



# The potential for technology and knowledge transfers between foreign and local firms: A study of the construction industry in Ghana



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## ABSTRACT

Multinational corporations (MNCs) and other foreign firms can be conduits for technology and knowledge (T&K) transfer to host countries in the developing world. Most of the existing research focuses on T&K transfers through FDI and are drawn from Asia not Sub-Saharan Africa (SSA), although SSA is increasingly receiving foreign investment. There is a paucity of research that gives insights into project-level T&K transfer issues in SSA countries. Using the Ghanaian construction industry as an empirical focus, this article explores T&K transfer potential. The findings reveal significant weaknesses in T&K transfer across industry subsectors and between foreign and local firms. This arises from the potentially complementary but dissimilar resource and knowledge bases. The weaknesses are compounded by the absence of coherent government T&K development policies.

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## 1. Introduction

One of the major benefits of foreign direct investment (FDI) is the potential for foreign firms, in particular multinational corporations (MNCs), to transfer technology and knowledge (T&K) to local firms in the host countries. This is particularly the case in developing countries that are lagging behind the technology frontier (Pack & Saggi, 1997). In Lim's (2001) view, FDI is a conduit for transferring advanced technology to host countries. But Pack and Saggi (1997) suggest that because such inflows and the domestic abilities to utilise them are complex, considerable effort to promote assimilation is required.

The characteristics of local firms, with particular emphasis on their absorptive capacity and dynamic capabilities, are important determinants of effective transfers (Blalock & Simon, 2009; Girma, 2005; Gooderham, 2007; Spencer, 2008). Transfer, for example, requires frequent and intensive interaction between the recipient and the source (McDermott & Corredoira, 2010). Local firms also need to overcome existing constraints to improve their absorptive capacity (Eapen, 2012). The bulk of research on T&K transfer has focused mainly on the absorptive capacity of local firms, paying relatively little attention to transfers between foreign and local firms. Sanna-Randaccio and Veugelers (2007) have, however, examined such transfers and observed that R&D decentralisation promotes T&K transfers (intra-firm and inter-firm) and centralisa-

tion limits external flows. While centralisation of R&D can prevent MNC T&K transfers both to and from local firms, decentralised R&D can result in reciprocal knowledge flows with the local competition. Centralised internal flows from parent to subsidiary remain unidirectional; decentralisation leads to a bi-directional flow. This paper argues that such bi-directional transfers can take place when foreign and local firms interact (Eden, 2009) or work together at the project-level.

As indicated earlier, there are relatively few studies in the international business literature on T&K transfer issues in sub-Saharan Africa (SSA) with a particular absence of project-level analysis. Moreover, the available literature has not focused on an in-depth examination of local technology transfer issues and the potential for foreign–local knowledge transfers. This study attempts to fill some of these gaps in the literature. The current paper examines the potential role/contribution of foreign firms in T&K transfer in SSA, using the construction industry in Ghana as the empirical focus. It investigates why T&K transfers are low and whether and in what ways foreign firms contribute to T&K transfer in the Ghanaian construction industry. Specifically, it attempts to explore the following research questions pertaining to Ghana:

- Whether there are significant T&K gaps between foreign and local firms and why?
- How can the presence of foreign firms facilitate T&K transfer?
- Why would foreign and local firms derive benefits from collaborating?

The paper is organised as follows: firstly, we review the relevant literature on technology transfer. Secondly, the research

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methodology is explained. Thirdly, the findings and empirical evidence are reported. Finally, we discuss the implications of the findings and draw some conclusions.

## 2. Theoretical and empirical literature

Technology has been defined in various ways in the business and management literature. Grosse (1996) refers to three main forms: **Product Technology**, **Process Technology** and **Management Technology**. **Product technology** is the knowledge used to produce any product—the information that specifies the product's characteristics and uses. **Process technology** is the knowledge used to produce and organise the inputs and operate machinery—it relates to the process by which a given product or service is produced. **Management technology** is the knowledge used in operating a business—the managerial skills that enable a firm to compete by using its resources effectively' (Grosse, 1996, p. 782). We adopt all three forms of Grosse's (1996) definition in the paper because it recognises technology and knowledge as integral components, which fits the conditions in the construction industry. Technology may be viewed as having both hard elements (construction outputs, materials, plant and equipment—product technology); and soft elements (skills, knowledge, organisation—management technology). The process technology, as described by Grosse (1996) combines product technology with management technology to produce outputs. All these processes as noted by Lee, Wang, and Lin (2010) require a continuous flow and utilisation of data and information (knowledge).

Sahal (1982) similarly refers to technology as a 'configuration' and observes that technology relies on specifiable subjectively determined products and processes. The study of technology transfer cannot only focus on the product, because the product needs to be transferred with the knowledge relevant for its use and applications. Sahal's concept underlines the inseparability of the technology and the related knowledge; technology transfer and knowledge transfer therefore go hand in hand (Li-Hua, 2004; Osabutey & Debrah, 2011).

T&K transfer has been a subject of considerable interest to groups such as government policymakers, international funding agencies, and business executives, because of its links to economic growth (Li-Hua, 2004). T&K transfers are seen as important mechanisms to promote capability building and innovation as well as technological development (van Egmond, 2012). van Egmond (2012) notes that these mechanisms are influenced by the type of T&K, prior experience, complexity, partner protectiveness, control, cultural distance and organisational distance. The literature, for example, suggests that globalisation intensifies the competition between foreign and local firms (Gajendran, Brewer, & Marimuthu, 2013). Where such firms are in direct competition with each other (offering similar products or services, on the same scale and for the same market); the local firm will need to imitate the behaviour of the foreign firm to be competitive. Thus local firms would need to become more innovative by adopting new T&K to compete or face the possibility of being displaced (Jenkins, 1990). T&K transfer from foreign firms to local firms can thus be measured by the productivity and growth or otherwise of local firms. Some studies have, however, shown that FDI can also negatively affect the productivity of local firms. Weak and nonexistent transfers to local firms has been attributed to limited hiring of local employees in higher-level positions within foreign subsidiaries, low labour mobility between local and foreign subsidiaries, insufficient subcontracting from foreign to local firms, little or no research and development (R&D) by foreign subsidiaries and few incentives for multinationals to diffuse their knowledge to local competitors in the host country (Aitken & Harrison, 1999).

With respect to the literature on T&K transfer in Africa, Hadded and Harrison (1993), in a study of the Moroccan manufacturing sector, found that joint ventures benefited from foreign investment. They did not find a significant relationship between FDI and productivity growth of local firms. Their findings are consistent with Dimitri's (1977). Woo (2009), on the other hand, found a positive effect of FDI on productivity using a large sample of 70 developing countries. It is, however, not clear how the 25 African countries in the sample contributed to the results. Researchers such as Hadded and Harrison (1993) advocate an investigation into why foreign presence generates positive spillovers in some countries but not others.

There is emerging literature that emphasises the impact of culture on learning and the adoption of new T&K (Lee, Trimi, & Kim, 2013; Steers, Meyer, & Sanchez-Runde, 2008; Tapanes, Smith, & White, 2009). These studies argue that culture influences the way knowledge is sought and shared and therefore attitudes towards adopting new technology. New T&K absorption and implementation requires considerable effort from a developing country (Pack & Saggi, 1997). Human resources management practices that invest in employee's ability and motivation can contribute extensively to knowledge transfer (Minbaeva, Pedersen, Björkman, Fey, & Park, 2003; Minbaeva, 2008). In line with the knowledge management (KM) concept, a conscious effort to acquire, store, create, disseminate, and improve upon or add onto knowledge is a cross-cultural activity (Glisby & Holden, 2003). Thus an understanding of how formal and informal norms may influence T&K transfers in high-context cultures, such as those in SSA, is important. The socio-cultural context both creates opportunities for interaction and shapes those interactions which may allow partners to learn through cross-cultural knowledge sharing, however, rational approaches to experiential learning are negatively influenced by weaknesses in the infrastructure in Africa (Kamoche & Harvey, 2006). Arguably, these weaknesses can restrict absorptive capacities.

KM processes are built upon the dynamic capabilities of firms and also support firms in the development of their knowledge base (Cepeda & Vera, 2007). Dynamic capability theory helps to explain how local firms in particular allocate their resources for T&K and innovation (Cetindamar, Phaal, & Probert, 2009). It suggests that firms with limited resources also have limited capability or capacity to adopt new T&K. The absorptive capacities of local firms are important determinants of T&K transfer (Blalock & Simon, 2009; Eapen, 2012; Spencer, 2008). Eapen (2012) observes that T&K transfer begins with a clear search prior to the transfer and that repeated and intensive interaction is required for effective transfer (see also McDermott & Corredoira, 2010). Thus T&K transfer relies both on the firm's absorptive capacity and a deliberate firm and governmental search, transfer and implementation of appropriate T&K.

In the FDI literature Findlay (1978) also argues for the possibility of a contagion effect, often referred to as externalities of efficiency spillovers, through which local firms could become more productive and efficient. Eden (2009) argues that informal transfers can occur which are not necessarily planned. Whether planned or not, T&K transfer is seen as requiring an enabling environment and concerted effort from stakeholders to achieve this. Firm-level absorptive capacity, depicted by capacity/capability to utilise acquired knowledge, is also needed to allow potential spillover effects to occur (Todorova & Durisin, 2007). Absorptive capacity and spillover effects depend to an appreciable extent on the dynamic capabilities of local firms and they are linked to the wider environment in which they operate. Since construction projects are often more transient and vary tremendously (Dubois & Gadde, 2002), formal and informal transfers can be more difficult to achieve at project-level. Project based firms are characterised by

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