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Intermediate institutions and technology transfer in developing countries: The case of the Construction Industry in Ghana

Abstract

There has been an emerging view that the quality of state institutions can influence technology transfer in host countries. The bulk of such studies have ignored the role of intermediate institutions which bridge government and industry. We compare academic and local expert views of how technology and knowledge (T&K) transfer could be enhanced in the developing world, taking the Ghanaian construction industry as an exemplar. The academic argument that the development of strong intermediate institutions is likely to improve T&K policy and practice is explicated. We then investigate expert perceptions of the industry's T&K transfer problems and their proposed solutions. Their views confirm, but also develop and nuance academic research by suggesting that certain types of intermediate institutions have a more significant role to play than others.

Keywords: Intermediate institutions; technology transfer; industry associations; professional bodies; Ghana; Africa

1. Introduction

Technology and knowledge (T&K) transfer may occur through foreign direct investment (FDI); trade; machinery and equipment imports; contacts with highly skilled diaspora members (nationals working abroad) and with other information networks, including those of academia and the media (World Bank, 2008; Danquah and Ouattara, 2015). Construction FDI can, uniquely, take significant advantage of the gamut of these T&K transfer elements within host countries in developing countries such as those in Africa (Osabutey, Williams and Debrah, 2014). We examine expert perceptions of the effectiveness of different types of intermediate institutions in facilitating T&K transfer in the Ghanaian construction industry, comparing them with theory. The subject is important because FDI's major contribution to economic growth derives from 'its role as a conduit for transferring advanced technology' (Lim, 2001:3). Whilst a considerable number of empirical works have noted technological gaps in Africa such studies have, at the same time, shown or emphasised the importance of technology transfer to economic growth in the region (Managi & Bwalya, 2010; Osabutey & Debrah, 2012; Rattso & Stokke, 2012; Chavula, 2013; Osabutey *et al*, 2014; Adenle, Manning & Azadi, 2017). Advanced technology should be a key driver for firm- and country-level productivity enhancement (Lai, 2011; Zhang, Li, Li, & Zhou, 2010). Yet FDI in Ghana has been shown to have negative effects on local firms' productivity (Waldkirch & Ofosu, 2010).

T&K benefits transferred to Ghana's local companies remain very limited: Ghana is ranked 112 of 139 countries in firm-level technology transfer (World Economic Forum, 2011). Aspects of the FDI literature examine whether sufficient technology transfers occur to justify the incentives policymakers give to attract foreign investment (Eapen, 2013). Osabutey & Debrah (2012) argued that low T&K transfer in Ghana can be attributed to policy lacunae. They discern that policymaking was generally inconsistent and fragmented, with existing policy frameworks failing to adequately link, for example, FDI, trade and education policies.

This suggests that government is generally unable to operate at the level required to enhance T&K transfer. Although this observation has some explanatory force, government capacities require supplementation in the context of Sub-Saharan Africa and researchers have not evaluated the role of intermediate institutions.

T&K transfer is likely to be influenced by local institutions (King, 1987). African states' institution-building activities to manage and mediate external interventions have recently been brought into sharp focus (Mohan & Lampert, 2013), but few studies explore the nature of the national institutional structures that may facilitate T&K transfer. Many researchers have simply adopted a state-centred approach, making prescriptions for government policy. A broader institutional view suggests fuller recognition of the limitations of state action when these institutions either do not exist or play an inadequate role. We therefore examine how T&K transfer, defined as the sharing of technology, 'know-how' and work organisation practices may be enhanced in the Ghanaian construction industry, testing academic theory through industry expert views.

The remainder of the paper is organised as follows: First, we outline our theoretical framework. Next, we provide a brief overview of the Ghanaian construction industry before describing the research design and method. Third we report on our experts' perceptions. Finally, we discuss how our theoretical perspectives relate to expert views and draw out conclusions and implications.

2. Theoretical framework

It is widely acknowledged that T&K is central to growth. A significant strand of the development literature has identified that firms' capabilities at the aggregate level of industries and countries have to develop as a condition for competitiveness and growth (Goedhuys, Janz and Mohnen, 2013). However, firm level theories alone cannot explain the

technology transfer choices managers make since institutions regulate the activities and enforcement characteristics within which organisational and economic activities occur (North, 1990; Scott, 1995). Effective relationships between institutions, organisations and government are essential for economic development, particularly in developing countries. T&K transfer, a development activity important for economic growth and development, requires interaction between institutions, government and organisations. In a cross-national setting, national institutions influence technology flow between source and recipient organisations (Malik, 2013). In the case of developed countries, such as the US, formal and informal institutional rules and constraints explain the effectiveness of technology transfer (Pattit, Raj and Wilemon, 2012). In the African context James (2000) draws attention to the high degree of institutional change required for the introduction of new technologies on a large scale.

Like institutions, national systems of innovation (NSIs) are essential for effective T&K transfer. The literature on NSIs has progressed from what was initially proposed by Lundvall (1992) to emphasise government, knowledge-based institutions, and industry as key actors (Etzkowitz & Leydesdorff, 2006). Knowledge brokers (arbitrageurs) serve as intermediaries between these actors to enhance T&K transfer and performance of firms (Zook, 2003; Baygan and Frendenberg, 2000). Institutional theory within the NSIs framework, therefore, provides a theoretical underpinning for the exploration of T&K transfer issues. The state often acts as a substitute for market failure to shape strategic choices that domestic firms make in emerging/developing economies (Hong, Wang, & Kaforous, 2015). Therefore, intermediate institutions, working in the space between the state and industry, may assist in linking the two.

2.1 The 'state action' tradition

Government policy, it has been widely suggested, is vital for T&K transfer and construction industry development (Chatterji, 1990; Ofori, 1994; Carrillo, Robinson, Anumba, &

Bouchlaghem, 2006). Much research on FDI analyses state action, giving little attention to the states' wider institutional relationships to civil society and industry; we describe this as the 'state action' tradition. Thus, Adams (2009) argues that FDI's impact depends on country-specific conditions and that African states require an approach which seeks to increase local firms' absorptive capacity. Lumbila (2005) emphasises that FDI's growth enhancement potential can only be fulfilled in a positive policy environment. Osabutey *et al.*, (2014) argue for the integration of different aspects of policies since governmental responsibility for the industry is dispersed among different ministries.

Efficient states undoubtedly fulfil a role in developing company technological adoption (Bessant & Rush, 1995). High levels of government efficiency enhance technological adoption, *inter alia*, by promoting national identification, societal involvement and improving educational infrastructures (Galang, 2012). Thus, governments, their policies and their efficiency count. However, the 'state action' strand offers only a partial and thus inadequate analysis. African states frequently suffer from weak legitimacy and corruption (Wood & Frynas, 2006). Indeed, efforts to attract FDI may themselves further undermine their legitimacy by increasing possibilities for corruption. Lumbila (2005) shows that African countries perceived as highly corrupt also benefited *short-term* from FDI's impact on growth. He argues that this may be due to incentives offered to attract FDI, which weaken local institutions by circumventing and undermining them creating a transitory positive effect that does not assist local industry's longer-term development. As Evans (1997) argued, to generate collective goods such as training states need to transcend developing-world states' tendency to impose 'the simplest possible set of centralized rules' (Evans, 1997: 81) and to create more sensitive policy tools. They appear likely to require assistance from local experts to do so.

2.2 Technology, institution, innovation systems and development

There is a growing literature that supports the thesis that technology plays a pivotal role in economic growth and development (Nelson & Winter, 1982; Romer, 1990; Aghion & Howitt, 1992). This is because early growth theories suggest that technological differences explain levels of economic development (Gerschenkron, 1962). FDI stimulates growth by improving technology which then enhances productivity (Borensztein, De Gregorio, & Lee, 1998) and, within the context of adequate labour quality and institutions; technology is expected to be transferred to host countries (Loko & Diouf, 2009). Arguably, developing countries with poor technological capabilities would lag behind in economic growth (Fagerberg & Srholec, 2008). Recent empirical works manifest that developing countries in general (Danquah, Moral-Benito, & Ouattara, 2014) and SSA countries in particular (Danquah & Ouattara, 2015) require improved technology and quality of institutions to develop their economic growth. Institutional structures play an important role in shaping and supporting efforts to advance in technology (Freeman, 1982; Nelson & Nelson, 2002). Institutions influence knowledge creation (Regnér & Zander, 2014) and the institutional approach to developing NSIs cultivates the social contexts required for firm innovation (Coriat & Wienstein, 2002) and T&K transfer. NSIs refer to a set of distinct institutions which separately or collectively contribute to the development and diffusion of new technologies (Lundvall, 1992; Metcalfe, 1995). Fagerberg and Srholec (2008), using data covering Europe, North and South America, Asia and Oceania, and Africa concluded that innovation systems and good governance are fundamental for effective technological (and economic) catch-up.

Highly transferable technologies may not, generally, be affected by the quality of institutions. However, the quality of economic, social and political institutions influence the transfer of complex, tacit, and systematic T&K transfer respectively (Galang, 2014). Earlier studies on technological catch-up by Gerschenkron (1962) compared a number of European

countries to the then technologically more advanced Great Britain and stressed the importance of developing appropriate institutions. Empirical literature generally point to a positive relationship between institutional quality and T&K transfer in both developed and developing countries (Costantini & Liberati, 2014; Krammer, 2015).. Vasudeva (2009) showed that in the advanced economies of Japan, France, Norway and the U.S. socio-political institutions positively influenced knowledge-building strategies. Drine (2012) found that good institutions in developing countries in North Africa, Sub-Saharan Africa, and Asia and Latin America reduced the technology gap and quickened catch-up. Osabutey and Jin (2016) also suggested that weak institutions may well explain, unambiguously, Sub-Saharan Africa's low T&K transfer. This stresses the importance of institutional quality to T&K transfer processes. Many such studies, however, focus on macro-level institutional arrangements but give little credence to intermediate bodies (between states and firms). Given that the majority of construction firms in developing countries are small-to-medium sized entities which lack resources (Assibey-Mensah, 2009; Osabutey *et al.*, 2014) it is important to explore how construction industry intermediate institutions could influence T&K transfer.

2.3 Intermediate Institutions, Industry and Government

One mechanism through which intermediate institutions may operate effectively is through training. The smaller companies that proliferate in the Ghanaian construction industry require institutional assistance to provide sufficient training to develop their absorptive capacities. As Cooke (2002) noted, the success of newly introduced technology depends on workers' conscious and subconscious characteristics. Human resource management (HRM), as a coherent set of modern labour management practices, is not present in many of these smaller firms. They also lack the resources to train employees adequately. Yet the simple development of HRM is a necessary but not sufficient condition for enhancing T&K transfer

(Osabutey & Jin, 2016). Further company capabilities are required. Therefore, dynamic capabilities, i.e. the capacity for companies to adapt via well-developed internal knowledge transmission, socialisation and motivational mechanisms also require development (Gooderham, 2007). The forms of HRM/D that appear most effective in creating an environment within which dynamic capabilities may be enhanced are those that build human capital rather than relying either on hierarchical or material incentives (Gooderham, 2007). These variants of HRM are relatively difficult to develop effectively even in large firms and thus require assistance from industry institutions. Training may enhance small companies' capacities through diffusing such insights.

It has therefore been argued that states in general and those in developing countries in particular require the co-operation of strong intermediate organisations well rooted in industry and society (Sandbrook, Edelman, Heller, & Teichman, 2007) to address firm-level problems through fostering company-company links which may help compensate for state deficiencies. This is consistent with a trend towards 'leaner, meaner' states with decreasing resources, as it allows the latter to be complemented in crucial areas, notably in the necessary practical knowledge encapsulated in James C. Scott's term *metis* (Evans, 1997; Scott, 1998). Developing countries, such as Mauritius, which have built strong intermediate organisations, developed from similar African postcolonial institutional remnants, have proved especially successful (Sandbrook, 2005; Sandbrook, *et al.*, 2007; Chutel, 2012) since they have sought to develop institutions that address their particular unique needs. In this case, they have assisted governments to target their resources effectively at those companies with proven capacities to innovate and to create demonstration effects to other companies. Intermediate bodies can advise government how best to achieve this targeting because of their comparative knowledge of companies (Culpepper, 2001). In construction, where workplaces are often transient, the precise locus of firm capacities may be problematic as site workforces and managements are

regularly re-constituted, whilst productive units may be cross-firm, creating ‘quasi-firms’ across established corporate boundaries (Eccles, 1981). Intermediate institutions, through their international connections and expertise, may also provide linkages into the increasingly important world of private standard setting and enforcement (Büthe & Mattli, 2011). This is, in turn, linked to greater negotiating weight with inward-investing companies, acquired through improved understandings of the balance of forces in any given entry bargain, and of the technical solutions most likely to prove effective. Finally, institutions may act as centres of high-status expertise which may be used in collaboration with government to raise levels of social capital and absorptive capacity. It has been demonstrated in the developing world context of the Dominican Republic that improvements in absorptive capacity are more likely to occur where developing state and industrial actors ‘co-produce’ change through dialogic processes (Schrank, 2011). Intermediate institutions, therefore, link state, economy and society in all of the ways detailed and ensuring that state initiatives are adequately linked to industry needs.

The precise role, nature and capacities of these intermediate bodies remains a relevant issue. The depth of their technical expertise is clearly relevant to their status. So, too, are the extents to which they are rooted in industry and enjoy high-trust relations with constituents and government (Schrank, 2011). The resources they have to support them in sustained dialogues that involve two very different sets of actors also appear *a priori* relevant. Relationships facilitate access to potentially valuable and beneficial technology, knowledge and resources and can considerably increase the probability of T&K transfer (Reagans & McEvily, 2003; van Wijk, Jansen, & Lyles, 2008). The presence of a knowledge centre within a wider network of relationships can be useful to individual companies (van Wijk *et al.*, 2008).

Different types of body may be appropriate to conduct this two-way dialogue. The most state-led case lies at one end of the spectrum of possibilities. A constructive role in developing human capital has been played elsewhere in Africa by ‘quasi-autonomous’ state-driven institutions, with no membership base but a focused remit and considerable resources (Sandbrook, *et al.*, 2007). At the other end of the spectrum, lie even more deeply-rooted native societal institutions which have also historically played a positive role in developing human capital through providing loci for civic participation and education (Chutel, 2012). Ayittey (2006) argues that such bodies should be allocated an increased role in developing African societies. Between these two polar cases (governmental-societal), lie at least two further possible types of intermediate institution: industry/employers’ associations and professional associations. Industry institutions and trade associations play a significant role in industrial development and epitomise the collective interest of an industry’s constituent firms (Marlerba & Orsenigo, 1996; Tomlinson, 2011). They are bodies which companies may join. They often have long histories of lobbying and consulting with government, and have increasingly conducted education and training (Croucher, Tyson, & Wild, 2006). They have, as industry-based bodies with some claim to representing an entire industry, a competitive advantage. Finally, professional associations, based on expert individual membership, which may also have experience of such dialogue, could also have potential. These, too, may have a record of conducting industrial training. However, these later organisations because of their *raison d’être* are likely to have more claim to professional expertise than to representativeness of company interests. Thus, the choice in the last two cases is between expertise (manifested in professional associations) and direct links to companies (manifested in industry associations).

Against the backdrop of lower T&K transfer in Africa and Ghana with the evidence suggesting existing institutions are not adequately addressing our issue, a need exists explore

the role of intermediate institutions. We therefore pursue three related research questions. (1): how far and in what senses do local experts support the view that state action may assist in developing T&K transfer?; (2): how far do they agree that intermediate institutions can assist government in this? (3): which type of intermediate institution appears to them most appropriate? Before presenting a detailed research design section, we present a brief industry overview to contextualise how industry parameter, directly or indirectly, relate to the issues our study seeks to address.

3. Overview of the construction subsector in Ghana

The construction industry in Ghana has been the third largest economic sector based on value addition to Gross Domestic Product (GDP) and the fastest growing sector (Anaman & Osei-Amponsah, 2007). Construction is officially treated as a subsector of the wider industrial sector in Ghana (Ghana Statistical Service, 2015; Danquah and Iddrisu, 2016). It is the second largest contributor to Ghanaian industrial output after manufacturing (Twerefou, Ebo-Turkson, & Osei Kwadwo, 2007). The construction subsector engages 14.3 per cent of employees in the industrial sector (Ghana Statistical Service, 2015) and contributes more to GDP than any other industry subsector and its contribution to GDP grew from 8.5 per cent in 2010 to 11.8% in 2013 (Ghana Statistical Services, 2014). The government is the major sponsor of infrastructure projects. Local contractors have limited financial, logistic and technical capacity and the industry has a weak registration and contractor classification regime. Weak oversight by government agencies results in poor monitoring and evaluation (Sutton & Kpentey, 2012).

Foreign firms dominate because of their size, capacity and technical expertise (Sutton & Kpentey, 2012). Large scale contracts are generally awarded to foreign companies, which then decide how far to involve local partners; in many cases, the latter's involvement is

minimal or even on occasion non-existent. A large number of small and medium-sized construction firms exist, but they generally lack the key capabilities required to be awarded major contracts (Assibey-Mensah, 2009; Ayarkwa et al., 2011). Local construction firms need to interact with technologically better resourced foreign firms to effect T&K transfer, however, existing evidence suggests no or low interaction and therefore inadequate T&K transfers (Assibey-Mensah, 2009; Osabutey *et al.*, 2014). Construction is increasingly becoming more technical and sophisticated (Ayarkwah et al., 2011) and local firms need to improve their T&K to survive and compete. T&K transfer would play a significant role in construction project performance (Ahadzie, et al., 2011), but local senior managers often lack professional qualifications and are, according to our respondents, frequently ‘illiterate’ or ‘semi-literate’. Their employees are rarely multi-skilled. They lack the capacity to undertake complex modern construction projects (Laryea, 2010; Ayarkwa et al., 2011). Their ability to invest in developing their capacities are very limited (Osabutey *et al.*, 2014). Difficulties in obtaining payment for completed projects further exacerbate weak financial situations often resulting in inability to honour loan repayments (Sutton & Kpentey, 2012). Thus, overall they operate within a low-skill, poor financial status, weak management paradigm from which it is difficult for them to extricate themselves.

4. Research design and method

Our questions are addressed using interviewing to elicit expert perceptions from a range of professionals (Table 1) with considerable collective experience, expertise and local and international knowledge. A purposive sampling frame designed to reflect the key industry stakeholders was developed from lists of practitioners. A further dimension in the sampling frame was the researchers’ experience of how detailed the responses were likely to be from individuals (Morgan and Smircich, 1980). Previous experience allowed us to create a sample

representative of key interests likely to provide appropriately rich data. Data saturation (Locke, 2001) was reached after around three-quarters of our interviews. We continued interviewing, to ensure that saturation had been reached.

Table 1: Composition of Respondents

Description	Code	Number
Professional consultants owning or working for/ with private local firms	PL	23
Professional consultants supervising government projects	PG	11
Professional Consultants working for multinational firms	PM	8
Executives and Senior Officers from Ministries, Departments and Agencies	MDA	15
Presidents of Professional and Allied Bodies	PPA	6
Presidents of Industry Associations	PIA	3
Senior Managers of Multinational Construction Equipment Firms	ME	2
TOTAL		68

Many respondents were members of professional and industry associations and 41 of the 68 respondents were members of the former. All respondents had some involvement with industry associations. Most professionals worked with, or for, firms who for the purposes of representation and contract eligibility belonged to one or more industry associations. Therefore, professional respondents had stakes in industry associations. Membership of these organisations is widespread in construction however, and does not imply even moderate commitment to specific institutions. Our analysis nevertheless required sensitivity to the possibility that these respondents advocated the involvement of associations in which they were stakeholders. However, this is unlikely to give rise to bias on respondents' part as it should be noted that most respondents were *simultaneous* stakeholders in numerous industry bodies and so not especially likely to favour one over the other. The affiliations of respondents expressing views in line with each theme are provided in the Appendix.

Field work was conducted in three waves, the first in 2009, the second in 2011 and the third in mid-2014. Each wave sought to interview selected key informants from the previous wave in order to update industry information. In addition, newly identified industry stakeholders were also interviewed. Since some executives in earlier waves may have been replaced or their terms expired it was important to capture views from new office holders. Hence, we interviewed new presidents of professional and industry bodies because the two or three year tenures of previous executives had expired in previous interview runs. The sample is shown in Table 1. The great majority of respondents had extensive experience in foreign funded projects, had either worked for or collaborated with foreign firms, had worked abroad and were aware of international practice.

Interviews lasted between half and two and a half hours. A range of questions was asked on institutions and T&K transfer, covering firm practices, the extent and quality of T&K transfer and how government and industry bodies could improve it. Notes were taken for all interviews (70 per cent of respondents agreed to audio recording). Responses were manually analysed by identifying emerging themes and deviations from them, through the widely used processes of data reduction, data display, and drawing and verifying conclusions (Miles & Huberman, 1994).

5. Data analysis

In our interviews, we pursued our three related research questions with regards to how far local experts support the view that state action may assist in developing T&K transfer and the extent to which specific intermediate institutions could also assist. Respondent themes, the number and affiliations of respondents supporting themes and representative respondent quotations are presented in the Appendix. We now report on the results relevant to our first two questions.

5.1 Government

The frequently re-named ministries of Environment and Science, Communication and Technology, Education and Manpower and Employment were identified as potentially relevant departments. Yet many respondents observed that these ministries were continuously reconfigured. The lack of an industry regulatory body similar to those in Singapore, Malaysia or South Africa to register contractors and develop the industry was felt to be a major issue. The absence of functioning NSIs creates discontinuities in policy direction with respect to technology development. The expected links between NSIs actors' government, knowledge-based institutions and industry is either weak or non-existent. Respondents observed that there was hardly any communication between the ministries and no synergy between their policies.

Nearly 70 per cent of respondents emphasised that there was a policy vacuum in terms of T&K transfer in virtually all sectors of the economy. The majority view is that politicians do not understand the importance of construction in particular and T&K transfer in general:

'It's basically a lack of policy drive..... As far as the politician is concerned; when I came [into office] the road was bad, I've got the road built. Now you are talking about something different; about the right to use road construction to build capacity and transfer technology. That is all too complicated; fundamentally has the road been built or not? That's the politicians' language. It ends there' (Planning Consultant).

It was widely agreed that a clear, well-articulated policy for foreign-local collaboration would improve T&K transfer. Although some respondents were unclear on the precise state of the law, there is in fact no specific statutory requirement on foreign-owned firms to enter partnerships with local firms and the Ghana Investment Promotion Centre (GIPC) reports explicitly *encourage* wholly foreign-owned investment (GIPC 2009; GIPC, 2010). Over 62 per cent of respondents felt that the linked problems of corruption and weak enforcement capacity also inhibit effective implementation of T&K transfer policies. Some contracts with

foreign companies have on occasion contained clauses related to T&K transfer, but these have not been enforced. As one respondent remarked, *'the major headache is enforcement'*. However, the wider problem of corruption is also relevant here:

“Often enforcement may be overlooked; this is part of corruption and it’s difficult to stop it at the moment because government is the largest client and *'he who pays the piper calls the tune'*” (Civil Engineering Consultant).

There appears to be insufficient government commitment due to conflicting interests. More than 85 per cent of respondents suggested that government could wield significant influence:

‘Government is a major stakeholder with about 80 per cent of national construction output; can easily dictate the direction of technology development within the industry’ (Public Sector Technical Advisor).

‘If it [government] has plans for a series of construction projects in all the regions it can decide that in the first one or two projects partnerships between local and foreign firms would result in the local firms being able to undertake the remainder of the projects’ (Civil engineering consultant).

Some 55 per cent of respondents emphasised that clients can influence T&K transfer and capacity building greatly through demands made during the bidding process, however, others argued that government’s influence was limited because of the scale of donor-funded projects.

Most responses gravitated towards governmental negotiations with foreign investors and international and multilateral organisations. Some 58 per cent of respondents argued that the country’s development needs had to be clearly communicated during negotiations; and that government representatives should seek capacity building and T&K transfers in all international transactions. They argued for local professionals’ involvement in international

negotiations because officials generally lacked adequate knowledge and understanding of the industry. Over 48 per cent of the respondents had been involved in projects where contracts had been signed by government officials without the local professionals' involvement. Such projects were often fraught with subsequent implementation and supervision difficulties.

Some respondents felt that the Ghana Investment Promotions Centre (GIPC), the government agency responsible for the promotion and coordination of investments could play a role. The agency focuses on attracting foreign investment but has no specific interest in T&K transfer. Some noted that current educational policy and practice do not assist T&K transfer. The lack of training facilities or institutions for artisans and the middle and lower level of workers was noted, many respondents pointed out that multi-skilled artisans were both the product and antecedent of T&K transfer and that multi-skilling was rare among Ghanaians. Some made the connection with knowledge transfer.

Falling standards in science and technology education and training were strongly emphasised by about 68 per cent of the respondents. Some respondents also suggested that there was an urgent need for a review of the educational curriculum particularly at tertiary level. It was noted that technical skills are taught without adequate integration of the practical content required to prepare students for the industry. Interaction between industry and tertiary educational institutions was criticised emphatically by over 74 per cent of the respondents as weak or non-existent.

Our experts felt that government needed to select progressive local firms to be developed for T&K transfer and capacity building. More than 60 per cent of respondents agreed that most local firms lacked the capabilities and capacities to meaningfully engage in collaborative activities with foreign firms. Foreign firms were more likely to agree to collaborate with well-developed and resourced (financial, human, equipment, etc.) local firms if the relationship was deemed symbiotic.

Some 41 per cent of respondents emphasised that government HRD initiatives were also required.

‘A Construction Industry Training Board (CITB), as practiced in the UK, could be a solution: A board which is purely meant for industry training, with structured training programmes for various companies...Companies who send their employees could be given some tax rebates. If you did that some firms who think they cannot afford to invest in training, would be encouraged to train their employees’ (Quantity Surveyor Consultant with MNC experience).

The reference to the UK’s CITB was one of numerous allusions to a range of bodies internationally; throughout the interviews international rather than local frames of reference were frequently employed. Such a CITB-style body could incorporate new technologies in their training curricula. The respondent quoted above expanded further:

‘If the industry board is forward-looking, it would start looking at some technologies... People could be sent abroad to understudy others and then come back to train others...For example, we [MNC he worked with previously] introduced pre-stressed concrete construction. In Ghana it’s supposed to be innovative but it’s not. In the UK, for example, it’s used everywhere and the technology is tried and tested...Such a board could collaborate with government... to stipulate that pre-stressed concrete should be incorporated in the design of government buildings with more than three storeys. Let’s use some of the more modern technologies as a way of training.’

Respondents expected government to create training budgets from the contractors’ registration fees. Other respondents argued that T&K transfer and capacity building must be allocated to independent institutions. Independence was needed to mitigate potential problems

of victimisation of individuals acting in ways inconsistent with others influenced by corruption. Hence, discussion of government centred on departmental inadequacies and fragmentation in the governmental machinery, but also tended to move towards suggesting possible existing or proposed institutions that could play a supplementary and bridging role.

5.2 Intermediate institutions

5.2.1 Industry associations

Numerous construction associations exist, fragmenting the industry's representative structures. Most respondents were aware of the Association of Road Contractors of Ghana (ASROC), and the Association of Building and Civil Engineering Contractors of Ghana (ABCECG). Few respondents were aware of the Progressive Road Contractors Association of Ghana (PROCA) which broke away from ASROC in late 2007. Even fewer mentioned the Ghana Real Estates Developers Association (GREDA).

Over 65 per cent of respondents indicated that since these industry associations had similar problems, it would be optimal for them to unite to present a unified front to government and indeed in late 2012 an umbrella organisation was created, the Ghana Contractors Association Council (GCAC). This body was a loose grouping and by late 2013 the road associations were reluctant to join, arguing that existing organisations should be strengthened, thereby illustrating the difficulties involved in achieving full consolidation. In the 1970s the Civil Engineering and Building Contractors Association of Ghana (CEBCAG) was the sole association, but then split into ASROC and ABCECG in the mid to late 1990s. The immediate cause of the split was the behaviour of the head of the Association's buildings section, which alienated members of the significant roads section. The Association split, which was government's preferred solution and some respondents felt that this provided government

with a ‘divide and rule’ advantage. Thus, whatever government’s motives for advocating a split, it had a negative effect in relation to the industry’s capacity to relate to the state.

Low perceived influence with government lowers incentives for firms to join the associations. ASROC and PROCA deduct levies directly from contracts awarded by the Ministry of Roads and Transports. ABCECG require payment of fixed levies according to classification and contractors’ country of origin. The latter are, therefore, less well-resourced because their rates were low and it was difficult to obtain subscription payments, clearly signalling low commitment from companies. Foreign firms often chose to join ABCECG probably because they favoured paying a fixed levy rather than one expressed as a percentage of their usually huge contract sums. Consequently, ABCECG, an organisation otherwise potentially well-placed to facilitate T&K transfer, since it has both foreign and local firms in membership, is poorly resourced to do so.

The general view was that the current configuration, profile and resources of the industry associations diminish their potential to address our issue. On the other hand, some 18 per cent of the respondents agreed with one who argued that there is a need to empower the associations, ‘*who will lose out, or benefit if the thing works well*’. The same respondent also felt that they needed to be empowered legally.

5.2.2 *Professional bodies*

About 65 per cent of respondents advocated professional bodies playing a role in curriculum development and continuing professional development (CPD) for all practitioners and employees of the construction industry. We note here that of the 44 respondents arguing in this sense, 29 (roughly 66%) of them belonged to professional bodies. The built environment professional bodies are the Ghana Institution of Engineers (GhIE), the Ghana Institution of

Surveyors (GIS), the Ghana Institution of Architects (GIA) and the Ghana Institution of Planners (GIP).

The GhIE is the highest profile body and the largest in membership terms. It had a membership of 2,694 in September 2013. It establishes and manages a register of engineers, conducts professional examinations and promotes the exchange of professional expertise along similar lines to the activities of many such bodies internationally. It appears to be in a sound financial position (GhIE, 2013).

These bodies are already influential with government. The GIS, for example, was involved in the drafting of the Procurement Act 663 (2003) and the development of guidelines for international and national competitive tendering which could be used to improve T&K transfer. The GhIE pursued the statutory establishment of an engineering council for over a decade and the Engineering Council Act 2011, Act 819 was eventually passed by parliament. The council is expected to regulate all engineering practitioners within the industry. In upholding and enforcing standards they may enhance T&K transfer. By mid-2014 the expected influence of GhIE to regulate and promote construction industry development and T&K transfer had not been felt.

More than 91 per cent of the respondents (including those who did not belong to a professional body) identified the professional bodies as the key potential drivers of T&K transfer and capacity building initiatives within the industry either alone or in co-operation with other organisations. 41 of these 62 respondents were also members of professional bodies. They emphasised that it is unthinkable that professional bodies were not adequately involved in industry policy formulation and implementation. Their argument was primarily because these bodies' expertise met international standards. They suggested that the professional consultants occupy a strategic position in the industry. They constitute the main links between the client, the project manager and the larger, medium-sized contractors (who

also employ professionals) on construction projects. They are involved in key decisions before construction projects and well linked to all parties, including the smaller contractors who actually implement much of the production process. Remarks on evident skills gaps include:

‘We see more of the gaps in professional human resource supply. It is easier for me to appreciate the need for certain skills that are not available than for the vice chancellor.... the onus lies on the demand end to ensure that the supply fits the demand equation.’

(Professional Body Executive)

This clearly emphasises the role of the professional bodies in HRD as extending beyond addressing present human capital deficiencies, to predicting future needs. Neither the ministries nor the industry associations were seen to have the requisite capacity to arrange or deliver these training programmes themselves. Furthermore, the professional bodies would have to develop new capacities if they were to train middle and lower level operatives on a larger scale than at present.

Thus, the professional bodies were considered a more effective advocacy group than the industry associations because of their stronger knowledge bases, abilities to negotiate international and multilateral infrastructure contracts and in policy formulation and implementation. Their capacity to improve local higher education institution provision and to conduct training themselves was also seen as important.

6. Discussion

Our three research questions concerned experts’ perceptions of the current utility of state action, how far experts supported the argument that intermediate institutions can assist government, and if so, which type of institution is best suited to do so. Responses to the first question exhibited considerable homogeneity, and showed that respondents viewed

governmental institutions as lacking coherence and a strategic approach to industrial policy. They thereby echoed earlier academic complaints that the construction industry should feature in the Ghanaian government's growth plans (Anaman & Osei-Amponsah, 2007). Weak state bargaining in relation to investors was also a common complaint, echoing long-standing academic concern with the issue (see for example Irvin, 1981). Those who advocated government negotiating harder with investors echo Manu's (2003) study of Ghana's post-independence negotiations with foreign investors. In that era – the late 1950s – national interests were perceived as having been inadequately pursued. The fact that this perception persists indicates a long-term and deeply rooted phenomenon that has become embedded in local expert collective consciousness. A further state-related difficulty was perceived in enforcement of *existing* contractual clauses. Hence the experts' proposed solution of an industry regulatory body including the professional bodies.

In expert discourses, professional, internationally rooted technocratic expertise was rhetorically contrasted with officials' ignorance of industry and indeed with corruption. Our experts used *international* institutional comparators as key referents. To this extent, those writing in an exclusively national 'state action' tradition and indeed nationally-focused institutional theorists are seen as according inadequate attention to the international dimension. Our findings confirm those of Wei, Zheng & Zhang (2011) that individual professionals operating in teams (professional bodies) with high levels of density and learning tend to have greater T&K transfer potential. This strengthens the role of the professional elements of a stakeholder group in the pursuit of T&K transfer within a given industry or sector.

In response to the second research question, respondents felt that policy lacunae alone were not solely responsible for poor T&K transfer. Up to this point, expert opinion essentially confirmed the institutionalist strand of academic thinking. However, the majority of

respondents supplemented the academic view in terms of the type of body they felt should play a role. Industry associations were not the main bodies they felt appropriate to undertake these functions. Rather, respondents suggested that the policy formulation and negotiating process with foreign companies should draw on the professional bodies' expertise. In relation to the third question, they also advocated involvement of the professional associations in establishing a regulatory body with enforcement powers. After most of our interviews were completed, it was announced in late 2012 that such a body (the Construction Industry Development Authority – CIDA), with representation from both types of association, government and higher education institutions would be created. This body had early difficulties in being established but by the middle of 2014 a CIDA draft bill was developed after a stakeholder conference. This new development received considerable external international support from organisations such as the Chartered Institute of Building (CIOB). As of April 2017 the CIDA bill was yet to be sent to parliament. It is currently with the Attorney-General's Department for review and alignment with government policy. The promoters of the bill, the CIOB – Ghana, are currently planning a post advocacy project to get the bill passed. The prevailing view is that this new CIDA bill, when passed, will complement the existing Acts. The CIDA Act and the body formed is expected to enhance technology, human resource, business and industry development. Respondents Interviewed in 2014 were confident that CIDA, with its intended regulatory powers, would be the body that could enhance industry T&K transfer potential.

Therefore, since state institutions are generally weak or dysfunctional in most developing countries (Khanna & Palepu, 2006; Osabutey & Jin, 2016), intermediate institutions may have a greater role to play in enhancing T&K transfer. They could support government in developing, implementing and enforcing integrated industry specific FDI, human capital development, and technology transfer policies in order to ensure that collaboration between

foreign and local firms would be encouraged to further T&K transfer. In addition, they can use their international knowledge and exposure together with their interaction with stakeholders to identify, suggest and implement industry capacity building programmes.

7. Conclusion

Our findings show how expert actors’ views may influence policy. They are also relevant to evaluating and building theory. Although existing theoretical and empirical literature suggest that in developed and developing countries good institutions enhance effective T&K transfer (Pattit et al., 2012; Costantini and Liberati; 2014) our findings suggest that Ghana’s construction industry lacks such institutions. We confirm the findings of Schrank (2011) that in developing countries, where state institutions are weak, knowledgeable stakeholder-driven intermediate institutions can drive the T&K transfer and development agenda. Our experts’ testimony emphatically endorsed this perspective; their preference was overwhelmingly for supplementing state efforts with those of established industrial organisations and indeed there was evidence of this having occurred. However, our contribution is to show that all intermediate institutions were not viewed in the same way by our respondents. Our respondents showed a preference for the professional associations’ because of their professional expertise. While the industry associations claimed expertise, these claims were viewed relatively sceptically while their claims of industry representivity were similarly treated. Thus, in our research context, expertise was preferred to industry representivity.

Appendix: Respondent themes with representative respondent quotations

Theme	Respondents supporting theme	Paradigmatic Quotation: central examples

<p>DIAGNOSIS: Lack of state commitment to T&K transfer</p>	<p>39(15PL, 8PG, 4PM, 5MDA, 5PPA, 2PIA)</p>	<p>(1) Mmmh! Government and technology transfer? That is where we have a bit of problem. (MDA)</p> <p>(2) In terms of government policies to promote FDI-linked T&K transfer...very little has been done, even if we have things sitting in the statute books they have not been implemented, because the environment here is free and over-liberalised. (PL)</p> <p>(3) Government needs to use FDI as a vehicle for developing human capital and transferring technology... but here we let investors come and do whatever they like and then go. (ME)</p>
<p>DIAGNOSIS: Dormant and uncoordinated public institutions</p>	<p>45 (17PL, 7PG, 4PM, 7MDA, 6PPA, 3PIA &1ME)</p>	<p>(1) Our public institutions are all dormant and virtually silent because they cannot talk. They know probably more than I do, they understand and see the problems but for fear of victimization, some of them say they want to protect their jobs. (PPA)</p> <p>(2) Our institutions are fragmented. The ministry of works and housing has a register different from that of the Ministry of transport and both register contractors. Most of our state institutions have no links with each other, science and technology and education, for example. (PM)</p> <p>(3) There is no link between relevant ministries like the Ministry of Manpower Development, the Ministry of Education (PL)</p> <p>(4) Our governments have not played a facilitating role to help this collaboration between tertiary institutions and industry. (PM)</p>
<p>DIAGNOSIS: Policy Deficiencies</p>	<p>48(19PL, 9PG, 5PM, 6MDA, 5PPA, 3PIA & 1ME)</p>	<p>(1) There is a lack of policy that aims at technology transfer and capacity building. There are no government policies to incorporate foreign-local partnership so that we can learn. Major projects like the Bui Dam are Turnkey Projects. So eventually when they leave who is going to handle the maintenance and other related issues (MDA)</p>

		<p>(2) First of all there has to be a certain policy environment... The World Bank is here to facilitate the government programmes, so the onus still goes back unto government. You must have that policy drive because you must have a programme then you can seek multinationals. (PG)</p> <p>(3) Poor policymaking... fundamentally national policy to understand our supply deficiencies in human resources. (PPA)</p> <p>(4) Sometimes the way our policy makers think is the problem... they don't see the long term reach of whatever they are doing now. (ME)</p> <p>(5) Government institutions must ensure that they provide better policies... They must be more consultative with other stakeholders to ensure that stakeholders receive maximum benefits. (PL)</p> <p>(6) If we are to encourage these foreign firms to voluntarily team up with our local firms then we would need to reposition ourselves... it's not attractive and that is one thing the policy makers have not brought into play. (PIA)</p> <p>(7) Our governments only focus on the construction output. Technology transfer and industry development is far-fetched and not considered. (PPA)</p>
<p>PRESCRIPTI ON: Weak and fragmented industry associations require strengthening</p>	<p>41(17PL, 6PG, 7PM, 3MDA, 5PPA, 1PIA & 2ME)</p>	<p>(1) The contractors' associations, for example they are not too strong and feedback from them is not significant enough (PM).</p> <p>(2) Apart from the need for the contractors' associations to come together they have a problem... constant in-fighting within the individual associations (PPA).</p> <p>(3) The contractors' associations need to come together to become a more effective advocacy group among many useful functions (PIA)</p> <p>(4) Again, with the associations...we tried to put them together and it</p>

		has not been successful...We were looking at one contractors association (PG)
PRESCRIPTI ON: Stronger, better informed and better related professional bodies required	62 (21PL, 11PG, 7PM, 13MDA, 6PPA, 2PIA, 2ME)	(1) The professional bodies have a lot they can do. (PIA) (2) The professional institutions are very key because if you talk about the human resource and the people who will learn, they all belong to professional institutions (PPA) (3) We are supposed to even know better because we are supposed to know what is happening outside this country, what other bodies are doing; what are the new technologies... I think the professional bodies should be actually doing that for the contractors and consultants (PG) (4) Depending on what professional bodies do in terms of their association with foreign subsidiaries of firms... you can have a fairly good transfer and capacity building (PPA) (5) The professional bodies organise workshops, conferences, exhibitions etc; bringing their own members up to date with current developments and technologies – showing people the new trends, products etc. (PM)

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