ENUMERATION OF THE ORGANIZATIONAL CULTURE PRESCRIBED BY THE DEMING THEORY OF MANAGEMENT

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ABSTRACT

Dr. W. Edwards Deming (1900-1993) is widely credited as the management philosopher most influential in the economic recovery of post-war Japan as well as the 20th Century ascent of quality as a strategic approach toward organizational leadership and culture. His philosophy effected a vast amount of profound influence and recognition, yet there exists little formal academic research on topic in the literature, despite a number of calls to research.

This work contributes a set of numerical values based upon a mature, established survey instrument that models a set of constructs regarding organizational culture. The instrument was completed by a significant number of Deming subject matter experts. The responses form a quantitative profile of the organizational culture prescribed under Demingism.

Analysis finds significant difference between the Deming quantitative profile and the instrument's normative values along all of its constructs. The derived values appear to be in rational agreement with major tenets of Deming's philosophy. Informal evidence suggests that approximately one-third of the Demingism is represented within the instrument's model.

The values found can be used to test Demingism against various organizational outcomes or to compare Demingism with other organizational cultures.

W. EDWARDS DEMING

Dr. W. Edwards Deming (1900-1993) is widely credited as the management philosopher most influential in the economic recovery of post-war Japan as well as the 20th Century ascent of quality as a strategic approach toward organizational leadership and culture (Bean, 1985; Dixon, 1987; Kusumoto, 1987; Lazzareschi, 1993; Milstein, 1992). Deming's management philosophy is typically considered as significant as, and generally contradicts most aspects of, Taylorism (Knouse, Carson, & Carson, 1993; Rossler & Beruvides, 1994; Tipton, 1994; Washbush, 2002). In the words of one Deming expert (Aguayo, 1990), Demingism "destroys every important notion of

management, shows that the important things learned in business school are not only wrong but that they lead to inferior results, poor quality, and customer dissatisfaction." Today, both of Deming's two major management books (Deming, 1986, 1994) enjoy continuing sales in ten languages and well over 100 self-organized Deming study groups exist throughout the world.

The significance of Deming's managerial philosophy was, and continues to be, recognized by the most prominent of leaders and institutions. In recognition of his contributions toward the recovery of the Japanese economy, The Second Order Medal of the Sacred Treasure was bestowed on Deming by Emperor Hirohito. In 1950, Japan's highest national award for quality, named the Deming Prize, was established by JUSE, the Japanese Union of Scientists and Engineers (Union of Japanese Scientists and Engineers, 2003). In 1983, Deming was elected to the National Academy of Engineering. In 1985, he was titled Distinguished Visiting Scholar at Columbia University. In 1986, he was inducted into the Science and Engineering Hall of Fame. Deming received the National Medal of Technology from President Reagan in 1986 "for his advocacy to corporations and nations of a general management philosophy that has resulted in improved product quality with consequent betterment of products available to users as well as more efficient corporate performance." Shortly thereafter, Deming received an award for his "Distinguished Career in Science" from the National Academy of Sciences. Newt Gingrich lectured on the value of Deming methods, finding that they would be "one of the five pillars upon which American civilization would be renewed in the 21st century" (Gingrich, 1995). The cover story of the April 22, 1991 edition of U. S. News and World Report (Boorstin & Parshall, 1991) named its "nine hidden turning points in human history;" its ninth turning point was Deming's fathering of the Japanese quality revolution. In 1994, Deming was inducted into the Junior Achievement National Business Hall of Fame (Junior Achievement, 2003). In 1995, the American Statistical Association established the Deming Lecturer Award in honor of Deming's accomplishments (American Statistical Association, 2003).

More recent recognition has been no less auspicious. Prior to his passing, Deming was honored with advanced degrees by The University of Wyoming, Rivier College, The University of Maryland, Ohio State University, Clarkson College, The University of Miami, George Washington University, The University of Colorado, Fordham University, The University of Alabama, Oregon State University, American University, The University of South Carolina, Yale and Harvard. Fortune stated that "together, Fredrick Taylor, Peter Drucker and W. Edwards Deming have had more influence on the conduct of business and the quality of life in the United States and abroad more than any CEO" (Stewart, Taylor, Petre, & Schlender, 1999). The Los Angeles Times listed Dr. Deming as among the fifty people who most influenced business in the 20th Century (Magnier, 1999). A recent book published by the American Management Association (Crainer, 1999) included in its list of "The 75 Best Management Decisions Ever Made" that of Toyota's acceptance of Deming's advice.

Unfortunately, it must be assumed that the reader is generally familiar with the major facets of Demingism, as the scope of the topic prevents any reasonable synopsis within the confines of this

paper. For such a discussion, the reader is directed to either Deming's two major books (Deming, 1986, 1994) or popularizations by Aguayo (Aguayo, 1990), Neave (Neave, 1990) and/or Walton (Walton, 1986).

REVIEW OF THE LITERATURE AND CALLS TO RESEARCH

Clearly, Deming's management philosophy, having effected such a vast amount of profound influence and recognition, is deserving of academic study under scientific method. Yet there exists little formal academic research on topic in the literature. The recent review of the literature for this study investigated the entries within databases providing full coverage for well over 10,000 journals and trade magazines; that search located approximately 150 articles, forty books, 100 article abstracts, fifteen dissertation abstracts, 100 newspaper articles and 100 newspaper article abstracts regarding Demingism. Among them, only twenty works were identified that could be fairly described as rigorous, quantitative analytical attempts to build knowledge via generally accepted scientific methods. The balance of the literature is best described as trade press cases informally anecdoting successful improvement through employment of Demingism, articles seeking to clarify and or exemplify some portion of Demingism or articles seeking to restate basic Deming principles toward a niche or neophyte audience, functional area or industry.

This lack of formal investigation exists despite a number of calls to research. In fact, one call for research into the Deming prescription found in the literature is explicitly based upon this deficiency. Anderson, Rungtusanatham and Schroeder (Anderson, Rungtusanatham, & Schroeder, 1994) state that "despite the apparent effect that the Deming management method has had on the practice of management around the world, there is little empirical research support for its effectiveness beyond anecdotal evidence. … Academic attention on the Deming management method has, in fact, been surprisingly sparse. … Other researchers are encouraged to critically examine the Deming management method approach to quality management."

A number of other calls are equally unequivocal. Saunders and Saunders (Saunders & Saunders, 1994) state that "there is also general agreement, however, that Deming's approach … lack[s] an emphasis on careful analysis …" Dow, Samson and Ford (Dow, Samson, & Ford, 1999) state "… in parallel to this trend among practitioners [to adopt total quality management practices] … a plethora of prescriptive quality management literature has also emerged … [such as] Deming's Fourteen Points. While these claims are seldom accompanied by rigorous supporting evidence, they do have some degree of face validity. Similar anecdotal evidence and inferential evidence has been put forth by a variety of consultants, quality associations, and governmental agencies. The disappointing aspect of this debate is that after more than two decades of such claims, exceptionally little … rigorous empirical research has been conducted to verify them." Rungtusanatham, Forza, Filippini, and Anderson (Rungtusanatham, Forza, Filippini, & Anderson, 1998) reiterate the point that "despite the paucity of scientific evidence attesting to the effectiveness of W. Edwards Deming's

quality management approach, it has received considerable attention from manufacturing and service organizations around the world."

Accordingly, this study addresses that recognized deficiency with more formal research of Demingism, a management philosophy frequently recognized, through anecdotal case study, inferential evidence and prestigious honors, as being highly effective.

RESEARCH QUESTION AND METHOD

Given the lack of existing research, special consideration was given to the aim of this study, in order to ensure a useful foundation for future work. Ideally, future research would ultimately result in the ability to posit the relationship between Demingism and successful organizational outcomes such as profitability, efficiency and/or worker satisfaction. However, this is not, at this point in time, truly possible since there are no established Demingism operational constructs, or associated numerical values, that could be employed in such comparisons. In fact, there is no valid method for either assuring or falsifying Demingism in practice. A set of such constructs and associated numerical values are, therefore, prerequisite to further formal study of the Deming philosophy. Accordingly, this work contributes a subset of such numerical values, specifically a set of numerical values based upon a mature, established set of constructs regarding organizational culture. Hence the primary research question addressed by this study is "What specific numerical values would result from measuring the organizational culture prescribed by Demingism?" The values that resulted from this study can be cited and employed by future researchers in the testing of the relationship between the organizational culture prescribed under Demingism and various organizational outcomes. The values can also be used to directly compare the organizational culture prescribed by Demingism with other organizational cultures when measured in a similar manner.

The set of aforementioned organizational constructs are sourced from, and embedded within, the primary survey instrument employed in this study, the Work Environment Scale (Moos, 1994b). The Work Environment Scale (WES) was developed in the 1970s by Dr. Rudolf H. Moos of Stanford University as part of his series of Social Climate Scales (Moos, 1994a). Other instruments in that set of scales are targeted and adjusted to measure culture, climate and environment in more specific settings, such as health care and educational organizations. The Work Environment Scale, however, is intended to be applicable for use in measuring and comparing culture, climate and environment over the broadest range of organizations. Literature searches reveal that the Work Environment Scale has been employed as the primary research instrument in hundreds of formal studies, implying that the instrument is generally acceptable for use in research. Further, Vaux (Vaux, 1992) states that "the theoretical underpinnings of the instrument … have worn well" and that the instrument is reliable and valid, having been developed with due concern for psychometrics. Additional evidence of the reliability and validity of the Work Environment Scale instrument is

readily available in the literature (Constable, 1983; Flood, 1987; Moos, 1994a, 1994b; Weyer & Hodapp, 1978; Yarne, 1983).

The development of the Work Environment Scale instrument was based upon the organizational theories of Henry Murray (Moses, 1994). Murray (Murray, 1959) theorized that organizational outcomes are a consequence of the interaction of the needs of the individual and the dictates of the organization's culture and environment. Murray viewed an organization's culture as comprised of three major dimensions: the nature of its interpersonal relationships, its capacity for personal growth and its capacity for change. Within the Work Environment Scale instrument, Moos operationalized these three dimensions into ten specific constructs. The interpersonal relationship dimension is operationalized as the degree of involvement, the degree of coworker cohesion and the degree of supervisor support present in the organization. The personal growth dimension is operationalized as the degree of autonomy, the degree of task orientation and the degree of work pressure present in the organization. The change capacity dimension is operationalized as the degree of clarity, the degree of managerial control, the degree of innovation and the degree of physical comfort present in the organization (More specific definitions of these operationalizations are found within the Data Analysis section of this study.). The instrument yields a numerical value for each construct, within a zero-to-nine scale, where nine represents the highest degree. Moos developed normative sample mean values for each of the ten constructs through the surveying of 8,146 people belonging to 116 work groups.

Most of these ten constructs, as well as Murray's underlying model, initially appeared to generally correspond with a number of central organizational themes that comprise Deming's philosophy, thereby justifying its use toward developing a set of measures of the organizational culture prescribed under Demingism. For example, Deming continually advocated a high degree of worker autonomy to pursue quality and improvement. One better known Deming quotation regarding this point is that he believed "the greatest waste in America is failure to use the abilities of people" (Deming, 1986). His strong position regarding the elimination of production quotas is also an advocacy of higher worker autonomy. Additional evidence collected during this study, in the form of a supplementary discussion question, provided additional support regarding the appropriateness of this instrument.

In this study, the Work Environment Scale instrument was distributed to, and completed by, a number of individuals that can be regarded as Demingism subject matter experts. Prior to this study, there was no generally accepted list of Deming subject matter experts, however fifty three individuals were identified as a population on the basis that they had relatively extensive professional contact with Deming, published extensively on the topic of Demingism, remained centrally active in the Deming community, and/or are credited by name in Deming's major written works. The responses of these participants resulted in mean values for each of the ten constructs that form a quantitative "profile" of the organizational culture prescribed under Demingism.

DATA ANALYSIS AND RESULTS

A satisfactory survey response rate was obtained. Of the fifty-three individuals originally identified in the population, six individuals either declined participation, self-disqualified their expertise during pre-contact or simply could not be located. Surveys were mailed to the remaining forty seven individuals. Twenty-three usable Work Environment Scale responses were returned, representing 48.9% of those individuals surveyed. Twenty-two usable supplementary discussion responses were returned, representing 46.8% of those individuals surveyed. Information was obtained from approximately nearly half of the individuals who did not return any portion of the survey regarding their lack of response; the information suggested low likelihood of non-response bias.

The Work Environment Scales responses returned from the Deming subject matter experts were aggregated to determine the numerical values for each of the ten constructs, then compared to the corresponding normative sample mean values as determined by Moos. It is important to note that Moos' normative sample means do not constitute a set of measures for a "normal" or "typical" organizational culture, but rather are a measure of central tendency. Further, while Moos has provided associated variances, no information is provided regarding their underlying distribution; hence normality cannot be assumed. In fact, the recommended test for significance suggests that the underlying distributions of the normative mean values are more likely uniform than normal in nature. "Work Environment Scale profile elevations typically are interpreted as significant at approximately one standard deviation above the approximate normative mean. … Work Environment Scale users would be well advised to interpret differences on the order of a standard deviation or more as clinically relevant" (Moses, 1994). Hence, significant difference between Demingism values and normative mean values should be interpreted only as clear evidence of deviation from the central tendency of organizational culture values, rather than evidence of deviation from any kind of "normal" or "typical" organizational culture values.

Significance was found for all three constructs within the Nature of Interpersonal Relationships dimension. The degree of involvement, as defined by Moos, is the degree to which employees are concerned about and committed to their jobs. Testing the derived Demingism involvement value of 8.174 against the normative mean involvement value of 5.710 found significance. Hence we conclude that Demingism expects a higher degree of involvement than that which organizations tend toward. Further, testing the involvement construct via a traditional t-test with a pooled variance resulted in a highly significant p-value of 0.004, which we interpret as strong evidence that Demingism expects a higher degree of involvement than the entire population of organizational cultures as represented by the Moos involvement normative mean and variance. The degree of coworker cohesion, as defined by Moos, is the degree to which employees are friendly and supportive of one another. Testing the derived Demingism coworker cohesion value of 7.957 against the normative mean coworker cohesion value of 5.520 found significance. Hence we conclude that

Demingism expects a higher degree of coworker cohesion than that degree toward which organizations tend. The degree of supervisor support, as defined by Moos, is the degree to which management is supportive of its employees and encourages employees to be supportive of one another. Testing the derived Demingism supervisor support value of 7.783 against the normative mean supervisor support value of 5.180 found significance. Hence we conclude that Demingism expects a higher degree of supervisor support than that degree toward which organizations tend.

Significance was also found for all three constructs within the Capacity for Personal Growth dimension. The degree of autonomy, as defined by Moos, is the degree to which employees are encouraged to be self-sufficient and to make their own decisions. Testing the derived Demingism autonomy value of 7.174 against the normative mean autonomy value of 5.470 found significance. Hence we conclude that Demingism expects a higher degree of autonomy than that degree toward which organizations tend. The degree of task orientation, as defined by Moos, is the degree of emphasis on good planning, efficiency, and getting the job done. Testing the derived Demingism task orientation value of 7.739 against the normative mean task orientation value of 5.860 found significance. Hence we conclude that Demingism expects a higher degree of task orientation than that degree toward which organizations tend. The degree of work pressure, as defined by Moos, is the degree to which high work demands and time pressure greatly dominate the job milieu. Testing the derived Demingism work pressure value of 3.652 against the normative mean work pressure value of 5.310 found significance. Hence we conclude that Demingism expects a lower degree of work pressure than that degree toward which organizations tend.

Further, significance was found for all four constructs within the Capacity for Change dimension. The degree of clarity, as defined by Moos, is the degree to which employees know what to expect in their daily routine and how explicitly rules and policies are communicated. Testing the derived Demingism clarity value of 7.565 against the normative mean clarity value of 4.910 found significance. Hence we conclude that Demingism expects a higher degree of clarity than that degree toward which organizations tend. The degree of managerial control, as defined by Moos, is the degree to which management uses rules and procedures to keep employees under control. Testing the derived Demingism managerial control value of 3.217 against the normative mean managerial control value of 5.260 found significance. Hence we conclude that Demingism expects a lower degree of managerial control than that degree toward which organizations tend. The degree of innovation, as defined by Moos, is the degree of emphasis on variety, change, and new approaches. Testing the derived Demingism innovation value of 7.435 against the normative mean innovation value of 4.090 found significance. Hence we conclude that Demingism expects a higher degree of innovation than that degree toward which organizations tend. The degree of physical comfort, as defined by Moos, is the degree to which the physical surroundings contribute to a pleasant work environment. Testing the derived Demingism physical comfort value of 7.130 against the normative mean physical comfort value of 4.240 found significance. Hence we conclude that Demingism expects a higher degree of physical comfort than that degree toward which organizations tend.

Table 1 summarizes the results of the ten aforementioned tests of significance:

Table 1: Results of Significance Tests, Demingism versus WES Normative Values

Construct	Demingism Mean	WES Normative Mean	Higher/Lower Degree Under Demingism
Involvement	8.174	5.710	Higher
Coworker Cohesion	7.957	5.520	Higher
Supervisor Support	7.783	5.180	Higher
Autonomy	7.174	5.470	Higher
Task Orientation	7.739	5.860	Higher
Work Pressure	3.652	5.310	Lower
Clarity	7.565	4.910	Higher
Managerial Control	3.217	5.260	Lower
Innovation	7.435	4.090	Higher
Physical Comfort	7.130	4.240	Higher

In addition to completion of the Work Environment Scale instrument, the Deming subject matter experts were asked to respond to the following discussion question: "What percentage of the Deming philosophy do you believe is addressed by the preceding survey instrument?" The intent of the question was to seek support for the initial assumption that the Work Environment Scale instrument generally corresponds to a number of central organizational themes that comprise the Deming philosophy.

As previously stated, twenty-two usable supplementary discussion responses were returned by the Deming subject matter experts, representing 46.8% of those surveyed. Table 2 summarizes the basic descriptive statistics derived from the twenty-two responses, while Table 3 summarizes the frequency of the responses using 10% bins.

Table 2: Descriptive Statistics, Percentage of Demingism Content within WES Instrument

Mean	36.2%	Std. Dev.	24.2%	Minimum	1.0%	Range	87.0%
Median	30.0%	Variance	5.9%	Maximum	88.0%	Mode	50.0% (f=4)

Table 3: Frequency Table, Percentage of Demingism Content within WES Instrument			
10%	4	60%	1
20%	5	70%	1
30%	3	80%	2
40%	1	90%	1
50%	4	100%	0

The dispersions observed in the standard deviation, range, as well as across the frequency bins, evidence that there was no clear consensus among the Deming subject matter experts regarding the actual percentage of content. However, the mean, median and mode do all provide strong informal evidence that the Work Environment Scale content does, beyond a trivial extent, correspond to a number of central organizational themes that comprise the Deming philosophy.

Based upon the dispersion across the frequency bins, that correspondence can reasonably be said to be less than, or equal to, 50% of the total Deming philosophy. Some insight into the nature of the unaddressed percentage of Demingism can be drawn from the discussions included with the percentage responses. Several of the discussions noted that the Work Environment Scale instrument did not address Demingism's systematic perspective, emphasis on the importance of statistical variation, supplier/customer philosophies or epistemological theory. These discussions suggest that the unaddressed percentage of Demingism does not pertain to facets of organizational culture climate or environment, further strengthening the argument that the instrument is highly explanatory with regard to the organizational culture prescribed by Demingism.

DISCUSSION OF RESULTS

Most of the Demingism WES values derived from the appear to be in general agreement with major tenets of Deming's philosophy. The following discussion provides the reader with information, quotations and rationalizations regarding Deming's philosophy that support the found Demingism values. The Tayloristic managerial perspective is also discussed in contrast.

A significantly higher degree of worker involvement under Demingism was found. Demingism does expect workers to be far more "involved," concerned and committed regarding their jobs. He repeatedly focuses upon the important effect that pride and intrinsic motivation can have upon the quality of work. Taylorism, in contrast, strives to disengage the worker from the task decisions that involvement and concern would provoke, since workers are viewed as unqualified to make task decisions. Rather, Taylorism expects workers to view their job as little more than the following of managerial edict. Taylor makes this posture clear, for example, in his classic pig iron

example, where he finds the "work to be so crude and elementary in its nature that ... it would be possible to train an intelligent gorilla so as to become a more efficient pig-iron handler than any man ..." (Taylor, 1911). Again, the degree of involvement found for Demingism is higher than that of the entire population of organizational cultures upon which the normative values are based.

A significantly higher degree of coworker cohesion under Demingism was found. Deming argues for benefits to be gained by workers being mutually supportive and cooperative. Deming's argument is that the greatest effect on outcomes is often caused by the interaction of system entities, rather than the entities themselves; he states that "the greater the interdependence between components, the greater the need for communication and cooperation between them" (Deming, 1986). He argues that the bulk of the capability of a company comes, not from individual abilities, but from the interactions of those individuals, "helping or hurting each other in pairs, triplets, etc., in teams, platforms, chimneys, divisions, departments" (Deming, 1994). Taylorism, on the other hand, advocates a division-of-labor perspective and delegates the coordination of system interactions to management.

A significantly higher degree of supervisor support under Demingism was found. Demingism expects supervisors, managers and leaders to adopt a highly supportive role toward labor's effort to do good work, as opposed to merely managing "by ordinal numerics and percentages" (Deming, 1986). Deming states that the aim of leadership "should be to help people ... to do a better job" (Deming, 1986) and that he views a manager as "coach and council, not a judge" (Deming, 1994), "a colleague, counseling and leading his people on a day-to-day basis"(Deming, 1986). The managerial focus upon numerical performance measurement and quantitative analysis of work standards that Deming decries is more generally associated with Taylorism.

A significantly higher degree of autonomy under Demingism was found. Deming clearly advocates the self-sufficiency and decision-making ability of labor in a variety of ways. His oft repeated posture against quotas but is one example: "one way to move away from quotas is to introduce ... a self-directed work force-anybody does anything that needs to be done" (Deming, 1994). Deming states that improvement "includes [giving] everyone, including production workers, a chance to ... contribute the best of their talents" (Deming, 1986). Demingism expects labor to be granted the autonomy to initiative improvement and quality efforts, rather than being first beholden to Tayloristic work rules, standards and quotas. According to Deming, lack of autonomy creates frustration and fear that prevents production workers from making "the contribution that they are eager to make" (Deming, 1986).

A significantly higher degree of task orientation under Demingism was found. Since workers within a Demingistic organization are given more autonomy and responsibility for continual improvement, they must also be more work-oriented and efficiency-oriented than "traditional" Tayloristic production line workers. Further, Deming often claims his approach will remove much of the inefficiency he observed under traditional management techniques, for example, he states that "the present style of management is the biggest producer of waste, causing huge losses ..." (Deming,

1994). In his books, Deming extensively notes examples of inefficiencies due to low quality, rework efforts, numerical distortions effected by quotas as well as inadequate managerial coordination and planning in general. The responses of the subject matter experts reflect their expectation that a Demingistic organization will be highly oriented toward the reduction of the types of inefficiencies to which Deming often referred.

A significantly lower degree of work pressure under Demingism was found. This finding is also in agreement with the Demingistic perspective. Demingism. Deming does not believe high work demands or time pressure should dominate the organizational culture. Rather, improvement of processes toward higher quality of product is a higher priority than meeting production quotas (as discussed above) or improvement of numerical measures of worker efficiency. Deming explains, for example, that pressure to meet quotas creates an "inability to serve the best interests of the company" (Deming, 1986) and that "the push for production robs [designers] of the chance to go into the production area to learn the problems created by the designs they construct" (Deming, 1986). Taylorism, on the other hand, is first concerned with outcome measures such as production rates and worker efficiency.

A significantly higher degree of innovation under Demingism was found. Deming's philosophy is centered upon continuous improvement of processes. Two of Deming's Fourteen Points for Management directly recommend a great amount of change and new approaches; specifically to "improve constantly and forever the system of production and service" and to "create constancy of purpose toward improvement of product and service" (Deming, 1986). Deming makes the relationship more explicit between constancy of purpose and innovation when he states that "establishment of constancy of purpose means acceptance of obligations [to] ... innovate ... new service and new product ... new materials ... method of production; possible changes in equipment for production ... new skills required ... training and retraining of personnel ..." (Deming, 1986). Traditional mass production and Tayloristic work design approaches tend to emphasize repetition before innovation.

CONCLUSION

The results of this study open a number of areas to future research. The values found can be used to identify organizations possessing a Demingistic organizational culture, and so compare that culture with various organizational outcomes such as profitability, efficiency and/or worker satisfaction. The values can also be used to falsify a claim that a particular organization is Demingistic in nature, to lend support to such a claim or to identify gaps between the organizational culture prescribed by Demingism and the actual organizational culture found. Further, the values can be used to compare organizations deemed successful by any particular criteria, in order to determine if successful companies are (or are not) Demingistic in nature. They may also be used to

compare Demingistic organizational culture with the organizational culture prescribed by other managerial philosophies.

The results also identify areas requiring further research. The extremely significant value determined for involvement calls for further examination and explanation. Given Deming's focus upon the pivotal role of leadership, higher significance could have been expected for the supervisor support construct. Other instruments should be located and employed to increment explanatory power with regard to Demingism's systematic perspective, emphasis on the importance of statistical variation, supplier/customer philosophies and epistemological theory.

In conclusion, this study contributes a degree of quantitative texture to Deming's ethereal philosophy, thereby facilitating numerous opportunities for further research employing traditional scientific methods. In addition, this study suggests a methodology for doing so with other managerial philosophies that influence organizational culture as well.

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