

# Quality Culture Management Model of Chinese Manufacturing Enterprises : A Grounded Theory Study

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**Abstract** — Lack of excellent quality culture becomes a deep crisis for most Chinese manufacturing enterprises and the obstacles for the quality improvement of their products. How to cultivate an effective quality culture and manage it well within an organization is a key question challenges the manufacturing enterprises. As there is lack of relative research on this issue, and the results of the only researches have been confined to extensive frameworks, this paper, based on the methodology of Grounded Theory, using three-level coding analysis techniques, analyzes in depth the quality culture management practices of eight representative Chinese manufacturing enterprises, and abstracts from those cases a quality culture management model and its measures. This study also analyzes the functions of the measures in developing different dimensions of quality culture. The results of this paper provide both theoretical and experiential reference for more enterprises facing the quality culture challenges.

**Keywords** - *Quality Culture; Management model; Grounded Theory; Chinese manufacturing enterprise*

## I. INTRODUCTION

Quality culture is the integration of values, beliefs, codes of conduct and their performance shared by the leadership and the entire workforce of an organization in the aspect of quality. Last century, the Japanese enterprises obtained success in quality management, which made people to realize that quality culture has significant impacts on the quality management of enterprises. Nowadays, enterprises from all over the world are paying more and more attention on the development of quality culture, because it has a positive influence on enterprises performance as a soft power. Academician Elizabeth Keim, with the International Quality Academy of Sciences, pointed out in the 9th Shanghai International Symposium on Quality that enterprises which have quality culture, make better innovation and gain better customers, and at the same time quality culture can also help the enterprises improve economic performance. This view has also been confirmed in the latest studies of many researchers, such as: Sarah Wu [1], Ilies, Sălăgean and Beileu [2], Hebbbar and Mathew [3].

With the development of economic globalization, quality culture is gradually becoming the key factor for enterprises obtaining and maintaining long-term quality competitive advantage. Over the past 30 years, Chinese manufacturing

enterprises have taken full advantages of labor resources, so that “MADE IN CHINA” products can be seen all over the world. As a result, China has been recognized as a big manufacturing country, but the quality of Chinese products has not been recognized worldwide. From the surface, it is because the Chinese manufacturing enterprises have taken the “low price” competition strategy in a long-term. Deeply, lack of quality culture is the biggest crisis for Chinese manufacturing enterprises to be confronted with. At present, Chinese manufacturing enterprises have fully realized the existence of this crisis. Setting up quality culture that conforms to the characteristic of Chinese enterprises has been promoted to an unprecedented important position. How to develop and manage an effective quality culture within an enterprise? We need to focus on the experiences of the successful cases.

In the last 10 years, the activities of quality culture are rising up in more and more Chinese enterprises. Many Chinese manufacturing enterprises continuously explore innovations on cultural practices, and gradually form their distinctive management methods of quality culture. Based on the approach of Grounded Theory and samples of 8 Chinese manufacturing enterprises with excellent quality culture management practices, this paper completes case studies following the three-level coding program, reveals the inherent law of the formation of excellent quality culture in the context of Chinese manufacturing management, and abstracts out a “quality culture management mode” and its eight core work measures, which provide a theoretical and experiential reference for more enterprises facing the quality culture challenges.

## II. LITERATURE REVIEW

Most of the research on quality culture is concentrated on its elements and factors. Kanji and Yui have considered the idea of total quality culture and its various dimensions [4]. Adebajo and Kehoe studied seven important factors that influence the development of a culture that complements total quality implementation [5]. Other significant studies in this field include: Watson, Mary Anne and Gryna, Frank [6], Deselnicu and Swiger [7], Davison, and Al-Shaghana [8], Mohammadzadeh and Saghaei [9].

There are few related researches on how to develop and manage a quality culture in an enterprise. Adebajo and

Kehoe pointed out the factors they classified are the basis for the development of a framework to assist in culture change, and illustrated an objective-agent-task framework [5]. Watson concluded critical conditions for a channel of total quality culture development, such as employee participation and leading exponents [6]. Wang Yanfeng, et al. put forward a three-dimension model of enterprise quality culture, which is composed of honesty, innovation and responsibility [10]. Rong Xiuying argued that the construction of enterprise quality culture needs the joint participation of government, enterprise and society [11].

However, the above point of views only show an extensive framework, and more specific, exercisable measures and models need to be proposed. Furthermore, there is a lack of relative research on Chinese manufacturing enterprises while the cultural environment in China is special, the existing theoretical and empirical research cannot provide more effective help for Chinese manufacturing enterprises to cope with the quality cultural challenges. The case study on quality cultural management of Chinese manufacturing enterprises based on facts is necessary.

### III. METHODS AND RESEARCH DESIGN

#### A. Methods

The methodology of Grounded Theory is a set of systematic procedures to achieve research results by analyze, arrange, and generalize of phenomenon, and by using theory to describe the nature and meaning of the phenomenon. Also, it does not use a theory to verify a fact, but generalize and establish a theory based on suitable facts. In recent years, the Grounded Theory method has gotten more and more consideration from management researchers all over the world, especially considering that it is suitable for application research referring to management and cultural context. This study strictly follows systematic application of Grounded Theory research method, by using Nvivo11 software and 3-level coding techniques of the open coding, axial coding and selective coding to abstract and construct theoretical framework of quality culture management [12].

#### B. Sampling

This study selected 8 Chinese manufacturing enterprises which obtained Chinese quality prize as typical samples of case study. Among these samples, 6 case enterprises' data is used to analysis and construct the theory of quality culture management, and data of other 2 enterprises is used to test theoretical saturation.

#### C. Data Collection

In this paper, data-collecting of case study and triangle method of evidences are used to collect and ensure the reliability of data. The data for Grounded Theory analysis comes from survey, semi-structured interview, focus group discussion and literature search.

#### D. Guiding Research Questions

What measures and actions do manufacturing enterprises with excellent quality performance take to establish an

effective quality culture? What's the function of these measures in developing a quality culture? The goal of this research is to summarize the process and measures of quality culture management practices in the 8 case enterprises, and to sum up a quality culture management model applicable to more enterprises.

#### E. Reliability and Validity

To ensure the reliability and validity of research, the data of different samples are separately coded to get preliminary conclusion, then comparisons between different cases are conducted. Following periodic analysis results, this study continues with theoretical sampling and supplementary information collecting. In this way, the steps are repeated until the theory is saturated.

TABLE I. OPEN CODING IN THE CASE STUDIES

Original material <sup>a</sup>	Open coding	
	Concept	Categorization
...The purpose of establishing the leadership team for quality culture was to formulate a strategic framework for quality culture, clarify quality values...(a1)	leadership team(a1)	1.a1,b1are categorized as: establish cultural committees(H1)
...Establish a quality cultural office, director of the office should be the first official in charge of the business ...(b1)	Establishment of quality cultural office(b1)	
...Besides, other departments outside the quality department set up separate liaison personnel to improve their own quality culture (a2)	interface of each department(a2)	2.a2, c3 are categorized as: assemble inter-departmental staff (H2)
... The quality culture roundtable was regularly held to coordinate the issues in the development of quality culture in various departments(c3)	A cross - departmental roundtable meeting(c3)	
... For all the teams, each month's rating is divided into 3 level prizes as well as encouragement awards based on quality improvement, and cost reduction, etc., (a13)	Team quality award(a13)	3.a13, b9, c11are categorized as: Quality rewards(H3)
.. once the quality improvement suggestion is adopted, a certain amount of cash incentives will be given on a case-by-case basis.(b9)	Personal Quality Improvement Award(b9)	
... star employees who have been selected as quality and technical innovators will get their photos displayed on boulevards.(c11)	Quality Star spiritual prize(c11)	
.....	.....	.....
	(108 concepts)	(21 categories)

a. Original data and materials are collected through multiple channels.

## IV. STUDY PROCESS

### A. Open coding

According to the open coding procedures, through analysis and integration of information, a total of 108 initial concepts are acquired. Because the initial concepts are relatively low-level and large in number, and there are overlapping parts of each other, further decomposition, analysis and refine is needed to realize the categorization of relevant concept. After multiple times of consolidation and analysis, a total of 21 sub-categories are abstracted out from the materials, which can be seen in Tab. 1.

### B. Axial Coding

According to the axial coding steps, the main category is developed on the basis of open coding. According to the mutual relations among different sub-categories obtained by open coding, eight main categories are summarized. The sub-categories corresponding to each main category are shown in Tab. 2.

### C. Selective Coding and the Model

According to the selective coding steps, the analysis of the relationships among the main categories is performed, the core categories are selected. Based on this typical relational structure, the research further constructs a new theoretical framework of quality culture management, which is called “Enterprise Quality Culture Management Model”, as shown in Fig. 1.

### D. Test of Theoretical Saturation

The paper tests the theoretical saturation through the remaining two case companies as a group. Through three-level coding and analysis, the contents of cases’ data still reflect the logical relations contained in the “Enterprise

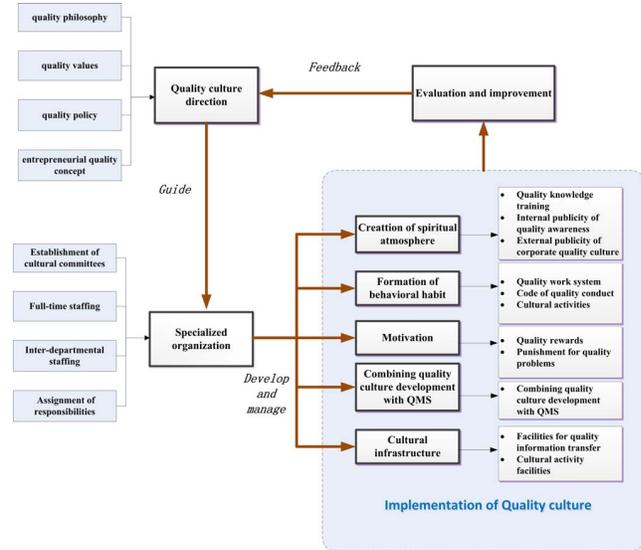


Figure 1. Results of selective coding : Enterprise Quality Culture Management Model

Quality Culture Management Model”, and no new category relation is found. Therefore, the above theory can be considered as saturated. So far, the research has completed the construction of enterprise quality culture management model based on Grounded Theory.

## V. STUDY RESULTS

Based on the complete Grounded Theory analysis of eight outstanding enterprise cases, the key actions, measures and methods of these Chinese manufacturing enterprises in quality culture management are summarized. As a result, eight main categories and their relationships are obtained, and herein the extraction of enterprise quality culture management model is completed. Furthermore, the key actions and contents of the 8 main categories are beneficial and instructive for many other manufacturing enterprises.

### A. Quality Culture Direction

The purpose of setting up the quality culture direction in the enterprises being studied is found to determine the goal and ideal state of the enterprise quality culture. They established the development direction of the enterprise quality culture based on their strategic plans in the aspect of quality, together with the full consideration of the demands of customers and stakeholders. This task also includes identifying quality philosophy and quality values, which need to be aligned with the mission and vision of the company. In addition, it should be socially progressive and embody the needs of customers as well as continue to guide the organization toward quality-focusing and excellence. Combined with quality strategy, quality policies are clearly established and decomposed to serve as the basis and guidance of the execution and improvement of the enterprise’s quality management. This work is a personal involvement and decision-making of top executives or chief

TABLE II. AXIAL CODING IN THE CASE STUDIES

Sub-categories	Main categories
Quality philosophy, quality values, quality policy, entrepreneurial quality concept	Quality culture direction
establishment of cultural committees, full-time staffing, inter-departmental staffing, assignment of responsibilities	Specialized organization
Quality knowledge training, internal publicity of quality awareness, external publicity of corporate quality culture	Creation of spiritual atmosphere
quality work system, code of quality conduct , cultural activities	Formation of behavioral habit
Quality reward, punishment for quality problems	Motivation
Combining the quality culture development with the implementation of quality management system (QMS)	Combining quality culture development with QMS
Facilities for Quality information transfer, Cultural activity facilities	Cultural infrastructure
Evaluation, problem analysis	Evaluation and improvement

quality officers. At the same time, we also find that the concept of quality of the high-level leaders and entrepreneurs in the enterprises deeply affects the choice of the direction of the enterprise's quality culture.

#### *B. Specilized Organization of Quality Culture Management*

In order to ensure that the quality culture would be promoted effectively, the case enterprises generally established the leadership team for corporate quality culture management and the corresponding department or committee, defined the full-time personnel and the daily management responsibility as a support condition of quality culture management. At the same time, because the influence and cultivation of a culture are related to all aspects of the enterprise, the culture management Committee has incorporated some of the personnel from all relevant departments as regular full-time or part-time members. This step can effectively establish an organizational structure and mechanism to ensure that quality concepts, values and policies can be effectively understood and implemented by all staffs.

#### *C. Creation of Spiritual Atmosphere*

In the case enterprises, the quality teams have established their respective methodology system that enables employees to understand the importance of quality and follow the instructions set out in quality management and workflow. However, it is unrealistic to establish detailed quality indicators in every link of the system. Only by letting each employee develop enthusiasm for quality from inside, and inspire the sense of responsibility and mission for quality, can we guarantee the outstanding quality more effectively. Although the sample enterprises have strict quality assurance systems, they are not satisfied with it; they are constantly striving to create a culture atmosphere of quality values in work. This provides a lively circumstance for all employees to perceive the importance of quality everywhere. After summing up these successful practices, we find that the following four concerns are most important in creating a good ideological and cultural atmosphere of quality:

- Repeated emphasis by the leadership on the importance of quality.
- An authoritative channel to ensure the transmission of reliable quality information.
- Training of relevant personnel on quality techniques and management methods in order to enhance staff quality knowledge.
- Promotion of the quality concepts to all employees in order to enhance their quality awareness.

#### *D. Formation of Behavior Habits*

According to their own quality values, quality policies and characteristics of production and management, case enterprises have set up work systems and codes of conduct that play a normative role in the quality behavior of their employees. And they made these rules and regulations become part of the enterprise quality management system document. All kinds of personnel's due quality behavior were

clear so that the staff in the process of cultivating their own quality behavior and habits had rules to follow. The case enterprises also monitored and improved the implementation of these system norms. These measures provide system guarantee for quality culture management.

#### *E. Combining the Development of Quality Culture with the Implementation of the Quality Management System*

When carrying out the quality culture management, the case enterprises not only developed management methods for the purpose of cultivating a quality culture, but also paid great attention to integrating these methods into existing quality management systems. Generally one or several kinds of quality management systems or methods being implemented well were selected, such as: ISO9000 series, Performance Excellence Model, Six Sigma, etc., as a platform to carry out daily activities of quality culture management, also as an important way to develop good quality behavior for all staff in their daily work. The above measures are to ensure that the quality culture management can be promoted continuously in the daily operations of an enterprise.

#### *F. Motivation*

In order to guide the enthusiasm and self-discipline of all staff in the pursuing of good quality, the case enterprises has established motivation System which effectively promoted the development of quality culture. Appropriate incentive measures and methods were adopted by the case enterprises based on their quality strategies, current situations and cultural environments. There are many types of motivation, including positive motivation, negative motivation, spiritual motivation, material motivation and so on. No matter what kind of motivation, paying more attention to rewards than punishment are the basic principles. This is because in the general situation, no quality defect is often thought to be goal-oriented and reasonable; person in charge will be punished if any quality problem is discovered. This makes people engaged in quality work easy to form converse-thinking. This situation needs to be improved by more positive incentives, particularly when an enterprise wants to stimulate the enthusiasm of employees on quality innovation.

#### *G. Cultural Infrastructure*

Cultural infrastructure is the external materialization of a quality culture and the basis for the development of it, such as: quality display board, quality activity facilities, quality banners, quality trophies and so on, which are the basic conditions of developing quality culture of a company. In a company that does not invest in cultural facilities well, the development of quality culture is relatively weak. The case enterprises generally provided adequate support to cultural facilities, and the facilities levels are high, thus facilitating the development of various measures and activities of quality culture management. Also the good quality culture of enterprises can be seen more intuitively, and so that employees and external visitors can fully feel the company's emphasis on quality culture.

## H. Evaluation and Improvement

According to the development direction and goal of quality culture, some of the case enterprises established their elementary quality culture management evaluation system and its index and methods. As a soft science, quality culture is not an object to evaluate easily. However, enterprises that have succeeded in quality culture attach great importance to cultural evaluation. They developed a set of applicable evaluation methods according to their own cultural characteristics. The above process mainly includes the following: First determine the various measurement objects, measurability and measurement methods; find ways of data collection for “Hard” indicators that can be directly measured; construct measure index system and questionnaires by identifying and describing the status of index and the performance characteristics for the “soft” indicators that difficult to be directly measured, such as the relevant personnel awareness, attitude, feelings and other intangible or qualitative things.

## VI. DISCUSSION

Through further analysis and discussion, the eight working measures of the quality culture management model concluded based on the experiences of these case enterprises with excellent quality cultural performance, play corresponding roles in shaping quality culture at different levels, and thus help an enterprise to develop its quality culture in a very multi-dimensional and comprehensive manner, and produce satisfactory results.

### A. The Hierarchical Structure of Quality Culture

Quality culture is the part of corporate culture that pays attention to quality. Therefore, the construction of quality culture follows the theoretical logic of corporate culture. According to the research of Guangming Liu, a scholar in the field of enterprise culture, the structure of corporate culture can be divided into four levels: spiritual, institutional, behavioral and material, which is also known as the pyramid structure [13]. This theory is also applicable to quality culture, which is a sub-culture of corporate culture. According to different manifestations, quality culture can be divided into four levels, as shown in Fig. 2.

Firstly, it is the spiritual layer of quality culture, including quality concepts, quality values and quality awareness, etc. The spiritual layer is located at the top of the pyramid of quality culture, which is not only the core and spiritual content of quality culture, but also the ultimate goal of quality culture management. Secondly, the institutional level of quality culture involves: standardization, regulations, systems, quality reward and punishment system, and legal system etc. The third one is the behavioral level of quality culture, which is the behavioral pattern of the quality practices of a specific group. Fourthly, it is the material layer of quality culture, that is, the material manifestation and carrier of quality culture, including the quality of products/services, quality-related cultural facilities etc. Among them, the material layer and the behavioral layer are perceptible, which belong to the shallow layer of the quality

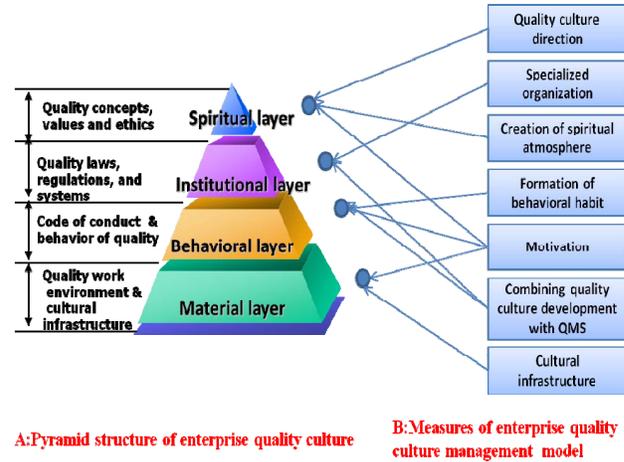


Figure 2. Roles of quality culture management model on different levels of quality culture

culture. While as the deeper level of quality culture, the institutional layer and the spiritual layer have low perceptibility. With the development of society, the research on the levels of quality cultural structure will continue to be enriched and deepened. From the perspective of quality culture management, the upper layers of the pyramid structure are more difficult to be changed and managed.

### B. The Roles of Quality Culture Management Model in Different Levels of Quality Culture

The function of the quality culture direction module in the quality culture management model is to construct the content that forms a clear spiritual layer of quality culture. Through the establishment of quality culture organization, the promotion of quality culture will have a solid institutional and systematical foundation, which refers to the institutional layer. The measures and activities to create the quality-focusing spiritual atmosphere are also supports for the formation of the spiritual level of quality culture. The quality oriented behavior habits established by the code of conduct strengthens the behavioral level of quality culture. All these spiritual and behavioral promotions of quality cannot be separated from a variety of stimulations. There is no doubt that the quality cultural development measures cannot be carried out steadily without solid cultural infrastructure as the material security. The combination of quality culture management and QMS is a key step, which is beneficial to the cultural construction of both institutional and behavioral levels, as in Fig. 2. Finally, the impact of assessment and improvement on the levels of quality culture depends on the scope of the assessment program and the ability to obtain and analyze information, so it isn't

specifically shown in Fig. 2. Of course, the ideal evaluation scheme is to be able to make a comprehensive evaluation of the current situation of quality culture from four dimensions. From these functions and effects, we can see that the work measures in the quality culture management model can provide useful guidance and reference for the quality culture practice in more enterprises by improving quality culture in all dimensions.

## VII. CONCLUSION

This study aims at answering the questions: How to develop and manage an effective quality culture within a manufacturing enterprise?

Based on the approach of Grounded Theory, this paper takes representative enterprises with good quality performance and excellent quality culture practices in Chinese manufacturing industry as samples, and completes case studies following the three-level coding analysis program.

Through the analysis of these experiences, this paper reveals the inherent law of the formation of an effective quality culture in the context of Chinese manufacturing management, and abstracts out a “Enterprise quality culture management mode” and its eight core work measures, as well as how they relate to each other in order to achieve the development of an quality culture in an enterprise.

Furthermore, based on the theory of corporate culture levels, this study also analyzes the different roles of measures in the model on the different levels of the quality culture, thus further explaining the function and value of the model and the reason why the case enterprises obtain success in quality culture. This model provides a valuable reference for an enterprise to develop a multidimensional and balanced quality culture more comprehensively.

As more and more managers and scholars around the world realize the powerful role of a quality culture in improving the quality performance of an enterprise, the research results of this paper is expected to provide a theoretical reference and valuable experience guidance for more enterprises which are facing the quality culture challenges and making efforts in the quality culture management practices.

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