



# Capacity Building in International Construction Joint Venture Projects – the case of South Africa

Pantaleo D. Rwelamila<sup>1</sup>, Shanks Mkandawire<sup>2</sup>

## Abstract

Although International Construction Joint Venture (ICJV) projects are believed to be beneficial with regard to aiding capacity building in the local construction industry, it is still debatable whether such skills and technology transfer effectively occurs in the hosting companies. South African construction companies are therefore not immune from these undesirable trends. This paper reports on a research project which was carried out in South Africa to identify salient challenges in ICJV environments, and proposes a conceptual structure of international construction joint venture at projects delivery stage that can appropriately assist to accelerate the transfer of expertise from the international JV partners to the host companies in South Africa.

**Keywords:** International construction joint venture, projects, capacity building, South Africa.

## 1. Introduction

The performance and capability of the industry is pivotal to transport and communication, import and export, industry development, and to all the logistics of a growing economy that increasingly supports an integrated and economically active population [Construction Industry Development Board (CIDB) (2004)]. Furthermore, the SACI is considered as one of the few African advanced construction industries and thus its role extends beyond the borders of South Africa to other countries across the continent, and the current African infrastructure backlog strongly suggest that the SACI's role is more prominent across the continent to-day than ever before.

According to Infrastructure Consortium for Africa (ICA) (2010), inefficient and insufficient infrastructure holds back Africa's economic growth per capita by 2% each year, and reduces firms' productivity by as much as 40%. Thus, Africa will need to invest approximately 40 Billion US Dollars of annual investment in infrastructure over the coming decade and a further 40 Billion US Dollars, worth of upkeep on existing networks (Emerging 2008).

---

<sup>1</sup> Professor of Project Management, Graduate School of Business Leadership, University of South Africa (UNISA), P O Box 392, UNISA 0003, South Africa; rwelapmd@unisa.ac.za

<sup>2</sup> Senior Civil Engineer, Group Five (Pty) Ltd, P O Box 3951, Rivonia, South Africa; smkandawire@g5.co.za

In order to meet the South African and African infrastructure demands, the SACI needs to possess sufficient competent skills, technology and resources capacity. However, Merrifield (2006) indicates that the industry is currently operating at close to capacity limits and there are concerns that the current capacity is already showing strains of not coping. The SACI is lacking experienced skills and technology to meet the demand for successful delivery of these projects both within South Africa and across the continent. Unless serious efforts are made to address capacity constraints, cost escalations and poor quality are likely to stifle growth going forward (Merrifield 2006 and Rwelamila 2007). Hence, the need to overcome the shortage of domestic skills, technology through joint ventures with overseas partners (Sewapaul 2007).

Although ICJVs are believed to be beneficial with regard to aiding capacity building in the hosting construction industry, it is still debatable whether such skills and technology transfer effectively occurs in the hosting South African (SA) companies. Lowitt (2007) argues for research on technology and skills transfer from developed country construction companies to their less developed counterparts.

The research project reported in this paper involved a case study of an international joint venture between Group Five (Pty) Ltd (a SA company) and Spiecapag (a French company) within the New Multiproduct Pipeline Project (NMPP). The NMPP comprised the construction of approximately 700 km of welded steel pipeline with new pump stations and storage terminals throughout the KwaZulu-Natal, Free State, Mpumalanga and Gauteng provinces in South Africa. The client of the NMPP project is Transnet Pipelines, a division of Transnet Ltd, which currently operates over 3,000 km of pipelines in South Africa. At the time of commencing this study, the NMPP project was valued at approximately 5 Billion Rands (approximately 650 Million US Dollars). The construction of the NMPP project was undertaken by an integrated international construction joint venture partnership known as Spiecapag/G5 JV and it was established so that the partnering companies could assist one another in their fields of expertise in order to deliver the NMPP project, which was considered challenging. Spiecapag provided its technical expertise in pipeline installation while Group Five (Pty) Ltd provided its South African local knowledge, and the administration and financial support necessary in facilitating a project of this scale. The implementation of the project commenced in August 2008 and at the inception of the research study, progress was at 60% with final completion in May 2011. As Group Five (Pty) Ltd., seeks to build its standalone capabilities in pipeline construction, especially in petrochemical pipelines, the establishment of a joint venture with Spiecapag in the NMPP project was viewed as an opportunity to acquire knowledge and technology.

This paper is organised as follows: literature review of theory and practice of knowledge and technology acquisition in ICJV; research methodology; research results and their synthesis and analysis; and finally, a conceptual structure that is suitable for speedy knowledge and technology acquisition in ICJV is proposed.

## 2. Theory and practice of capacity building in ICJV projects

An International Construction Joint Venture (ICJV) involves one or more local construction companies teaming up with one or more foreign construction companies to undertake a construction project (Vaughan 2010). However, in other cases, an ICJV may involve two or more foreign companies undertaking a construction project in abroad territories without partnering with a local company. Vaughan (2010) stresses that regardless of the scope of the undertaking, the nature of the ICJV or the respective degrees of equity or management involvement, a joint venture must possess the following features: (a) It must be a separately identifiable entity; (b) It must have an ownership interest in such entity by joint venture partners (JVPs); and (c) It must have an active management involvement or deliberate rejection of the right to such involvement by each joint venture partner.

### 2.1 The drivers and benefits of ICJV

Several factors have been acting as catalysts for ICJV throughout the world including Africa. The construction industry in most developed countries, e.g. European countries, is operating in maturity stage as the new construction demand has slowed and de-industrialization has occurred (Lowitt, 2007). The subsequent fierce competition has compelled construction companies in these countries to seek markets in other geographical areas (Africa being the emerging market due to its high infrastructure demand) to strengthen their strategic positioning, competitiveness and performance. Dlungwana and Rwelamila (2004) indicate that Africa, particularly Southern Africa, is increasingly experiencing globalization in construction works. While African construction companies seek external expertise and technology to execute large complex infrastructure projects, foreign companies perceive teaming up with local companies via joint ventures as an ideal option to overcome government-mandated barriers to entry in Africa (Boateng & Glaister, 2003). Among those African countries seeking external expertise and technology to execute large complex infrastructure projects is South Africa (Sewpaul 2007). Rowan (2005) identified the following as the motives to formation of ICJV:

- (a) A foreign contractor takes a project that is larger than it normally would undertake outside its country and therefore teams up with a competent local contractor with a view toward spreading the risk.
- (b) A foreign contractor teams up with a competent local contractor to generate bonding capacity that each contractor would not have individually.
- (c) Two or more contractors with special expertise e.g. a civil and mechanical contractor, team up to undertake a project that requires diverse expertise e.g., a power plant.
- (d) A contractor that has an established organization in a country teams up with a contractor with little or no experience in the country but with specialized engineering knowledge or technology.

- (e) A foreign contractor teams up with a local contractor that may have political or other valuable relationships in the country where the project is executed.

Therefore, the foreign companies benefit the feasibility of entering new geographical markets in pursuit of strengthening their strategic positioning, competitiveness and performance while the local companies gain from the expertise and technology brought in by the foreign companies which can vitally contribute to the performance improvement of local companies

## 2.2 Types of ICJV and agreements

According to Rowan (2005), International Construction Joint Ventures can take any of these three forms:

**Integrated joint venture:** This type of joint venture's primary characteristic is that it can represent a true partnership in that the parties share profits and losses.

- **Non-Integrated joint venture:** In this type, there is no sharing of profit and losses between the parties.
- **Combination joint ventures:** These joint ventures present a combination of an Integrated and Non-Integrated joint venture partnership. Each member takes on a specified scope of work and is responsible for that scope of work.

While the joint venture is not a partnership (usually the JV agreement will expressly stipulate that it is not), its structure and form closely resemble a partnership (Rowan, 2005). Vaughan (2010) alerts that structuring international construction joint venture agreements may pose challenges due to the fact that, parties are from different jurisdictions and various cultural backgrounds. After parties have decided on fundamental issues such as the commercial nature, scope and mutual objectives of the joint venture, the JVP must determine what legal structure the joint venture will take (Vaughan, 2010). Usually and particularly where the JV involves a local partner, the legal structure of the ICJV follows the laws of the host nation. Vaughan (2010) and Rowan (2005) suggest that, the joint venture contractual agreement should at least define and address the following:

- **Specific Limited Purpose and Duration:** Joint ventures are formed for a specific business objective and can have a limited life span or long-term.
- **Sharing of Profits and Losses:** Whether the joint venture is an integrated or non-integrated joint venture.
- **The Project Leader:** When there is a non-integrated joint venture in which each party is undertaking its own separate scope of work, it is critical that all joint venture agreements contain provisions that either specify that the party is the Leader of the ICJV or identify who is the project manager or provide a mechanism to appoint the project manager.

- **Working Capital:** Regardless of whether the joint venture is an integrated or non-integrated joint venture, provisions must be included that address the responsibility of the parties for working capital contributions.
- **Default:** As in any main contract or subcontract, the joint venture agreement must address default by one of its members. Default must be defined as clearly as possible and the remedies for default must be included.

### 2.3 Structure and management of ICJV projects

An international construction joint venture project structure refers to formal and informal framework of policies and rules, within which an ICJV arranges its lines of authority and communications, and allocates rights and duties. Graham and Englund (2004) argue that structure influences behavior of the project team members. Thus the objective in designing a project structure should be to provide a formal environment that the project manager can use to influence team members to do their best in completing their assignment and duties (pm4dev, 2007). Vaughan (2010) further highlights that some JVs are dominant partner enterprises in which projects are managed by one parent like wholly owned subsidiaries. Management normally will be in two tiers, i.e., project level and board level (Rowan 2005).

- **Management Board:** This forms the top layer of ICJV management. The management board usually comprises senior management personnel from head offices of the respective members and not project staff.
- **Project Level Management:** The project-level management often is left to a project manager, with or without the support of a project board. Generally, unanimity is not required of the Project Committee and frequently the project manager will be given the right to break tie votes.

### 2.4 Knowledge and technology acquisition in ICJV

IJVs are viewed as a practical vehicle for knowledge and technology transfer, and such knowledge transfer can contribute to the performance improvement of local companies (International, 2010). Such transfer of knowledge and technology from the foreign company to the local partner is not guaranteed. Hence the need to firstly understand the terms, technology and knowledge in order to have a better view on the dynamics of their acquisition in ICJVs. These terms from various sources are articulated in Table 1.

**Table 1: Understanding technology and knowledge acquisition**

Researcher(s)	Arguments, definitions and assertions
Cohen and Levinthal (1990)	Aspects that make absorptive capacity distinctly organizational include structure of communication between external environment, and the organization and the character and distribution of expertise within the organization itself.
Grant (1996)	Knowledge classified based on transferability as tacit (knowledge which is only known by an individual and that is difficult to communicate to rest of the

	<p>organization) and explicit (knowledge which can be codified, articulated and easily communicated). Knowledge transfer involves both transmission and receipt.</p> <p>An organizational structure that promotes interaction between individuals is highly pivotal to knowledge and technology acquisition among other factors.</p>
Toukas (1996)	<p>Knowledge acquisition or transfer, results from participation and interactions with task, technology, resources and people within a particular context. Individuals acquire knowledge but an organization creates a context for acquiring that knowledge.</p>
Meschi (1997)	<p>An ICJV structure that can facilitate mutual interaction between employees can enhance the foreign employees' successful adjustment to the cultural differences.</p>
Davenport and Prusak (1998)	<p>Knowledge is a fluid mix of experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experience and information.</p>
Lane, Salk and Lyles (2001)	<p>Ability to learn directly reflects the ability to assimilate new knowledge and cultural distance serves as the context that facilitates or inhibit this ability.</p>
Anh <i>et al.</i> (2006)	<p>Investment in training is critical in determining the level of knowledge acquisition.</p>

## 2.5 Previous research on knowledge and technology acquisition ICJV

Learning from foreign partners is considered to be a determinant of success of the IJVs especially IJVs in transitional economies, hence the importance of learning from foreign partners in international joint ventures (Lane, Salk & Lyles, 2001). Some factors that affect successful technology and knowledge acquisition by local partners from the foreign partners in IJVs, include, internal environment of the firm, external environment of the firm and the process of consultation (Wallender III 1979), and absorptive capacity (Cohen & Levinthal 1990). Of all these factors, absorptive capacity has attracted the most attention. Based upon Cohen & Levinthal (1990), Lane *et al.* (2001) and Minbaevas *et al.* (2003) studies which point out that both human and organizational mechanisms are important aspects of organizational absorptive capacity, Anh *et al.* (2006) reaffirm the important role of absorptive capacity in inter-organizational learning context and further argue that different absorptive capacity components contribute to knowledge acquisition from foreign partners in different ways.

## 2.6 Synthesis of theory and practice – identifying the gap

The synthesis of literature above indicates that there is no research or any significant documented work that has been conducted in South Africa and across Africa and other

developing countries generally on knowledge and technology acquisition by local partnering firms, specifically in international construction joint venture projects.

### 3 Expertise acquisition in ICJVs in practice – the case study

The research project was carried out in order to partly fill the gap described above, by carrying out a case study of the NMPP project in South Africa as briefly described in Section 1, above.

For lack of space and brevity, only case study salient information is provided and extensive case study details are found elsewhere (Rwelamila and Mkandawire 2010).

- **The main hypothesis:**

**H<sub>main</sub>:** *The ICJV structure that promotes joint participation of local personnel with expertriates in shared activities of the international construction joint venture project is positively correlated with the local company's level of skills and technology acquisition from the foreign partner.*

- **Sub-hypotheses:**

Two sub-hypotheses were formulated from the main hypothesis and tested:

On the relationship between interaction at work place and collaboration in job tasks (Question 26)

*H<sub>0</sub>: There is no significant relationship between collaboration in job tasks and the foreign employees' willingness to share their knowledge and technology with local employees.*

*H<sub>1</sub>: There is a significant relationship between collaboration in job tasks and the foreign employees' willingness to share their knowledge and technology with local employees.*

On the relationship between collaboration in job tasks and sharing and sharing of knowledge and technology (Question 27)

*H<sub>0</sub>: There is no significant relationship between interaction at work place and collaboration in job tasks.*

*H<sub>1</sub>: There is a significant relationship between interaction at work place and collaboration in job tasks.*



### 3.1 Design of research method

The case study incorporated both *qualitative* and *quantitative* research methods via a two-phase design, in which *quantitative* study was followed by *qualitative* study. The *quantitative* research method was aimed at assessing the extent to which knowledge and technology acquisition occurs in the ICJV project. The *quantitative* research approach was purposed to profoundly describe and analyse the common drivers of knowledge and technology acquisition or lack thereof in the ICJV project in relation to its structure. This led to identification of the critical success factors for speedy acquisition of knowledge and technology. This is supported by Eisenhardt (1989), Tellis (1997) and Lee (1999) as a leverage to the weaknesses inherent in each.

### 3.4 Design of research instruments and profile of respondents

#### 3.4.1 *Research instrument*

A 44 questions structured questionnaire was administered to the project participants and the philosophy and details of the instrument (including its administration) are described elsewhere (Rwelamila and Mkandawire 2010).

Follow-up interviews were conducted to simple sampled focus groups of not more than 20 people, in which open-ended questions were asked.

#### 3.2.2 *Profile of respondents*

A total of 125 randomly selected employees in the Spiecapag/G5 JV within NMPP project were involved in the case study. As expected from a typical construction project in South Africa, the majority of respondents were male (82%) and the rest were female (18%).

On the job level, the sample was stratified into non-management, middle management and senior management levels. The non-management strata, was made-up of 58% of respondents, while middle and senior management represented 33% and 9% respectively. For a typical organisation or project, the sample was deemed to be fairly distributed across job levels.

### 3.5 Summary of research results

For lack of space and brevity, summary of questionnaire and interview results are presented here and detailed results are reported elsewhere (Rwelamila and Mkandawire 2010).

The following key findings from the research project are fundamental to ensuring that these critical success factors materialize, and that the local partner acquires enough knowledge and technology from the foreign partner:

- **The structure should enhance project success:** project success which is determined by factors such as cost, time, quality, utility, stakeholder management, health and safety,

etc., should not be hampered at the expense of knowledge and technology acquisition. JV partners were concerned with this.

- **The structure should help minimize the cultural shock period:** the study discovered that regardless of whether the employees are foreign or local, they all go through a cultural shock period when mobilized together in a project.
- **The structure should emphasize sharing of same project objectives:** it was found from the study that knowledge and technology sharing may become feasible when employees share the same project objectives. When employees share the same project objectives they bear the responsibility of achieving those objectives, as a result they find it compelling to collaborate in tasks and share information, knowledge and technology.

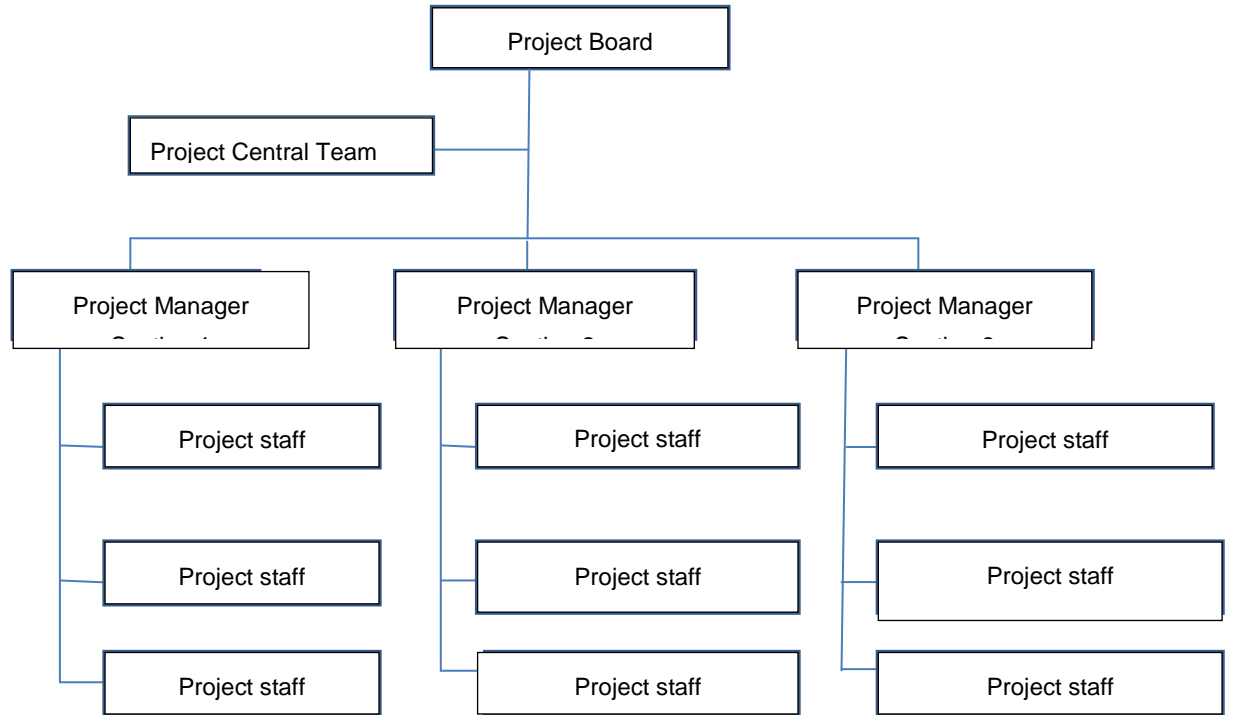
### 3.6 Conclusions and recommendations

#### 3.6.1 Conclusions

- **The importance of the JV structure:** even though the primary rationale for adoption of the section-based structure is to facilitate knowledge and technology acquisition in an international construction joint venture project, the structure is also perceived to be pivotal to enhancing project success.
- **The need for integration:** with the integration of local and foreign employees in one project section, the foreign and local employees will feel compelled to collaborate in jobs tasks and share knowledge and technology.
- **The importance of risk mitigation:** in any international JV, the foreign partner is more likely to be risk averse than the local partner and hence will incline more toward adopting a structure that is more capable of mitigating project risks.
- **The importance of local partner commitment to knowledge and technology acquisition:** the local partnering company should also show commitment to knowledge and technology acquisition to its employees.

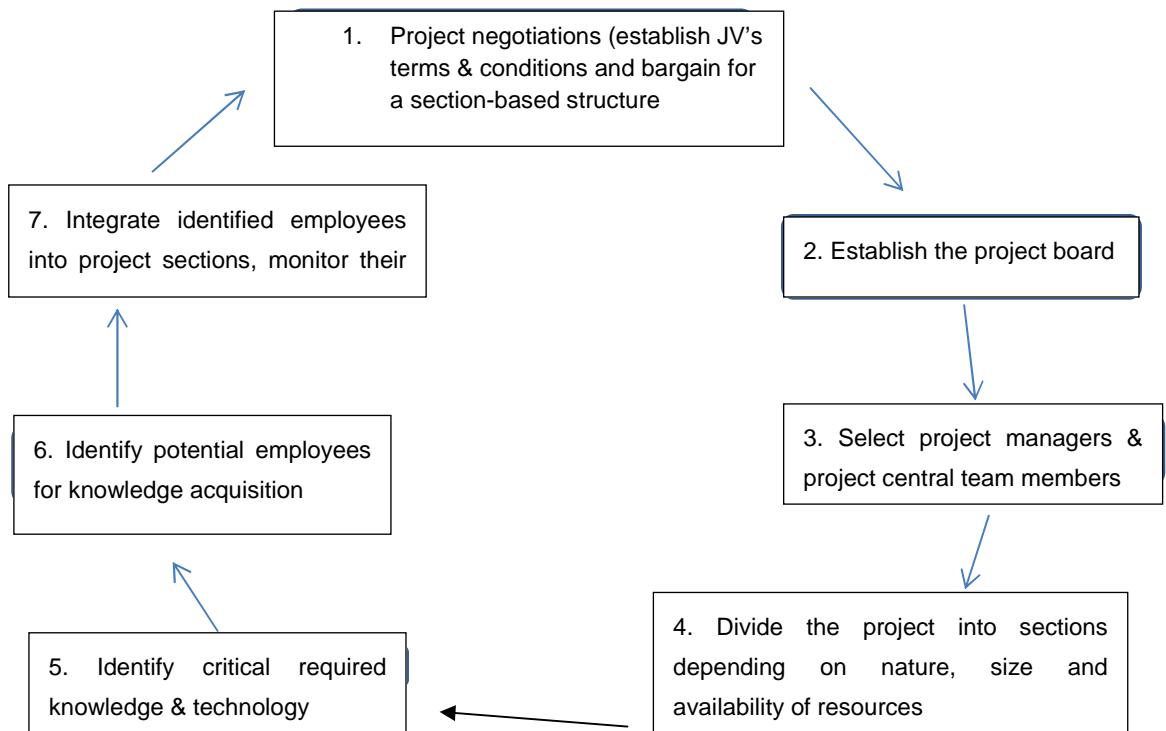
#### 3.6.2 Recommendations

Overall, it is recommended that where international construction joint venture projects are involved and that knowledge and technology acquisition from the foreign partnering company becomes one of the objectives of a local company, a section-based structure should be adopted as indicated in Figure 1.



**Figure 1: Section-based joint venture project structure**

A section-based structure should be supported by a conceptual framework (Figure 2).



**Figure 2: A conceptual framework for effective adoption of section-based structure**

Other recommendations include:

- **Induction of project team on project objectives:** induction should involve orienting employees to the project partners, the reasons for the international joint venture, the different cultures, and what they should expect from the partnering companies and their employees.
- **Identification of required knowledge and technology:** unless the local company identifies the knowledge and technology it needs to acquire from the foreign partnering company, it may not acquire sufficient knowledge and technology in the ICJV even if a section-based structure is adopted.
- **Training and monitoring of employees:** it is not enough to induct employees on ICJV project objectives, identify required knowledge and technology, and single-out potential employees. It is important that the above is coupled with training of employees and continuous monitoring of their progress.

## References

Anh, P.T.T., Baughn, C.C., Hang, N.T.M., and Neupert, K.E. (2006). Knowledge acquisition from foreign parents in international joint ventures: An empirical study in Vietnam. *International Business Review*, 15(2006), pp. 463-487.

Boateng, A. and Glaister, K.W. (2002). Performance of International Joint Ventures: Evidence for West Africa, *International Business Review*, 11 (5), pp. 523-541.

Buckley, P.J., Glaister, K.W. and Husan, R. (2002). International Joint Ventures: Partnering Skills and Cross-Cultural Issues, *Long Range Planning*, 35 (2002), pp. 113-134.

Cohen, W. and Levinthal, D. (1990). Absorptive capacity: A new perspective on learning and innovation, *Administration Science Quarterly*, Vol.35, pp.128-152.

Construction Industry Development Board (CIDB) (2004) South African Construction Industry Status Report 2004, CIDB, Pretoria, South Africa.

Dlungwana, W.S. and Rwelamila, P.D. (2004). *Contractor development models that meet the challenges of globalization - a case for developing management capability of local contractors*. CIB 2004 International Symposium on Globalization and Construction, Bangkok, Thailand, November, 2004, pp.1-12

Eisenhardt, K.M. (1989). 'Building theories from case study research'. *Academy of Management Review*

Grant, R.M. (1996). 'Toward a Knowledge-Based Theory of the Firm'. *Strategic Management Journal*, Volume 17 (Winter, 1996), pp. 109-122.

Graham, R. J. and Englund, R. L. (2004). *Creating an environment for successful projects, 2<sup>nd</sup> edition*. John Wiley & Sons, San Francisco, CA.

Infrastructure Consortium for Africa (ICA). Challenges, Available at: [www.icasfrica.org/en/infrastructure-issues/aims](http://www.icasfrica.org/en/infrastructure-issues/aims), (Accessed May 20, 2010).

International Joint Venture (IJV). Available at [http://en.wikipedia.org/wiki/Joint\\_venture](http://en.wikipedia.org/wiki/Joint_venture), (Accessed June 15, 2010).

Lane, P.J., Salk, J.E. and Lyles, M.A. (2001). 'Absorptive capacity, learning and performance in international joint ventures. *Strategic Management Journal*, Vol. 22(12), pp. 1139-1161.

Lee, T.W. (1999). *Using Qualitative Methods in Organizational Research*. SAGE Publications, Thousand Oaks, CA.

Levinthal, D. A (1990), Effects of knowledge transfer in intraorganizational networks. R&D – measurement of absorptive capacity at the business unit level. Data on R&D(<http://www.jstor.org/stable/3069443>), (Accessed August 18, 2-010).

Lowitt, S. (2007). *Constructing Future Growth Opportunities: The Potential of the Civil Engineering and Construction sector*. HSRC, Pretoria, South Africa.

Merrifield, A. (2006). *Demand for Skills: An Analysis of the Proposed Infrastructure Spending Programme*. CIDB, Pretoria, South Africa.

Meschi, P. (1997). 'Longevity and Cultural differences of international joint ventures: Toward time-based cultural management'. *Human Relations*, Vol. 50(2), pp.211-227.

Minbaeva, D., Pedersen, T., Bjorkman, I., Fey, C., and Park, H. (2003). 'MNC knowledge transfer, subsidiary absorptive capacity, and HRM'. *Journal of International Business Studies*, Vol. 34, pp. 585-599.

Pm4dev, (2007). Project management organizational structures. Available at: [www.pm4dev.com](http://www.pm4dev.com), (Accessed July 28, 2010).

Rowan, V. (2005). How Joint Ventures Are Organized, Operated on International Construction Projects, Available at: [http://www.constructionweblinks.com/Resources/Industry/Reports/Newsletters/May23\\_2005/howj.html](http://www.constructionweblinks.com/Resources/Industry/Reports/Newsletters/May23_2005/howj.html), (Accessed June 11, 2010).

Rwelamila, P D and Mkandawire, S (2010). Capacity Building in International Construction Joint Venture Projects in South Africa: a Case Study of the NMPP Project, Unpublished Report, UNISA Graduate School of Business Leadership, Midrand, South Africa.

Rwelamila, P M D (2007) 'Project management competence in public sector infrastructure organisations', *Construction Management and Economics*, 25:1, 55 - 66

Sewpaul, J. (2007). Overview of the Construction Industry-South Africa. Available at: [www.export.gov/build/groups/public/@eg.../eg\\_main\\_020664.pdf](http://www.export.gov/build/groups/public/@eg.../eg_main_020664.pdf), (Accessed May 20, 2010).

Tellis, W. (1997). 'Introduction to case study'. *The Qualitative Report (online serial)*, Vol. 3(2). Available at: (<http://www.nova.edu/ssss/QR/QR3-2/tellis1.html>), (Accessed August 18, 2010).

Toukas, H. (1996). 'The firm as a distributed knowledge system: A constructionist approach'. *Strategic Management Journal*, Vol. 17 (winter special issue), pp. 11-26.

Vaughan, J. (2010). What is a Joint Venture? Available at: [www.uiowa.edu/ifdebook/faq/fq\\_docs/Venture.shtml](http://www.uiowa.edu/ifdebook/faq/fq_docs/Venture.shtml), (Accessed June 15, 2010).

Wallender III, H.W. (1979). *Technology transfer and management in the developing countries: Company cases and policy analysis in Brazil, Kenya, Korea, Peru and Tanzania*, Balling.