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IS OFFSHORING: A PROPOSED MATURITY MODEL OF OFFSHORE IS SUPPLIERS

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Abstract

Companies in developed economies are now accustomed to use offshore IS services to develop and maintain software, and an increasing number of specialist offshore services firms exists to meet the demand. These include systems integrators whose origins are in developed economies, and 'pure play' offshore IS providers that originate in countries where the cost of IS labour is relatively low. Both type of offshore organisation have changed considerably in recent years in response to market demand and competitive pressure.

Although researchers have developed maturity models for users of IS offshoring, there is little that describes the nature and behaviour of offshore IS providers. Accordingly, this paper proposes a maturity model for offshore IS suppliers that is analogous to various consumer-oriented maturity models found in the literature and in trade journals. This preliminary framework is developed by reference to literature on outsourcing, offshoring and IS maturity models, and by recent relevant experience of practitioner organisations.

The conclusions from this study can be used to guide further research, and to develop constructs helpful to practitioners. The research helps suppliers of offshore IS services to understand the particular conditions in which it is appropriate to consider new business models. For consumers of offshore outsourcing, it provides a framework for categorising suppliers of IS services.

Key words

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

1 INTRODUCTION

In less than a decade, it has become commonplace to use geographically and temporally dispersed teams to work jointly on software development and maintenance activities. Distributed development occurs when teams of individuals work as part of a global virtual team across national boundaries (Edwards & Sridhar, 2002). Distributed development can be insourced, where all team members are employees of the same parent organisation, or outsourced to a services supplier that is likely to be offshore. 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.

Although the practice of offshoring is not new, its widespread adoption represents a fundamental change in how IS activities are conducted. Traditional manufacturing and distribution models are breaking down, and new models for supply of IS services emerging. Such change is interesting to affected parties, and will remain relevant as long as the phenomenon causes instability. It is interesting also to researchers: despite its profound impact on many aspects of the IS environment in developed countries, offshoring has not yet been the focus of significant research activity. This has resulted in calls for research by the pre-eminent journals in the field, such as *Management Information Systems Quarterly* (King and Torkezadeh, 2006) and by its increasing popularity as a theme at IS academic conferences. It is partly in response to these calls that this paper investigates a particular aspect of IS offshoring: it describes a maturity model for the providers of offshore IS services that is analogous to models developed for offshore users.

An alternative approach would have been to focus on the consumer side only, since many of the challenges faced when offshoring relate to the management and transfer of knowledge across cultural barriers. However, by addressing the characteristics and behaviour of offshore providers at various levels of maturity, the conceptual framework identified in this paper will – in conjunction with consumer maturity models - highlight issues associated with the relationship between offshore consumer and supplier, which is key to successful offshore development activity.

This model is intended as a preliminary statement of a partial methodology for research; in effect, an inductive theoretical phase to be followed by a validation phase. It does not describe a quality assessment tool for practitioners, such as the Software Engineering Institute's Capabilities Maturity Model (CMM) (Humphrey & Sweet, 1987). Rather, it is a preliminary framework developed to support further research in this area, from which practical guidelines for practitioners will emerge. In this respect, it is intended to follow the path of some earlier maturity models which started as theoretical constructs that emerged from IS deployment (Gibson & Nolan, 1974) and were subsequently subjected to validation and empirical study.

The methodology for the research follows Gregor (2006). Beginning with the research problem, the type of theory to be developed is identified, given the current state of knowledge in the field. An epistemological approach and research method are then chosen as a further step. In this instance, the primary research interest is to understand how offshore IS service companies evolve. Thus, the research develops a type II theory in Gregor's categorisation, which is concerned primarily with explaining how, why, and when things happen. In choosing an epistemological position, the authors share the view taken by Galliers (1992) that IS comprises computer systems embedded in a social context, and not just hardware and software, and thus adopt an interpretivist approach. Because the paper is largely conceptual, a research method based on literature review has been adopted, although this is tempered by recent global experience of relevant practice.

The unit of analysis for the study is the organisation – that is, companies that provide IS services that are or can be sent offshore. These include firms that have originated in industrialised economies – recent manifestations of Systems Integration (SI) or management consulting firms such as Accenture which typically provide offshore software development as part of a wider portfolio of 'multi-shore'

consulting, technology and outsourcing services; and others that have originated in developing economies, particularly India, and are new firms dedicated to exporting labour and IT-enabled services to western economies – the so-called ‘pure play’ offshore IS providers such as Wipro.

The rest of this paper is structured as follows. The next section briefly reviews the literature on IS offshoring and maturity models, and the theoretical antecedents for the research. Subsequent sections describe extant consumer maturity models and the proposed supplier maturity model. The final section of the report outlines the conclusion of the study and identifies areas for further research.

2 LITERATURE REVIEW AND THEORETICAL BASIS OF STUDY

Three research strands are described briefly, noting that the intent is not to provide an exhaustive review of the theoretical and empirical literature, but to highlight how a few key studies in these streams contribute to the present research. This is consistent with the approach suggested by Webster and Watson (2002), who note that the review of literature on an emerging topic is necessarily short.

2.1 Literature on IS Outsourcing

The first of these strands covers IS outsourcing in general. There is a substantial body of literature concerning the outsourcing of the IT function (Ang and Straub 1998; Apte et al. 1997; Loh and Venkatraman 1995) from both conceptual and empirical bases. This addresses also the 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). Predominant among these are transaction cost theory (Williamson, 1979) and the political model of organisational decision making (Pfeffer, 1982), both of which have generated a substantial body of empirical and theoretical support. Particular interpretations of these, as applied to IS outsourcing decisions, are addressed by Lacity and Hirschheim (1993). Other theories that can inform outsourcing decisions are co-ordination theory, agency theory and competitive strategy, which de Looft (1998) has summarised in terms of their major constructs and implications.

2.2 Literature on IS Offshoring

A second 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) – more often scholars describe the rationale for offshore development, its associated benefits, the risks of offshore development and key success factors. Most begin by noting that offshoring is one of the fastest growing phenomena in IS in recent years and that it is an accepted component of modern software development practice.

The fundamental business question associated with offshore software development 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 through labour arbitrage. Other advantages include quality of output, increased access to new (and older) technologies and skills, increased labour pool flexibility, and access to international markets (Ravichandran & Ahmed, 1993).

There is consensus also on the main categories of risk associated with offshore development. 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 apply equally to offshore projects (Rajkumar and Dawley, 1997). Ravichandran & Ahmed (1993) identify three special problems associated with distributed software development as language barriers, differences in laws and regulation, and fragile infrastructure. 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 & MacCarthy, 2003).

Many of these studies look at offshoring from the perspective of the offshore services consumer. Although some recent proposals 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. Recent research is providing new insights into offshoring as a phenomenon. The related papers by Farrell (2005), Levy (2005) and Doh (2005) highlight some of the emerging social issues associated with offshoring - Levy in particular stressing the tensions and social cost of wholesale adoption of the practice.

2.3 Literature on IS Maturity Models

The third strand of the literature reviewed addresses IS maturity models. Various maturity models have been used in research and in practice to help describe the evolution of complex IS organisations and thereby predict and avoid potential problems (Greiner, 1972; Gibson and Nolan, 1974; Galliers and Sutherland, 2003). A different type of maturity model – the CMM – is primarily concerned with developing good practice. This is described by Humphrey (1987) and Paulk et al (1993). The CMM originated as a means to establish a discipline for software engineering, and it was designed to help software developers identify better processes in order to develop better software products. As such, it is a tool for measuring the capability of a software development organisation and a set of guidelines for development efficiency.

2.4 Theoretical Basis of Research

This paper draws on the theoretical frameworks that underpin IS organisational maturity models. These constructs, such as the six-stage growth model developed by Nolan (1979), provide a perspective on the characteristics and behaviours of IS organisations as they evolve, where the IS organisation comprises the part of the company that develops IS solutions for the company as a whole (the IT department). In this tradition, 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 is normally in the same linear sequence.

More recent models focus specifically on the maturity of users of offshore services. An example is the Sourcing of IT Work Offshore (SITO) stage model developed by Carmel and Agarwal (2002), which provides a framework for assessing the relative degree of maturity of a company in its use of offshore sourcing of IT. These studies take a company-wide view of maturity characterised by capability, internal dynamics and so on. Of the theoretical models described, these are most closely related to the offshore supplier framework proposed in this paper. Moreover, Wilson’s three concepts are directly applicable, and the study uses these to elaborate the various stages of the offshore supplier maturity model and the triggers for transition from stage to stage.

These maturity models are distinct from the CMM. The latter (which is about process maturity and relates to software engineering) is a sub-set of the former (which is about organizational maturity and relate to IS planning and structure). For both, the unit of analysis is the IS department. Also, the Nolan/Greiner models see maturity as a series of S-curves, where the transitions from stage to stage

correspond to the main events in the life of the IT organisation (Gibson and Nolan, 1974) and are reactive. The CMM models represent discrete step changes in capability caused by active adherence to defined codes of practice, and are proactive. Later CMM models are often used for the commercial validation and benchmarking of supplier capability. Greiner (1972) asserted and Nolan concurred (1979) that the progression through stages in their models was caused by reactions to conditions set during the previous rapid growth periods as well as the external environment. In contrast, the CMM models imply management driven transitions to ever more desirable states.

Because the theoretical framework developed in this paper considers the company as the unit of analysis (and is therefore further abstracted from the unit that develops the software), and comments on organisational rather than process maturity, it is not prescriptive about specific and generic processes and goals at each stage of development. Its purpose is not to assess IS capability, which is largely driven by a practitioner desire to be perceived as using best practice, but to analyse the nature of the offshore supplier and predict how the supplier will adapt and evolve in response to changes in the market and other external and internal events.

3 CURRENT MATURITY MODELS OF OFFSHORING USERS

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 SITO stage model, which identifies four stages characterised by a set of strategic imperatives and internal firm dynamics, and 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 that seek primarily to promote cost efficiencies;
- **Proactive Strategic Focus** – organisations where the concept and practice of offshore IT is fully embraced.

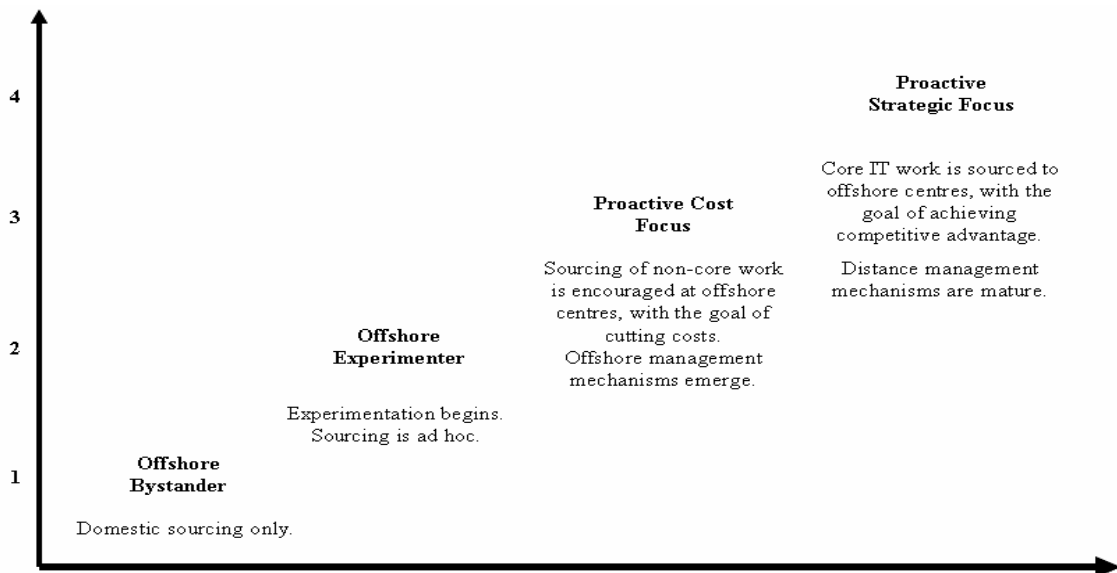


Figure 1 Sourcing of IT Work Offshore (SITO) Stage model (Carmel and Agarwal, 2002)

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. 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
Focus of efforts	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
Level of program management skills	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 consumer 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 PROPOSED MATURITY MODEL OF OFFSHORE SUPPLIERS

The assumption in this study is that the market for offshore IS service suppliers follows a stage maturity model analogous to that for offshore consumers. The evolution of offshore suppliers is therefore described in a four stage maturity model, illustrated in Figure 3:

- **Domestic supplier** – small systems integrators or consulting firms with no offshore capability;
- **Tactical Offshore supplier** – 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, business process outsourcing (BPO), high-end business process and strategy consulting, supported by a mature distributed development business model.

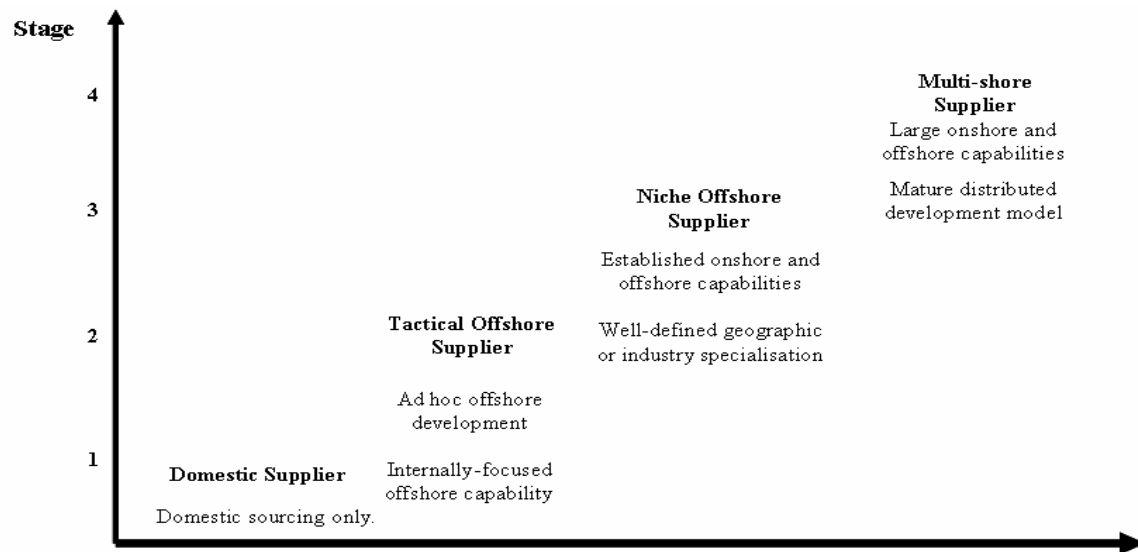


Figure 3 –Supplier stage maturity model

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 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 is 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.

Maturity stage	Domestic supplier	Tactical offshore supplier	Niche offshore supplier	Multi-shore supplier
Facets of each stage	Local focus/ general IS development & consultancy High-value consulting, local development, IT outsourcing (ITO) and BPO services Presence and brand awareness in one on-shore market	Ad-hoc, defensive approach to offshore development Medium/large scale application development, high- value consulting, IT outsourcing and BPO services 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 multi-shore service supplier capability and focus Large scale application development, high-value consulting, ITO and BPO Strong brand, presence and capability off- shore and in all primary western markets
Conditions causing change	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

It is notable that while the consumer maturity models apply to organisations from developed economies only, the supplier stage maturity model applies to both western and pure play offshore companies.

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 consumer’s perspective. This has been achieved by drawing on the existing literature and by extrapolating from a variety of consumer-focused maturity models.

The proposed model helps suppliers understand the particular conditions in which they operate and the strategic options available to them. For example, it points to a blurring of boundaries between the practice of domestic outsourcing and global offshoring and highlights each as a manifestation of a new

global sourcing approach. This emphasises the need for suppliers to develop a global delivery model to protect revenues.

For consumers looking to source IT work offshore, the model provides an entry point in making the sourcing decision, since it categorises suppliers in terms of their strategic imperatives and thus highlights the primary strategic sourcing options available to consumers. 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 consumer stage maturity model, the organisation is able to avoid potential risk.

Similar benefits arise from an understanding of the transition points implicit in the models, both of which tend to be deterministic - that is, they expect most organisations to transition to later stages over time. For consumers, this progression is not inevitable, and in fact the expectation 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. This is largely a factor of scale: organisations at stages one and two will tend to be smaller than those at later stages of maturity. 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 market pressures. 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.

As for the consumer maturity models, the supplier model implies a linear progression in the same sequence. However, there is scope for supplier organisations to regress – for example as a result of a trauma or trading crisis that causes retrenchment to a core market or competency.

The opportunities for related research in this field are many. First, the model proposed in this paper is the result of a preliminary theoretical phase and is intended to be followed by a validation phase: there is therefore scope to conduct this empirical research. 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 economies, such as Vietnam and Russia, and this will in turn bring new challenges and demands that are worthy of research.

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