any evaluation methods. Quality management is highly immature, and therefore, there is a lack of effective approaches to prevent fake products on the platform, to punish illegal transactions and to ensure service quality.

Stage two: Awakening. In this phase managers are aware of the importance of quality management, therefore proactively endeavoring to improve quality; however, they fail to consider the current level of budgets and enterprises and to produce desirable outcomes in a short term. There are some evaluation and inspection projects being conducted.

Stage three: Development. In this stage there are specialized quality management departments on e-commerce platforms, along with a complete system of quality and management standards. The platform can use regular processes to cope with existing quality problems.

Stage four: Rational. In this stage the e-commerce platform largely improves the efficiency of leaders and quality departments. It continues to perfect quantitative management and control processes as well as to implement complete quality management.

Stage five: Excellent. In this phase e-commerce platforms achieve the highest level of quality management, wherein managers consider platforms as the lifeblood and quality improvement as their routine work. Any quality problems can be tackled the earliest possible.

### 4. Establishment of Quality Management Maturity Model on E-commerce Platforms

After determining the five stages of maturity, e-commerce platforms can evaluate the level of quality management and deal with the weaknesses thereof. Each evaluation indicator of quality maturity can be scored, including leadership, strategies, services, information management, resource management, process management and quality management performance, thereby adding up all the scores. By comparing the total score to the standards of all levels, managers can identify the current level of quality management.

Given certain attributes of e-commerce platforms, consumer satisfaction, website and service quality are important parts in the quality management of e-business platforms. According to the criteria determined by the principles of quality management, International Quality Maturity Model and Criteria for Performance Excellence, this research has summarized some widely-applied evaluation indicators of the design and content of quality management practices, and thereby conducted surveys regarding e-commerce platforms on the basis of the features of the platform. The survey investigates five first-class indicators and ten second-class indicators: quality leadership is categorized into high-level leadership and strategic development; quality culture is classified into universal quality education and universal e-commerce platform standards; process control is divided into payment, supplier management and logistics management; information management includes

website quality; corporate performance includes consumer satisfaction and platform service quality. The research has thereupon rendered second-class indicators measurable, whereby to establish a complete indicating system for the quality management maturity of e-commerce platforms. The study has surveyed several major e-commerce platforms by using the Likert quantified form of 5 scales to evaluate all the indicators and demonstrated data features by SPSS statistical analysis.

The variances among the indicators can be pinpointed according to the statistics presented in the survey. Each indicator is listed based on weights (see Figure 2).

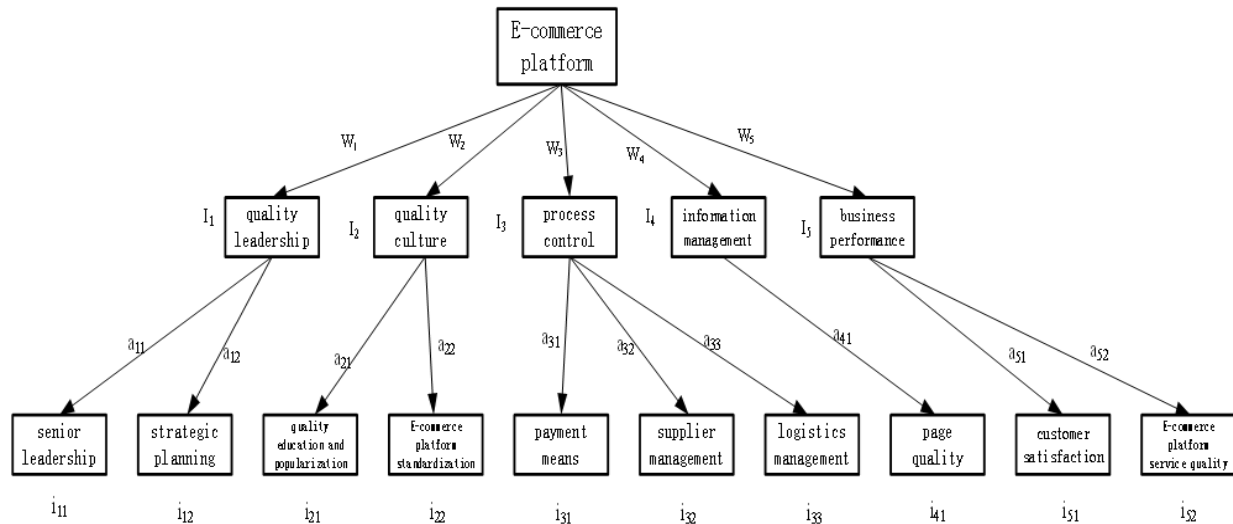


Figure 2 The structure of evaluation indicators for the quality management maturity of e-commerce platforms.

By using the calculating method of quality management maturity presented in the Table 2, the study has calculated the total score of quality management maturity for each e-commerce platform.

Table 2 The calculating method of quality management maturity.

$QMM = W_1 \times I_1 + W_2 \times I_2 + \dots + W_N \times I_N$
$I_i = \sum_{j=1}^{N_i} a_{ij} \times i_{ij}$
QMM—Quality management maturity index
$W_i$ --The weight of the $i^{th}$ element, $i=1,2,\dots,N$
$I_i$ --The vale of the $i^{th}$ element, $i=1,2,\dots,N$
$N_i$ --The number of indicators of the $i^{th}$ element
$I_{ij}$ --The $j^{th}$ Index value of the $i^{th}$ element, $j=1 \sim N$
$a_{ij}$ --The $j^{th}$ Index weight of the $i^{th}$ element, $j=1 \sim N$

## 5. Mportance of Quality Management Maturity Model

The quality management maturity model aims to improve the level of quality management on e-commerce platforms. The following principles should be noted when applying the model. The copyright form is located on the authors' reserved area.

Evaluation is an approach rather than a purpose. The establishment of the model is not to judge whether the quality management of a platform is sufficient or not, but to seek new ways to amend the weaknesses after the appraisal.

The ability to accept new ways is needed. The quality management maturity model is an innovative creation, and therefore, it may contradict some previous ideas. In that case, people should learn to bid farewell to the old and welcome to new, and try to operate the new model, thereby reaching the higher level of management.

The whole is greater than the sum of the parts. The model of quality management maturity functions as a part to improve the level of quality management. All positive factors should be

included as to further the improvement of the management, from preparation ahead of the implementation and the thought shifting after the project. In so doing, the potential of the model can be fulfilled.

## 6. Conclusions

This paper, via analyzing the quality management maturity of domestic and overseas enterprises, has acquired several findings. First, the evaluation of corporate quality management, for the most part, applies the major indicators of corporate quality management ability to construct evaluation indicator system and digital methods to appraise corporate quality control ability comprehensively. Second, the maturity model has been employed across various sectors; the model, to a large extent, has been used in terms of qualitative analysis, dividing quality management maturity into four or five levels; basically, these models show the course of quality control maturity from chaotic to sophisticated levels, yet failing to reflect them accurately. Third, by studying domestic literature, the study shows that the conclusion that there is a lack of quality control tools used in China's research on quality management maturity is merely based on overseas research. Fourth, currently, the quality management practices of the Chinese enterprises have focused on developing tables and questionnaires. Fifth, as the research on the quality management of e-commerce platforms is rather microcosmic, therefore lacking systematic studies.

Due to its particularities, e-commerce has been relatively immature compared to traditional industries. Hence, this paper, while establishing the quality management model and considering the features of e-commerce, tries to render the model applicable to the process of quality management on e-commerce platforms, to improve the level of quality management, and thereby to enhance the competitiveness of e-commerce platforms. Because of the limitation of data and practices, the model has currently been theoretical, devoid of empirical analysis; additionally, the method of evaluating maturity level is highly subjective, requiring further improvement by studying quality management maturity on the e-commerce platform.

## References

- [1] Crosby, P.B., (1979) *Quality is Free*, McGraw-Hill. New York.
- [2] China Standard Research Center, (2000) *Quality management systems--Guidelines for performance improvements* online. Available at: <http://www.std.gov.cn/gb/search/gbDetailed?id=71F772D77209D3A7E05397BE0A0AB82A>.
- [3] China Association for Quality Beijing Broadcasting Institute Survey & Statistics Institute, (2002) *Report for 2001 Nationwide Survey on QM Statement of China Enterprises*, China quality. (11), 4-21.
- [4] Xu, D.M.,(2014) *An empirical study on quality management maturity in Chinese manufacturing industry enterprises*. Tianjin University.
- [5] Hartnett, J.L., Kropp, D.H., (1988) *Managing Quality: The Strategic and Competitive Edge*, by David A. Garvin, Collier Macmillan.
- [6] Hockman, K.K., Bhote, K.R., (1994) *World class quality--using design of experiments to make it happen*, Technometric. 36(4), 425.
- [7] Li, L., (2009) *The Establishment and Evaluation of a Quality Management Maturity Model for Manufacturing Enterprises*. Hubei University of Technology.
- [8] Mekinsey Company. Ine., (2003) *Mekinsey Company. Ine results on quality management and quality performance of foreign companies*, Journal of Ordnance Equipment Engineering. 24(1), 37.
- [9] National Certification Commission, (2015) *Xinhua News Agency reported good e-commerce certification system* online. Available at: [www.cnca.gov.cn/xxgk/hydt/201502/t20150202\\_36235](http://www.cnca.gov.cn/xxgk/hydt/201502/t20150202_36235).

shtml.

- [10] Patti, A.L., Hartman, S.J., Fok, L.Y., (2001) Investigating organizational quality management maturity: an instrument validation study, *International Journal of Quality & Reliability Management*. 18(9), 882-899.
- [11] Su,Q., Song, Y.T., Liu, W.Y., (2010) Quality Management Maturity of Chinese Firms, *Science and science and technology management*. 31(9), 172-177.
- [12] Saad, G.H., Siha, S., (2000) Managing quality: critical links and a contingency model, *International Journal of Operations & Production Management*. 20(10), 1146-1164.
- [13] Zhao, X.D., Yeung, A.C.L., Lee, T.S., (2004) Quality management and organizational context in selected service industries of china. *Journal of Operations Management*, 22(6), 575-587.
- [14] Yeung, A., Chan, L., Lee, T., (2003) An empirical taxonomy for quality management systems: a study of the hong kong electronics industry, *Journal of Operations Management*. 21(1), 45-62.
- [15] Gu, Y.J., Li, J., Li, Q., Liang, X.W., Wang, X.S., Song, M.S., (2011) Managing for the sustained success of an organization--A quality management approach [online]. Available at: <http://www.std.gov.cn/gb/search/gbDetailed?id=5DDA8BA1ED1818DEE05397BE0A0A95A7>.
- [16] Li Y, (2014) An Empirical Study of Chinese enterprises Quality Management Maturity--A Case Study of Shanxi manufacturing enterprises. Xi'an University of Science and Technology.
- [17] He, Z., Wan, P., Li, C.G., (2001) On the quality Management status and its strategies of China's manufacturing industry, *Journal of Tianjin University (Social Science)*. 3(4), 347-349.