ASSESSING THE ACTUALITY AND RELEVANT IMPORTANCE OF DEMING'S 14 POINTS

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Abstract

Deming's 14 points summarize the main challenges of corporate management to change for the 1980s, but the teaching may still be actual. Recent crises have drawn attention to the need to rethink and refine business. Leadership and organization have a crucial role in responding appropriately to environmental changes. The study uses an online survey to assess the relative importance of 14 points among higher education students. The analysis used the Q-methodology. The results suggest competing opinion patterns about the importance of the points. Still, there is an agreement about the key relevance of constantly improving every process for planning, production, and service as well as instituting training on the job. At the same time, the respondents significantly agreed that eliminating numerical quotas cannot be considered indispensable.

Keywords: *Deming, 14 points, Q-sort, quality management, organizational development*
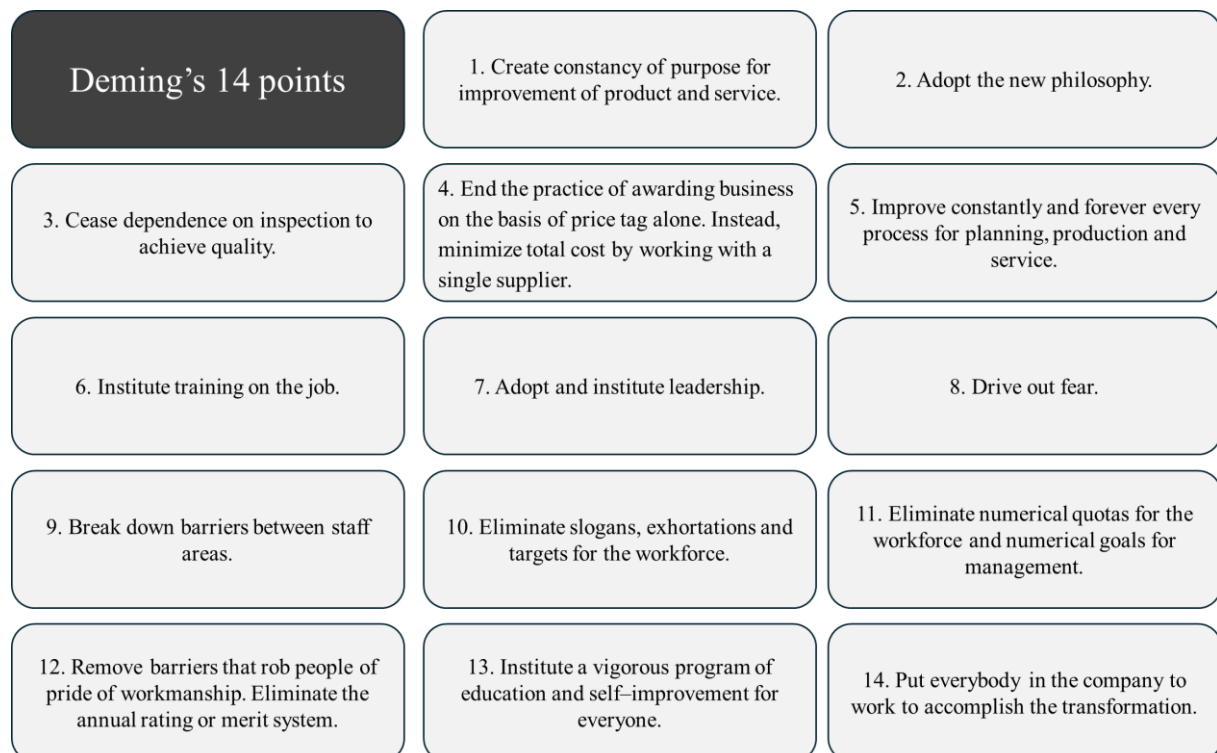
1. Introduction

The changing social and business environment requires continuously rethinking the corporate governance and management toolkit. The massive economic prosperity has been broken, and there have been signs of a severe and gradual downturn, especially in the United States. Pieces of evidence are to be found in the broadening business and economic literature. The appreciation and development of strategic management (Szintay, 2001; Mészáros, 2005; Bartek-Lesi et al., 2007; Balaton et al., 2017; Deutsch et al., 2017a; Deutsch et al., 2017b) with a particular emphasis on Porter's model of competitiveness (Porter, 1980), or quality management developments covering quality assurance and quality management (Tenner and De Toro, 2005; Szintay, 2005), activity-based cost management (Kaplan and Bruns, 1987) and the elaboration of the Balanced Scorecard method had significant impact on management and leadership thinking. New solutions to meet customer needs take from products and services (Zsótér et al., 2024), but organizational support is essential. In essence, everyone agreed that the effective methods for operational management and leadership grounded by Taylor, Fayol, and Weber (see Crainer, 1998) alone are not able to provide a guideline for the changed environment.

The spread of modern information technology boosted the changes, and at the same time, it offered solutions for data processing and management. Nowadays, connected networks, including management solutions (Hayward, 2017), the Internet of Things (Greengard, 2021), cybersecurity (Bányász, 2018), and Artificial Intelligence (Kissinger et al., 2022) are the key topics. Still, every era has had its innovations, from statistical methods (Shewhart and Deming, 1939) to computer-based manufacturing, computer-assisted administration and databases (Espeter, 2022), and later, the Internet.

The impact of the oil crises and the emergence of the German and Japanese industries urged immediate responses to renew the approach to leadership and management. Among others, McKinsey's research entitled 'In Search of Excellence' (Peters and Waterman, 1982) was a comprehensive effort to explore the critical issues based on the experience of the decades after WWII. Their conclusion is not novel at all: a radical change in leadership style and a new approach to humans is required. Quality assurance, lean management, and agile approach are aimed at the same purpose: improving the business. There is no shortage of challenges: the Chinese economic boom in the early 2000s, the global financial crisis in 2008, the COVID–19 pandemic in 2020, the Ukrainian-Russian conflicts from 2014 and 2022, and the Middle East conflict from 2023 can be highlighted. Despite the different reasons for these issues, they have one thing in common: remarkable impact on the world economy and the need for improving corporate competitiveness.

Deming's teachings are characteristic of understanding the related changes. It was born based on the Japanese and US approaches to management after WWII and emphasizes their valuable elements. His famous 14 points (Deming, 2018) were published in 1982, but the message and the context are still actual. This paper is a particular experiment to check the relative importance of Deming's model in the 21st century. Higher education students were asked to rank the 14 points using the Q-methodology. The goal of the study is to explore the opinion patterns and the majority opinion about the actual relevance of Deming's advice.

2. Background

Deming's 14 points	1. Create constancy of purpose for improvement of product and service.	2. Adopt the new philosophy.
3. Cease dependence on inspection to achieve quality.	4. End the practice of awarding business on the basis of price tag alone. Instead, minimize total cost by working with a single supplier.	5. Improve constantly and forever every process for planning, production and service.
6. Institute training on the job.	7. Adopt and institute leadership.	8. Drive out fear.
9. Break down barriers between staff areas.	10. Eliminate slogans, exhortations and targets for the workforce.	11. Eliminate numerical quotas for the workforce and numerical goals for management.
12. Remove barriers that rob people of pride of workmanship. Eliminate the annual rating or merit system.	13. Institute a vigorous program of education and self–improvement for everyone.	14. Put everybody in the company to work to accomplish the transformation.

Figure 1. Demings' 14 point

William Edward Deming (1900–1993) is known as one of the top 'quality gurus'. However, he did not deal with quality management in a traditional sense. He focused on management and organization; quality was an approach and outcome. According to Deming, "Quality is something you work at. It is a learning process" (Crainer, 1998: 43). He learned Walter Shewhart's statistical methods for improving production. He sought to enhance it to non-production processes. After WWII, he worked as a statistician adviser for the census in Japan. Later, he played a key role in rebuilding the Japanese industry (Golubeff et al., 2009). The opportunities for teaching were recognized in the 1980s by the Western countries.

His book, 'Out of the Crisis', was first published in 1982 and has been reprinted several times, most recently in 2018, underlining the content's authenticity. The famous 14 points are summarized (Crainer, 1988: 44) in *Figure 1*.

It must be noted that the teachings above have been reformulated, reorganized, and sometimes changed in various translations and applications. However, their meaning has not been damaged.

3. Method and sample

3.1. Research goal and sample

The study presents an experiment with a dual purpose. On the one side, assessing the relative importance of Deming's 14 points can contribute to developing appropriate management responses to the actual challenges. On the other side, the experiment would like to present Q-methodology opportunities in similar ranking problems.

The research question can be formulated as which of Deming's 14 points can be considered the most important for companies to improve competitiveness. It is hypothesized that an unambiguous majority pattern exists about the topic.

The sample consists of 37 master-level business students (32 studying at the University of Miskolc, and 5 studying at the Corvinus University of Budapest). They were asked to rank the 14 points by considering the survey question: 'Which advice do you think is more important for a company to be competitive?'

3.2. Analysis method

The study used a voluntary survey designed for the Q-methodology, supported by online data collection and processing. The method was developed by Stephenson (1935; 1953). The main benefit of the technique can be explained according to Brown (1980), who emphasized that only a limited number of distinct viewpoints exist on any topic, so Q-samples containing a wide range of existing opinions on the subject will reveal these perspectives.

There is no need for large samples or to assure the normal distribution of different indicators; the latter is built into the design of the Q-sort ranking pattern. The author has provided more details and applications about the UN's Sustainable Development Goals (Berényi, 2023a), Technology Adoption Propensity factors (Berényi, 2023b), and risk factors mapping in automotive projects (Venczel et al., 2024). A detailed description of the methodology is included in former papers or the book of McKeown and Thomas (2013). Banasick's Ken-q Analysis package supported data collection and statistical analysis (Banasick, 2023). Due to the explorative nature of the study, principal component analysis was applied with Varimax rotation to define the factors. Survey items were generated by translating the 14 points presented in Figure 1 into Hungarian. Data collection was performed in February 2024.

An additional question was formulated using the quality definitions by Garvin (1988). The question was the extent to which the items (performance, features, reliability, conformance, durability, serviceability, aesthetics, perceived quality) characterize products nowadays. The assessment used a 5-point scale about the respondent's agreement (1: not at all, 5: totally).

3.3. Limitations

However, Q-methodology offers quick and comprehensive insights into a ranking problem, but some limitations must be mentioned. The respondents are business students who can be considered future decision-makers. However, their studies include topics that provide a comprehensive overview of the subject; they cannot represent corporate or political decision-makers. Due to this fact, the study must be considered a pilot study. The sample size applies to a pilot study with the selected method, but repeated studies will be needed to validate the results or find competing patterns.

4. Results

4.1. Factor selection

Three opinion patterns were drawn in the sample based on the statistical analysis. The KADE software offered eight factors (Table 1), each with considerable eigenvalues (higher than 1) and 87% total variance explained.

Table 1. *Eigenvalues and explained variance based on principal component analysis*

Factor	1	2	3	4	5	6	7	8
Eigenvalues	13.44	4.28	3.46	3.11	2.50	2.10	1.72	1.53
% Explained Variance	36	12	9	8	7	6	5	4
Cumulative % Explained Variance	36	48	57	65	72	78	83	87

The scree plot analysis suggested two or three factors, but a fourth factor is also considerable based on the cumulative explained variance. Checking the significant factor loadings and the respondents belonging to the factors, a three-factor solution was selected for interpretation *(Table 2)*.

Table 2. *Number of respondents (defining variables) in different solutions*

	No of respondents	Factor 1	Factor 2	Factor 3	Factor 4
2 Factors	Total	22	15	–	–
	Significant	18	9	–	–
3 Factors	Total	12	12	13	–
	Significant	11	7	10	–
4 Factors	Total	12	10	12	3
	Significant	10	6	7	2

Factor correlation scores for the three-factor solution show moderate values (Factor 1 – Factor 2: 0.340, Factor 1 – Factor 3: 0.519, and Factor 2 – Factor 3: 0.303). The minimum Composite Reliability is 0.966 (higher than 0.7 for each factor).

4.2. Factor characteristics

Table 3 summarizes the ranking orders and the weights (z-scores) by factors. Factor visualizations (*Figure 2* to *Figure 4*) highlight the significant consensus and distinguishing statements.

***Table 3.** Factor ranks and Z-scores*

	No.	Z-score	Rank	Z-score	Rank	Z-score	Rank
…improving products and services	1	0.99	2	0.4	5	0.35	5
Adopt the new philosophy	2	0.84	5	−0.82	11	0.15	7
Cease dependence…	3	−0.82	10	0.14	7	−1	11
…minimize total cost by working with a single supplier	4	−0.75	9	0.29	6	−1.34	13
Improve constantly…	5	1.55	1	1.39	1	1.16	2
Institute training on the job	6	0.93	4	0.63	4	1.08	4
Adopt and institute leadership	7	0.24	7	1.34	2	−0.16	9
Drive out fear	8	−0.17	8	−0.02	9	1.62	1
Break down barriers between staff areas	9	−0.89	11	1.34	3	0.27	6
Eliminate slogans, exhortations, and targets for the workforce	10	−0.93	12	−1.76	14	−1.41	14
Eliminate numerical quotas…	11	−1.26	13	−1.14	12	−0.72	10
Remove barriers that rob people…	12	−1.42	14	−0.66	10	−0.12	8
Institute a vigorous program of education…	13	0.72	6	−1.16	13	1.14	3
…work accomplishing the transformation	14	0.98	3	0.01	8	−1.02	12

Composite Q sort for Factor 1

-2	-1	0	1	2
Eliminate numerical quotas for the workforce and numerical goals	Cease dependence on inspection to achieve quality	Institute a vigorous program of education and elf-improvement	** ▶ Put everybody in the company to work accomplishing the	Improve constantly and forever every process for planning,
** ◀ Remove barriers that rob people of pride of workmanship, and eliminate	** ◀ Break down barriers between staff areas	Adopt and institute leadership	Institute training on the job	* ▶ Create constancy of purpose for improving products and
	* ▶ Eliminate slogans, exhortations, and targets for the workforce	Drive out fear	** ▶ Adopt the new philosophy	
		** End the practice of awarding business on price alone;		

Legend

* Distinguishing statement at P< 0.05
** Distinguishing statement at P< 0.01
▶ z-Score for the statement is higher than in all other factors
◀ z-Score for the statement is lower than in all other factors
▢ Consensus Statements

Figure 2. *Factor 1 visualization with legend (KADE output)*

Composite Q sort for Factor 2

-2	-1	0	1	2
** ◀ Institute a vigorous program of education and elf-improvement	* Remove barriers that rob people of pride of workmanship, and eliminate	** ▶ End the practice of awarding business on price alone;	** ▶ Break down barriers between staff areas	Improve constantly and forever every process for planning,
Eliminate slogans, exhortations, and targets for the workforce	** ◀ Adopt the new philosophy	** ◀ Cease dependence on inspection to achieve quality	Institute training on the job	** ▶ Adopt and institute leadership
	Eliminate numerical quotas for the workforce and numerical goals	** Put everybody in the company to work accomplishing the	Create constancy of purpose for improving products and	
		Drive out fear		

Figure 3. *Factor 2 visualization (KADE output)*

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Composite Q sort for Factor 3

-2	-1	0	1	2
** ◄ End the practice of awarding business on price alone;	Eliminate numerical quotas for the workforce and numerical goals	** Break down barriers between staff areas	Institute a vigorous program of education and elf-improvement	** ► Drive out fear
Eliminate slogans, exhortations, and targets for the workforce	Cease dependence on inspection to achieve quality	** Adopt the new philosophy	Institute training on the job	Improve constantly and forever every process for planning,
	** ◄ Put everybody in the company to work accomplishing the	* ► Remove barriers that rob people of pride of workmanship, and eliminate	Create constancy of purpose for improving products and	
		Adopt and institute leadership		

**Figure 4.** *Factor 3 visualization (KADE output)*

4.3. Appearance of Garvin's quality dimension

The mean values of the respondents' assessment of the eight quality definitions show that products nowadays focus on aesthetics, perceived quality, and conformance to standards, while durability and serviceability lag *(Table 4).*

Table 4. *Descriptive statistics for the evaluation of the quality definitions*

	Min.	Max.	Mean	Std. Deviation	Skewness (std. error = 0.388)	Kurtosis (std. error = 0.759)
Performance	2	5	3.649	0.676	–0.007	–0.092
Features	1	5	3.703	0.939	–0.629	0.653
Reliability	1	5	3.189	1.126	0.099	–0.627
Conformance	3	5	4.054	0.705	–0.076	–0.891
Durability	1	5	2.649	1.136	0.753	–0.016
Serviceability	1	5	2.730	1.097	0.174	–0.56
Aesthetics	2	5	4.243	0.796	–0.825	0.212
Perceived Quality	3	5	4.405	0.686	–0.733	–0.539

The responses were grouped by the factors created based on the Q-sorts. The differences are presented in *Figure 5*. A non-parametric variance analysis did not confirm the significant differences in any cases; the significance levels of the Kruskal-Wallis H test are higher than 0.05 *(Table 5)*.
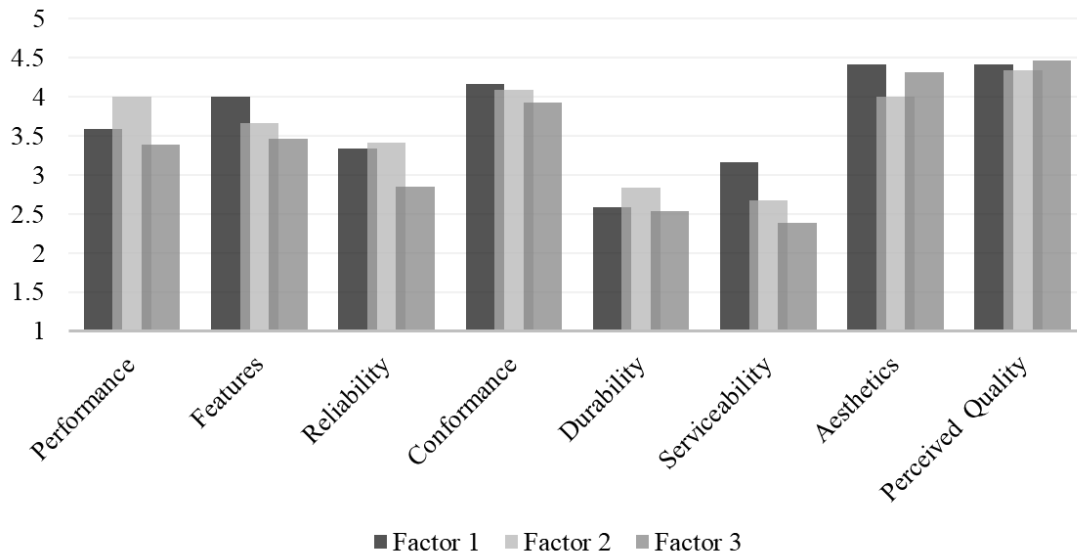
Figure 5. *Mean values of quality definitions' evaluation by factors*

Table 5. *Non-parametric variance analysis by factors*

	Kruskal-Wallis H	**d$_f$**	**Asymp. Sig.**
Performance	4.44	2	0.109
Features	2.018	2	0.365
Reliability	1.752	2	0.416
Conformance	0.805	2	0.669
Durability	0.782	2	0.676
Serviceability	4.885	2	0.087
Aesthetics	2.349	2	0.309
Perceived Quality	0.46	2	0.795

4.4. Interpretation of the results

The analysis does not show a majority opinion on the three or more-factor solution based on the high eigenvalues and the number of defining variables (significant respondents within the factor). Increasing the number of factors for analysis can explore new patterns, but the sample cannot provide significant defining variables for them.

According to the consensus statements, constantly improving every process for planning, production, and service was considered among the two most important issues for the competitiveness of the companies by evaluating the business students. Instituting training on the job also has a high level of consensus, but this item was considered not among the most important issues. At the same time, eliminating the numerical quotas for the workforce and numerical goals for management is considered among the less important issues.

The remarkable distinguishing items are:

- instituting a vigorous program of education and self-improvement for everyone,
- breaking down barriers between staff areas,
- put everybody in the company to work accomplishing the transformation,
- drive out fear.

The study does not draw a majority opinion due to the number of defining variables in the factors. The three factors present competing opinion patterns. However, the moderate correlation values suggest that the patterns are not highly independent from each other.

5. Conclusions

The study results confirm that there is no ultimate answer to the competitiveness challenge. The three factors explored suggest competing opinion patterns about the most essential ingredients for improving competitiveness:

Factor 1 represents the belief in Deming's first points about improving production and service processes, supported by accepting that a new philosophy in management is needed. Most of the HR-related items were considered less important. The respondents think conformance and serviceability are more characteristic of today's products than other factors.

Factor 2 found that adopting and instituting leadership was the most important issue, and breaking down barriers between staff areas was similar to process development. These factors keep the performance of today's products better than others.

Factor 3 emphasized the HR-related items. Driving out fear and vigorous education and self-improvement programs can be highlighted as important items. They found the quality definitions the most minor characteristics, except for aesthetics and perceived quality.

There are some common characteristics of the opinion patterns. Constant improvement of processes for planning, production, and service, as well as training on the job, are considered essential for improving competitiveness, and there is consensus that numerical quotas for the workforce and numerical goals for management should be eliminated. The consensus points allow great initial points for strategy development and education. Other goals can be subordinated to them. There is no intention to eliminate any teachings of Deming in today's context, and the relative orders can give a guide for decision-makers.

A methodological implication of the study is the usability of Q-methodology in the field. However, the sample extension is needed, and repeated measurements can validate the results. Future research aims to involve existing managers from different industries, allow a more nuanced picture of the opinion pattern, and support policy making.

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