

# Understanding construction industry competitiveness: the introduction of the Hexagon framework

Stefan Ericsson (stefan.ericsson@reading.ac.uk)

Patrik Henricsson (j.p.e.henricsson@reading.ac.uk)

Carol Jewell (c.a.jewell@reading.ac.uk)

Department of Construction Management and Engineering, University of Reading, UK

## Abstract

The link between competitiveness and the sustained prosperity of a nation, industry or firm, is a well established argument and the basis for policy making and strategic changes. However, in order to develop, implement and monitor any initiatives for improving competitiveness, there is a need for a framework through which competitiveness can be measured and understood. This paper reviews the existing frameworks for analysing competitiveness and especially their application to the construction industry. Based on this review of frameworks, a new model to analyse construction industry competitiveness is introduced. Most importantly, the new model distinguishes between the indicators that are used to measure actual competitiveness, i.e. relative efficiency in achieving objectives, and the factors that influence and explain differences in the competitiveness of construction industries.

**Keywords:** Competitiveness, construction industry, frameworks, measurement

## 1. Introduction

The research community agrees that despite the increased attention over the past decade and an abundance of literature in the area, competitiveness remains a vague concept and theories and frameworks have yet to prove their relevance in competitiveness practices [1].

In order to develop, implement and monitor any initiatives for improving competitiveness, there is a need for a framework through which competitiveness can be measured and understood. However, both Momaya and Selby [2] and Ofori [3] concluded that no appropriate framework exists for analysing the competitiveness of a construction industry.

The purpose of this paper is to review the existing frameworks for analysing and understanding competitiveness and especially their application to the construction industry. Based on this review, a new framework is introduced, which capitalises on the strengths and weaknesses of the existing frameworks.

## 2. Characteristics of Competitiveness

Many authors have engaged in an intellectual debate about competitiveness and contributed to a wider understanding of, the subject, so before embarking on the tour of competitiveness frameworks, it is useful to point out some characteristics of the concept.

- § *Multi-defined*: There is no general, generic definition of competitiveness and hence the term is subject to misinterpretation and consequent confusion [4, 5, 6, 7, 8].
- § *Multi-measured*: There is no single, generic measurement of competitiveness. Instead measurements vary with the definitions [9, 6, 10].
- § *Multi-layered*: Competitiveness may be applied at national, industrial and firm levels [1, 7, 11].
- § *Dependent*: The meaning of competitiveness depends on the values of the stakeholders of the entity under investigation [2, 6].
- § *Relative*: Every measurement of competitiveness needs to be looked at in a relative sense, either against some maximum, ideal level or against its peers [6, 7].
- § *Dynamic*: The factors that influence competitiveness change with time and context, e.g. as the national economy moves from a less to a more developed stage [1, 8].
- § *Process*: Competitiveness involves assets, processes and performance, where processes turn assets into performance [9, 12].

## 3. Frameworks for Analysing Competitiveness and Their Application to Construction

This section reviews various competitiveness frameworks and how these have been applied to the construction industry. For further discussion, it is important to note the cause-and-outcome-relationship between the measurement of competitiveness and the understanding and explanation of it. Interestingly, one major criticism of the model used by the World Economic Forum (WEF) in their Global Competitiveness Report, is “that the model does not clearly differentiate between the factors which determine competitiveness of a nation (i.e. causes of competitiveness) and the indicators that are used to measure its competitiveness (i.e. outcomes)” [13, page 121].

The frameworks of competitiveness found in the literature can be divided into three categories, those that:

- § Measure competitiveness
- § Provide an explanation and understanding of competitiveness
- § Integrate the explanation and measurement

### 3.1 Frameworks for Measuring Competitiveness

This section introduces two frameworks that have been developed with the main objective to produce an ultimate competitiveness score. The score would then enable an assessment of on company's competitiveness in comparison with another.

#### 3.1.1 The Three Dimensions of Competitiveness

Feurer and Chaharbaghi [6] introduce a framework for measuring firm competitiveness. They suggest that a system for measuring competitiveness is dependent on “an organisation's perception of customer and shareholder values, the competitive environment and the drivers that determine competitiveness in that environment” [6, page 54].

The model comprises three dimensions; *Customer values*, *Shareholder values* and *Ability to Act and React*. Each of these dimensions may be quantified using various criteria: e.g. cost and speed; financial key ratios; and financial terms or non-financial terms, e.g. innovativeness or risk management for the three dimensions respectively.

Together, these three dimensions build up a ‘room’ in which the organisation may map itself in relation to its competitors. The final position in this room “reflects the trade-off between satisfying customer and shareholder values and maintaining financial strength” [6, page 58]. This framework has not appeared in any assessments, or been applied to any industry or firm case.

#### 3.1.2 The Total Value Competitiveness (TVC)

This is a computer-aided decision support system, produced to enable a contractor to assess its own competitiveness, or for a client to assess the contractor's competitiveness. Although it was specifically designed to suit the Chinese construction industry, the methodology may be of use in other countries.

Based on criteria identified by Li and Shen [14], Shen et al. [15], organised their TVC-framework in a three-level hierarchical structure. As illustrated in figure 1, the top-level parameters are; Social influence (CM-A),

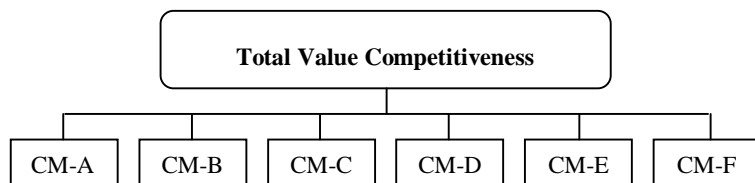


Figure 1: The top-level of the TVC-framework.

Technical ability (CM-B), Financing ability and Accounting status (CM-C), Marketing ability (CM-D), Management skills (CM-E) and Organisation structure and Operation (CM-F). Each of these parameters in turn has sub-categories and sub-sub-categories, in all there are 98 criteria, to enable assessments at different levels of the organisation. For each of the 98 criteria, there is a benchmark book that provides a benchmark score from 0 to 100. Furthermore, in order to

acknowledge the varying importance of the various criteria, Shen et al. [15] provide a weighted matrix for each of the different levels of the framework.

### 3.2 Frameworks for Understanding Competitiveness

This category of frameworks represents attempts to understand and provide an explanation to why some nations, industries or firms meet their objectives better, i.e. more efficiently than their competitors.

#### 3.2.1 The Diamond Framework

By far the most established, applied and debated framework on competitiveness is the ‘Diamond Framework’, introduced by Porter [4]. He investigated why firms based in a particular nation are able to create and sustain competitive advantage against the world’s best competitors in a particular field. Porter concluded on a wide range of factors that influence, determine and explain this international success and categorised these factors under four determinants, which in turn were famously arranged in the shape of a diamond. See figure 2 below.

The first determinant, *Factor conditions*, covers factors related to human, physical and knowledge resources. The *Demand conditions* describes the size, structure and sophistication of the home market demand for the products and services of a particular industry. *Related and supporting industries* reflects the presence or

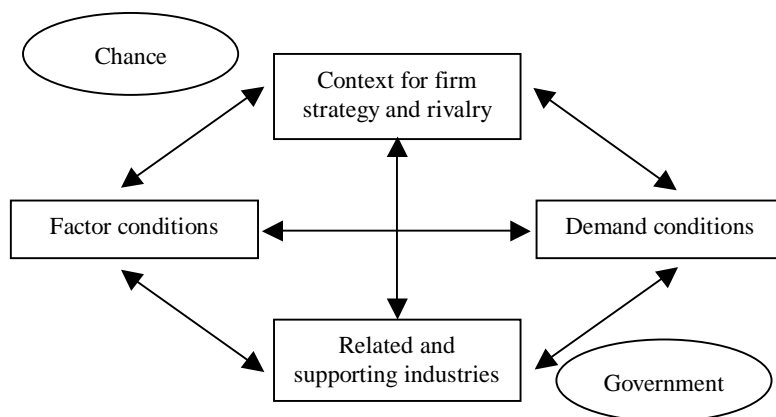


Figure 2: Porter’s Diamond framework.

absence of internationally competitive related and supporting industries of a particular industry in a nation. The fourth and final determinant, *Firm strategy, structure and rivalry*, includes the strategies and structures of firms as well as the nature of domestic rivalry. For a more comprehensive description of the framework, see [4] and for its credits, criticism and debate, see for example [8] and [16].

Ofori [17] used the Diamond framework to formulate a long-term strategy for Singapore’s construction industry, and in Ofori and Betts [18] found it to be a framework suitable for strategic planning in construction. Oz [19] applied the Diamond framework to the Turkish construction industry in order to find the sources of its competitive advantage.

### 3.2.2 The Double Diamond Framework

As a result of the debate on whether Porter had dealt with multinational activity properly or not, Rugman and D’Cruz [20] introduced the so-called *Double Diamond*, and applied it to Canada [20], Mexico [21] and New Zealand [22]. As a next step Moon, Rugman and Verbeke [23] generalised the *Double Diamond*, see figure 3 below, which, they suggest, will suit all countries and appropriately incorporate multinational activity [8]. The *Generalised Double Diamond* was later applied and tested on Korea and Singapore [24].

In figure 3, the inner-most diamond is identical to Porter’s original diamond. The outer-most diamond is also identical in terms of the four determinants, but represents the global context. The dotted diamond is the result of the national diamond as well as international or multinational activities [8].

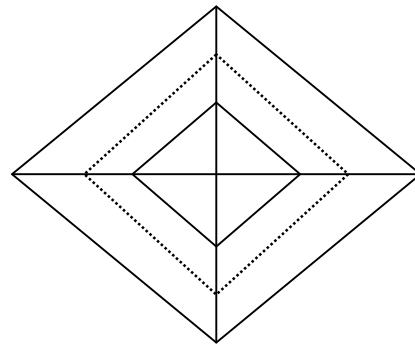


Figure 3: The Generalised Double Diamond framework.

The extensions of Porter’s diamond framework have not received very much attention, but they serve as a good starting point for analysis of the interaction between a nation’s home base and the global context in which industries operate.

Mutti [25] adapted the *Double Diamond* for assessing the competitiveness of Brazilian contractors in the international market.

### 3.2.3 The Nine-factor Framework

A second extension of Porter’s diamond is presented by Cho [26]. He suggests a regrouping of factors into two main categories: *Physical factors* and *Human factors*. The first category includes; endowed resources, the business environment, related and supporting industries and domestic demand. The four human factors are: workers, politicians and bureaucrats, entrepreneurs, and, finally, professional managers and engineers. Cho’s main argument is then that the human factors manage and utilise the four physical factors to drive the national economy from one stage of international competitiveness to the next [8]. This framework does not appear to have received any further attention.

### 3.2.4 The Competitiveness Triangle

A fourth and final framework for understanding and explaining competitiveness is the Competitiveness Triangle, proposed by Lall [7]. It is similar to Porter’s Diamond, but whereas Porter [4] investigated what factors build up national productivity, Lall focuses her analysis on “the markets within which enterprise learning takes place and the failures that each market is liable to suffer” [7, page 20-21]. Lall “puts government policy in the centre of the action”, while Porter places the role of government as an exogenous factor [7, page 21].

The Competitiveness Triangle contains three inter-connected determinants. *Incentive markets*, includes a nation’s macroeconomic management and trade policies and characteristics of the industry and home demand. *Factor markets* focuses on skills, especially technical skills, and finance for, and information on, technology. *Institutional markets* refers to bodies that support technological activities and development, e.g. institutions for R&D and training and development.

The Competitiveness Triangle has not been applied in any practical case study or received any further attention in the academic literature.

### 3.3 Frameworks that integrate measurement and understanding

The final category of frameworks are those that integrate the measurement and understanding of competitiveness.

#### 3.3.1 The APP-framework

Buckley et al. [9] noted that definitions and measures of competitiveness vary, and could distinguish three different views of competitiveness - the ability to perform well, the endowment of assets, and the management process. They concluded that all three perspectives must be included in order to unearth a satisfactory view of a nation, industry or firm’s sustainable competitiveness.

This school of thought was later adapted by the WEF and the International Institute for Management Development (IMD) in the 1993 World Competitiveness Report under the name of the world competitiveness formula; Assets (potential) x Processes=Performance [27].

The terms Assets, Process and Performance were adopted by Momaya and Selby [1, 2, 28] to become the cornerstones of the APP-framework, see figure 4 below.



Figure 4: The headline factors of the APP- framework.

The first category, *Assets*, represents elements that traditionally have been considered as key sources of competitiveness, but which are “dormant factors unless they are transformed by

competitive processes” [28, page 41]. Momaya focuses strongly on the competitive processes, as he views these to be the key to sustained competitiveness [1, 28].

The APP-framework has been used by Momaya and Selby [2] in their study of the international competitiveness of the Canadian construction industry in comparison with Japan and the USA. To quantify competitiveness, they used 95 non-weighted criteria, which were collected both through surveys and published statistics.

### 3.4 Summary of review of competitiveness frameworks

Table 1 below summarises the main points of interest from the discussion above.

*Table 1: Summary of frameworks for competitiveness analysis.*

Framework	Author, year	Level	Focus	Applied to construction
The Three Dimensions	Feurer and Chaharbaghi, 1994	Firm	Measurement	No
Total Value Competitiveness	Shen and Lu, 2002	Firm	Measurement	Yes
The Diamond	Porter, 1990	Nation, industry	Understanding	Yes
The Double Diamond	Moon, Rugman and Verbeke, 1995	Nation, industry	Understanding	Yes
The Nine-Factor Model	Cho, 1998	Nation, industry	Understanding	No
The Competitiveness Triangle	Lall, 2001	Firm	Understanding	No
Assets-Processes-Performance (APP)	Buckley et al., 1988; Momaya and Selby, 1998	Nation, Industry and Firm	Integration of understanding and measurement	Yes

## 4. The development of a new framework for analysing construction industry competitiveness

According to Lall [7], a complete competitiveness analysis must: (1) define what competitiveness means and how it is to be measured and, (2) identify the most important factors influencing it, the interactions between these factors and how they affect the competitiveness of the subject of investigation. This fits in with the earlier observation, and also with the underlying thinking of the APP-framework, i.e. the appropriateness of distinguishing between the causes and the outcome of competitiveness.

Hence, a framework for analysing construction industry competitiveness should consist of two separate but yet interconnected parts – one for the measurement and one the understanding. The latter is used to understand and provide explanations to the scores, differences and trends of the measurements of competitiveness.

#### 4.1 Defining and measuring construction industry competitiveness

Any definition of competitiveness should consider the perspectives of the stakeholders of the subject under investigation [6]. Furthermore, the aspects of the definition, i.e. the stakeholders' perspectives, should be covered in the quantification of competitiveness [2]. In their definition of competitiveness, Momaya and Selby [2], include the satisfaction of shareholders', employees' and clients' needs.

The authors propose a fourth stakeholder that a competitive construction industry needs to satisfy, - the overall society, i.e. the society in which the construction industry operates. Society at large, or more exactly a nation's tax payers, is indirectly the largest client of the construction industry. Moreover, the industry generally makes up a large percentage of a nation's GDP, approximately 10% in the case of the UK [29], and is one of a nation's major job-creators. Consequently, inefficiencies in the industry have a great negative impact on the economic well-being of the country. Many construction processes, including city planning, have a significant impact on the physical environment and their deliverables have a long-term impact on the public's social well-being. The Confederation of Finnish Construction Industries states in its mission that the construction industry should supply 'practical, healthy, secure and cost-efficient buildings', and 'act in a socially responsible way to contribute to national wealth, whilst upholding its responsibility for the environment' [30].

Table 2 below, presents a suggestion of the broad indicators that may be used to provide measurement of construction industry competitiveness.

*Table 2: Examples of competitiveness indicators for different stakeholders of the construction industry.*

<b>Stakeholder</b>	<b>Shareholders</b>	<b>Employees</b>	<b>Clients</b>	<b>Society</b>
<b>Competitiveness indicators</b>	Profitability	Health and safety	Time and cost predictability	Environmental consciousness
	Growth	Wage level	Quality of product	Business ethics
	Productivity	Work hours	Life cost	Corporate social responsibility
	Equity-asset ratio	Power of unions	Service	Inclusion



## 4.2 Understanding construction industry competitiveness

The next step of the analysis is to identify and organise the factors that explain construction industry competitiveness. As a starting point, it is important to consider the conclusions drawn by Ofori [3]. He suggests that “in developing a model for analysing international construction, it would be relevant to consider the four determinants in Porter’s diamond, as well as culture and institutional arrangements and government’s influence. Chance would be an exogenous variable. Each of these seven factors should have an international dimension. Thus, each company’s or industry’s competitiveness would be depicted by a series of linked (national) diamonds” [3, page 389]. It is interesting to note that the construction industry was not the focus of any of the frameworks explaining competitiveness as discussed above, and thus it is likely that some aspects characteristic to construction have not been taken into account.

Following Ofori’s suggestions, the framework for understanding construction industry competitiveness originates from Porter’s Diamond framework. However, a number of alterations are proposed in the next section.

### 4.2.1 Porter’s Factor conditions

The construction industry is labour intensive. Labour forms a large percentage of the cost of a project and labour productivity is in many cases used as the only measurement of competitiveness. The work environment, including health and safety, and investment in training are considered as important areas for construction. However, in Porter’s Diamond, factors related to human resources/labour is included in factor conditions. In order to highlight their importance for construction industry competitiveness, they are put in a determinant of their own.

Thus, Porter’s *Factor conditions* are split into *Human resources* plus *Factor conditions*. A similar alteration was suggested in the formulation of the Nine-factor model [26].

*Human resources*, covers aspects like: availability, skills and commitment of labour; work environment (physical and psychological); work conditions (compensation system, work hours, labour market regulations) and workforce characteristics. *Factor conditions* includes: availability, cost and sophistication of material, equipment and ICT; financial market conditions (ease of access to loans, rate and stability of interest and exchange rates) and country characteristics (climate, geographical location, political stability, and infrastructure).

### 4.2.2 Porter’s Demand conditions

Porter devoted *Demand conditions* as a determinant in itself. As these conditions play an important role in the performance of a construction industry they are kept unchanged. This determinant includes for example: size and structure of home market and sophistication of clients’ needs and procurement practises.

### 4.2.3 Porter's Related and Supporting Industries

The scope of the framework that is to be developed is a nation's construction industry, including material suppliers, designers, engineering consultants and contractors. In Porter's Diamond these would instead have been treated as individual industries, i.e. designers would have been seen as a related and supporting industry to contractors. This shift of focus implies that the area of related and supporting industries will not be given the same attention as it was from Porter. Thus, the role of Porter's *Related and supporting industries* is left out in this framework.

### 4.2.4 Porter's Context for firm strategy and rivalry

The context for competition and collaboration within an industry is of major importance to the performance of that industry [4]. However, since the agenda within the industry as a whole is different from that of an individual firm, it is appropriate to separate the macro and micro levels and devote each of the levels to one determinant in the adapted framework. At the industry level, the focus is on competition and collaboration in the industry and its image. At the firm level, management practices, project management skills and in-house R&D are major areas of interest. Thus, Porter's *Context for firm strategy and rivalry* is split into *Firm strategies, management and organisation* and *Industry characteristics*.

The former determinant relates to firm's specific practices like: goals and strategies; supply, financial and marketing practises; organisational structure, communication and decision-making mechanisms; R&D activity; and production processes. *Industry characteristics* is devoted to: presence and power of trade, client and employee associations; intensity, fairness and sophistication of competition; and integration and collaboration of industry stakeholders.

### 4.2.5 Government

The role of government was considered by Porter as an exogenous factor. However, government activity is of major importance to the construction industry, not only in shaping the business environment and setting market regulations, but, for construction, also as a major client or market intervener.

In this adapted framework, *Government* is shifted from an exogenous parameter to a determinant of its own. This is supported by Lall [7] who gives government a central position in her *Competitiveness Triangle* and also by the criticism that Porter's Diamond underestimated the influence of government [31, 32]. This determinant covers issues like: the tax system and bureaucracy, policies, incentives and regulations on, for example, environmental, ethical, health and safety issues, and the presence and power of a single construction authority.

### 4.2.6 The exogenous dimensions

To complete his Diamond, Porter adds the two exogenous dimensions of government and chance. His positioning of these dimensions is due to their influence on the other four determinants, but at

the same time they are outside the immediate control of firms [4]. In the suggested framework, adapted for the construction industry, the role of government has been shifted to become a determinant of its own. The impact of chance, however, can neither be neglected nor predicted or measured. For a nation's construction industry, chance may refer to events either in the domestic or international market. For example, in the home market the risk of political instability or geographical proximity to markets that are becoming more competitive [19].

Another area of criticism of the diamond framework is that the framework should incorporate the impact of culture [3, 33]. In the adapted version of the framework, this suggestion is acknowledged and accordingly the role of national, industry and firm culture becomes an exogenous dimension. This dimension covers aspects such as: the attitudes of managers and the workforce towards innovation, business ethics, and the nature of employer-employee-relationships.

Thus, in this adapted framework, there are two exogenous dimensions – the role of chance and the impact of culture – that influence all of the six determinants of the framework, but are out of the industry stakeholders' immediate control.

#### 4.2.7 The domestic construction competitiveness hexagon

*The Domestic Construction Competitiveness Hexagon* is a framework to organise the factors that influence the competitiveness of nation's construction industry, i.e. its ability to satisfy its stakeholders; shareholders, employees, clients and overall society. In summary, the suggested framework consists of six determinants, which are organised in the shape of a hexagon, and two exogenous dimensions, see figure 5. The determinants are, like the ones in Porter's Diamond, mutually dependent in the sense that the state of one affects the others' and thereby form a dynamic system [4]. For example, government policies will affect the sophistication of the clients' needs, which will in turn have an effect on firms' strategy.

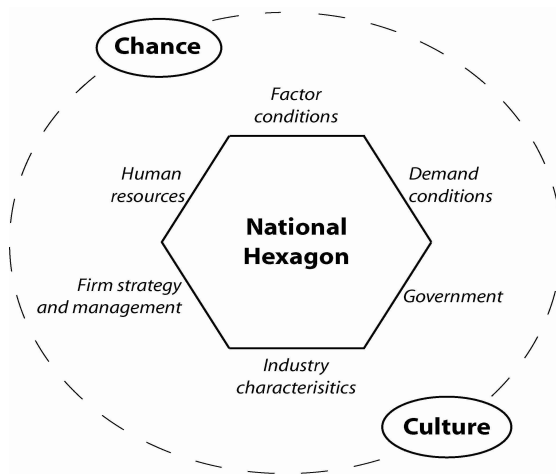


Figure 5: *The Domestic Construction Industry Competitiveness Hexagon.*

#### 4.2.8 International activity: the complete hexagon framework

As discussed above, the determinants of the domestic hexagon framework are inter-dependent and also affected by chance and culture. However, in times of increased globalization of supply and lowered barriers to entry markets previously dominated by domestic firms, there is an obvious international dimension that poses both threats and opportunities to a nation's construction industry.

The international dimension captures the international aspects regarding: supply of material and equipment, mobility of workers, demand conditions, and competition.

The incorporation of international activity is also the area where the Diamond framework has received the most criticism [20, 21, and 22]. As discussed earlier, the result of that debate was the *Generalised Double Diamond* framework [23]. In order to respond to the need of an international dimension, the domestic hexagon framework adapts this ‘double-design’ to form the complete *Construction Industry Competitiveness Hexagon*, see figure 6.

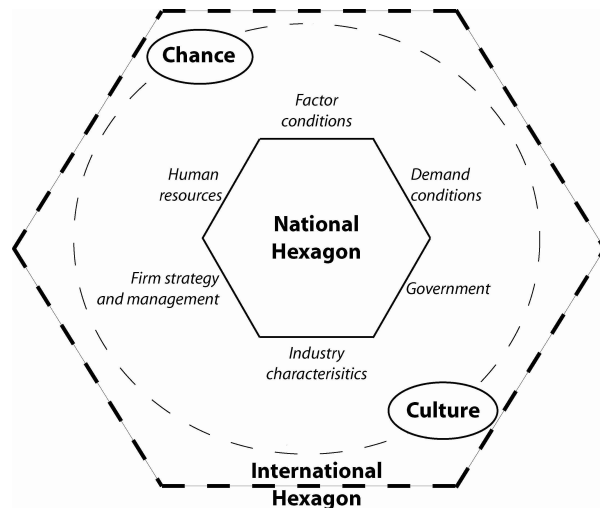


Figure 6: The Construction Industry Competitiveness Hexagon.

## 5. Conclusions

Competitiveness is vague concept that may be defined and measured in a number of ways. The measurement is dependent on the definition employed. Competitiveness may be applied at national, industry or firm level and depends on stakeholder values. It should be seen in a relative sense and from a long-term perspective.

There are three kinds of frameworks for competitiveness analysis; those that measure competitiveness, those that attempt to explain and understand competitiveness, and the frameworks that integrate the explanation and measurement. The paper reviews a total of seven frameworks, of which four have been applied to the construction industry.

Based on the review, this paper introduces a new way of analysing construction industry competitiveness. It does so by explicitly distinguishing between the measurement of competitiveness and the analysis of the factors that influence competitiveness. Furthermore, besides shareholders, employees and clients, overall society is brought in as a fourth stakeholder of the construction industry. In order to conceptualise the factors that influence the competitiveness of the construction industry, this paper extends Porter’s Diamond by acknowledging the suggestions put forward by Ofori [3]. The resulting framework – *The Construction Industry Competitiveness Hexagon* (CICH) – consists of six determinants, each attached to an international dimension. The determinants are mutually inter-dependent and are further affected by the two exogenous dimensions of culture and chance. The authors believe that the CICH framework serves as a good starting point for understanding the competitiveness of a construction industry, but they realise that further research is needed in order to identify the most important factors that influence construction industry competitiveness.

## References

- [1] Momaya, K. (2004) Competitiveness of firms: review of theory, frameworks, and models, *Singapore management review*, **26**(1), 45-61.
- [2] Momaya, K. and Selby, K. (1998). International competitiveness of the Canadian construction industry: a comparison with Japan and the United States, *Canadian journal of civil engineering*, **25**, 640-652.
- [3] Ofori, G. (2003). Frameworks for analysing international construction, *Construction Management and Economics*, **21**(June), 379-391.
- [4] Porter, M. E. (1990). *The competitive advantage of nations*, Macmillan, London.
- [5] Boltho, A. (1996). The assessment: international competitiveness, *Oxford review of economic policy*, **12**(3), 1-16.
- [6] Chaharbaghi, K. and Feurer, R. (1994). Defining competitiveness: a holistic approach, *Management Decision*, **32**(2), 49-58.
- [7] Lall, S. (2001) *Competitiveness, Technology and Skills*, Edward Elgar Publishing, Cheltenham, UK.
- [8] Cho, D.-S. and Moon, C.-H. (2000) *From Adam Smith to Michael Porter: Evolution of competitiveness theory*, World Scientific Publishing Company Ltd., Singapore.
- [9] Buckley, P. J., Pass, C. L. and Prescott, K. (1988) Measures of international competitiveness: a critical survey, *Journal of marketing management*, **4**(2), 175-200.
- [10] Henricsson, J.P.E., Ericsson, S., Jewell, C.A. (2004). Rethinking Competitiveness in the construction industry. Proceedings of the ARCOM 20th annual conference, Edited by Farzad Khosrowshahi, 1-3 September 2004, Edinburgh, Scotland, pp. 54-60. ARCOM.
- [11] Nelson, R. (1992). Recent writings on competitiveness: boxing the compass, *California Management Review*, **Winter**, 127-137.
- [12] Crouch, G. I. and Ritchie, J. R. B. (1999). Tourism, Competitiveness and Societal Prosperity, *Journal of Business Research*, **44**(3), 137-152.
- [13] DC (2001). *Destination Competitiveness: development of a model with application to Australia and the Republic of Korea*. Australia-Korea Foundation. Available online at: [http://www.dfat.gov.au/akf/program\\_activities/destination\\_competitiveness.pdf](http://www.dfat.gov.au/akf/program_activities/destination_competitiveness.pdf).

- [14] Li, Q. M. and Shen, L. Y. (2002) Parameters assessing construction company's competitiveness in China, *Journal of Construction Economics*, **3**, 8-11.
- [15] Shen, L. Y., Lu, W., Shen, Q. and Li, H. (2003). A computer-aided decision support system for assessing a contractor's competitiveness, *Automation in construction*, **12**(5), 577-587.
- [16] Davies, H. and Ellis, P. (2000) Porter's competitive advantage of nations: Time for the final judgement?, *Journal of management studies*, **37**(8), 1189-1215.
- [17] Ofori, G. (1994) Formulating a long-term strategy for developing the construction industry of Singapore, *Construction Management and Economics*, **12**(3), 219-231.
- [18] Betts, M. and Ofori, G. (1994) Strategic planning for competitive advantage in construction: The institutions, *Construction Management and Economics*, **12**(3), 203-217.
- [19] Oz, O. (2001) Sources of competitive advantage of Turkish construction companies in international markets, *Construction Management and Economics*, **19**(2), 135-144.
- [20] Rugman, A. M. and d'Cruz, J. R. (1993) The 'double diamond' model of international competitiveness: the Canadian experience, *Management International Review*, **33**(2), 17-39.
- [21] Hodgetts, R. M. (1993) Porter's diamond framework in a Mexican context, *Management International Review*, **33**(2), 41-54.
- [22] Cartwright, W. R. (1993) Multiple linked 'diamonds' and the international competitiveness of export-dependent industries: The New Zealand experience, *Management International Review*, **33**(2), 55-70.
- [23] Moon, H. C., Rugman, A. M. and Verbeke, A. (1995) In *Research in Global Strategic Management* (Ed, Rugman, A. M.) CT: JAI Press, Greenwich.
- [24] Moon, H. C., Rugman, A. M. and Verbeke, A. (1998) A generalized double diamond approach to the global competitiveness of Korea and Singapore, *International business review*, **7**(2), 135-150.
- [25] do Nascimento Mutti, C., (2004). *The drivers of Brazilian contractors' competitiveness in the international market*, PhD, Department of Construction Management and Engineering, University of Reading, UK
- [26] Cho, D.-S. (1994). A dynamic approach to international competitiveness: the case of Korea, *Journal of Far Eastern Business*, **1**(1), 17-36.
- [27] IMD and WEF (1993) International Institute of Management Development (IMD), World Economic Forum (WEF), Lausanne, Switzerland.

- [28] Momaya, K. (1998) Evaluating international competitiveness at the industry level, *Vikalpa*, **23**(2), 39-46.
- [29] Department of Trade and Industry (DTI), (2004). Building, Construction and Property Services – Overview. Available online at: [http://www.dti.gov.uk/sectors\\_building.html](http://www.dti.gov.uk/sectors_building.html)
- [30] The Confederation of Finnish Construction Industries (2004). Mission. Available online at: <http://www.rakennusteollisuus.fi/english/fciw/mission>
- [31] van den Bosch, F. A. J. and de Man, A. P. (1994) Government's impact on the business environment and strategic management, *Journal of General Management*, **19**(3).
- [32] Stopford, J. M. and Strange, S. (1991) *Rival states, rival firms: competition for world market shares*, Cambridge University Press, Cambridge.
- [33] van den Bosch, F. A. J. and van Prooijen, A. A. (1992) The competitive advantage of European nations: the impact of national culture - a missing element in Porter's analysis?, *European Management Journal*, **10**(2), 173-177.