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# IS OFFSHORING: A PROPOSED MATURITY MODEL FOR OFFSHORE IS SUPPLIERS

## Abstract

*This paper provides a new perspective on the maturing landscape of IS offshoring. It investigates the providers of offshore services, and proposes a maturity model that is analogous to various customer-oriented maturity models found in the literature and in trade journals. Maturity and stage development models are also employed to provide a developmental perspective on the emerging offshore-enabled IT organisation. The research will help suppliers of offshore services in understanding the particular conditions in which it is appropriate to consider new business models, and will provide consumers of offshore outsourcing with a framework for categorising suppliers of IS services. From a research perspective, there is a need to understand emerging development models, and to place them in the context of the maturity curve for distributed software development.*

## Key words

*Offshore; multi-shore; outsourcing; global software development; maturity model.*

# 1 INTRODUCTION

Distributed or global software development, and particularly outsourced offshore development, is now an accepted way of building and maintaining software applications. Distributed development occurs when teams of geographically dispersed individuals work as part of a global virtual team to build software, using telecommunications technologies across national boundaries (Edwards & Sridhar, 2002). Distributed development can be insourced, where all team members are employees of the same parent organisation. However, outsourced distributed development, where some or all members of the team belong to a third party organisation, accounts for a large part of distributed development projects. Whether in-sourced or outsourced, global virtual teams face challenges not associated with more traditional co-located development (Dubé & Paré, 2001), particularly where the cultures of the participants differ. Outsourced offshore development adds an additional layer of complexity.

The primary reason companies source offshore services is to gain cost efficiencies through labour arbitrage (Ramarapu et al, 1997; Carmel and Agarwal, 2002). Secondary advantages of offshoring include quality of output, the increased access to leading-edge (and legacy) technologies and skills, the increased labour pool flexibility and access to international markets (Ravichandran & Ahmed, 1993). The risks associated with offshore development can be typified as strategic (primarily in deciding how to divide up the work across sites) and operational (the processes, skills and tools needed to allow the project to function optimally) (Herbsleb and Moitra, 2001).

Research on offshoring addresses primarily the drivers, the risks and the enabling factors of distributed software development. In one of the more extensive empirical studies, Carmel and Agarwal (2002) focus on the dynamics and characteristics of the offshoring phenomenon and propose a 'Sourcing of IT Work Offshore' (SITO) stage maturity model for outsourced offshore customers. However, with some exceptions (Rajkumar and Mani, 2001; Mathrani et al, 2005; Khan et al, 2003), much of the existing research focuses on the customer or demand-side of the business, and these studies have tended to be US-centric. Few studies address the supplier landscape, and those that have, present the topic from an Indian perspective, since India is the world's leading offshoring location (Rajkumar and Dawley, 1998). With the exception of industry analysts like Forrester and Gartner (McCarthy et al, 2004; Iyengar et al, 2006), there has been little research on offshore suppliers.

As would be expected in a fast growing and profitable market, the options for the sourcing of offshore services are becoming increasingly varied and complex. In particular, as the outsourced offshore business model matures, the competition among the primary suppliers of offshore IT services is intensifying, particularly between 'pure play' integrators - companies which have originated in offshore locations, particularly India, and which specialise in offshore software development and maintenance - and western systems integrators (SIs), which typically provide offshore software development as part of a wider portfolio of onshore consulting, technology and outsourcing services. Other developments in the supplier market involve increased vertical focus - the specialisation of some supply firms in a particular industry, such as financial services - or increased functional specialisation, such as business process outsourcing (BPO) of administrative activities.

This paper examines several maturity models for users of offshore IS services and proposes an analogous model for offshore providers. Used together, the maturity models will allow users and suppliers of offshore services to optimise onshore/offshore project configurations and understand the particular conditions in which it is appropriate to consider different offshoring models.

The rest of this paper is structured as follows. The next section reviews briefly the literature on IS offshoring. Subsequent sections describe the customer-focused stage models and the proposed supplier-focused model. The final section of the report outlines the conclusion of the study and identifies areas for further research.

## 2 LITERATURE REVIEW

There is a substantial body of literature concerning the outsourcing of the IT function (Ang and Straub 1998; Apte et al. 1997; Carmel and Agarwal 2002; Loh and Venkatraman 1995). Other research in this stream covers IT outsourcing from both conceptual and empirical bases and highlights various theoretical frameworks upon which it is based (Lacity and Willcocks 1995; Lacity and Hirschheim, 1993; Jurison, 1998; de Looft, 1998; Lacity and Willcocks, 1998; Willcocks and Fitzgerald, 1993). A related body of research describes the evolution of the multi-national corporation (Porter, 1986; Doz and Prahalad, 1991; Ghoshal and Bartlett, 1990; Kogut and Zander, 1993), which is instructive in analysing the maturity of offshore IS firms.

A smaller body of research addresses offshoring directly. Although there are studies that address specific aspects of offshore development - for example, the role of development methodologies (Ramarapu et al, 1997) - two themes dominate the literature. The first relates to the increasing rate of growth and maturity of the phenomenon. The second theme is concerned with describing the rationale for offshore development, its associated benefits, the risks of offshore development and key success factors. Each of these themes is addressed in turn.

Most research in this field begins by noting that offshoring is one of the fastest growing phenomena in IS in recent years. In less than a decade, the practice of using geographically and temporally dispersed teams to work jointly on software development projects has become commonplace. This is having a profound impact on many aspects of the IS environment in developed countries. For example, it is estimated that 3.3 million US jobs will move offshore by 2015 (McCarthy et al, 2004). The National Association of Software and Service Companies (NASSCOM) Strategic Review (2006) reports that IT services and software exports from India, the leading offshore location, are expected to grow by 32%, to reach USD 23.4 billion in 2006. Further, the growing number of offshore firms reaching level 5 of the Software Engineering Institute's Capabilities Maturity Model [CMM] suggests that the industry is no longer in the early stages of development but is in fact well established as an accepted component of modern software development practice. Indian firms in particular have aligned their internal processes and practices to international standards such as the International Standards Organisation (ISO) grades, CMM and Six Sigma and are seeking to increase further the quality and productivity benchmarks for remote service delivery (NASSCOM Strategic Review 2006).

The fundamental business question associated with offshoring is whether the associated risks are outweighed by the benefits (Delmonte & McCarthy, 2003). The literature shows that the primary rationale for companies using offshore services has been the search for cost efficiencies. There remains a significant disparity in personnel costs between Western and less-developed countries (Carmel & Agarwal, 2001; Delmonte & McCarthy, 2003; Moore, 2005). Indeed, while Transaction Cost Economics is frequently employed as a theoretical basis for outsourcing research (Williamson, 1979; Lacity & Willcocks, 1995; Whitaker et al, 2005; Jurison, 1998), there is an implicit acknowledgement in the literature that in the case of offshoring, the production cost advantage (the significantly lower cost of offshore programmers and analysts) greatly outweighs the associated transaction costs. Offshoring also offers the potential for higher quality of output, access to scarce technical skills, greater flexibility and access to international markets.

There is consensus also on the main categories of risk associated with offshoring. McFarlan (1981) describes four categories of risk associated with any systems development project – size and complexity of project, project structure, technology used and user factors (number of user interactions and number of user sites) – and these equally apply to offshore projects (Rajkumar and Dawley, 1998). Ravichandran & Ahmed (1993) identify three special problems associated with distributed software development as language barriers, differences in laws and regulation, and fragile infrastructure. The same problems are cited by Ramarapu et al (1997), in addition to economic issues and hidden costs. Herbsleb and Moitra (2001) categorise the issues of offshore development problems as strategic

(primarily in deciding how to divide up the work across sites, and addressing organisational resistance to offshore development); cultural issues; inadequate communication; knowledge management; process and project management issues; and technical issues. Dubé and Paré (2001) name the key issues in implementing global virtual teams as people related (culture, language, IT proficiency) and technology related (accessibility, reliability and compatibility, and appropriate technology use). Khan et al (2003) similarly identify a set of offshoring fundamentals that consist of contact, quality, project management, expertise, trust and security, culture, infrastructure and trade policy. Mathrani et al (2005) identify a set of case variables linked to success, comprising culture, communication, relationship building, coordination and control, quality processes, project management and types of contracts. Finally, offshore projects present management challenges that are often not considered when costs are analysed (Delmonte & McCarthy, 2003).

The key success factors in global software development are derived from an analysis of the risks. Thus, four “critical success factors” are defined as maturity of the management team; level of strategy and commitment demonstrated by senior management; maturity of the organisation’s processes; clarity of the objectives and level of preparation (Delmonte & McCarthy, 2003).

Many of these studies look at offshoring from the perspective of the offshore services consumer. Although there are some recent proposals to look at alternative offshore sourcing options (Evaristo et al, 2005), there is little reference to the strategic positioning and interaction among organisations competing to provide offshore IS services. Mathrani et al (2005) take a detailed look at offshore development from an outsourcer’s perspective and summarise the key success variables. They note that the practitioner community has led in highlighting offshoring, and that much primary research has been conducted by consulting firms such as Forrester Research. In particular they note that “...much of the literature of information systems outsourcing and offshore software development of applications considers a customer perspective or global perspective rather than the offshore software suppliers’ perspective.”

### **3 OFFSHORE SOURCING FROM A CONSUMER PERSPECTIVE**

IS offshoring is a relatively new phenomenon. Before the 1990s, few organisations in developed countries used offshore resources in any capacity. Similarly, the export of software development services from low-cost locations was rare. For example, India’s software exports in 1985 totalled US\$24 million (Rajkumar and Dawley, 1998). Since then, however, there has been a gradual increase in sophistication in delivery and consumption of offshore IS services. Initially, lasting throughout the 1980s, offshore IT sourcing consisted largely of sending personnel from low-cost locations to work in more developed economies, usually the USA. The type of work assigned to offshore programmers was predominantly low-level, mainframe-based application conversion tasks (Soota, 1994). A second phase, lasting from the early to late 1990s, involved the gradual expansion and acceptance of the role of the offshore programmer. Although the offshore work remained relatively compartmentalised, it expanded in range to cover multiple platforms and applications, often from the offshore locations linked to the onshore site via telecommunications links. The peak in demand for IT resource in the years leading up to the year 2000 generated a rapid expansion of the offshore industry. The ‘dotcom’ boom and bust reinforced this growth, initially to satisfy huge demand for skill and subsequently to help reduce the cost of IT in developed countries.

#### **3.1 A theoretical framework - IS maturity models**

Wilson (1997) describes a maturity model as ‘an abstraction of the normal life of a class of objects that we wish to study’, noting that it is formed by identifiable stages in the object’s development, where characteristics, or facets, of the object may change from stage to stage. Three concepts define such models: the need for a set of identifiable stages occurring in a given sequence; the conditions causing a change from one stage to the next; and, the characteristics that identify the object or organisation to be

in a specific stage. Wilson further notes that progression through the stages should always be in the same linear sequence. Various maturity models have been used, in both research and in practice, to help describe the evolution of complex IS organisations and thereby predict and avoid potential problems (Gibson and Nolan, 1974; Greiner, 1972; Galliers and Sutherland, 2003). A further model – Humphrey’s capability model (Humphrey and Sweet, 1987) – is primarily concerned with developing exemplary practice.

In a detailed study of 13 of the largest U.S.-based firms, Carmel and Agarwal (2002) interviewed the executives responsible for global IT sourcing decisions and note that their experiences suggested that “...offshore IT sourcing follows a stage model, based on increasing maturity and sophistication in the offshore effort.” They define the Sourcing of IT Work Offshore (SITO) Stage model, which provides a framework for assessing the relative degree of maturity of a company in its use of offshore sourcing of IT. The model, which identifies four stages, each characterised by a set of strategic imperatives and internal firm dynamics is presented in Figure 1:

- **Bystanders** – organisations that have minimal exposure to offshore development;
- **Experimenters** – organisations that have started to experiment with offshore development;
- **Proactive Cost Focus** – organisations that recognise the advantages of offshore development, and who seek primarily to promote cost efficiencies;
- **Proactive Strategic Focus** – organisations where the concept and practice of offshore IT is fully embraced.

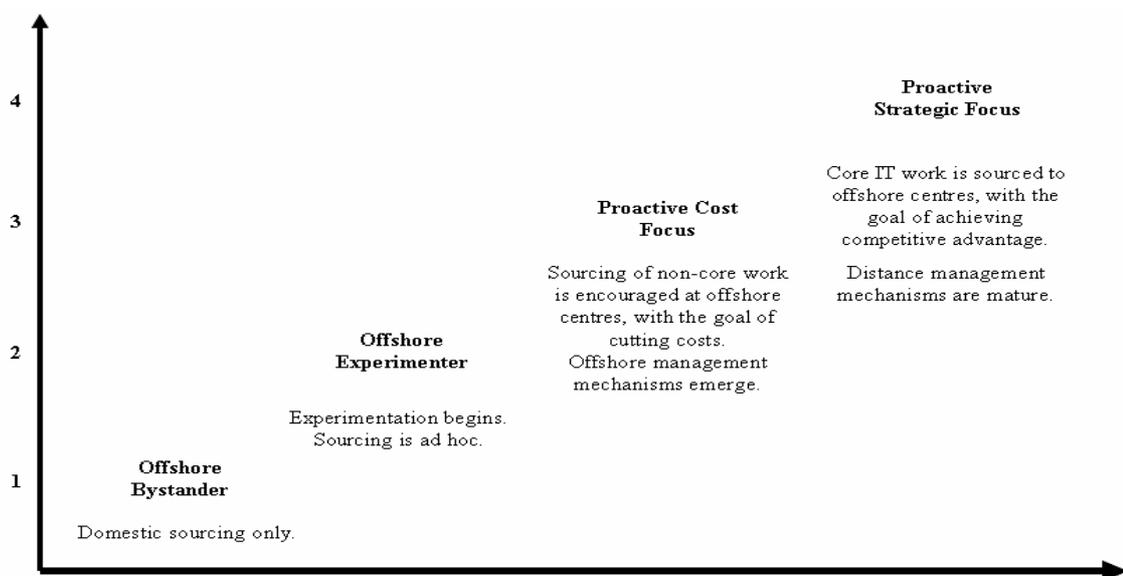


Figure 1 Sourcing of IT Work Offshore (SITO) Stage model (Carmel and Agarwal, 2002)

McCarthy et al. (2003) describe a similar four-stage migration path for organisations that source IT work offshore, outlining the programme management capability associated with each stage. They note that companies go through this migration process over a period of 24 to 60 or more months. An adapted version of this model is presented in Figure 2.

- **Bystanders** – organisations that are either doing nothing or just starting to consider offshoring;
- **Experimenters** – organisations that have offshore experience and relationships with offshore vendors, but offshore is not a key element of their overall IT strategy or spending plans;
- **Committeds** – organisations that have incorporated sophisticated governance techniques for offshore development, such as creating an offshore-specific sourcing office;
- **Full exploiters** – organisations that take full advantage of offshore and place a high percentage of work offshore.

Customer characteristics	Bystanders	Experimenters	Committeds	Full Exploiters
<b>Focus of efforts</b>	None to initial investigation of offshore's potential	Small 10-20 person projects for conversion of older apps or isolated new development	30-50 person mission-critical development and maintenance programs	Large-scale apps development and management, remote monitoring and administration, implementation and upgrades of packaged apps/BPO
<b>Level of program management skills</b>	None	Uncoordinated project-by-project management	Centralized and dedicated program management	Global sourcing is a core competence with documented best practices

Figure 2 – Stages in Offshore Journey (McCarthy et al, 2003.)

A third model proposed by Rajkumar and Mani (2001) takes a slightly different view, and sets out the various stages of customer relationships with offshore companies. Again, this describes four stages of maturity, but this time in terms of the projects these organisations undertake offshore.

- **Initiation** – an ‘entry-level’ stage for organisations – the projects undertaken are pilot projects;
- **Confidence building** – organisations whose project portfolio is characterised by a significant mix of onshore and offshore components;
- **Large Projects** – organisations that are comfortable executing large scale projects (100-600 man months of effort) offshore;
- **Virtual Software Arm** – organisations that recognise offshore suppliers as a key partner in all the organisations software development endeavours.

It is interesting to note that although Carmel & Agarwal and McCarthy have proposed very similar models, and the stages identified correlate closely, the authors’ estimates of the levels of maturity of Fortune 1000 companies in the US vary considerably, with the earlier study offering a more optimistic assessment of companies in the later stages of adoption of offshore outsourcing. This suggests that pinpointing the maturity of an organisation at any given time is not straightforward.

## 4 OFFSHORE SOURCING FROM A SUPPLIER PERSPECTIVE

The assumption in this study is that the market for offshore IS service suppliers follows a stage maturity model analogous to that of offshore consumers. As described previously, suppliers of offshore IS services have graduated from using simple sourcing models like immigration hiring to using complex and sophisticated cross-border contractual arrangements with its customers.

Now, both pure play and western systems integrators (SIs) are moving aggressively into each other’s traditional area of operation. For example, some pure play firms are offering high end business consulting services, and most western SIs now provide pure offshore services to their clients. There is a growing trend by both pure play and western SIs to use joint onshore/offshore teams. Capgemini’s Rightshore™ and BearingPoint’s AnyShore<sup>SM</sup> methodology are examples of this. At the same time, Indian firms are acquiring businesses in the USA and Europe. For example, Wipro, a leading Indian offshore provider, is acquiring small systems integrators in Europe (Davis et al, 2006).

This approach to offshoring – described in this paper as multi-shoring - presents new opportunities for efficient sourcing of offshore services. Multi-shore development involves the use of staff from the third party supplier’s offshore locations working on-site with experienced local supplier staff for at least a part of the development cycle. It is attractive to organisations because it permits them to take advantage of many of the benefits associated with offshoring while offering a risk profile that is partly mitigated by using combinations of local and offshore staff.

#### 4.1 A theoretical framework – a maturity model for offshore suppliers

The evolution of offshore suppliers is described in a four stage maturity model, illustrated in Figure 3:

- **Domestic supplier**– systems integrators or consulting firms with no offshore capability;
- **Tactical Offshore supplier** – larger national systems integrators or consulting firms that have ad-hoc experience with offshore development, and small or internally-focused offshore capability;
- **Niche Offshore supplier** – larger systems integrators and consultants that have a well-defined geographic or industry specialisation, and established onshore and offshore capabilities;
- **Multi-shore supplier** – organisations that provide large-scale application development and management, BPO, high-end business process and strategy consulting, supported by a mature distributed development business model.

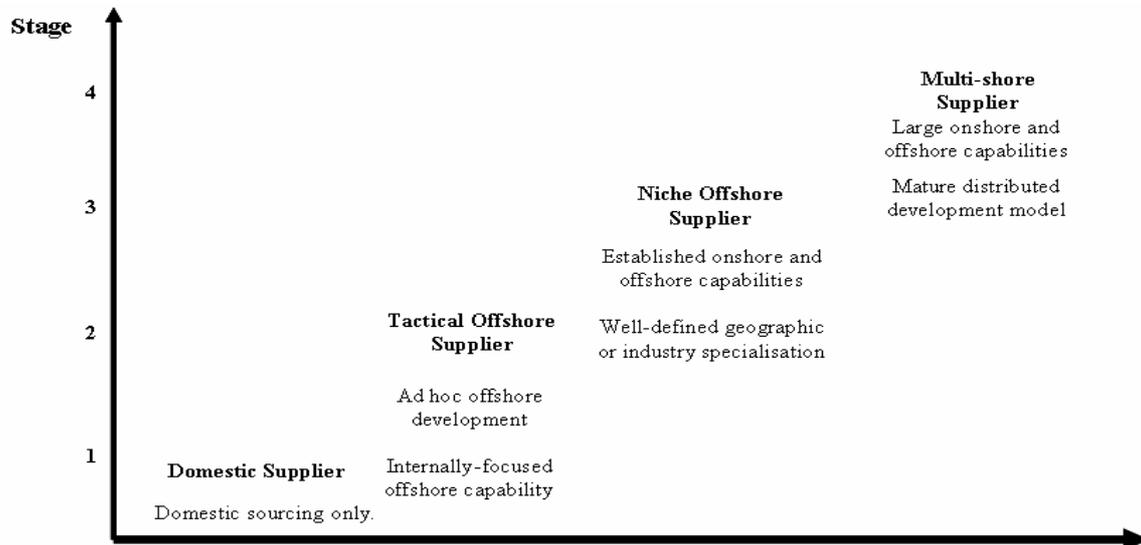


Figure 3 –Supplier stage maturity model

Stage one organisations – Domestic Supplier – are those that provide local technical or business consulting or SI services in a single market. These range from small advisory boutiques to specialist software houses. What they have in common is a narrow geographic focus, and they often operate as low cost providers or contractors in tandem with stage three or stage four organisations. Typically, these firms do not have large numbers of staff, and are often privately-held concerns. Their appetite and capability for offshoring is minimal – in fact, offshoring is perceived as a direct threat to existing revenue streams. Many stage one organisations will find the market for commodity IT services increasingly eroded by aggressive cost-led competition from stage three and stage four organisations, and this will trigger a move to the next stage of maturity, although this transition is likely to be constrained by access to capital and by a limiting number of relationships.

Stage two organisations – Tactical Offshore Supplier - are those that have started to experiment with offshore development. These comprise larger national systems integrators or consulting firms that have conducted a limited number of offshore projects, primarily as a defensive measure against

encroaching offshore suppliers, or as a cost-reduction measure. Their offshore experience will often be gained through an alliance or joint venture with a specialist offshore provider, but such alliances tend to be project or contract-based and not strategic in nature. In some cases, stage two organisations will have invested in a small offshore capability to service core clients, but this again is predominantly a defensive strategy. Stage two organisations have the capability of maturing into stage three or stage four organisations, but are constrained by capital and opportunity, or by a strategic imperative to focus on high-end business and strategy consulting services alone.

Stage three organisations - Niche Offshore Supplier – are those which have recognised the necessity of adopting a global service delivery model - namely, the optimum combination of processes, end-to-end methodologies and quality procedures, with high-quality skills and resources available internally or externally in requisite quantities on a global basis (Iyengar et al, 2006). Accordingly, stage three organisations will have a significant presence in one or more low-cost offshore locations, and also in one or more of the developed western markets in Europe or the USA. The main trigger for continued evolution of stage three organisations is a desire to take advantage of revenue growth opportunities afforded by a more global presence.

Stage four organisations – Multi-shore Supplier - are those organisations that have offshore capabilities on a par with or in excess of their onshore presence. Such firms view offshore delivery as a core competence, and have built (or are in the process of building) an offshore-biased business operating model. They have also invested in and promote a global delivery model.

The model can also be described in terms of Wilson’s three ‘concepts of interest’ (Wilson, 1997) - the maturity stage and sequence, the characteristics or facets displayed at each stage, and the conditions that trigger change – and this is illustrated in Table 1.

<b>Maturity stage</b>	<b>Domestic supplier</b>	<b>Tactical offshore supplier</b>	<b>Niche offshore supplier</b>	<b>Multi-shore supplier</b>
<b>Facets of each stage</b>	Local focus/ general IS development & consultancy  High-value end-user consulting, local smaller development, ITO & BPO  Presence and brand awareness in one on-shore market	Ad-hoc, defensive approach to offshore development  Medium/large scale application development, high-value consulting, ITO and BPO  Strong presence in one or more onshore markets, and ad hoc or loose alliance in offshore locations	Vertical or geographic multi-shore focus  Large scale application development, high-value consulting, ITO and BPO  Strong presence in offshore location & emerging presence in US or Europe	Full-capability multi-shore service supplier  Large scale application development, high-value consulting, ITO and BPO  Strong brand, presence and capability off- shore and in all primary western markets
<b>Conditions causing change</b>	Increasing erosion of margins by low cost offshore operators	Increasing erosion of margins; revenue growth opportunities; efficiency drives	Revenue growth opportunities	

Table 1 –Supplier stage maturity model

## 5 CONCLUSION AND SCOPE FOR FURTHER RESEARCH

This paper proposes a maturity model for suppliers of offshore IS services and thereby complements the existing body of research which is predominantly viewed from the customer's perspective. This has been achieved by drawing on the existing literature and by extrapolating from a variety of customer-focused maturity models. The proposed model could help suppliers understand the particular conditions in which they operate, and identify strategic options available to them in the context of their existing demand profiles. For consumers looking to source IT work offshore, the model could provide an entry point in making the offshore sourcing decision, since it categorises suppliers in terms of their strategic imperatives and thereby highlights the primary strategic sourcing options available to customers. For example, a European organisation looking to develop a strategic offshore alliance would know to evaluate stage three and stage four organisations only. Further, by understanding its own positioning in the customer-focused maturity model, the organisation might be able to avoid some possible risk.

Some notable differences emerge when comparing the supplier-focussed and customer-focused stage maturity models. First, while the customer maturity models apply to western, or on-shore, organisations only, the supplier stage maturity model applies to both western and pure play offshore companies. Second, the customer models tend to be deterministic - that is, they expect most customer organisations to transition to stage three or four over time. This is because the economics of sending IT work offshore is compelling for customers, from both a production and transaction cost perspective. This progression is not inevitable, and in fact the expectation set by Carmel and Agarwal is that most firms will not evolve to stage four, but will reach a steady state at stage three: firms that compete on the basis of IT, like financial services firms, are more likely to progress to stage four (Carmel and Agarwal, 2002).

Similarly, the supplier maturity model does not imply an inevitable progression. For example, progression from stage one to subsequent stages is difficult – most systems integrators in this category will probably be unable or unwilling, for the reasons outlined above, to do anything other than maintain their current domestic focus. Progression from stage three to stage four is also not inevitable – some companies will derive profitable revenue streams from a portfolio of specialised consulting and technology services – but most of the larger pure play and western systems integrators will be forced into stage four by the market. This is happening now: both categories of organisation are developing multi-shore propositions to address reducing margins in commodity software development and to protect existing onshore client revenues. What the supplier model does imply, however, is a liner progression in the same sequence. There is also scope for organisations to regress – for example as a result of a trauma, or trading crisis, that causes an organisation to retrench to a core market or competency - although this is outside the scope of the present study.

The opportunities for related research in this field are many. First, the model proposed in this paper is conceptual and has not been verified by field research. There is therefore scope to conduct an empirical study to validate this perspective. Second, there are opportunities to investigate how this phenomenon will cause existing IT organisations to change, and how their development methodologies and practices will adapt to accommodate offshoring. Third, there is little in the wider literature that looks at the social and organisational impact of offshoring. Fourth, there is scope for further empirical research to understand and assess the effectiveness of multi-shoring as a development paradigm.

An alternative research stream could look at the offshore industry itself. For example, it could be argued that international offshore providers are becoming globalised, using the definitions set out by Tallman and Fladmoe-Lindquist (2002). This perspective alone may not be sufficiently comprehensive, since it generally takes as a starting point organisations from mature economies with well-defined products and branding, mature business models and processes, structured access to capital and materials, and a robust operating history in the originating domestic market. Similarly,

there is an opportunity to examine offshoring in India in the context of Porter's concept of economic clusters (Porter, 1998), where the current concentration of primary and secondary suppliers to the offshore IT industry conform to his definitions. Finally, it is likely that IS offshoring suppliers will become established in less traditional offshore markets, such as Vietnam and Russia, and this will in turn bring new challenges and demands that are worthy of research.

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