ANDRÉS CARRIÓN-
GARCÍA¹
ANGELA GRISALES¹

¹ Universidad Politécnica de
Valencia, Spain

¹acarrion@eio.upv.es

QUALITY AND SUSTAINABILITY: THE DEMING'S CHAIN REACTION

Abstract: Deming's Chain Reaction is a well known proposal from Dr. W. E. Deming, in which he explains the positive effect of improving quality in different aspects of an organizational activities and performance. Recognizing and enhancing the value of Deming ideas, Chain Reaction is, in this paper, reevaluated and adapted to the environments different to those considered by Dr Deming, specifically to those where competition is not present in the companies' environment. The paper enhances the strength and power of Deming's ideas, showing its ability to adapt to scenarios different to those originally considered.

Key words: Deming's chain reaction, competitiveness, public and non-profit organizations, multiple environment.

INTRODUCTION

One of the main reasons for all quality efforts in business is the long-term survival of organizations, thus positively serving the community (customers and other stakeholders).

This fact was thoroughly understood by W. E. Deming, and in his books and lectures, he insisted on this survival as the goal for any organization, as opposed to the short-term search for profit.

He explained his ideas clearly and these explanations have become one of the fundamentals in the world of quality. One of his best-known contributions is Deming's chain reaction, in which the author clearly states the impacts that quality improvement generates in the organization (see Figure 1).

The first result of improving quality (after a lot of hard work by people in the organization), is increased productivity. This improvement is the expected (and almost unavoidable) effect of doing things right first time, with no retouching or reworking, no time-wasting, considerable scrap reduction, as well as other improvements in the organization's effectiveness.

Better productivity implies lower production costs. The question is not to produce more, but to produce more effectively, and thus produce more economically. Cost reduction allows companies to decrease prices, and to exploit improved effectiveness as an advantage in a competitive world.

Figure 1. Deming's chain reaction

The natural effect of reducing prices, according to classical economic theory, is increased sales, thus gaining market share and widening the company's presence in markets. W.E. Deming emphasizes the true aim of the organization at this point: long-term survival, understood as a long-term profitable presence in the market.

Finally, the increase in market share means growth for the company, which may need to hire new staff, thus contributing to community development and increased welfare.

DEMING'S CHAIN REACTION IN NON-COMPETITIVE ENVIRONMENTS

When Deming put forward this famous chain reaction, he was thinking about companies working in a competitive environment, as is the case of most US and European industrial and service companies.

However, there are other economic and social situations, where competition among companies is not the key to their activities, and profits are not their *raison d'être*. In the case of some companies, it is difficult to fit their situation and activity into Deming's chain reaction. This is the case, for example, of public-sector companies, public services, and non-profit organizations.

Does this mean that Deming's chain reaction does not apply to these organizations? Definitely not. The strength of Deming's idea makes it applicable to different economic environments. However, some re-writing may be needed and some steps of the chain may need to be redefined.

In the following lines, we will review how the basic chain reaction can be adapted to two different situations: non-competitive environments, and public services and non-profit organizations.

This is the situation in which monopolistic organizations live. It is also the situation for companies in theoretically open markets, in which geographical, technical or commercial issues mean that competition is weak or non-existent. Some practices (frequently on the edge of legality) in oligopolistic markets produce a similar environment in which competition does not exist.

Thus, what happens when a company does not have competitors? Does the chain reaction continue to work? How does a lack of competition affects its steps?

The first three steps of the chain remain unchanged: well addressed quality efforts will always produce cost reductions, and this automatically implies improving productivity. Differences start in the fourth step: without competition, are there any advantages of reducing prices? Or, if we are the only company in market, can we really increase market share? If the answer to these two questions is yes, then Deming's standard chain reaction applies directly. In these cases, reducing prices can make our product or service accessible to segments of the market that could not previously afford them, and this will produce growth and long-term presence in the market.

However, if the answer to these two questions is negative, then the chain would seem to break at this point. In fact, the chain does not really break, it simply doesn't need to be as long. In this case, the effect of reducing costs and improving productivity is transferred directly to the organization's economic results, increasing profits and helping to achieve long-term presence in the market, but maybe without growing or creating new jobs. We must consider that at least the robustness of the organization is improved.

For this last situation, Deming's chain reaction can be redrawn as shown in Figure 2.

Figure 2. Deming's chain reaction for non-competitive environments

DEMING'S CHAIN REACTION IN PUBLIC SERVICES AND NON-PROFIT ORGANIZATIONS

Public services, such as public healthcare systems and public educational institutions, don't have the pressure of competition. Nevertheless, if they are well-managed, such organizations must look for effectiveness and quality. "Public" shouldn't mean inefficient or low quality, and quality tools have an important role in achieving first class standards in those services. Pressure here can be established by accountability systems and transparency. In non-profit organizations, again market competition isn't at the root of efforts to improve and become more effective. There may be competition for public or private resources, or it may simply be a question of using the resources available as best as possible. Quality tools are again in the front line on the road to success.

How does Deming's chain reaction perform now? Again the three first steps remain unchanged. In the fourth step, as in the previous case but for different reasons, price reduction may not make sense and increasing market share may be impossible (sometimes fixed by regulatory institutions). Thus, after cost reduction and improved productivity, different consequences and different steps should be considered in the chain. As opposed to the previous case, this is not only a question of eliminating some steps in the chain. It is actually a question of replacing some steps with others which are more suitable to this environment.

Figure 3 shows how the chain reaction can be adapted. After reducing costs and increasing productivity, what follows is better use of the available resources (maybe public funds), allowing organizations to better serve the community, providing greater numbers of improved services which, together with recognized good use of resources, helps organizations to stay in the market (if

this term is suitable) with what we can call good Social Return of Investment (S-ROI). If this is required by the organization, and in terms of social environment characteristics, growth and the creation of new jobs are an option.

DEMING'S CHAIN REACTION IN MULTIPLE ENVIRONMENTS

Can these three chain reactions be integrated into one structure? An attempt to do so is presented in Figure 4, in what we have called, Deming's chain reaction in multiple environments. Some changes have been made in the order of the original steps.

In this version, there is a common end for the three cases: to stay in the market, i.e. the long-term permanence of the organization in the market. ROI can be understood as a means to achieving this goal. This is coherent with Deming's ideas about the importance of the will to prevail in the market, and the importance given to long-term efforts and planning. Thus, we have separated this long-term permanence and the ROI (or S-ROI). The rest of elements remain the same as those in Figures 1 to 3.

Figure 3. Deming's chain reaction for non-profit organizations.

The right branch corresponds to environments in which organizations do not look for economic profit, that is, public services, NGOs, and non-profit organizations, in general. The left branch applies in non-competitive environments in which it makes no sense for organizations to reduce prices and increase their market share, and where growth and job creation will probably not occur.

Finally, the central column corresponds to Deming's original proposal, for organizations living in a competitive environment where every opportunity to get ahead of the competition must be exploited.

In all three environments, the common goal of organizations is to stay in the market and to continue serving the community as best as possible.

THE DARK SIDE OF DEMING'S CHAIN REACTION

The aforementioned chain reaction shows the concatenation of facts generated by an improvement in quality. This concatenation is not automatic, but defines a logical path that is frequently followed in organizations.

But, and there is always a "but", the path can be different. After the first three steps, once the organization has improved its productivity, the lines of action can be oriented not towards growth and job creation, but to downsizing and cutting jobs. In some cases, this can be oriented to the primary goal of staying in the market, in a market that is more and more demanding, and where suppliers are under customer pressure to reduce costs. In other companies, which cannot or do not have the will to grow, this is a way to further increase profits.

In both cases, but especially in the second, the problem is how to ask people for motivation and to participate in actions that may lead to redundancies, possibly affecting those who made the improvements possible. The public image of quality may then be affected, and special efforts must be made to explain what happens, firstly to the company's staff and secondly, to the community.

Figure 4. Integrated multi-environment for Deming's chain reaction

REFERENCES

[1] Deming W. E., (1982), Quality, Productivity and Competitive Position, Massachusetts Institute of Technology Press, Cambridge, MA.

[2] Deming W. E., (1986), Out of the Crisis, Massachusetts Institute of Technology Press, Cambridge, MA.

KVALITET I ODRŽIVOST: DEMINGOVA LANČANA REAKCIJA

Andrés Carrión-García, Angela Grisales

Rezime: Demingova lančana reakcija je poznata po Dr.W.Demingu u kojem on objašnjava pozitivan efekat poboljšanja kvaliteta različitih aspekata aktivnosti i performansi jedne organizacije. S prepoznavanjem i povećanjem vrednosti Demingovih ideja, lančana reakcija se ponovo evaluira u ovom radu i prilagođava sredinama drugačijim od onih koje je dr Deming razmatrao, posebno onih kod kojih ne postoji konkurencija. U radu se naglašava jznačaj Demingovih ideja u kojima je pokazana sposobnost prilagođavanja različitim scenarijima od onih koje su prvobitno razmatrane.

Ključne reči: Demingova lančana reakcija, konkurentnost, javne i neprofitne organizacije, višestruko okruženje