

Full Length Research Paper

Organizational primary activities as facilitator in the quality function deployment (QFD) performance

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Accepted 21 June, 2011

It is clear that relative to the elements that were seen as constituting quality function deployment (QFD), the term has evolved considerably. Clearly, the organization's management seeking competition status appears to be faced with a far more complex task than was the case previously. This article made use of the data collected in the period of 2008 from studies in eight small official and industrial organizations in North West of Iran. However, the main purpose was to examine the organizational primary activities (OPA) and the QFD performance. The examples have clear implications for practitioners who wish to improve organizational performance as far as possible via OPA management and QFD procedure and process. In particular, paying particular attention to QFD as an occupational group with numerous responsibilities and often competing priorities is necessary. The relationship between QFD and their managers is important and we have shown elsewhere how this was the biggest variable explaining QFD levels of affective QFD and customer satisfaction. It also follows that since OPA management have a major role in bringing QFD and customer satisfaction, the design of these policies should include consideration of how QFD can apply them by QFD procedure and process to be as possible. The other implication of the research is OPA management, which through QFD procedure and process, impacts on organizational performance. That is the combination of OPA management, QFD procedure and process, organizational climate and conceptions of OPA need to take account of this wider agenda in both practice and theory.

Key words: Organizational primary activities (OPA), quality function deployment (QFD) procedure and process, customer satisfaction.

INTRODUCTION

Organizational activities

One way of considering how customer relationships create value is within the framework of Porter's value chain. The chain of activities gives the products more added value than the sum of added values of all activities. It may be reasonable to suggest that it is the customer's direct or indirect relationship with each of

these activities that creates value for the business. As all activities create value from and contribute to the customer relationship, it follows that the value of the business and the value of the customer relationship could be considered to be the same. The value chain is often criticized as a dated framework that is only applicable to manufacturing industries and considers marketing in a silo rather than encompassing the whole enterprise (Thayne, 2007). In according with Porter organizational activities categories to support and main as Table 1, we know that organizational goal attachment is depend on all of them (Fegh-hi Farahmand, 2011b). In this research, the organizational primary activities (OPA) selected as input activities (IA), process activities (PA), output activities (OA), marketing activities (MA) and services

Abbreviations: QFD, Quality function deployment; OPA, organizational primary activities; IA, input activities; PA, process activities; OA, output activities; MA, marketing activities; SA, services activities; RD, research and development.

Table 1. Organizational activities categories.

| Organizational support activities (OPA) | Infra structure (IF) | | | | |
|---|---|-------------------------|------------------------|---------------------------|--------------------------|
| | Human resources management and development (HRMD) | | | | |
| | Technology development (TD) | | | | |
| | Organizational resources procurement (ORP) | | | | |
| Organizational primary activities (OPA) | Input activities (IA) | Process activities (PA) | Output activities (OA) | Marketing activities (MA) | Services activities (SA) |

activities (SA).

Quality function deployment (QFD)

The term QFD is used to cover many techniques and technologies designed to enable organizations to match their best competitors. Results from the literature show that the concepts were developed principally and relatively little attention has been paid to the organization and there exists scope for framing the ideas implicit in competitive position for them to seeking to improve its competitive position. It is not sufficient, however, to attempt to apply techniques appropriate to organization.

The techniques covered by QFD must be made recognizable and relevant to the organizations if there is to be any possibility of them being adopted. When introduced the concept of QFD into popular parlance, the term was seen to embrace the techniques and factors. However, techniques of competitive organizations were well established and would include process design and control as one of the early manifestations. The substantial increase in techniques can be related in part to the growing influence of the organizations philosophies (Bouchereau, 2000; Gilligan, 1987; Fegh-hi Farahmand, 2003; Wernerfelt, 1997). What is particularly interesting from a review of the literature is that while there is a degree of overlap in some of the techniques, it is clear that relative to the elements that were seen as constituting QFD, the term has evolved considerably.

In recent years, it has expanded most notably to include simultaneous engineering, benchmarking and increasing emphasis on issues relating to organization strategy. Clearly, the organization management seeking world class status would appear to be faced with a far more complex task than was the case previously. One of the main reasons for the inappropriate use of advanced organizations technologies and techniques in many organizations arises from an inadequate understanding of their production or operation problems and the integrated nature of modern technology. All too often, technological solutions are imposed which necessitate the organizations to engage in an organizational metamorphosis to effectively employ them. These can often produce sub optimal results (Fegh-hi Farahmand, 2011b; Crawford, 1982; Glenn, 2002). Ideally, the reverse process should occur, where the organizational progresses from a detailed understanding of its problems, which ensures

that a particular technology or technique is adapted to meet the needs of the organization.

This process of adaptation should also take into account the size and workforce. World class needs to be framed in terms of the needs of the organization rather than the other way round. For many organizations, becoming world class does not always mean implementing the most advanced technologies; instead its competitiveness may arise from the flexibility and skills of its workforce or a unique market niche and business strategy. A useful framework for analyzing the deficiencies of the organizations operations is to identify gaps in the production or operation and business processes that lead to inefficiencies and compare these to its own model of what constitutes world class in its field. For example, the organization may employ modern production technologies, but as a result of poor operation layout and organization is not using these to their full potential.

Quality function deployment (QFD) procedure

A method to ensure that the plan is deployed and adhered to should be part of the management review procedure throughout the organization. To develop strategies and business plan to strengthen the organization's customer relations, operational, and financial performance is purpose of QFD. These activities could be a separate procedure or included as part of this procedure. The chief executive usually has control of these developments, deployment, and improvement processes and all executive management should be personally involved in these processes. The procedure should include the following:

(1) Strategy timetable: A description of the timetable for strategy and business plan development should be included and how development is considers (Dessein, 2003; Fegh-hi Farahmand, 2011a):

- Customer requirements, expectation, and expected changes.
- The competitive environment.
- Financial, market, technological, and societal risks.
- Company capabilities, Supplier, human resource, technology, and research and development.

(2) Quality information: A description of how information

Table 2. The sample blank of importance/strength matrix.

| Critical activity | Strength scale (1-5) | | | | |
|-------------------------|----------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| CA ₁ = | | | | | |
| CA ₂ = | | | | | |
| CT _n = | | | | | |

and organization data related to quality, customers, operational performance, and relevant financial data are collected, analyzed, and integrated into the strategy development should be included in this procedure. These should be compared with similar measures of competitors and/or appropriate benchmarks.

(3) QFD strategies: A description of how the strategies with the key business drivers are deployed throughout the organization should be included to describe how they are translated into actions.

(4) Continuous improvement: This describes the main types of data and information needed to support operations and decision making, and to drive improvement of this business process. The management and use of these key performance measures should include periodic review for continued validity and need, as well as the analysis and use in process improvement. Factors in the evaluation might include completeness, timeliness, effectiveness, and reliability. Whenever possible, opportunities for improvement should be implemented by the business process owner(s) or cross-functional team. If this is not feasible, the identified opportunities should be forwarded to the management review process or QFD process where applicable for review, prioritization, or integration into the system and cross-functional improvement activities (Garicano, 2000; Homans, 1950).

(5) Procedures and Job Instructions: Within an organization there must be a constancy of purpose, an alignment or unification of goals, and consistency of processes, actions, information, and decisions among organization units in support of these goals. Since the QFD is one of the primary documents describing these goals, it impacts all business processes in the organization. It is directly related to the management review, customer satisfaction measurement, list all job instruction related to this procedure, list all documentation used in this procedure.

(6) Development: Minutes of development meeting, including the documentation of customer expectations, financial, and marketing assumptions are filed and retained for the length of the long-term strategy focus (Tan, 2002; Yoji, 2003; Zbaracki, 2004).

QFD process

The process of QFD strategy formulation has three main phases:

Step 1 (QFD assessment): The process of QFD assessment aims to collect information on the current and future state of QFD development to evaluate the importance of QFD in the competitive arena and the strength of the enterprise in each operation. The internal analysis provides an overall assessment of the strength of the organization in each QFD and the result of this exercise is to identify strengths and weaknesses (Khoo, 1996; Harris, 2002; Lindsay, 2003; Hauser, 1990).

Step 2 (QFD strategy): The QFD selection aims at identifying the critical activities which the organization should concentrate its interest on, and thus ranks investments. On the basis of the analysis, the importance - strength matrix (Table 2) can be constructed. The rows of the matrix show the critical activities identified previously. The columns show a scale from 1 to 5 where the strength in each QFD is reported. This mirrors the evolution of the organization capability in that QFD given in the previous step. In the matrix, the current and desired position of QFD is assessed. This provides the basis for formulating the QFD strategy that is, identifying the effort needed to achieve the desired competitive position. To this end, the QFD capability assessment also allows identification of the areas in which a certain QFD needs such as equipment, human resources and level of expenses to be improved. The matrix also reveals whether a QFD leadership strategy being first on the market, developing new technologies, keeping a position on the leading edge or a follower strategy as imitate leaders, bring new products or services on the market later should be adopted.

Step 3 (Definition of portfolio of QFD projects): These projects can be classified in two main types:

1. Research and development projects and engineering related to product and process. Process should be understood in a broad sense, involving the production or operation chain as a whole.
2. Capital investment projects such as purchasing and laboratory equipment. This guide shows how this can be carried out for research and development (RD) projects (Madrian, 2001; Minor, 2004).

QFD and customer satisfaction

By coupling quality with customer service recovering

satisfaction, a few tactical actions can make the challenge simpler and provide leadership:

1. Support: An organization's total quality efforts must begin at the very top. Begin with the board of directors. One method of obtaining their support is to conduct a quality survey among them (Mazur, 2006; Sullivan, 1986).
2. Action plan: The answers to these and other questions will provide valuable insights into the existing corporate culture and indicate the organization's readiness for adopting quality.
3. Vision and mission: Develop a vision or mission statement if the organization does not have one already.
4. Training: Organization's with successful quality cultures start by training and educating senior management, followed by all employees (Sah, 1988; Mintzberg, 1973).
5. Quality committee: An essential ingredient for success is a senior quality committee, which provides leadership in quality and stimulates cultural change. This should be chaired by the CEO and comprise the entire senior management team and the individual responsible for quality. The responsibilities of a senior quality committee can include: establishing strategic quality goals; allocating resources; sanctioning quality improvement teams; reviewing key indicators of quality; estimating the cost of poor quality; ensuring adequate training of employees and recognizing and rewarding individual and team efforts (Sah, 1988; Segal, 2006; Stein, 2002).
6. Customer satisfaction survey: This should be sponsored by the CEO and top management to send a clear message throughout the organization that quality is linked to customer satisfaction.
7. Quality and customer satisfaction goals: The results of the customer satisfaction survey lead the CEO and senior management to establishing a set of quality goals. Although the whole organization can provide input to this task, the setting of goals is part of management's leadership responsibility.
8. Reward system: As with financial performance rewards, quality improvement goals can be incorporated into executive management compensation models to help achieve the desired quality results.
9. The Quality obsession: A CEO should be obsessed with quality. Strong corporate cultures are established through leadership by strategy (Simon, 1960; Tadelis, 2002).

METHODOLOGY

This article uses data collected during the period of 2008 from studies in eight small official and industrial organizations in North West of Iran. The main purpose of this is to examine the OPA and the QFD performance that:

- 1) OPA independent of QFD performance in organization.
- 2) Independent of OPA, the QFD performance as perceived by the

managers will be related to organizational commitment and job experiences, and that the outcome effect on employee attitudes will be greater when both are positive.

If these propositions are confirmed these will have important implications for practitioners in the way they seek to ensure successful implementation of QFD performance and enhance OPA. The relationship between managers and OPA is important in influencing the employees' views of the support received or available from the organization both at the functional practice level and in organizational climate. That is related to levels of organizational commitment and attitudes towards the job. Eight small official and industrial organizations agreed to take part in the research in the period 2008. Organizations were approached on the basis of their known quality in QFD. Questionnaires prepared by Farsi language in seven-point scale as Table 3 and so random sample of employees were selected within the unit of analysis. Interviews were conducted face to face directly within the workplace, meeting and consultant sessions by researcher or indirectly by using structured questionnaire and lasted about 30 min on average. The response rate was in excess of 87%. The survey was repeated a half year after the first in the same unit of analysis, and where possible, with the same employees. In subsequent analysis, only employee response was use once (N295). Some of the variables are based on a single measure, while others are summated scales. Factor analysis based on principal component analysis with varimax rotation confirmed that each set of scales loaded on a single factor and the Cronbach's alpha reliability test was used to assess the internal consistency of the variables.

Control variables covered OPA (1-5) and six items (6-11) taken from QFD procedure and three items (12-14) from QFD process. The first stage of our analysis was to assess the association between the nine outcome variables included QFD and customer satisfaction (15-23). Table 4 indicates that there is a strong and significantly positive relationship between all the outcomes, OPA, QFD procedure and QFD process.

These results suggest that perceptions of QFD procedure and QFD process enhance organizational outcomes such as QFD and customer satisfaction. Similarly, QFD procedure is associated with higher levels of QFD process. The strong associations between OPA and QFD procedure and QFD processs indicate the importance of QFD and customer satisfaction.

Further analysis carried out to understand how the correlations interact with each other. Ordinary least squares regression was conducted with each of the outcome variables as the dependant variable, and the controls characteristics. The results are shown in Table 5.

After block of control data, next block shows that perceptions of leadership from QFD as QFD procedure are significant, although there is considerable variation in the explanatory power of this factor across the dependant variables that this is consistent with the first proposition.

Similarly, if we then add perceptions of QFD process, we find that this is also significant in explaining the various outcomes. This supports the second proposition. For example, if we take support (column 15), model shows that the control variables explain 12% (R^2) of support of QFD and customer satisfaction. If we then add QFD procedure we can explain 21% of the variance that is, a further $(21-12 = 9)$ percent which is the R^2 change.

Finally, QFD process adds an additional impact of $(41-21+12 = 32)$ percent in support of QFD and customer satisfaction. Taken together the combined effect of QFD procedure and QFD process explains 41% of the variance in support of QFD and customer satisfaction.

The major limitation to surveys of this sort is always that by being cross-sectional it is impossible to identify trends or establish causality. We were able to do quasi-longitudinal research by repeating fieldwork in a next half year. Four organizations had

Table 3. The sample blank questionnaire sample.

| Questionnaire type | Alpha | Questionnaire | Very weak | Medium | Very strong |
|---|-------|--|-----------|--------|-------------|
| Organizational primary Activities (OPA) | 0.75 | 1) Input activities (IA) 2) Process activities (PA) 3) Output activities (OA) 4) Marketing activities (MA) 5) Services activities (SA) | | | |
| QFD procedure | 0.81 | 6) Strategy timetable 7) Quality information 8) Strategies 9) Continuous improvement 10) Procedures and Job Instructions 11) Development | | | |
| QFD process | 0.76 | 12) QFD assessment 13) QFD strategy 14) Definition of portfolio of QFD projects | | | |
| QFD and customer satisfaction | 0.79 | 15) Support 16) Action plan 17) Vision and mission 18) Training 19) Quality committee 20) Customer satisfaction survey 21) Quality and customer satisfaction goals 22) Reward system 23) The quality obsession | | | |

Table 4. Bivariate correlations (percent) for the variables used in our analysis ($p < 0.05$).

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | - | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 78 | - | | | | | | | | | | | | | | | | | | | | | |
| 3 | 39 | 89 | - | | | | | | | | | | | | | | | | | | | | |
| 4 | 69 | 60 | 91 | - | | | | | | | | | | | | | | | | | | | |
| 5 | 41 | 62 | 55 | 93 | - | | | | | | | | | | | | | | | | | | |
| 6 | 79 | 69 | 89 | 96 | 59 | - | | | | | | | | | | | | | | | | | |
| 7 | 95 | 99 | 95 | 62 | 35 | 50 | - | | | | | | | | | | | | | | | | |
| 8 | 73 | 63 | 91 | 96 | 68 | 98 | 64 | - | | | | | | | | | | | | | | | |
| 9 | 42 | 78 | 77 | 80 | 81 | 93 | 96 | 95 | - | | | | | | | | | | | | | | |
| 10 | 93 | 92 | 89 | 76 | 66 | 70 | 74 | 69 | 80 | - | | | | | | | | | | | | | |
| 11 | 69 | 79 | 83 | 90 | 77 | 91 | 94 | 93 | 80 | 79 | - | | | | | | | | | | | | |
| 12 | 95 | 96 | 97 | 98 | 82 | 71 | 90 | 86 | 95 | 90 | 96 | - | | | | | | | | | | | |
| 13 | 96 | 91 | 95 | 93 | 69 | 98 | 94 | 99 | 89 | 66 | 72 | 88 | - | | | | | | | | | | |
| 14 | 69 | 78 | 89 | 89 | 69 | 77 | 89 | 76 | 77 | 81 | 67 | 94 | 80 | - | | | | | | | | | |
| 15 | 96 | 87 | 66 | 69 | 75 | 56 | 59 | 63 | 60 | 59 | 66 | 61 | 56 | 60 | - | | | | | | | | |
| 16 | 83 | 84 | 79 | 91 | 69 | 88 | 92 | 87 | 96 | 93 | 91 | 95 | 81 | 69 | 73 | - | | | | | | | |
| 17 | 63 | 59 | 45 | 91 | 72 | 66 | 98 | 59 | 70 | 78 | 81 | 65 | 90 | 79 | 64 | 88 | - | | | | | | |
| 18 | 69 | 84 | 73 | 84 | 81 | 66 | 71 | 58 | 80 | 78 | 54 | 64 | 59 | 75 | 67 | 80 | 45 | - | | | | | |
| 19 | 91 | 95 | 98 | 96 | 90 | 78 | 96 | 77 | 95 | 70 | 72 | 95 | 88 | 93 | 60 | 89 | 89 | 70 | - | | | | |
| 20 | 77 | 75 | 71 | 98 | 98 | 70 | 89 | 95 | 96 | 90 | 72 | 89 | 95 | 81 | 70 | 96 | 77 | 78 | 96 | - | | | |

Table 4. Contd.

| | | | | | | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| 21 | 87 | 88 | 85 | 91 | 94 | 78 | 95 | 93 | 94 | 77 | 75 | 95 | 96 | 91 | 72 | 96 | 89 | 91 | 96 | 97 | - | | |
| 22 | 55 | 48 | 91 | 94 | 82 | 56 | 35 | 41 | 61 | 82 | 46 | 89 | 81 | 80 | 66 | 91 | 66 | 35 | 91 | 83 | 94 | - | |
| 23 | 93 | 95 | 96 | 85 | 90 | 35 | 65 | 42 | 89 | 88 | 36 | 96 | 96 | 98 | 64 | 87 | 70 | 46 | 95 | 94 | 96 | 39 | - |

Table 5. Regression (percent) outcomes (significant at 5% level).

| Number of observation | 295 | 295 | 295 | 295 | 295 | 295 | 295 | 295 | 295 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| QFD and customer satisfaction (Dependent variable) | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| Organizational primary activities (OPA) (control variables) | | | | | | | | | |
| 1 | 25 | 36 | 41 | 35 | 52 | 23 | 22 | 36 | 21 |
| 2 | 23 | 25 | 43 | 28 | 39 | 27 | 34 | 22 | 19 |
| 3 | 51 | 29 | 59 | 55 | 39 | 45 | 29 | 26 | 50 |
| 4 | 26 | 29 | 33 | 39 | 38 | 45 | 22 | 19 | 55 |
| 5 | 34 | 33 | 37 | 26 | 24 | 44 | 27 | 19 | 26 |
| R ² | 12 | 19 | 11 | 26 | 27 | 10 | 19 | 26 | 29 |
| QFD procedure | | | | | | | | | |
| 6 | 41 | 40 | 29 | 28 | 44 | 36 | 25 | 51 | 26 |
| 7 | 33 | 38 | 33 | 46 | 25 | 58 | 24 | 29 | 34 |
| 8 | 25 | 36 | 38 | 18 | 15 | 16 | 38 | 37 | 24 |
| 9 | 61 | 25 | 29 | 35 | 16 | 24 | 38 | 29 | 30 |
| 10 | 19 | 25 | 27 | 24 | 26 | 34 | 31 | 15 | 19 |
| 11 | 17 | 25 | 19 | 36 | 24 | 28 | 5 | 55 | 52 |
| R ² | 21 | 22 | 14 | 29 | 39 | 29 | 27 | 34 | 39 |
| QFD process | | | | | | | | | |
| 12 | 25 | 28 | 39 | 40 | 44 | 29 | 34 | 19 | 33 |
| 13 | 20 | 26 | 54 | 47 | 49 | 33 | 60 | 27 | 58 |
| 14 | 50 | 48 | 24 | 45 | 36 | 57 | 54 | 29 | 26 |
| R ² | 41 | 36 | 22 | 44 | 49 | 38 | 51 | 40 | 49 |

responded to the first half year survey results by taking action to improve the quality of QFD. All research has limitations and this is not different.

Although, significant proportions were covered, the small number of respondents in each case limits analysis. However, the total number of achieved interviews (295) is sufficient to draw some general conclusions with respect to these types of organizations with extensive QFD procedure and process.

RESULTS

This research focused on the official and industrial organizations of the Tabriz industrial area of Iran, which were the first organizations established in 2003. Around 2300 staff worked with extensive range of QFD, including extensive training and development of QFD and customer satisfaction, QFD procedure and process. Most studies in the QFD paradigm use the number of QFD procedure and process, whereas here we are looking at the effectiveness of a reasonably full range of practices.

Longitudinal research can overcome this difficulty and, while it can never be certain, it can be strongly suggestive.

The action of organizations in trying to improve the QFD and customer satisfaction through OPA behavioral selection, QFD procedure and process did have a marked and measured effect on manager's attitudes on performance.

The examples have clear implications for practitioners who wish to improve organizational performance as far as possible via OPA management and QFD procedure and process. In particular, paying particular attention to QFD as an occupational group with numerous responsibilities and often competing priorities is necessary. This can include building involvement and problem solving activities to allow access to decision-makers and provide means for mutual support, better selection with greater emphasis given to OPA management as well as technical skills and knowledge, access to

further development, coaching and guidance and quality management. The relationship between QFD and their managers is important and we have shown elsewhere how this was the biggest variable explaining QFD levels of affective QFD and customer satisfaction.

It also follows that since OPA management have a major role in bringing QFD and customer satisfaction, the design of these policies should include consideration of how QFD can apply them by QFD procedure and process to be possible.

The other implication of the research is OPA management, which through QFD procedure and process, impacts on organizational performance. That is the combination of OPA management, QFD procedure and process, organizational climate and conceptions of OPA need to take account of this wider agenda in both practice and theory.

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