

# Deming's Quality Management Practices by Small Businesses in Rural Areas

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**Abstract.** Deming's Philosophy is a famous thought among Quality Management scholars and practitioner. The theory consists of 14 principles providing guidelines for appropriate firms' quality behavior and practices. Deming proposes that an organization shall experience high-quality service by lowering non-value added activities, such as scrap, rework, and conflicts, while increasing customers' loyalty. There is an overwhelming allegation on the apparent effect of Deming's theory on quality management theory and practices worldwide, mostly in larger organizations of developed countries. Few studies have discussed the relevance of Deming theories in small business management practices in developing countries. Moreover, there is a stigma among small business practitioners that all western originated management theories are less applicable in their context. At the same time, the currently available literature on Deming management methods is mostly a description of the 14 points. This study aims at elaborating the small businesses owners'/managers' understanding of Deming's fourteen points. The rising numbers of Small Medium Enterprises in Indonesia is a positive sign of local economic development in the Industrial revolution 4.0. To remain competitive, SMEs are forced to be a quality focus and consistently innovate. The sample of the study was 335 SMEs' owners/ managers in Banyumas Central Java, Indonesia. Authors used descriptive statistics to analyze the data — results based on descriptive analysis. The result of the study confirmed the practices of Deming's theory among SMEs in Indonesia. Majority of respondents had a good understanding of the theory and felt the benefits of the theory while adopting it.

## 1 INTRODUCTION

Continues improvement is being given more significant consideration in portion by the inherent nature of global competition, which is driven by advances in consumer value and system (Adi, Wihuda, & Adawiyah, 2017; Hari Adi & Adawiyah, 2018). Therefore, small firms should consistently improve the quality of products and services offered. Continuous improvement connects higher value to lower expenses and more significant market share (meaning more fulfilled and faithful clients) and offers the rationale for ongoing

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performance changes to organizations (Adawiyah, Pramuka, Najmudin, & Jati, 2015; Anderson, Rungtusanatham, & Schroeder, 1994). Consistently, continuous improvement implies higher performance with less variety, resulting from process management methods that take about incremental changes and innovations in procedures, products, and facilities (Anderson et al., 1994). Some studies over the years demonstrate that implementing quality management enables companies to improve their product or service quality systematically and sustainably. (see for example Adawiyah, Shariff, Saud, and Mokhtar 2011, Ahire, Landeros and Golhar 1995; Easton and Jarrell, 1998, Hendricks and Singhal 1996; Powell 1995; Yasir, Pervaiz, and Saifur, 2014 ) . The organization can adjust to the evolving setting in which it is currently active and maintain the dynamic edge (Huang and Lai, 2014, Kathleen, McFadden, Lee, Gowen III & Sharp (2014). Research results indeed promote the view that proper quality implementation is associated with creative procedures and goods (Kim, Kumar and Kumar 2012, Kathleen et al., 2014).

Although the Deming leadership technique has an impact on leadership practices, worldwide, empirical study assistance for its efficacy except for total proof is little (Anderson et al., 1994). This is partly because of the concept of depicting, explaining, and anticipating the effect of Deming leadership. The technique that was not submitted would be the direct advancement of the empirical investigator. In reality, the academic focus on Deming leadership was remarkably limited (Gartner & Naughton, 1988); this has still been comparatively unexplored for its position in formalizing and promoting the governance hypothesis.

The quality management frameworks can broadly be classified into three groups: 1) formal and quasi standards such as ISO 9000; 2) academic-research-based empirically validated models; and 3) road maps proposed by prominent gurus such as W. Edwards Deming, Joseph Juran, and Philip Crosby (Singh, Dean, and Chuong, 2013) . Management in many companies in the US and around the world embraces the Deming method (Hodgson, 1987). Its popularity is of various case studies that attributed the influence of the Deming method of managing organization (Anderson, Rungtusanatham, & Schroeder, 1994; Douglas & Fredendall, 2004; Khan, 2010).

This paper provides a model of system dynamics to demonstrate some of the elements of the Profound Knowledge System of Deming. It would act as a pedagogical instrument as a helpful guide to Deming's concepts for those fresh ones. Deming a knowledge system would direct people to new leadership from the 'Tyranny' of contemporary leadership (Deming, 1986). The scheme consists of four components (appreciation for systems, knowledge about variation, the theory of knowledge, and psychology) and emphasizes interconnection components. This study also presents how SMEs apply quality management based on W. Edwards Deming theory.

## **2 Literature Review**

### **2.1 Deming's System of Profound Knowledge**

Deming defined by the System of Profound Knowledge that gives insight into the transformation method of organizations. System of Profound Knowledge 's main topic is to undergo a conversion of the prevalent management style. The system consists of four interdependent components. The first component is an assessment of the scheme and the systems. A scheme is an organization that works together to attain organizational objectives. Managers must understand the links between all subsystems and individuals working in order to operate every scheme.

The comparison of the variance hypothesis is the second component of Deming's theory. There are many causes of variability in the manufacturing method. It is not possible to understand the complicated relationship between materials, tools, machines, operators, and atmosphere differences between isolated bases. However, there is a statistical examination of the mixed impact of all different causes. Deming's second aspect of Profound Knowledge, "understanding of the variety," relates to not only recognizing and operating with variety. The checked performance is, according to Shewhart (1931 ), variable value and unidentified and fortunate triggers, as a result. Multiple schemes and complicated communication between these themes often affect performance.

The following aspect of Deming's System of Profound Knowledge is information theory, a philosophy that deals with the premises, essence, and extent of information. Deming is stressed that it can not create a theory. Managers are responsible for learning hypothesis and applying it. Psychology is the last component of the System of Profound Knowledge. Psychology enables executives to comprehend individuals. Managers must acknowledge and use psychologists to guarantee the beneficial inherent characteristics of each individual. The 14 leadership points of Deming's System of Profound Knowledge follows.

## 2.2 Deming's Fourteen Points

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**Table 1.** The Deming Management Method

Point 1	Create constancy purpose or toward the improvement of product and service to be competitive and to stay in business, and to provide jobs.
Point 2	Adopt the new philosophy
Point 3	Cease depends on mass inspection to improve quality. Eliminate the need for inspection on a mass base by building quality into the product in the first place.
Point 4	End the practice of awarding business based on price tags alone. Instead, minimize total cost. Move toward a single supplier for any one item, a long-term relationship of loyalty and trust.
Point 5	Improve constantly and forever the system of production and service, to improve quality and productivity, and thus consistently reduce costs.
Point 6	Institute training on the job.
Point 7	Institute leadership.
Point 8	Drive out fear so that everyone may work effectively for the company.
Point 9	Break down barriers between departments. People in research, design, sales, and production must work as a team, to address problems of production and use that may be encountered with the product or service.
Point 10	Eliminate slogans, exhortations, and targets for the workforce asking for zero defects and new levels of productivity. Such relationships only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the workforce.
Point 11	a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.

	b. Eliminate management by objective. Eliminate management by numbers, numeric goals. Substitute leadership.
Point 12	a. Remove barriers right to pride on workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.  b. Remove barriers that rob people in management and their right to pride of workmanship. This means, among other things, the abolishment of the annual or merit rating and management by objective.
Point 13	Institute a vigorous program of education and self-improvement.
Point 14	Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job.

Source: WE Deming, 1986, Cambridge: Massachusetts Institute of Technology, Center for Advanced Engineering Study, pp22-24

### 2.3 SMEs in Indonesia

Small and Medium Enterprises in Indonesia began to be regulated based on the Presidential Decree Number: 96 of 1993. The Decree implies that the Ministry of Cooperatives in Indonesia is responsible for fostering small entrepreneurs. Small business is considered as an influential founder of the nation's economy due to their agility. Beyond that, the mushrooming of small businesses in Indonesia help reducing poverty through job creation. The total number of registered small businesses in Indonesia have reached a figure of 4.076 billion. The development of SMEs in Indonesia is also evidenced by the increasing amount of loans channeled to small businesses.

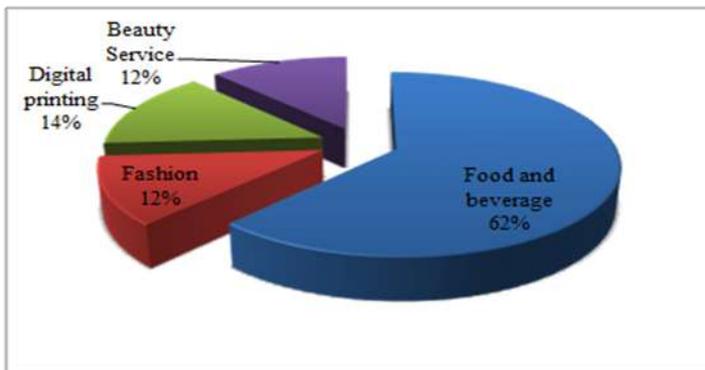
## 3 Methodology

The selected samples using random sampling technique and data were collected from 335 SMEs in Indonesia. Research data includes primary data and secondary data. Primary data were obtained from an object of research to make use of n a list of questions (questionnaire), while the data secondary obtained from literature, literature books, magazines and reports related research problems in this study. The analytical method used in this study is descriptive statistics to describe the extent of understanding of the owner or small business manager of Deming's quality management theory.

## 4 Findings

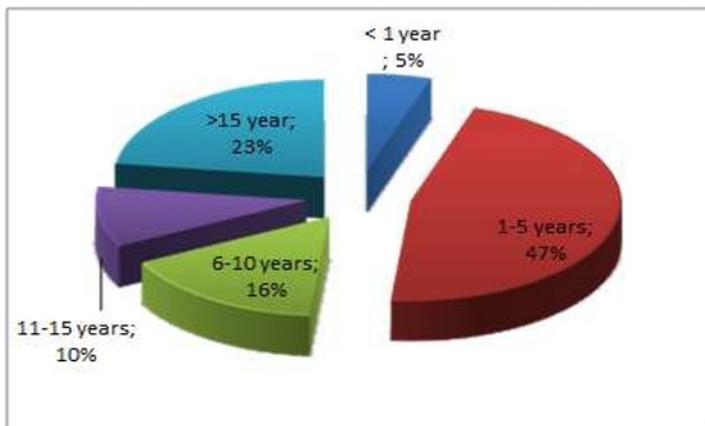
### 4.1 Profile of Respondents

From the distribution of questionnaires obtained data regarding the profile of respondents of MSME owners. Of the 335 MSMEs, food and beverage businesses dominate more than half, namely 207 or 62 %. Followed by photocopy services of 14% or 48 MSMEs, and the same amount in the type of salon and fashion business by 12%.



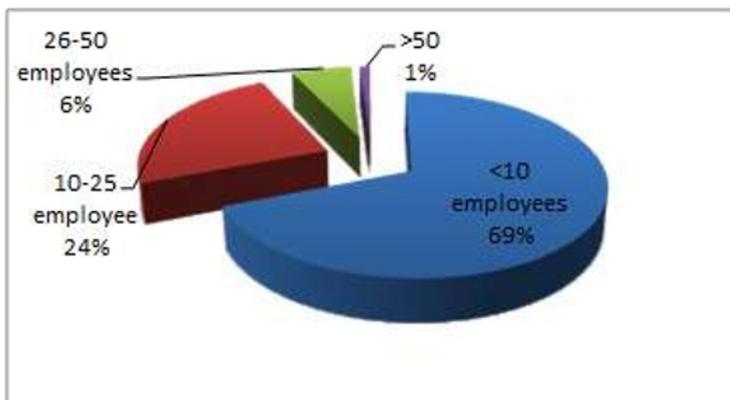
**Fig. 1.** Characteristics of respondents based on the type of business

While the number of respondents based on business age range <1 year with a percentage of 5 % or as many as 16 respondents, followed by a range of business ages 1-5 years ( 156 %), as many as 156 respondents, business age range 6-10 years ( 16%) as much 52 respondents, age range effort 11-15 years old ( 10 %) of 35 respondents, and the age of the business more than 15 years ( 23 %) of 76 respondents , as displayed in figure 2.



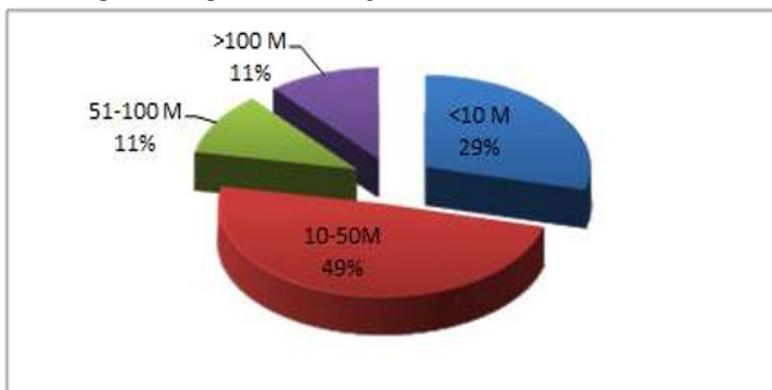
**Fig. 2.** Characteristics of respondents based on business age

Based on the number of employees, the highest number of employees in UMKM respondents was <10 employees, namely 231 respondents ( 69 %). The number of employees 10-25 people occupies the second largest number with 81 respondents ( 24%), followed by the number of employees 26-50 people ( 6 %), and finally the number of employees > 50 people only 3 people ( 1 %). For more details, can be seen in Figure 3 below.



**Fig. 3.** Characteristics of respondents based on the number of employees

Based on monthly turnover, the most massive turnover of MSME respondents is > 100 million, which is 36 respondents ( 11 %). The total turnover of 51-50 million was 37 respondents ( 11%), followed by the turnover of 10-50 million (49 %) or 164 respondents, and the last was the turnover of <10 million there were 98 respondents ( 29 %). The following is a more precise explanation in Figure 4.



**Fig. 4.** Characteristics of respondents based on turnover per month

### 4.2 Descriptive Analysis

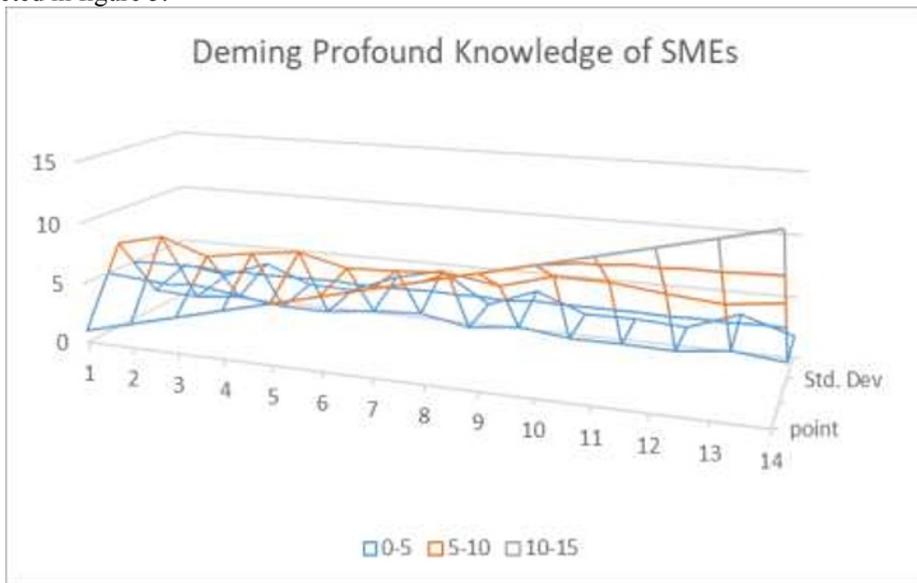
Respondents were asked on their daily quality management practice based the Deming’s system of profound knowledge. Table 2 presents the results of the analysis using descriptive statistics.

**Table 2.** Descriptive Statistics

Points	N	Min	Max	Sum	Mean	Std. Dev	Variance	Std. Error
1	335	1	10	2389.25	7.13	1.63	2.65	0.13324
2	335	3.67	10	2700.67	8.06	1.43	2.04	0.13324
3	335	1	10	2258,33	6.74	1.87	3.5	0.13324
4	335	2.25	10	2464.75	7.36	1.4	1.97	0.13324
5	335	3	10	2622,33	7.83	1.37	1.87	0.13324

6	335	1	10	2308.75	6.89	1.86	3.45	0.13324
7	335	1	10	2366	7.06	2.1	4.39	0.13324
8	335	3.5	10	2448.75	7.31	1.36	1.85	0.13324
9	335	1	10	2232.67	6.66	1.85	3.42	0.13324
10	335	2	10	2618,33	7.82	1.36	1.85	0.13324
11	335	3.67	10	2608	7.78	1.37	1.89	0.13324
12	335	3.8	10	2445	7.3	1.28	1.63	0.13324
13	335	1	10	2329.5	6.95	1.78	3.17	0.13324
14	335	3	10	2499	7.46	1.35	1.82	0.13324

Based on Table 2. It shows that from 335 respondents the lowest average value in filling out the questionnaire is 1 and the maximum average value is 10. Then the average value of each attribute is ranged from 6.66 on point number six, which is the attribute "institutionalizing training" to 8.06 on point number 2, namely the attribute "throw away fear." While the standard error value for each attribute is 0.13324, this shows that the level of understanding of small business managers is in the excellent category. Although pedagogically managers do not recognize Deming's big names and their philosophical theories very well, at the practical level, small managers have implemented the theory as a daily practice in developing quality business management. The result of the study can be depicted in figure 5.



**Fig. 5.** Deming’s system of profound knowledge by SMEs

The average respondent's understanding of Deming theory is in the excellent category. The top three points are the second point, "Adopt the new philosophy of quality", the fifth point is "Improve constantly and forever the system of planning, production, and service, to improve quality and productivity and constantly decrease costs "and tenth point," Eliminate slogans, exhortations, and targets for the workforce ". While three points with the lowest score are: "Cease dependence on inspection to achieve quality. Instead of require statistical evidence that quality is bunt in. ", " Institute modern methods of training on the job "and " Break down barriers between departments."

## 5 Conclusions

Overall, small business managers are practicing Deming's system of profound knowledge into their business operation. Managers adopt the new philosophy of quality to remain competitive in the market. Likewise, there is strong belief among the managers on the importance of continuous effort for improvement. They improve constantly and forever the system of planning, production, and service, to achieve high quality and productivity and continuously decrease costs. Small business managers also eliminate slogans, exhortations, and targets for the workforce. Managers of small business as a guideline when adopting quality management system can use the result of the study. The theory is easy to implement and have a good impact on organization performance.

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