DISTRIBUTED SOFTWARE DEVELOPMENT IN A FINANCIAL SERVICES ORGANISATION

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Abstract

The outsourcing of IS functionality to offshore development firms has been a growth industry that has blossomed over the last 10 years. This is as a result of organisations, seeking to optimise costs, mitigate risks, and achieve greater return on shareholder value by delegating the delivery of business information systems and applications to third party vendors. At the same time, distributed approaches to software development has arisen, there has been a growing interest in the applicability of lightweight or Agile development methodologies. As such, this paper this paper discusses experiences of a European Financial Services firm in outsourcing, and subsequently offshoring, two of its IT projects to vendor firms in India, where Agile approaches were used. The authors provide a model of the financial firm's critical success factors presented as a frame of reference for others interested and involved in this topical area.

Keywords: Outsourcing, Financial Services, Agile development, IT/IS Project Management

1 OUTSOURCING AND OFFSHORING - A GLOBAL PHENOMENON

Agile software development methods and processes are typically well-suited to tasks that have high variability, where people capabilities are strongly accentuated and high customer interaction and technology skills are required (Beck 2000; Highsmith and Cockburn, 2001). At the same time, the lure of readily available, usually highly skilled IT resources for less cost, available beyond and outside of normal business hours (within low per-capita countries, such as those within South Asia and the Far East), has become a business strategy for many multinational firms (such as American Express, British Airways and IBM). This approach is more commonly known as Offshoring (Moore and Barnett, 2004), with the greatest savings being found to be in the areas of resource costs, project delivery timescales, IT productivity, competitive advantage and internal customer satisfaction. However, issues of culture clash, communication, collaboration, legal and contractual obligations, increased software and hardware licence costs, and costs associated with setting up and replicating IT infrastructures in disparate geographic locations, need to be borne in mind. A key question that has often been raised is whether or not such given pitfalls and risks associated with outsourcing application development are worth the benefits that such approaches can afford.

The experiences of a major European Financial Services firm in outsourcing two of its IT projects to two vendor firms in India (for legal and client confidentiality purposes, known as FS Vendor A and Vendor B respectively), are detailed with a view to extending the understanding of agile application development within an offshoring context. By using a case study research approach (Yin, 1994) employing interviews and participant observation with both offshoring team members within the firm and vendor software project managers, the authors provide an insight into the state of offshore application development in this case. Through analysing how the given firm managed these two projects, a generalised frame of reference of factors impinging upon offshore development is

formulated and can be used as a management tool to evaluate offshore distributed development scenarios.

2 OFFSHORING STRATEGY AND VENDOR SELECTION

The financial services firm investigated by the authors, FS, is a leading institution within the investment and retail banking sector. It is globally recognised as having market-leading capabilities across securities trading in product areas such as equities, fixed income, rates and foreign exchange. In particular, its wholesale banking franchise of 16,000 employees provides clients across more than 25 countries with access to various capital markets and exchanges. Like its competitors, the firm already contracts out a variety of IT-related work and other activities to vendors in several countries in South and Far East Asia. However, resources have been based onsite, as well as within regional offices such as in Singapore, tending to be of the "body shopping" (i.e. piecemeal) variety using medium sized vendors where scope was limited to very specific or discrete development projects. The firm therefore took the view that if it was to engage in offshore development on a much bigger scale, it would outsource projects under a 'lab on hire' type approach: onshore business analysts feeding requirements to an offshore team for development. After assessing the opportunities for offshore development, Company FS's plan was to create an offshore technical development centre (TDC) in Hyderabad, India. By putting in place a team structure to oversee the offshoring initiative and processes, and defining a transition plan and guidelines, offshore development could therefore be monitored. As such, two key tactical projects were chosen to be offshored in the first instance.

Project 1 involved relocating an application test / QA team within Equities IT, from the regional office in Singapore. This would involve a team, which would not only provide QA services to development projects but also become a first-line support team available on a 24x5 basis. By providing a fully managed testing and quality assurance service, standardisation of tools and processes for testing functions and programmes could be achieved. In the case of Project 2, the aim was to outsource maintenance and support of the firm's general ledger and management accounting applications (general ledger, statutory and regulatory reporting, liquidity and profit and loss). One major component of this program was to re-engineer the legacy centralized accounting logic component within the application, known as GlobalOne, taking feeds (trade, risk and settlement) and building the logic, maps, transformations and validations that ultimately generate accounting entries. This outsourcing would involve an overseas wholesale migration of the development process from the UK office. Although the primary driver behind these offshoring initiatives was not necessarily to pursue cost savings, the outsourcing of specific IT projects' functionality was seen as "low-hanging fruit", for application platforms that were relatively simple and amenable to componentisation, having well-specified requirements.

As such, the firm chose to use Top Tier Suppliers in India enforcing the same rigorous hiring standards as in the UK and the US. Vendors were chosen based on a score carding approach against factors of capability to adapt project resource roles as business needs require (flexibility in on-boarding / off-boarding developers at short notice), and a capacity for development staff to learn and share business and technical knowledge. The selection process itself took approximately four months to carry out, wherein ten vendors were selected, which were then short listed to four. One vendor for each project was desired, instead of one vendor to cover both projects. This was to ensure that no single vendor would have access to more than one area of the bank (for security and data protection purposes). From the shortlist two vendors, A and B were chosen for Project 1 and Project 2 respectively. Vendor A was selected for the Equities QA project due to their market leading expertise in FS generally and testimonials on similar QA / bug fixing projects. This vendor pioneered the global delivery model and was one of the first to create a sizable infrastructure across multiple sites in India, providing Asia's largest IT campus at a single location. Vendor B was selected for the accounting systems project, based on its overall capability within the area of multiple toolset development and

general development experience within the focal area. Although smaller than Vendor A, the key differentiator for this particular vendor was that they had previously worked on a tactical delivery project in the Far East for Company FS already, so therefore had knowledge of how firm FS worked.

Both vendors professed to be leaders in quality and process improvement methodologies, being certified to SEI CMM Level 5, CMM Level 5, and PCMM Level 5, as well as ISO 9002 accredited. Neither vendor had direct experience of using and adopting agile techniques that included XP or SCRUM, but were interested and aware of the benefits that such techniques could offer. A fixed price contract was negotiated with Vendor A, whilst a time and materials contract was agreed with Vendor B.

3 ADOPTION OF A DISTRIBUTED DEVELOPMENT METHODOLOGY

In both cases, a project management office was set up, which would liaise and control the flow of requirements to the vendor function leads. Using a high level project management framework as now described, a management council of FS and Vendor A and B managers provided strategic guidance to the progress of the deliverables. FS managers were responsible for task allocation and managing knowledge transfer, facilitated movement of resources as required across functions, increasing efficiency of service and accuracy of pricing. Each vendor was responsible for development, estimation of development effort, test automation and status reporting. FS technical managers drove the definition of delivery and milestones (project plans were shared - joint reviews and agreement). This combined organisational / vendor governance structure, allowed the firm to take a holistic approach to managing distributed processes, which allowed progress to be tracked; issues to be escalated, vendor performance to be monitored and communication with offshore teams to be co-ordinated. The development approach favoured by Company FS internally was based upon a combination of PRINCE2 and DSDM RAD approaches. This has therefore led to the evolution of a "just enough method" culture within the firm, which is, in a generic sense, agile in terms of its ethos (in terms of being adaptable to different development working styles and user interaction patterns). Company FS sought to find an equivalent amenable and flexible approach to application development in its offshore vendors whilst also making sure that they were experienced in not only plan-driven but also more agile processes. Therefore, the generic application development approach that was thought to suit FS, Vendor A and Vendor B, was a hybrid of the two: structured in the sense of carrying out tasks to plan, yet agile in the sense of employing a highly iterative and collaborative, user-focussed development style. As such, Figures 1 and 2 show the development approaches used in each case which are now detailed below. In the case of Project 1, the technique used was that of utilising the offshore resource to implement user requirements by refining business analyst specifications sent to them by the team in London (UK).

By doing so, the aim was to gradually introduce the offshore team of Vendor A into owning and subsequently delivering on the ongoing requirements for QA and bug fixing across various equities stream projects. In the course of employing this approach, FS was steering and reviewing the interaction of the offshore vendor with users and development teams in London and New York, within the lifecycle development process (shown in Figure 1 from left to right). Due to the discrete and iterative nature of the development between FS and the vendor, an agile-like approach was eventually adopted by the development teams. Although a specific agile nomenclature and method of working was not utilised as such, elements of this approach were evident (the use of short iteration cycles, iteration planning and short, brief communications leading to a high degree of collaboration). However, the lack of direct user interaction meant that the approach was not truly agile and indeed the development style applied by Vendor A team members tended to be based upon single, as opposed to pair, programming tasks. Such a response can be explained by the observation of Sircar *et al.* (2001) and more recently Nerur *et al.* (2005), that it is more difficult for developers to change their

architectural worldview (i.e. method to build components) than it is to change their technological worldview (i.e. evaluating and choosing a technology platform). The offshore team was also responsible for co-ordinating releases and builds which was initially seen to be a contentious point.

This was due to the fact that it was expected that once development was complete, it would be the task of the IT teams of FS based in London to co-ordinate the release. This expectation was tacitly understood by Vendor A to be the case as its traditional mode of working was more akin to a "body shop" following a traditional plan-driven approach. Also, since equities-based IT projects were largely executed in a RAD manner, Company FS did not consider this an issue until Vendor A raised its concerns. The development rationale used in Project 2 was more structured and involved both users and IT management throughout its lifecycle.

Company FS instigated a more rigorous plan-driven approach where Company FS IT managers reporting to the accounting department were overseeing the development work of the Vendor B offshore team. Subsequently it was agreed by both FS and Vendor B, that in order to work to meet the given system requirements, some flexibility and adaptability would be needed to accommodate the mix of Java, Oracle and SAP technology implementation approaches. Hence, relying upon the plan-driven experiences of Vendor B, the offshoring team realised an opportunity to adopt an iterative agile approach within the overall project management framework to address user requirements and business issues as quickly as possible. In this case, as opposed to Project 1, a greater interaction with users was required and indeed sought by company FS, to ensure future transition and ownership of the project to a complete offshore solution could occur.

4 EVALUATING THE AGILE OFFSHORING CASE

The offshore TDC in Hyderabad has been active for approximately 12 months, and hence evaluation of the offshoring projects detailed, is ultimately still in progress. Nevertheless, benefits and impact of each project have been realised. So far, the output of Project 1 has established a metrics collection and reporting process within the IT function of the equities business (a weekly collection of data at project level being rolled up into a metrics report at the function business process level). Also, various checklists and guidelines have been drawn up to improve the standardisation of processes. Through leveraging the consolidation of QA services as an outsourced activity, to drive the standardisation of tools and processes across the organization, significant economies of scale have been achieved. The expertise of Vendor A in global delivery has been leveraged by remotely executing testing services at the offshore Hyderabad location, leading to reduced project resource costs of up to 45%, resulting in an annualised direct cost saving of approximately $3.5 million (a 35% cost saving over previous years). In terms of Project 2, it was found that offshore staff became better integrated with Company FS development and delivery processes simply by understanding FS needs and taking delivery responsibility early on. The ability to add resources and rotate them at the local TDC site in India was also of great benefit to both FS and this vendor too. Again, company FS was able to quantify this in terms of a 5-10% saving in efficiency in terms of resource review processes, leading to a reduction in offshore role transition cost of between $500 – 600,000.

Although each vendor was prone to utilising a predominantly plan-driven approach to development, the nature of each project meant that agile-like work practices were to a large extent adopted as noted previously. Not having a fully agile approach was evident in the lack of direct user interaction (in the case of Project 1) and a structured approach to iteration planning (in the case of Project 2). In the former case, proximity and time zone differences meant that it would not be entirely possible to include user interaction in the development phase. In the latter case however, a lack of experience and knowledge of agile methodologies on the part of Vendor B meant that such iteration planning was not recognised or implemented. Both projects observed also showed that pair programming was not the

normal work mode of the developers, who were largely used for sole responsibility tasks. Thus, the authors present a frame of reference for describing these component parts of offshoring development as experienced by Company FS in Figure 3, which are now detailed below.

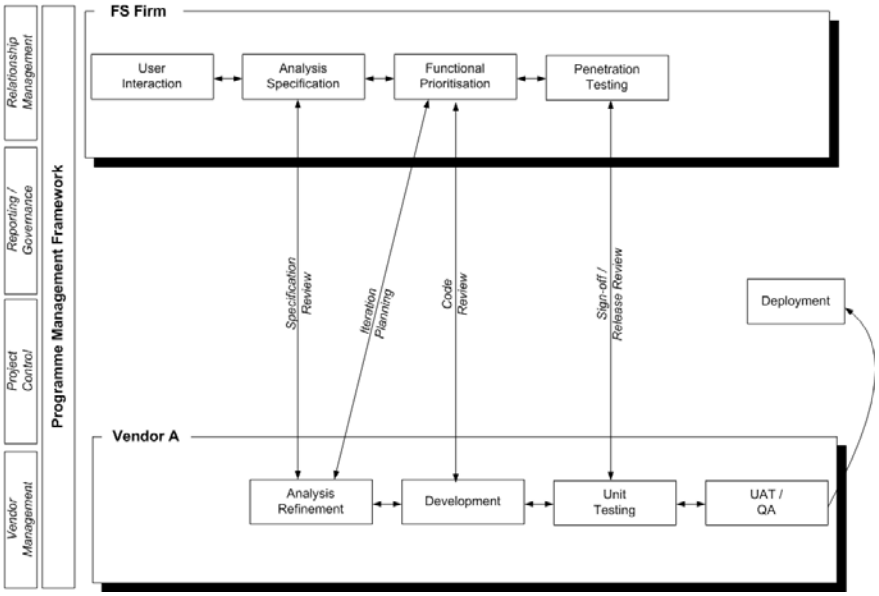

Figure 1. Development lifecycle model used in Project 1

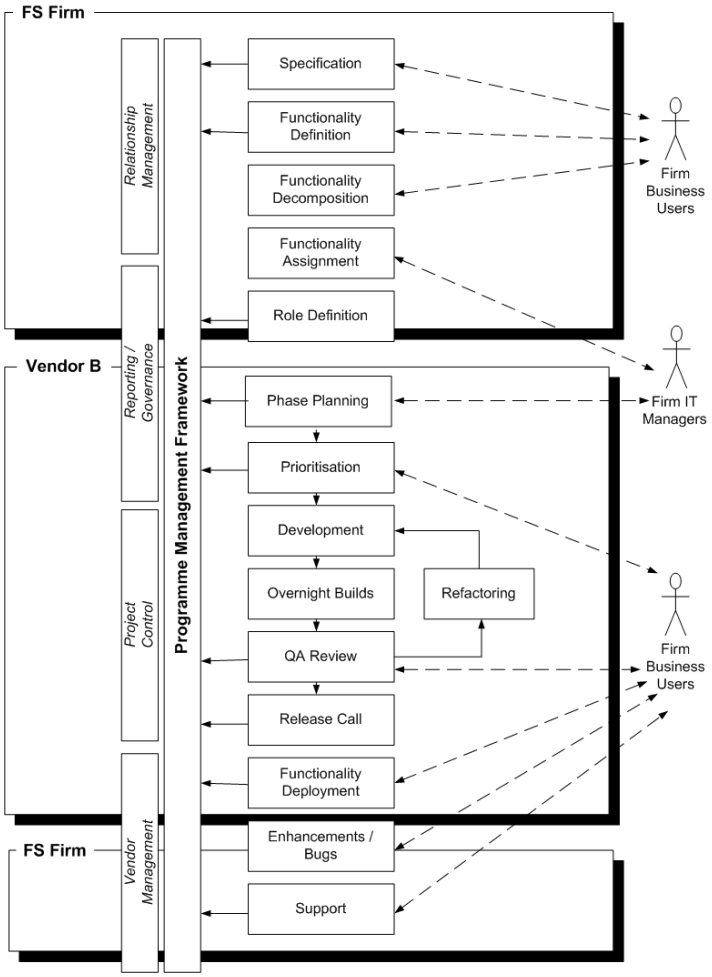

Figure 2. Development lifecycle model used in Project 2

- *Evaluation*: selection and evaluation of vendor pre, in-situ, and post-development is crucial to determining if the offshore model is achieving the goals laid down within the business strategy and the vendor relationship.
- *Management Involvement*: providing a governance structure across the project / programme can take a significant amount of effort (in order to manage the vendor relationship, resources, code reviews, etc). Such visibility shows a commitment to purpose.
- *Culture*: differences in culture undoubtedly affect the overall relationship between both organisations in terms of quality, work ethics, role rotation and overall expectations. Management involvement from both the host organisation (e.g. company FS) and the vendor firms (e.g. Vendor A and B) should oversee and highlight areas of contention and misunderstanding.
- *Collaboration*: communication with vendors; contract terms, as well as other project related details, should be in clear and explicit terms. The utilisation of instant messaging and other tools (such as knowledge portals – see next bullet point) is extremely helpful in reducing the overall cycle time of development through providing a collaborative working environment. Shared responsibility and peer review creates opportunities for process improvement.
- *Development Methodology Adoption*: create a standard configuration for the application development environment and make the on boarding of vendor resources as straightforward as possible. Highlight, discuss and agree on the most appropriate development approach that fits within the project, as the project progresses and implement a common development and testing

lifecycle approach.

- *Knowledge Transfer*: learning to share knowledge ultimately adds value to the development enterprise. Providing vendor staff with knowledge (technical and business related) allows purposeful business relationships to be built, leading to shorter communication loops and eventually, more accurate specifications and development cycle times.

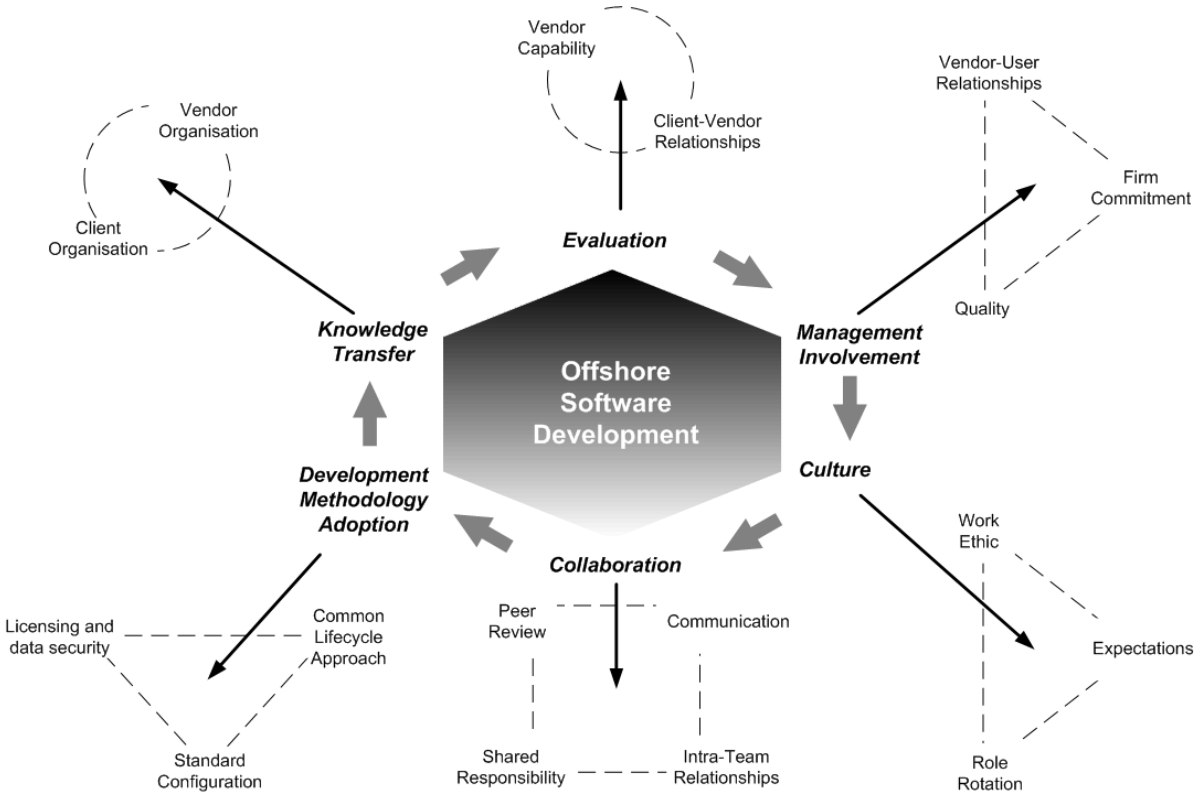

Figure 3. Offshore Development Frame of Reference

5 CONCLUSIONS

By applying a structured project management approach (for governance purposes) on top of an agile methodology approach (for rapid and flexible application development) both projects analysed by the authors were able to realise their anticipated benefits, quickly, based upon an open and collaborative working business relationship. The financial services firm explored had an open approach to employing development methodologies by not being tied to any particular approach. However, each of the vendors used by the company very much subscribed to structured approaches (being used to CMM compliant lifecycles). It was more difficult for them to 'let go' and adopt an agile-like approach, being mired in ritualistic development processes and software engineering 'scripture'. Hence, it was found that distributed development was assisted not so much by the agile approaches themselves (which nonetheless helped in keeping the project moving via constant collaboration and communication), but by management and organisational commitment to each project observed. Since agile methods are predominantly interested in involvement of people and their inter-related tasks, flexibility of developers, users and organisation is more important than agile processes and technology themselves. Management style, organisational culture, knowledge sharing and incentivisation to be agile, all drive its adoption. A combination of "just enough method" coupled with constant collaboration and communication appears to lie at the heart of the application of agile techniques within an offshoring

environment. This was ultimately exemplified by the firm investing its own time, money and resources in setting up its own local development campus in India, and bringing outsource vendors into the FS firms' "offshore-onsite" environment. In doing so, this engendered and fostered trust, understanding and high regard across both client and vendor. Thus, key drivers for success on both of the projects was a commitment by senior IT management and the business to making the offshoring effort succeed, through the maintenance of working business relationships between the client and vendor firms at all levels, taking a shared responsibility approach to technology solution delivery.

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