House of Excellence: Better BSC Practice Through QFD Plus Hoshin Kanri

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Abstract: In this paper, we are to propose a new methodology for organization evaluation by balanced Scorecard, Quality Function Deployment and Hoshin Kanri. This method covers the weaknesses of previous methods and helps managers design a road map. We believe that by combining these methods managers can ensure that limited resources of the organization are allocated properly to get a proper vision. The weakness of the previous methods was that they are more qualitative and very hard to understand for the staff. To remedy this weakness, first of all we execute strategic planning. Secondly a BSC is used translate qualitative factors in to quantities factors. Furthermore, we rank these performance drivers by QFD and find out how we can get indicators by Voice of customer, Voice of Staff and Voice of Engineering. Ultimately we design improvement projects based on these voices and using Hoshin Kanri. The proposed methodology was implemented in Iran Porcelain factory (IRANA).

Key words: Balanced scorecard (BSC); Quality Function deployment (QFD); Hoshin Kanri, Strategic Management

INTRODUCTION

Strategic management is one of managerial activities to set vision, mission, strategy, goals and other Tactics. Without a strategy, organizations are blind in the competitive world (Kuei Liao, Lun Chang, 2009; Zehir et al., 2006; Decoene, Bruggeman, 2006). Strategic management causes are closely related to organization strategy. It involves integrating an organization to get vision, goals, policies, and tactics. Also; managers try to have the best and most appropriate performance choose excellence and appropriate methods to push the organization towards excellence. Strategic planning is one of these methods that help managers compare their organization with another organization. But on the other hand, one of the weaknesses of strategy is that it is not clear and understandable for all staff because it is qualitative and not quantitative (.Gurd, Gao, 2008) Therefore staff do not know how to try to get a vision (Olsen and et al, 2007). In order to solve this problem, Professor Kaplan introduced 'Balanced Scorecard' which evaluates strategy. (Seggie et al. 2007; Pangarka, Kirkwood, 2008; Thakkar and et al, 2007; Jusoh and et al, 2008) After introduction, BSC was developed by other researchers. (Malmi, 2001; Speckbacher et al., 2003; Van der Meer-Kooistra and Vosselman, 2004; Ax and Bjørnerak, 2005; Madsen and Windlin, 2006) But the BSC method has some weaknesses. One of these weaknesses is that it does not show which performance drivers and how managers can achieve performance drivers indicators. Since linking strategy and operational initiatives is an important success factor in the long term, this paper concentrates on three strategic management tools: Balanced Scorecard, Quality Function Deployment, and Hoshin Kanri. This new method focuses on the vision of the organization and tries to find the best solution to reach it.

To conclude, we try to identify the weaknesses and strengths of each method and design a new comprehensive method for organization evaluation which ensure that are in the right path and do not waste their limited resources such as Time, Budget, Human resource and etc.

This paper is organized as follows:

Section 2 provides a brief literature review summarizing the current state of the art and highlighting deficiencies that the proposed work responds to. The Integrated methodology for evaluation of organization’s performance is explained detail in Sect 3. The methodology will be illustrated and in Sect 4 provides an example problem with extensive discussion of the results. Finally, Sect. 5 summarizes the primary contributions, and discussion on the broader implications of the work, and also itemizes potential areas for future work.

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Literature Review:

There is an actual history of research in the field of Balanced Scorecard (BSC) method. The method is used as a comprehensive method in evaluation of organization’s performance by Kaplan & Norton (1992). Balanced scorecard help to managers and staff to have a unique understanding of vision and strategies and to know when, where, what how and why to try to get a vision. (Chavan, 2009; Umashankar, Kirti Dutta, 2007; McDevitt and etc all, 2008). This method shows that if you want to get a vision, you must evaluate your organization from four perspectives: 1-financial 2-customer 3-internal processes and 4-growth and learning. These perspectives have cause and effect relation (Aidemark, 2001). It means that if you want to get performance drivers of financial indicators you must improve your performance drivers of customer’s perspective. Performance drivers of customer’s perspective are not improved unless you develop your internal processes. Only staff can improve internal process. (Varma and et al, 2008). Dumond (1994), Forzsa and Salvador (2000 & 2001), Ittner and Larcker (2003), Evans and Jack (2003) Handfield and Ghosh (1995), and Ngreklit (2000) noted that the use of BSC will give as a higher business compared to the previous position to all positive effects of the business. Andersen and Lawrie (2001) analyzed how BSC could adopted effectively in public sector and devoted less focus on its actual effectiveness therein. But on the other hand, this method is not sufficient alone and must be used in addition other methods that we illustrated in section three.

There is a concrete history of research in the field of QFD problems. QFD was first used at Mitsubishi’s Kobe shipyard site in 1972 and later in 1983 it was introduced to the American (Akao, 1990). The first automobile company that used QFD was Toyota (Cohen, 1995). Also Mizuno in Mitsubishi’s Kobe first used QFD in 1972 to design super tankers. The QFD method is used in various industries such as automotives, electronics, banking, and food processing (Martins and Aspinwall 2001; Chan and Wu 2002).

One of the most useful and important application of QFD is that you use voice of customer to translate their needs to produced goods or service.

Another useful usage of QFD is that it can rank your important concepts and show the most important ones.

QFD is not only used in industrial companies but it can also be used in service companies.

According to an existing research, Hoshin Kanri means of Hoshin kanri is policy management (witcher, chau, 2007). Hoshin Kanri was introduced by Akao (1991) as a systematic approach for daily activities for all organizations to get the defined indicators. This method was used first in Bridgestone Tire Company (Ming Yang, Ton Su, 2007)

In Hoshin Kanri, all staff and managers are involved in performance improvement projects (Chau, Witcher, 2008)

According to Witcher & Butterworth (1999) and Tennant & Roberts (2001) of the merits of Hoshin Kanri is that in order to reach your goals and to be sure that the whole organization is involved in the performance improvement projects, you can integrate strategic objectives in to daily management through PDCA circle application.

In previous researches (lee and etc all,2000; sai on ko,lee,2000;lp and koo,2004; Clegg , Tan,2007) focus was only put on the BSC, QFD and strategic management methods which could not ensure managers of what would happened after ranking performance drivers and that their improvement projects are in the right path. These researches did not also shows how to use improve projects. The researchers focus was only on BSCs indicators or a combination of BSC and Hoshin (witcher, chau, 2007; Asan, 2007). This method was in efficient, since does not tell us how to allocate resource. Consequently, we design a new managerial tool for more efficient resource reallocation in an organization. The QFD is originally based on of Voice of customer, but in this paper we introduce three voices: voice of customer (VOC), Voice of Staff (VOS), Voice of Engineering. These voices help managers hear all viewpoints of organization members based on internal and external customers. The proposed approach had been applied in Iran Porcelain Factory (IRANA) as a case study which provided a new successful managerial tool for planning and analyzing organization strategies more effectively.

In this part, we reviewed the literature of Balanced Scorecard, QFD and Hoshin Kanri and found out the weaknesses of each method and also reviewed the latest researchers in this regard.

Methodology Development for Strategic Management and definition:

Nowadays if companies want to survive in competitive markets, they must try hard and compare themselves with other competitors. This is done by strategic management. However, this method has some weaknesses which have already been mentioned. To design indicators, the application of Balance scorecard is
a must by which, managers can evaluate organizations weaknesses. The first weakness is that organizations do not have all resources (such as human resource, Time, budget and etc al) to design improvement projects. Thus managers must know which of the performance drivers is the most important for the organization.

Therefore we used QFD to rank performance drivers.

One of the merits of QFD is that it translates customer needs to goods and service and helps managers understand customer needs. Furthermore, QFD can rank performance drivers and internal and external customer need. Ranking these drivers and needs can assist managers to find out their merits and priorities. This ranking is done by "House of Quality" matrix. The general format of this matrix is made up of the following six major components: 1) Customer requirements, 2) Technical requirements, 3) Planning matrix 4) Interrelationship matrix, 5) Technical correlation matrix, 6) Technical priorities.

We have added staff and Engineering requirements to customer requirement and call all them"Hows". Also the Technical requirements are the performance drivers, which are called of BSC. We nominate “Whats” in this paper.

![Fig. 1: The strategy map for Quality Function deployment (QFD)](image)

In our methodology, firstly we evaluate BSC’s performance drivers (Whats) using Strategic planning. Then we recognized Hows by:

- VOE: means to know the organizational requirements based on the knowledge and experience of the experts existing in the organization , thanks to their previous experience with other companies, these experts have an excellent sense to find out what the existing organization needs to be Excellent
- VOC: deals with customers’ needs and requirements within budget constraints. This is achieved by creating the value and delivering the quality and functionality as expected by the customers.
- VOS: deals with staff requirements and limitation. It is satisfied by designing a product that is compatible with staff and in line with their working conditions satisfies the staff need by VOS, will motivate them to minimize production waste. One of the principles of TQM is that, only staff's can improve processes. So we need VOS to re-engineer our processes by staff.

Finally after ranking our HOWs and WHATs, in order to improve projects more effectively, we introduce Hoshin Kanri method which is based on PDCA cycle.

First of all, managers base their planning improvement project on performance drivers which have high priority. Then each of there HOWS with high priority is related to these performance drivers assign qualified people for doing especial tasks. In the second stage the, improvement projects are implemented. Next, the programs are measured with indicators obtained by BSC. And finally in the action phase, the managers try to know that why they have not reached indicators define d for each project and their weak and strong points in each step.

Now we introduce the following mathematical notations and definitions:

\[
W_{fr} = \text{weight of performance drivers from financial perspective}
\]
\[
W_{cr} = \text{weight of performance drivers from customer perspective}
\]
\[
W_{ir} = \text{weight of performance drivers from internal process perspective}
\]
\[
W_{lr} = \text{weight of performance drivers from learning and growth perspective}
\]
This formulation is novel in that it incorporates the following capabilities into one analysis tool: 1) this method helps managers scan internal and external environment. VOC scan external environment and VOS and VOE Scan internal Environment. 2) The VOC method can help managers increase the quality of response to the needs of customers. Consequently, it helps them to increase the sale volume and also obtain higher profit. 3) The HOQ which ranks our HOWs and WHATs is a significant method for organizations and managers, to improve their projects.

The following steps should be taken to execute this model:

Step1: (P) the Balanced Scorecard is a performance based approach which evaluates our strategies based on financial, Customer, Internal processes and learning and growth perspectives to evaluate our organization.

Step2: (R,R,R,R) each performance driver is given weight based on internal and external customer.

Step3: (Vc, Vs, Ve) Identification of Voice of Customer (VOC), voice of Staff (VOS), and Voice of Engineer (VOE) to find "HOWS"

Step4: each relationship between Hows (Vc, Vs, Ve) and Whas (P) is given weight.

Step5: (R) we multiply the $W_{Vc}$, $W_{Vs}$, $W_{Ve}$ by $W_{Rc}$, $W_{Rv}$, $W_{Re}$ to rank hows and whats

Step6: Designing and execution of improvement project based on Excellence voice ($R_{Vc,Vs,Ve}$) using Hoshin Kanri.

In this part we illustrated our model and introduced three voices: VOS, VOE, VOC And showed how we can use BSC, QFD and Hoshin together.

A Case study: Iran factory of Porcelain (IRANA):

In this section, the approach in Sect. 4 is used to solve the problem in Sect. 3. Firstly, we propose a plan for each HOW and WHAT which is most important factor for Iran Porcelain Factory (IRANA) and the methodology can be implemented in this factory. Performance drivers were extracted from strategic planning. Hows were obtained by VOC, VOS and VOE. The which is directly related to the customers and others perspectives were obtained from the factory’s customers. Then we asked the staff how they can be motivated to improve their organization. This work helps managers to expand learning and growth performance drivers. After that, VOE helps to improve internal process performance drivers based on the view points of their experts. We compare the results with indicators identified in BSC. Finally, the methodology shows us how to achieve the indicators with the use of PDCA cycle.
**Problem Description:**

In this case study, the questionnaires were distributed among all 20 experts who had 15 years of experience in production, strategy, marketing departments and customers of IRANA. We use this questionnaire, to know how we can reach these performance drivers and how to rank.

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<th>Table 1: The rank of financial performance drivers</th>
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As a matter of fact, we give each performance drivers and perspectives a weight to identify which one is more important. Quality function deployment (QFD) is a unique and powerful quality tool that is designed to ensure the voice of both the internal and external customers is clearly heard and followed in the development of a product or service. Consequently, we use Voice of Customer (VOC), voice of Staff (VOS), and Voice of Engineer (VOE) to find "Hows". These voices tell us how to achieve indicators of performance drivers based on which we design improvement projects remedy weakness of QFD method which only scans external environment. Then, "whats" and "hows" can be ranked by with House of quality (HOQ) which eliminates the weaknesses of BSC and helps managers find out the priority of performance drivers and allocate limited resource to them. These results are shown in Table 5.

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<th>Table 5: Perspectives of QFD</th>
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This table displays the priority of each performance drivers (Whats) and (Hows). After ranking, we find out which performance drivers and Hows are most important. Finally, we design improvement project using Hows of high priority by Hoshin Kanri. After designing improvement projects by Hoshin, PDCA cycle is used to achieve indicators of performance drivers in the first year. This will ensure managers that resources are not wasted and help these recognize the weaknesses and strengths of their organization.

Below are the performance drivers ranked according to the priority:

1. Income
2. New production
3. Customer satisfaction
4. Profit
5. Increase of sells value
6. Continuous improvement
7. Percentage of detect
8. Rate of customer increase
9. Number of loosed customers
10. Motivation
11. Return of investment
12. Cost of R&D
Absence rate
Job environment quality
Training investment per capita
Organization abandon rate
Value added by staff

The following are the important Hows according to which the organization must design in important projects by Hoshin Kanri:

1. Marketing planning
2. Increase of sale based on marketing
3. Marketing through relation with customer
4. Identification of customers need
5. Increase of R&D cost
6. Quality improvement
7. Decrease of costs
8. Reengineering
9. Create more sells agents
10. Decrease of detects
11. Increase of staff skills
12. Obtaining financial resources
13. Staff satisfaction
14. Designing discount system
15. Designing penalty for staff
16. Ergonomic
17. Documentation

Such ranking, show that financial and customer performance drivers are of more priority than learning and growth and internal process performance drivers. We must focus financial and customers performance drivers and the Hows which are of higher priority these drivers. Then we design improvement projects based on them.

Now improvement projects can be executed by Hoshin. In the first year, we extracted improvement projects based on six hows (Marketing planning, Increase of sale based on marketing, Marketing through relation with customer, Identification of customers need, Increase of R&D cost, Quality improvement). Then the improvement projects are in implemented by PDCA cycle. In the next step, we compare results to the indicators of BSC and identify how much of these indicators have been achieved. Table 6 shows the results.

In this section, we illustrated case and showed how we aligned BSC, QFD and Hoshin Kanri.

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<th>Table 6: house of excellence</th>
<th>Decrease</th>
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Conclusion:

In this paper, we showed that how we can combination Strategic Planning, Balanced Scorecard, QFD and Hoshin kanri for organizational planning, performance and evaluation. This new method, eliminated weaknesses of each of said methods and helped managers find out what, When and Where to get a vision and to be excellent among similar companies. Also this method helps us not to use Try and error methods to reach performance drivers indicators based on the important project designed for them and not waste are limited resources in the world economic crisis.

Our goal in this paper was to design a road map for managers to find out Internal and External environments and to show on time reaction. The steps of the new method are as following:

1) Formulation of strategy planning by Balance Scorecard and identification of indicators for each performance drivers (What’s) to get a vision,
2) The use Voice of Customer (VOC), voice of Staff (VOS), and Voice of Engineer (VOE) to find "Hows".
3) Ranking of "whats" and "hows" with House of quality (HOQ),
4) The use of Hoshin Kanri for improvement projects which are high priority
5) Designing a Road Map to allocate limited resource such as time, budget, human resource and etc to high priority improvement projects extracted from Hows and performance drivers to get a vision

As further research, the implementation of the proposed methodology for other types of organizations can be studied.

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