

# Identifying the Relationship between Total Quality Management and Sustainable Competitive Advantage from the Construction Industry Perspective

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## 요 약

While it is well-known that Total Quality Management (TQM) can generate and sustain competitive advantage, its process and components have not been clearly identified for the construction industry. This paper aims first to enhance the understanding of TQM Content and Process. Then, drawing various seminal works on TQM and an application of market-based and resource-based theory, a consolidated model identifying the relationship among TQM principles and gaining a sustainable competitive advantage is proposed. Finally, the influence of TQM on sustainable competitive advantage of construction organizations is discussed, thereby interpreting the proposed model. Recognition of TQM's influence will be a starting point, enabling the construction industry to sustain their competitive advantage in the highly competitive global construction market.

**Keywords:** Total Quality Management (TQM), Sustainability, Competitive Advantage, Construction Industry

## 1. Introduction

Total Quality Management (TQM) is a well-known theory with techniques developed to generate and sustain business competitive advantage (Powell 1995; Reed et al. 2000; Roca Puig et al. 2001; Sagir et al. 2001). As a result, many organizations have incorporated TQM into their organizational structures and management strategies. Unlike the manufacturing industry, however, the construction industry has been relatively slow to apply the concept to real projects due to the unique characteristics that each project has. Different specifications and requirements for each project mean

that one successful application of TQM principles does not guarantee the same result on others.

To overcome these barriers and enable successful implementation of TQM, it is first necessary to understand how TQM generates competitive advantage. Then, it should be followed to identify how the competitive advantage resulting from TQM can be sustained within organizations. To fulfill these needs, this study commences with defining TQM Content and Process, then, continues by identifying the most significant factors that directly affect the generation of competitive advantage and its sustainability. Authoritative works of TQM gurus such as Crosby, Deming, Feigenbaum, Ishikawa and Juran are reviewed and discussed. Next, a framework for sustainable competitive advantage is applied to two complementary models: market-based and resource-based. After that,

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the relationships between TQM Content and competitive advantage, and between TQM Process and sustainability of advantage are explained. Finally, this paper is rounded out with a consolidated model that depicts how TQM can help organizations generate and sustain competitive advantage. This model is then adapted to the construction industry.

## 2. TQM Content and Process

According to Reed et al. (2000), the seminal works of Crosby, Deming, Feigenbaum, Ishikawa, and Juran unanimously agreed on the purpose of quality management. These authors insisted that quality can improve customer satisfaction and reduce the cost of waste and rework. Considering that customer satisfaction is a common goal for all activities within organizations and that every organization tries to find ways of reducing cost and rework, these two factors are the main components of TQM. There is no doubt that organizations in the construction industry also try to achieve the same goal.

Reed et al. (2000) also maintained that the authors also unanimously defined TQM Process as interactions among leadership and commitment, training and education, using teams, and having appropriate culture. Sagir et al. (2001) argued that without top executive vision, an organization's mission as well as commitment to development and implementation of quality culture and practices may not be fully executed. As a result, top management must be aware of the importance of quality management first, then follow-up action, such as training and education for project managers, and middle and lower level employees in the aspect of quality measures, tools and concepts must be implemented. TQM requires continuous commitment of top management, people educated on quality concepts and trained to apply quality tools and techniques to real situations. Furthermore, organizations have to communicate to discuss and solve quality problems in a culture where all employees can freely give opinions about ineffective

quality practices. By doing so, the cycle of TQM Process can be completed and stay continuously in an organization.

Considering that construction projects are performed by project teams in which each member is trained and educated to understand and support business objectives set by top management, TQM Process may be easily interpreted from the construction industry perspective. Figure 1 depicts TQM Content and the components of TQM Process.

## 3. Sustainable Competitive Advantage

In order to fully understand the meaning of 'Sustainable Competitive Advantage', it is first necessary to break the phrase into two: Competitive Advantage and Sustainability. Then, the relationship between two terms should be identified by answering the following two questions:

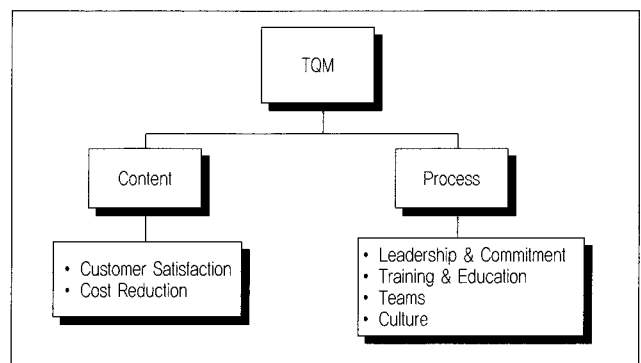


Figure 1 TQM Content and Process

- How can competitive advantage be generated in an organization?
- How can competitive advantage be sustained in the organization?

The market-based and resource-based models derived from economic theory provide clues to answer the questions above (Conner 1991; Porter 1980, 1985; Reed et al. 2000). The subsequent sections detail the relationship between competitive advantage and the market-based model, and between sustainability and the resource-based

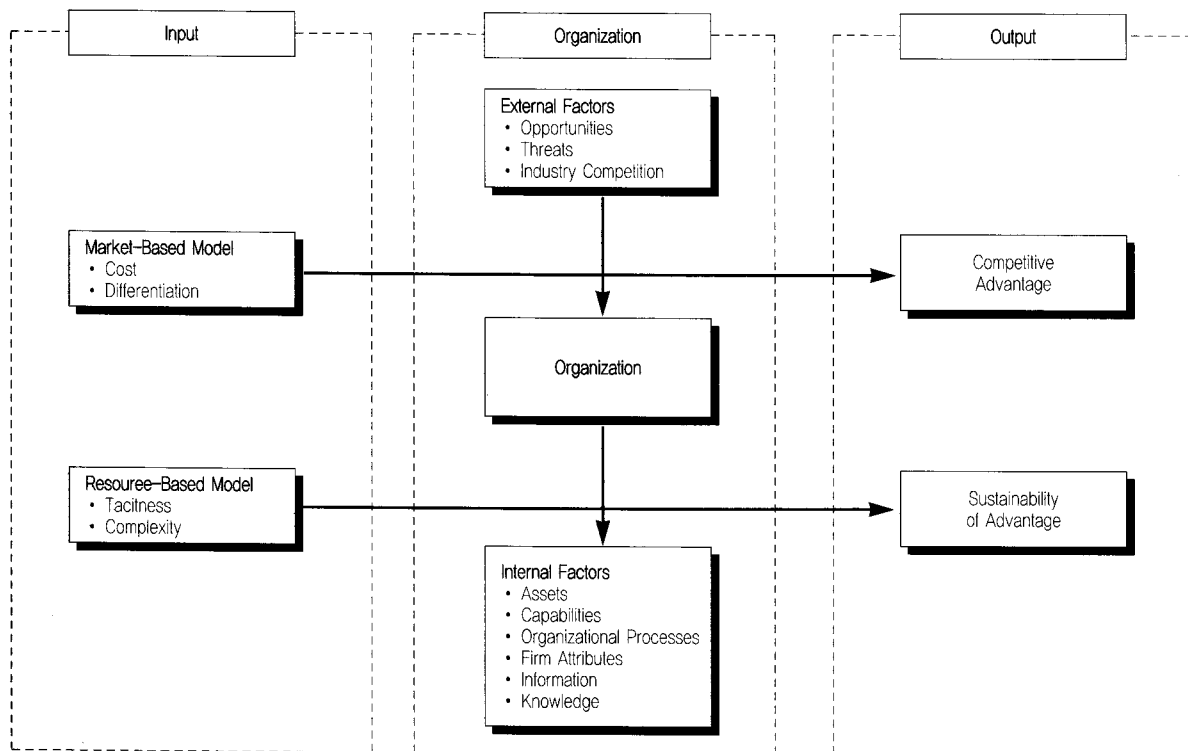


Figure 2 Market-Based Model, Resource-Based Model, Competitive Advantage, and Sustainability of Advantage

model, respectively.

### 3.1 Competitive Advantage and the Market-Based Model

The market-based model, focusing on cost and differentiation of products produced by an organization, posits that external factors decide whether or not organizations can survive (Reed et al. 2000). In this model, organizations that do not offer products for which customers are willing to pay more money can not help being screened out from markets. Moreover, organizations that have higher product costs than others are not capable of getting competitive advantage, since a market is one of the main factors determining product costs. Therefore, in this model, competitive advantage is mainly controlled by external factors such as opportunities, threats, and industry competition, and can be generated by managing these factors effectively. This relationship is summarized in Figure 2.

In the perspective of the construction industry, specifying highly qualified facilities forces the owner of the project to pay more money. On the other hand, the owner's selection of contractors heavily depends on bid price. Taken together, there is a high possibility that contractors who present the lowest cost, yet guarantee high quality will be awarded the contract. In other words, contractors who have experience in similar facility construction with better quality and comparable price can be considered to have competitive advantage since they are in a superior position in terms of opportunities, or threats from their competitors. Consequently, they are controlling the external factors in the construction market by continuously enhancing their ability to construct highly qualified facilities with the lowest cost possible. Once the competitive advantage has been achieved, it is even more important to sustain it. The following section identifies how to sustain the archived competitive advantage by employing the resource-based model.

### 3.2 Sustainability of Competitive Advantage and the Resource-Based Model

In contrast to the market-based model focusing on the external factors, the resource-based model centers on an organization's internal resources and thus, is driven by such factors as assets, capabilities, processes, firm attributes, information, and knowledge of an organization (Reed et al. 2000). According to Reed et al. (2000), this model is based upon the concept that idiosyncratic resources can produce operational superiority or help organizations to be in a superior market position. In other words, organizations that have idiosyncratic resources can sustain their competitive advantage. At this point, sustainability of advantage relies upon competitors not being able to imitate resources. Powell (1995) agreed that in line with the resource-based view, it is difficult for potential imitators to gather resources for successful reproduction of the same strategy. The difficulty of imitation can be explained by tacitness and complexity. Tacitness arises from learning-by-doing and complexity arises from the interrelationship among resources that have tacitness (Reed et al. 2000). Figure 2 depicts this relationship.

A defining characteristic of construction projects is "uniqueness"; no projects are exactly the same. This makes it hard to transfer tacitness and complexity generated by one project to another. However, this is the key to keeping competitive advantage, so organizations in the construction industry should focus on keeping their resources differentiated with that of their competitors.

### 4. TQM Content and Competitive Advantage

Sagir et al. (2001) developed indicators measuring competitiveness in a market. They identified factors affecting market competitiveness and divided these factors into two categories: industry factors and differentiation factors.

According to Sagir et al. (2001) higher competitiveness in a market can be generated by more barriers to entry

and more intensive rivalry/competition among existing competitors. This means that the level of difficulty that newcomers face when entering into the existing market influences the competitive position and returns on capital of existing organizations already in the market. The difficulty can increase by the existing rivalry/competition. Therefore, one of the most feasible ways that a newcomer can enter and succeed in the market is to ensure competitiveness by differentiating their cost and product.

The differentiation factors identified by Sagir et al. (2001) include product differentiation, personnel differentiation and price/cost differentiation. Product and personnel differentiations involve achieving competitive advantage through improving product or personnel attributes that customers perceive as more valuable than the competition. Price or cost differentiation refers to achieving competitive advantage through lower competitive prices. TQM Content is, as noted previously, to reduce costs and to improve customer satisfaction. Considering that the market-based model focuses on cost and differentiation of products, the TQM approach can be correlated with the market-based concept in the sense that competitive advantage comes from cost reduction and customer satisfaction with differentiated products. As such, it can be concluded that the proper interpretation and application of TQM objectives are a basis for generating competitive advantage in a organization, ultimately satisfying the demands from the market-based model. Figure 3 shows the relationship between TQM Content and competitive advantage.

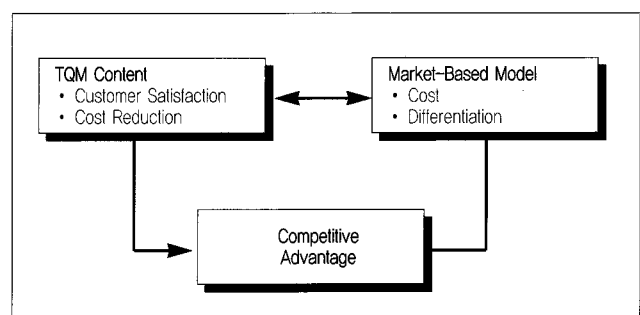


Figure 3 TQM Content, Market-Based Model, and Competitive Advantage

## 5. TQM Process and Sustainability of Advantage

Reed et al. (2000) argued that the relationship between TQM Process (leadership and commitment, training and education, using teams, and having the appropriate culture) and the tacitness and complexity of resources, which are two components of the resource-based model, can be explained in two ways. The first way is to connect each component of TQM Process with tacitness individually as described in Section 5.1. The second way is to consider complexity within all the components of TQM Process at the same time, which is referred to as "TQM Process Interaction". Section 5.2 details how this interaction affects complexity. By understanding these relationships the mechanism for creating sustainability of advantage in organizations implementing TQM Process can be identified. Figure 4 modified from the diagram provided by Reed et al. (2000) illustrates the relationship between TQM Process and sustainability of advantage. Figure 5 presents TQM Process Interaction.

### 5.1 Tacitness

This section provides details of each component of TQM Process and their one-to-one relationship with tacitness.

As previously noted in Chapter 3, tacitness is one of the key elements of the resource-based model creating sustainability of advantage.

#### 5.1.1 Leadership and Top Management Commitment

Most organizations have slogans or a motto containing top management's vision. The vision created by the experience of top management has strong tacitness since experience can not be imitated.

Furthermore, leadership can be expressed by attaining the vision, and top management's commitment to achieving the targeted vision or goal should be an important part of leadership. Powell (1995) pointed out that committed leadership is a near-evangelical, unwavering and long-term commitment by top managers to the philosophy, indicating that leadership and the commitment resulting from the leadership have inherent tacitness in nature and thus are difficult to imitate. Therefore, it can be concluded that leadership and top management commitment, one of the organizational resources that contains tacitness, keeps competitive advantage sustainable. This reveals the relationship between the first element of TQM Process and tacitness embedded in the resource-based model.

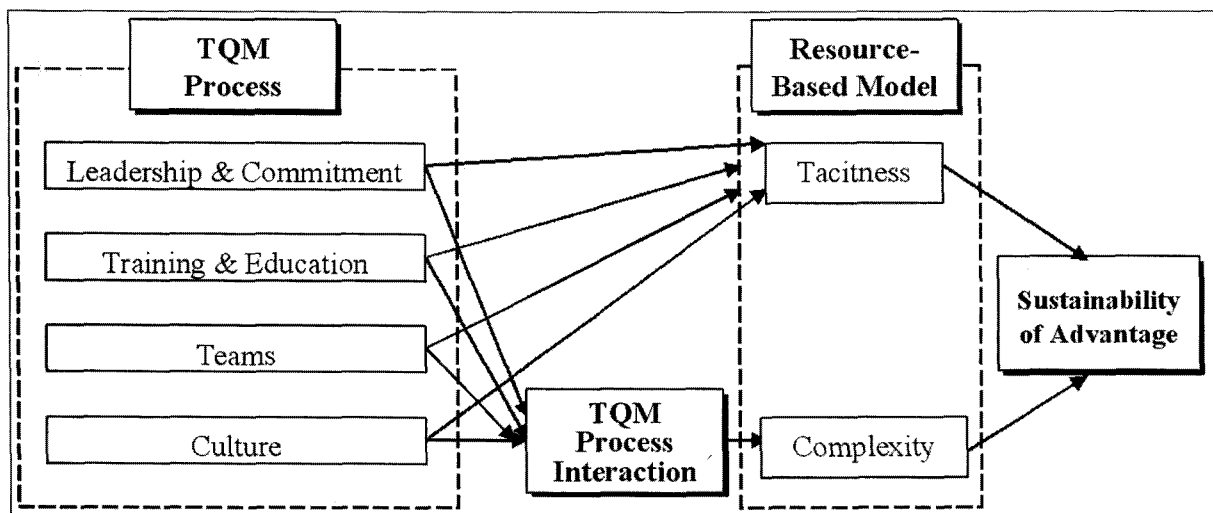


Figure 4 TQM Process, Resource-Based Model, and Sustainability of Advantage is one of the key elements of the resource-based model creating sustainability of advantage.

### 5.1.2 Training and Education

Efficiency at work is assumed to increase if the workforce is more motivated, takes on responsibilities and shows initiative (Roca Puig et al, 2001). In order to meet these assumptions, organizations should conduct employee training and education, providing their employees with knowledge and information about essential skills such as reducing cost and improving service or quality. This TQM Process also results in tacitness within an organization. Moreover, the content of the training and education should involve top management's vision and repercussions of the vision to the employees. By doing so, employee training and education can be a means of exchanging employees' philosophies and experience. Because philosophies and experience are tacit in nature, training and education are difficult to be codified and thus imitated. As a result, both of training and education can be a powerful source to sustain an organizations' competitive advantage.

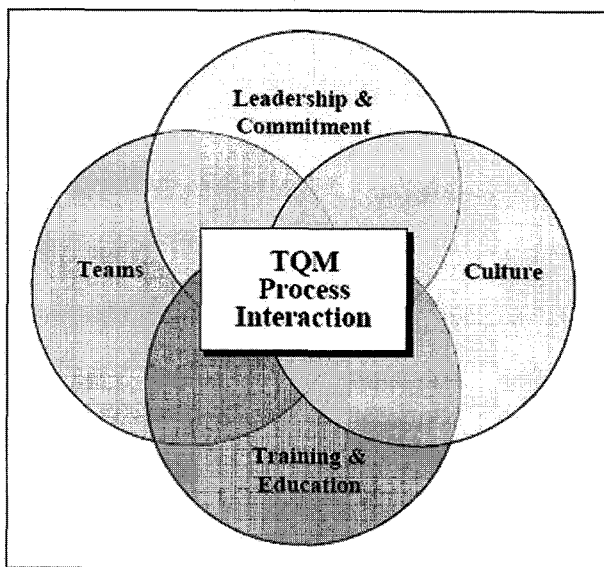


Figure 5 TQM Process Interaction

### 5.1.3 Teams

According to Gibson (2002) project or process teams are defined as groups of people who share goals or a reason for working together. Team members are interdependent in effectively achieving shared goals and share a

commitment to working together toward more effective problem-solving and decision-making. Thus, they are accountable as a functional unit within a larger inter-organizational context. Experience, philosophies, and originalities of members in a team produce heterogeneity (Powell 1995; Reed et al, 2000) that makes the team differentiated from other teams. Since the heterogeneity of teams affects each team's decision-making and problem-solving, teams are one of the factors generating imperfect imitation, ultimately enhancing tacitness in organizations.

### 5.1.4 Culture

Culture is the pattern of shared beliefs and values that provides members of an organization with rules of behavior or accepted norms for conducting operations (Swift et al, 1998). As culture is formed within the organization by people who have different philosophies, values, assumptions, beliefs, and expectations, it is natural and reasonable that organizational cultures have inimitable tacitness. Therefore, it can be concluded that culture containing tacitness can be a source of providing sustainability of TQM-based advantage.

### 5.2 Complexity

Complexity is the second element in the resource-based model, as shown in Figure 4. Complexity arises from the number of system components and the interaction among them (Reed et al, 2000). When an organization is regarded as a total system, the complicated interactions among leadership and top management commitment, training and education, teams, and culture cause competitors to be more difficult to imitate than each component does alone. In other words, when the components of TQM Process interact, more barriers to imitation can be generated, causing more complexity to competitors.

A new employee of an organization has his/her own experience, belief, assumption, and philosophy. He/she

starts to learn and practice knowledge and information including the organization's vision as defined by top management and skills essential to execute duties in his or her team. A new employee must also become accustomed to the organization's process and culture that have already had cumulated complexity resulting from interactions among existing members, teams, and cultures of the organization. As a result, new employees adding complexity to imitation can be one of the inimitable resources of organizations. Considering that the leadership of top management drives an organization and that the organization is made up of the teams that are the vehicles for carrying out training and education, leadership, education and training, teams, and culture of the organization is an entire factor cumulating barriers that make competitors difficult to imitate. This is why the interaction among TQM Process elements may be effective at generating complexity, ultimately sustaining competitive advantage of organizations as depicted in Figures 4 and Figure 5.

## 6. Consolidated Model and Application to the Construction Industry

By consolidating partial relationships explained and described in the previous Chapters and Figures, a model identifying the relationship between TQM and sustainable competitive advantage was established as shown in Figure 6. This model can furthermore be interpreted from the construction industry perspective since in reality, the relationship is often found out.

While there are various types of construction projects, and their scopes and business objectives may vary, cost reduction and customer satisfaction, which are defined as TQM Content as shown in Figure 6, must be the main concern of most organizations in the construction industry. Furthermore, strong leadership and commitment of top management, training and education for project participants, effective team composition and management, and sound culture for more efficient communication among participants, which are the

components of TQM Process, are required for the successful delivery of construction projects.

As suggested by both the market-based and resource-based models, organizations in the construction industry have their own markets in which they compete against both domestic and international competitors. Additionally, they have their own resources for the delivery of projects. This implies that customers in construction markets will demand organizations to provide differentiated designs, buildings, infrastructures, or project management and customer service with competitive costs. Furthermore, resources such as top management, project managers, contractors, and suppliers need to have differentiated skills or technologies that competitors can not imitate easily. As a result, it is no doubt that organizations should generate competitive advantage from cost reduction and differentiation. Otherwise, they will be selected out and ultimately expelled from the market.

Finally, even if a construction organization with competitive advantage stands at a superior point in the market, the organization can not survive without making efforts to sustain its advantage. However, compared with projects or products of manufacturing organizations, it is difficult for organizations in the construction industry to generate tacitness and complexity resulting in sustainability from one project to another. This is because each project has such specific or unique conditions as fluctuating on-site human resources, unexpected soil conditions, complicated and different regulations, or an environment that can not be applied even to similar projects.

Consequently, the most important thing is to determine how to sustain competitive advantage once it has been achieved through quality management efforts. It should be also remembered that keeping a position of advantage is much more difficult than getting the position.

## 7. Conclusion

The main purpose of this paper was to identify the relationship between TQM and sustainable competitive

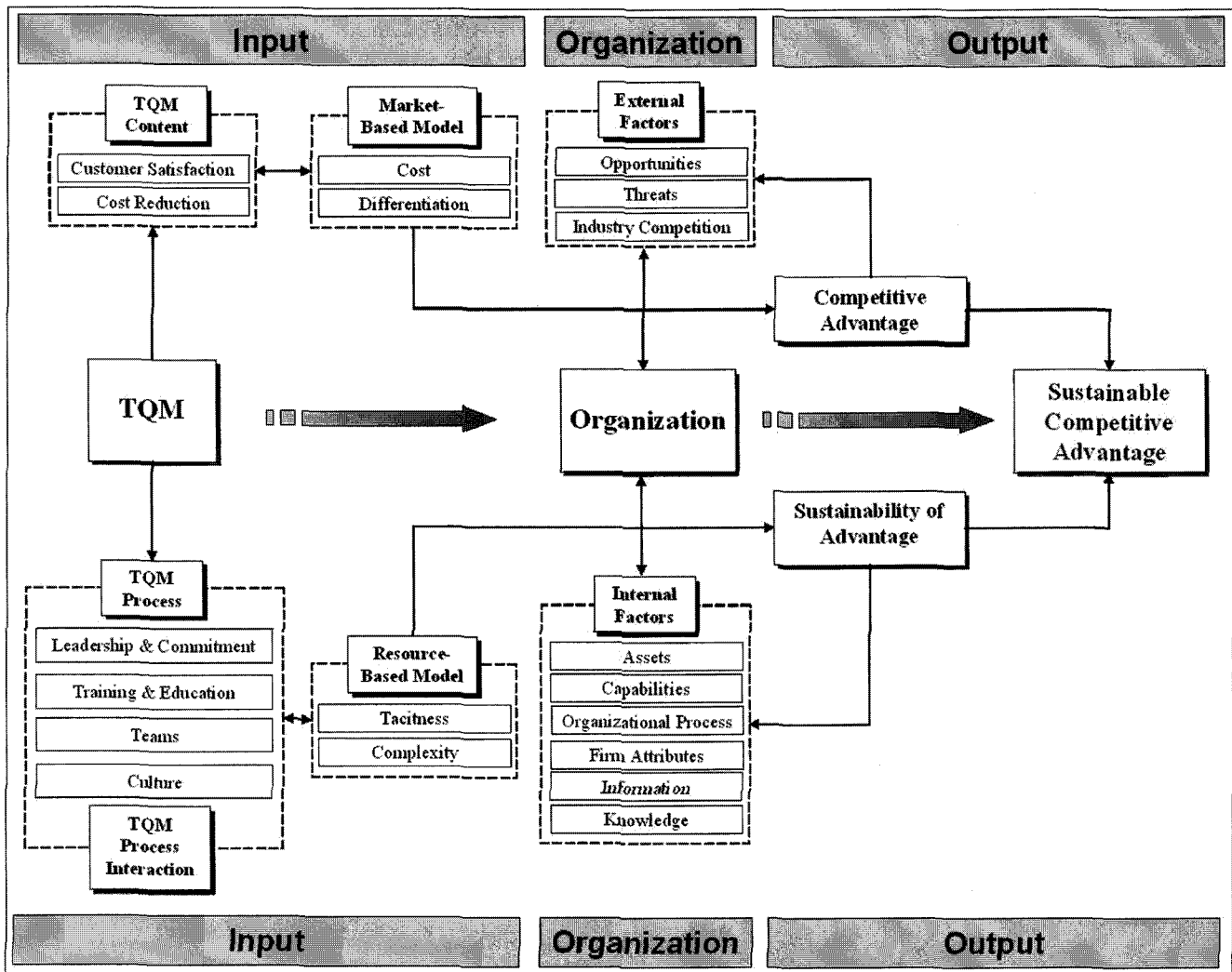


Figure 6 The Consolidated Model for the Relationship between TQM and Sustainable Competitive Advantage

advantage based upon the seminal works on TQM, market-based theory, and resource-based theory. The paper concludes by proposing a consolidated model applicable to the construction industry. To develop the consolidated model, the content and process of TQM were defined with a review of published literature containing the unanimous opinions of TQM gurus. Then, the market-based model and the resource-based model were provided in order to identify where competitive advantage comes from and how it can be sustained. At this point, it was explained that TQM Content can generate competitive advantage based on the main factors of the market-based view such as cost and differentiation.

Moreover, using concepts of the resource-based model, it was shown that each component of TQM Process,

which has barriers to imitation coming from tacitness and complexity, plays important roles in creating the sustainability of competitive advantage.

Even if it can not be deniable that the projects being performed in the construction industry vary and thus are too different to transfer achieved competitive advantage to other projects, it should be remembered that organizations that can not generate and sustain competitive advantage will be selected out and expelled from the market sooner or later. The recognition of the mechanism for generating sustainable competitive advantage within organizations is a starting point to survive in today's highly competitive globalized environment.



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