SDI QUALIFICATION USING TQM CONCEPT

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ABSTRACT:

By analysis of performed spatial data infrastructures (SDIs) in developed countries, it is believed that one of the most important problems which obstacles the implementation of SDI's objectives, is the lack of enough harmony in different parts. The solution given in management systems for more adaptability is using total quality management (TQM). In this paper, we compare SDI and TQM from advantages, objectives and fundamental concepts. It is observed that the foundations of the two concepts seem similar. Indeed SDI can be considered as a spatial TQM. In the other words, by implementation of TQM in spatial data, SDI can be achieved. The concentration of TQM on evolution elements is its most important difference and advantage compared with SDI. It is to say that SDI emphasizes on permanent evolution of spatial processes, on the other hand in TQM, these solutions are given.It can be concluded that by applying TQM principles in SDI development processes, the problem of inadaptability in different sections of SDI, which is known as the main obstacle in its development can be mostly solved. This paper highlights the fundamental similarities and dissimilarities of SDI and TQM concepts and provides solutions to develop means of establishment of qualified SDIs through TQM principles.

1. INTRODUCTION

In the analysis of SDI in US and Britain as two developed countries in this field, it is observed that lack of uniformity in development of different parts and lack of coordination between them, are the main problems and obstacles for their SDI development, which are tried to be solved in the expansion phase (Hadley and Elliott, 2002 and Maitra, 2005). In order to have an organization out of its different parts, total assimilation for its continuous evolution is necessary. In fact, fitment that does not evolve with the others with harmony or are not organized, threats the development of the organization. Hence, the restriction of SDI development is defined as shortage of its total assimilation because of unorganized situation of processes in SDI (Rezayan et al., 2004). The most important parameter for similar development in different parts of a SDI is making a quality trend for coordination between them; indeed, quality crisis is passed as the limitation for development of a SDI. Expansion of SDI can be analyzed from three points of view: increase of users, expansion and increase of organizations involved in data production and increase and improvement of existing data. These three segments might look apart from each other. However, in the case of lack of any of them; expansion of SDI activities will confront problems. The suitable solution for problems such as the development is implementation of total TQM and following TQM trend (Rezayan et al., 2004). In a general description, total quality management can be defined as "a method for management regarding participation of all members of organization focused on the needs of customers in order to improve the activities in an organization" (Rajabbeigi and Salami, 1995). In the other words, TQM contains quantity and quality of the product and improvement trend and value making. In this paper, comparing SDI and TQM, we would pose remedies for improvement of SDI by emphasis on TQM concepts.

2. COMPARISON OF SDI AND TQM

In order to compare concepts of SDI and TQM, firstly we consider comparison of advantages, objectives and main segments of these two concepts.

2.1 Advantages

Four main advantages of TQM include cost reduction, expansion of activities and satisfaction of customers and personals (Rajabbeigi and Salami, 1995). As shown in Table 1, by a slight change, these advantages can also be mentioned as the advantages of a successful SDI.

Due to the involvement of different private and public organizations, SDI will comprehend decline of costs for government, producer and consumer of data. This shows that by implementation of TQM in organization which produces spatial data, we will achieve the first goal of SDI and TQM that is cost reduction.

Expansion of activities is another advantage of TQM. By making a total quality management in production of spatial data, regarding the involvement of all contributed factors and movement of the total system toward the visions of the organizations, different data producer organizations should improve their abilities in order to be selected as trustee of production of wanted data, among other organizations which have the ability to produce similar data. This would cause an increment in the competition between producers that is one advantage of SDI.

Another advantage posed for SDI is the increment of industries which use spatial data. The result of a total quality management system is the satisfaction of customers of products or services given by producers. This satisfaction causes increase the number of users and indeed is a justification for other consumers to use the products.

TQM	SDI
Decline of costs	Decline of costs for government
	Decline of costs for commercial activities and for consumers
Expansion of activities	Increment of competition
Satisfaction of customers as the cheapest way to increase the income	Increment of industries using spatial data
Satisfaction of personals	?

Table 1. Advantages of SDI and TQM (Rajabbeigi and Salami, 1995; Rezayan, 2003)

The final main advantage of total quality management is the satisfaction of personals. All the persons and organizations involved in the production of spatial data can be considered as personals in SDI. Personnel's satisfaction is not usually considered as one of the SDI's advantages, but in the case of using SDI, due to the increment of profit and productivity of organization, this satisfaction will be made in personals. However, it should be considered that for making satisfaction in the persons who are in the organization, most suitable method is to make an indoor total quality management system.

2.2 Goals

The ultimate bases of TQM are divided into three main segments: focus on customers, focus on working processes, extensive and continuous improvement of processes and systems (Rajabbeigi and Salami, 1995). As shown in Table 2, with slight difference, these specifications are posed in goals of SDI too, which are described below.

TQM	SDI
Focus on customers	Simplification and speed up and regulation of the processes of providing and access to information content
	Development of domestic transactions
Focus on working processes	Simplification and speed up of the process of providing and making necessary data
	Development of common framework in policies
	Improvement in accessibility and data evaluation
Extensive and continuous improvement of processes and systems	Evaluation and improvement of education and skills development
	Increase in research and development effect

Table 2. The Goals of SDI and TQM (Rajabbeigi and Salami, 1995; Rezayan, 2003)

Two primary goals of SDI are simplification and speed up and regulation of the process of production and access to information content and development of domestic transactions. These two goals focus on two kinds of the mentioned customers in TQM. The first case, i.e. the simplification of production and access to information content, is in fact to help foreign customers in order to have optimum, on time, simple and cheap usage of spatial data. The second case, i.e. development of domestic transactions, is also indeed an increase of interchanges among domestic customers of an organization. In fact these two cases, provide the first goal of TQM, i.e. focus on customers (domestic and foreign) and increase of their satisfaction of the system.

The second case in TQM focuses on working processes. It has been introduced in three segments mentioned in the main goals of SDI: development of common framework in policies, simplification and speed up of the process of providing and making necessary data, improvement in accessibility and data evaluation. These three cases are in fact three main segments of a system. Development of common framework in policies is a solution for managing and decision making segment of a system, simplification and speed up of the process of providing and making necessary data is a method for optimization of producing process (spatial data in SDI), and improvement in accessibility and evaluation is indeed an influencing factor to increase productivity in providing final product to consumers. In SDI, in fact, in each one of the three segments of management, performance and production, some solutions are considered for improvement of the working processes.

The third segment of ultimate bases of TQM is also extensive and continuous improvement of processes and systems. By analysis of the SDI's goals, it is observed that two of the SDI's goals are in the same direction of the TQM's goals. Evaluation in order to know existing problems and rate of customers (domestic and foreign) satisfaction, education and development of skills for increase of effectiveness and in order to analyze the existing problems, identification of new requirements and providing solution to resolve shortages and problems, are in fact steps to extensive and continuous improvement of processes and systems.

2.3 Main Segments

In the analysis of the main parts of SDI, four segments can be recognized: organizational framework, standard, clearinghouse (accessing network) and fundamental data sets. Two elements of leadership and supporting structure in TQM have the function of organizational framework in SDI. The main function of organizational framework in SDI is to assign policy and organizational arrangements in order to make, maintain, access and use of standards and data sets. So, in SDI the custodian of spatial data sets, has the responsibility of SDI's goals in the way of arrangements related to fundamental data sets for production and preparation and rendering them to the users, and makes the necessary flow in the spatial data infrastructure model. In TQM, a separate management structure is made to indicate priorities and performance protection of general quality management. Moreover, top managers as the leaders of making successful TQM have a responsibility similar to what the custodian have in SDI, by using scientific tools and languages to indicate the requirements, using statistics and considering the persons who have successfully used the concepts of quality management process.

Standards as the second segments of the main parts of SDI, shows the main specification of data and its type and format. In the other words, one of the main and important solutions in order to make a proper and coordinated base for implementation of any integration and versatility process of a data set, is to develop and use proper standard that treating this is one of the main duties of guiding mechanism of SDI. Besides, SDI needs the guarantee of data, product and system standards, so that amateur users have the necessary tools to achieve their goals. In TQM, education is a main factor for continuous improvement of

activities and processes. For the development of processes, there should be a scientific method with simple and applicable tools simultaneously and all managers and employees should be taught about the usage of the method and tools. Existence of standard methods and tools and the use of them create a communal language. In the other words, some standards should be defined for the personnel's activities to make interchange between producers and consumers.

The other main segment of SDI is access networks. These networks are for accessibility to fundamental data sets according to the defined policies in organizational framework and related standards. Due to the need to meet the requirements and expectations of customers (domestic and foreign) in TQM, communications are not inevitable. In fact, existence of access network in SDI can be propounded as satisfier of communication segment in TQM.

The fourth segment of SDI main parts is fundamental data. Fundamental data is considered as one of the major outputs of SDI. In fact, one of the main objectives of SDI development is to improve production, usage and presentation of the data. All affairs in TQM are also for improvement of services and products presented to customers. However, regarding the application of TQM in different organizations (production and service), there is no special focus on the type of product. Since TQM presents solution for improvement of processes and products in all activities, in the case of using this process in spatial activities, this will be highlighted in SDI.

TQM	SDI
Leadership	Organizational framework
Supportive structure	
Education	Standard
Communication	Access network
?	Fundamental data
Recognition and bonus	?
Promotion teams	?
Man's skills	?
Reengineering processes	?

Table 3. The main segments of SDI and TQM (Rajabbeigi and Salami, 1995, Rezayan, 2003)

The most important difference between SDI and TQM, is in their improving segments. Although in SDI, evaluation and improvement of education and development of skills and increase of research and development's effects are two main goals, there is no solution for this improvement. This, in recent years, through the capability of SDI, has caused activities which confront challenges in development, because of lack of an evolution-revolution trend. By making a proper process to know the existing problems and recognition of abilities and advantages of SDI in increment of productivity, the development and improvement of SDI activities can be contributed. For this purpose, the most suitable method is using the concept of TQM in SDI. One of the main segments in TQM is the existence and continuous improvement of processes and systems. Unlike the SDI, in TQM some solutions are presented for this purpose. So, in main parts of TQM, four segments are considered for improvement of processes and systems. They include diagnosis and bonuses in order to recognize leading sections in activity for betterment of organization's goals, promotion teams in order to recognize problems and shortages and providing solutions for resolving them, increment of man's skill as a conception of work of employees and reengineering of processes for designation of some processes to reply the customer's requirements. In fact, these four segments have capability to make a PDCA circle in order to do the continuous improvement.

3. CONCLUSION

Comparing SDI and TQM, it is observed that these two concepts have man similarities in advantages, goals and major segments and indeed SDI can be mentioned as a spatial TQM. In the other words, by implementation of TQM in spatial data, the result is SDI. However, unlike TQM, there is no obvious solution for continuous improvement of activities and processes. Hence, by using these concepts, i.e. recognition and bonus, promotion teams, man's skills and reengineering, the processes in SDI can achieve the above goals.

In the next stage of this research, the goal is to implement TQM in SDI. So, the TQM concepts should be implemented in all segments and details of SDI and also in their communication.

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