

The Embeddedness of Software Development in the Ukraine: An Offshoring Country Perspective

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HARDY, J. and HOLLINSHEAD, G. .Since 2004 there has been an acceleration in offshoring tasks that engender high level skills. The aim of this article is to examine the offshoring of software development to the Ukraine from the perspective of sender countries. We report the data gathered from interviews with CEOs or senior managers in Europe and the United States that offshore software development to the Ukraine. We use a three fold conceptual framework to analyse the data, which focuses on; structural embeddedness to identify constraining influences; cognitive-cultural embeddedness to examine how firms leverage tacit knowledge; and network embeddedness to understand the role of offshoring in wider corporate strategies. We conclude that while offshoring to the Ukraine has brought higher level employment for individuals, territorially and temporally it is weakly embedded.

Software development Ukraine offshoring embeddedness regional development

INTRODUCTION

There is general agreement regarding the increasing importance of foreign direct investment in the service sector as a key driver of the globalisation process (COE, 1997; BLINDER, 2006; UNCTAD, 2004; DANIELS, 2007). Until recently the internationalisation of TNC business service providers and their presence in other countries was motivated by performing activities for the local market which demanded a degree of firm embeddedness (DOSSANI and KENNEY, 2007; DICKEN, 2003). As value have become more fragmented, more recently the range of business services considered for relocation has widened with an increase in the potential regions and countries under consideration (ASPRAY *et al.* 2006; MEYER, 2006; ROBERT-NICOUD, 2008; VAN WELSUM and REIF, 2005; GORDON *et al.*, 2005).

Offshoring and outsourcing represent ongoing and accelerating trends in the reorganisation of firms. Outsourcing focuses on ownership and is the process of contracting part of a firm's operation or value chain to a third party. This has been increasing as firms concentrate on their core business as a way of minimising costs. Offshoring is a spatial concept as firms relocate part of their production to another country. However, these arrangements are not dichotomous, and as Table 2 shows, these two developments can give rise to a complex menu of arrangements.

A bifurcated division of labour has been suggested with knowledge based functions remaining in the core economies, while simplified and routinised tasks in production and the provision of services would be outsourced to or undertaken in emerging markets (HUTTON, 2004; COYLE and QUAH, 2002). The 'light' and electronically transmittable nature of financial products, for example, has permitted the reorganization of productive activity into international 'financial factories' with scant regard for national borders (MARTIN, 1999). However, attention has turned, not only to offshoring and outsourcing routine business services, but also to those that engender high skills and knowledge (GUZIK and MICEK, 2008). Since 2004 there has been an acceleration in offshoring more skilled tasks such as R&D, sophisticated software development, design, mathematics based finance and actuarial functions that require post-graduate or higher level skills.

While the bulk of offshoring activity in software development and related activities continues to favour India and Ireland as host destinations, there is a growing view that major cities in these countries are reaching a saturation point as a focus for these operations (WHITE, 2004). As a consequence companies are surveying other global regions, including Central and Eastern Europe (CEE) and Russia, as well as China as possible destinations for relocation. Therefore, there is agreement that offshoring and outsourcing is shaped by and shaping complex geographical and organizational forms which has profound implications for regions and cities (AGGARWAL *et al*, 2008).

The empirical focus of this article is the offshoring of software development to the Ukraine, which has emerged as a new site for sophisticated IT functions.

Ukraine's perceived attractiveness lies in its legacy and culture of research, which emanates from having the biggest and oldest cybernetics centre in former Soviet bloc, and consistent production of highly qualified students in mathematics and theoretical physics relying heavily on IT technologies. Although a large economy with a population of 49 million and major cities (Kiev, Lvov, Kharkov and Odessa), it could be viewed as economically and politically peripheral on the edge of the European Union. Further, with low levels of foreign direct investment it is weakly integrated into global flows of capital (UNCTAD, 2008). This raises pertinent questions regarding the possibilities of regional growth and dynamism, particularly with regard to its capital city Kiev, as a result of capturing high level functions in the value chains of software development.

The conceptual lens for considering this question is the notion embeddedness (POLANYI, 1944, GRANOVETTER, 1985 and 1992, SMELSER AND SWEDBERGH, 1994; GRABHER, 1993 and 1994), which enables an exploration of the nature and form of social, economic and institutional linkages. By adding a spatial dimension, economic geographers consider the extent to which these relations are embedded within particular spaces and place. Therefore the notion of embeddedness is a starting point for considering quantitative and qualitative aspects of employment, spillovers in the form of technological and managerial know-how for indigenous firms and the establishment of new discourses appropriate to a competitive regional economy. There have been extensive contributions to understanding and conceptualising the relationship between

firms, localities and regional environments (DICKEN AND THRIFT, 1992; OINAS, 1995; DICKEN, *et al.*, 1995, DICKEN, 1998) in general, and those that have examined the role foreign investment in transition economies (SMITH, 1998; VAN ZON, 1998; HARDY; 1998, 2006 and 2007; PAVLINEK AND SMITH, 1998; ALTVATER, 1998; UHLIR, 1998; SWAIN, 1998; DRAHOKOUPIL, 2008). However, there has been little attempt to consider the impact on or embeddedness of investment in high skilled business services through offshoring arrangements to these economies.

It is argued that in order to understand and explore the impacts of offshoring software development to a particular region, it is necessary to reconsider and sharpen the notion of embeddedness. Rather than supplanting economic categories with non-economic categories which might include 'social', 'cultural' and 'political', and viewing them as mutually exclusive and dichotomous, these aspects are merged to offer a more integrated and richer way of looking the influences of firms on locality. Drawing on a categorisation posited by ZUKIN and DIMAGGIO (1990) and WHITE (2004) the conceptual framework centres on a taxonomy based on three influences on embeddedness, which are grouped for discursive convenience into structural, cognitive-cultural and network influences.

The article aims to contribute to the literature on regional development by considering the relationship between offshoring software development and locality. The purpose is also to enrich understanding of the concept of embeddedness in the context of an empirical investigation. The article is structured as follows; the first section outlines the

methodology of the project. The second section explores the conceptual framework by elaborating the influences on embeddedness. Sections three, four and five report the findings and analyse the data through the lens of structural, cognitive-cultural and network influences on embeddedness. The final section concludes by discussing the implications of these for the embeddedness of software outsourcing in the Ukraine.

METHODOLOGY

Twelve semi-structured interviews were conducted with CEOs or senior managers of companies based in Europe and the United States (US) that offshored software development to the Ukraine. Interviews in the UK were conducted face-to-face, while those with respondents in Europe and the US were conducted by telephone. The interviews lasted between 45 minutes and two hours, they were recorded, transcribed and analysed thematically. To ensure anonymity the names of the firms have been changed. Table 1 provides a summary of the interviewees, the activities of the companies and their country of origin.

Table 1 here

CONCEPTUAL FRAMEWORK

At a conceptual level critics have argued that embeddedness has become an ‘over-territorialised’ concept (WHITE, 2004) which emphasizes local inter-firm relationships.

It is contended here that in order to understand the spatial impacts of investment in business services, and specifically the impacts of offshoring on locality three salient influences on embeddedness need to be considered. These emphasize structural constraints and the distinctive features of the sector; the interrelationship of the cognitive and cultural influences as firms try and leverage knowledge; and network embeddedness in order to contextualize activity in the wider value chain and corporate strategy of firms.

Structural influences on embeddedness

An understanding of structural influences on embeddedness is important in terms of gauging the potential of offshoring for regional development. The range of options and degree of latitude that firms have in making decisions about their own future, for example, may be overstated by underplaying factors that are exogenous to the region. Structural factors can be defined as the parameters that limit the field of action in which agents formulate strategy, and broad imperatives which ultimately push firms towards particular ends, albeit via a number of diverse routes and managerial strategies (SCHOENBERGER, 1994). These structural influences relate to factors such as the competitive features of the sector, the knowledge intensity and relational demands of the product or service, the level of technology and nature of the market.

Increased competitiveness and the need to sustain profits has led to the deverticalisation of firms and reengineering in order to arbitrage costs and seek new knowledge and innovation (JACOBIDES, 2005; COE, 1997). The separation of work geographically and

organizationally has involved longer and more complex value chains (GUPTA, 2006; GUPTA ET AL, 2006). The compression of time and the need for agility and flexibility is critical to the new competition as firms compete in terms of their ability to reduce time in the development of new products, order cycles and time to market in order to gain a significant advantage over competitors (SCHOENBERGER, 1997; MYTELKA, 2004).

There is an important connection between outsourcing, offshoring and regional development. SABEL (1985, 1988 and 1994) suggests that the vertical disintegration of large TNCs has resulted in the proliferation of autonomous small and medium firms (SMEs). The argument suggests that the reorganization of large firms in the past three decades has encouraged regional embeddedness by creating opportunities for SMEs to cultivate long term supply relationships. This production network is best viewed as a learning system which minimises transaction costs by fostering high trust relations typical of clans, socially constructed markets and productive communities.

There is an extensive literature on value chains, which focuses on the role of an activity which is specifically located in wider production networks (COE *et al.*, 2004, 2008a and 2008b; GEREFFI, 1996, 1999 and 2005; HESS and COE, 2006; HESS and YEUNG, 2006). The relevance of this approach is to interrogate the extent and implications of the location of higher value added function such as design, sales and marketing, and those decision-making operations such as finance and human resource management. These enable the interrogation of power relationships within value chains (CHRISTOPHERSON and CLARK, 2007).

Cognitive -cultural influences on embeddedness

Cognitive and cultural influences on embeddedness are inextricably linked. Cognitive influences on embeddedness refer to the way in which capital accumulation depends on embodied knowledge and skills (BEAVERSTOCK, 200x), while cultural embeddedness refers to the way in which individual firms use management strategies to leverage high level knowledge. A firm's culture can be defined as 'shared collective understandings in shaping economic strategies and goals' (ZUKIN AND DIMAGGIO, 1990). It is that set of social conventions embracing behavioural norms, standards and customs and the rules of the game underlying social interaction within the firm (SCHOENBERGER, 1994). Three bodies of literature contribute to understanding the relationship between cultural-cognitive influences on embeddedness which include; regions, agglomeration and tacit knowledge, the internal reorganization of firms to access tacit knowledge and the transfer of discursive and material institutions across borders.

The first strand of literature claims the superiority of relational and geographic proximity (industrial clusters and agglomerations) over formally constituted networks of knowledge and learning based on ubiquitously available products of education, science and technology (AMIN AND COHENDET, 1998 and 2004). According to this view highly dynamic local regions draw extensively upon localised assets for competitiveness (SAXENIAN, 1994; ASHEIM, 1997; KIRAT AND LUNG, 1999; MASKELL and MALMBERG, 1999a and 1999b, 2002; MORGAN, 2004; BATHELT *et al.*, 2002;

GERTLER, 2003). This literature points to the conclusion that in a global economy where the codified knowledge offered by science and technology is increasingly easy to access, uncoded knowledge rooted in relations of proximity gives an advantage in deriving and maintaining competitive advantage (AMIN AND COHENDET, 1998; PORTER AND SOLVELL, 1998; ZANFEI, 1998; STORPER, 1997a and 1997b). The importance of face-to-face contact, for example, is evident in the agglomeration of service sector industries such as the concentration of business services in global cities, and financial centres in particular.

However, the existence, properties and success of agglomeration and industrial districts have been criticised for being regionally and sectorally selective (GRABHER, 1993; BAKER, 1996; MARKUSEN, 1996) and embracing adversarial rather than cooperative relationships in the sharing of knowledge and learning (MARKUSEN, 1999). Further, some evidence points in the direction of the internationalisation rather than the localisation of R&D, with transnational firms scanning and absorbing foreign R&D (BLANC AND SIERRA, 1999; ALLEN, 2000; AMIN and COHENDET, 2004 and GRABHER and IBERT, 2006; DREYER and VINDING, 2007), while other literature emphasises increasing tensions between localisation and internationalisation (CHAMINADE AND VANG, 2008; CHRISTOPHERSON and STORPER, 1986; COE, 2001; HARDY and CURRIE, 2002; KAISER and LIECKE, 2008; TRIPPL and TODTLING, 2007; LORENZEN, 2008; LANE and PROBERT, 2007).

The second strand of literature pertinent to cognitive-cultural embeddedness focuses on how firms restructure their internal organizations to elicit tacit knowledge embedded in employees at all levels of the firm's structure. It has been argued that traditional hierarchical structures are a block on learning and innovation and that there are therefore limits to classical modes of organization. Moves towards less hierarchical structures and networked relationships between different divisions have been interpreted as opening up the possibility for firms to be more deeply embedded in localities. However, it has been argued that accounts purporting that changes in the internal organization of firms have resulted in flatter structures or more autonomous subsidiaries have often been oversimplified (HARDY, 2006 and 2007).

Connected to this literature is an exploration of the relationship between innovation potential and the organization of work that underpins it, and in particular the need to access tacit knowledge and tap into the creativity of labour in order to innovate and maintain competitive advantage (NONAKA and TAKEUCHI, 1995; LORENZ and WILKINSON, 2003; LAURSEN AND FOSS, 2003). Contemporary management literature points to a new orthodoxy (BILTON, 2007) of eschewing harder controls of the labour process by enabling individual autonomy, creating flatter structures and developing inclusive cultures (TEECE, 1998; HAGSTROM and HEDLUND, 1998). However, there is also evidence that the pressures of commercial competition form a countervailing force which can result in a range of organizational controls that are to the detriment of creativity and innovation (RANDLE, 1996; RANDLE and RAINNIE, 1997;

BARRETT, 2004). Therefore, the tension between creativity and control forms a strong thread through the literature on management, organization, creativity and innovation.

The third strand of literature relates to entering new institutional contexts, whereby incoming firms have to negotiate with or around existing established behaviours and understandings in order to become more responsive and react quickly to changes in the market. In other words as firms cross national boundaries they need to introduce and establish new material and discursive practices in the firm through restructuring management practices and changing established business habits and practices (HARDY *et al.*, 2005; HARDY; 2006).. Therefore there are important issues relating to entering new markets and acquiring new assets, and how to manage operations over wider geographical areas embracing different institutional and cultural set ups.

A further aspect of offshoring strategy relates to the methods used by firms to establish their corporate culture and collective understandings in a new context. Questions related to how far existing firm need to be restructured to bring its operation and norms into line with those of its other operations; the extent to which firms transfer existing models, and how far they consciously attempt to replace existing behaviours and methods will have implications for their sensitivity to local institutions.

Network influences on embeddedness

Network embeddedness examines the role played by intra- and inter-firm relationships (WHITE, 2004) that impinge on the propensity for local linkages. Key issues are raised regarding the place of the local operation within the wider corporate network, such as those between local managers and key decision makers in headquarters. These issues have largely been addressed within the context of an analysis of the relationship between affiliates and parent company, although others writers have pointed to a need to understand networks as being much more loosely constructed both temporally and in their architecture.

CASTELLS claims that ‘networks are the fundamental stuff of which organizations are made’ (: 168), and that rather than talking about TNCs we should talk about international networks to capture the myriad of firms’ relations across borders. TEECE (1998) suggests that changes in internal structures and the proliferation of interfirm agreements have produced new hybrid organizational arrangements which ‘.....may well represent a new and dramatic organizational innovation in business history’ (ibid: 158). Therefore it has been argued that in this more turbulent and competitive environment we are witnessing the emergence of a new type of TNC which differs from those which predominated earlier periods (BARTLETT and GHOSHAL, 1993; DICKEN, 2003). This complex global model is characterised by an integrated network configuration and a capacity to develop flexible coordinating processes.

There are two aspects of network embeddedness that are pertinent to territorial embeddedness, namely questions related to heterarchical managerial control and the management of distance.

First, it has been argued that networks herald a uniform move from hierarchy to heterarchy, whereby HQs have relinquished their role as monitoring devices to become ‘architects of communications’ in order to tap subsidiaries as a source of product, process and organizational innovation (DUNNING, 1997). These capabilities apply both inside the firm which, it is argued, displace hierarchical governance relationships, as networks of relationships which comprise social capital become more inclusive and egalitarian.

The second aspect relates to how distance is managed. While some have privileged the face-to face contact that comes from geographical proximity in their accounts, others have posited the importance of networks or organizational proximity. Technology such as electronic mail, video conferencing and work stations may be able to achieve the organizational advantages of centralisation on a decentralised geographic basis. Table 2 provides a summary of possible permutations of offshoring/outsourcing network relationships along the dimensions of geography and ownership.

Table 2 here

OFFSHORING AND OUTSOURCING TO THE UKRAINE: A SIMPLE TAXONOMY

The next three sections analyse the interview data from firms that offshore or outsource to the Ukraine through the lens of structural, cognitive-cultural and network influences on embeddedness. The taxonomy proposed in Table 2 identifies and highlights critical dimensions of these three influences, which are pertinent to offshoring.

Table 3 here

STRUCTURAL INFLUENCES ON EMBEDDEDNESS

In considering motives for relocating parts of the value chain, accessing knowledge and low wage costs have been posited as occupying different end points of a spectrum and as dichotomous. Further, many accounts have privileged knowledge acquisition as a motive for remaining in the home country. However, the offshoring of software development in general, and to the Ukraine in particular, was driven both by the search for lower costs and knowledge seeking. All companies had a precise knowledge of wage costs and fully loaded costs per hour and the reason for locating in the Ukraine was given as the wage differential between other parts of Europe, including the post-communist countries which joined the European Union in 2004 and 2007. One CEO summarized this as being the ability to obtain ‘human capital at a competitive price compared with other Western European capitals’ (CEO of Ebuilders). According the manager of one organization;

By leveraging our global facilities, world-class engineers and state-of-the-art tools and processes, companies can increase the quality of their software products while dramatically reducing timelines and operating costs - often by more than 60% (Senior Manager).

The Ukraine's cultural and geographical proximity were cited as advantageous attributes for some of the case study firms. However, the overriding attractiveness of this location was the ability to leverage high level knowledge at a relatively low cost. The standard of technical education was deemed to be exceptionally high with an extensive pool of potential employees emerging from the three higher education institutions and universities (estimated at 12,000 graduates a year). In particular, these Ukrainian graduates were perceived as having high level mathematical and computational skills, which were a continuity of the knowledge that had been central to the defence industry before 1990. One CEO noted that;

They [Ukrainians] had a lot of expertise, putting it bluntly, in calculating the trajectory of a missile...so very strong depth of talent...not a strong local market (Marketing Director Globalogic)

Two sets of processes were evident in making the decision to locate in the Ukraine. The first was where a matrix was constructed to evaluate and compare various locations in an objective and scientific way. Cost savings, technical skills, command of English and the business environment were each scored and weighted and the final decision was driven by cost minimization. A second group of CEOs had taken the decision to offshore to the

Ukraine through having personal or business connections with the country and in these cases other destinations were not considered. A 'good experience' with the place or the people minimized risk, and the cost differential was considered to be sufficient.

The structural characteristics of software development point to a lack of embeddedness and high degree of mobility. The relocation of production had taken place in a series of waves, with countries at different points in a cycle. As wage costs increased in one country then lower cost destinations were sought and therefore comparative advantage was relatively short lived. Some of the software companies were not considering other destinations, whereas others were continually searching for the next low cost destination with Vietnam, South America and Nigeria identified as countries that were potential sites for offshoring. One CEO reported;

I've got a friend his model is his goes round sets up an office and hires people...and he sells the bodies (CEO Extrembyte).

It was suggested that people could be hired relatively cheaply as they had not 'learned their value', but as companies start to offshore to that country they went through a process of price inflation, which had been observed in the Ukraine. A consensus emerged from the interviewees was that the wage cost of a developer had risen from \$450 in 2004 to \$1500 by 2008.

Mobility was possible, because with no expenditure on equipment or property, ‘sunk costs’ were minimal. The only investment was in training, where it would take a new employee about six months to learn the code and get up to speed. As a result of this one respondent argued that;

Every country in the world is a possible site for software development. There are computers and intelligence all over the world...it is easy to find out what they are doing by the code they write...if they don't write good code you get rid of them (CEO Extrembyte).

It was relatively easy to downsize and/or relocate as the software developers were generally on flexible contracts or self employed. Most professionals in the Ukraine were paid in dollars after receiving a minimum wage salary in *ribna*, everything else was paid into an offshore bank account. This meant that if offshoring firms wanted to downsize, close down or relocate they were only obliged to pay severance on that part of salaries that was paid in *ribna*, which gave them flexibility regarding costs.

COGNITIVE AND CULTURAL INFLUENCES ON EMBEDDEDNESS

There was no evidence of firms engaging with local institutions, and most reported a desire for institutional avoidance and distance from government. Ukrainian firms and individuals were employed to deal with the bureaucracy. Further, there was little contact between sub-contracting/offshoring firms, in some cases this was deliberate as they

regarded themselves in competition for highly skilled workers. Therefore rather than drawing on the generalised tacit knowledge in the city, firms were specifically trying to access embodied knowledge from Ukrainian programmers and developers.

The link between cognitive and cultural influences on embeddedness is that management strategies, implicit or explicit in corporate culture, are specific ways of leveraging codified and tacit knowledge. This is reflected in deliberate policies exhibited by firms regarding both their organizational structures and management of human resources. In particular, there is a debate about the process and management of software development, where skills and knowledge need to be focused on the ability to adapt in quickly changing environments. Complex management strategies can be distilled to three particular methodologies; the waterfall model, the agile/adaptive approach and extreme programming.

Much of present-day software acquisitions procedure rests on the waterfall approach, which assumes that one can specify a satisfactory system in advance, collect bids for its construction, and then have it built and installed. The waterfall method is based on an inflexible division of labour which divides a project into stages, such that commitments are made early on, and it is difficult to react to changes in requirements.

This linear production process is criticised for being too rigid. The agile-adaptive method is more of an evolutionary approach based on the assumption that software development needs to engender a more iterative methodology. Agile-adaptive methods choose to do

things in small increments with minimal planning and iterations are in short time frames, typically lasting from one to four weeks. Each iteration is worked on by a team through a full software development cycle. This method emphasizes face-to-face communication over written documents, and places a high level of importance on routine and formal daily face-to-face communication among team members. Therefore agile methodologies are often characterised as being at the adaptive end of the spectrum with predictive approaches lying at the other.

A third methodology is that of extreme programming which is characterised by ‘simplicity’ where no future investment is made unless immediately needed. Feedback is given in order to have a system running constantly that gives developers reliable information on its functions; ‘the system and its code serve as the incorruptible oracle to report about the progress and state of development’. A central tenet is that the direction of product and process development uses pre-defined techniques and frameworks.

In the rest of this section we examine three firms which occupy the end points of this spectrum. Logiglob and Heavensent exemplify the agile-adaptive approach, whereas Extrembyte provides a clear example of extreme programming.

Logiglob and Heavensent: the agile-adaptive model

The interviewees from Logiglob and Heavensent were both explicit in their use of an agile-adaptive model. The marketing director of Logiglob explained;

There is a traditional way of building systems, which is known as waterfall where you have an idea and write a spec, you take that spec as though its gospel, develop the product and then it often has no value to anyone as things have moved on. There's a very much more agile approach where you're my business user, you're continually coming up with new ideas, so I am building in short iterations, sometimes as short as two or three weeks. Everything is evolving – you are very rapidly going through that life cycle.

The CEO of Heavensent echoed this need for agility, suggesting that the process of producing software for a non-technical final user could not be reduced to simply sending a specification for code and then getting it back. This agility demanded a close relationship between the offshoring firm and programmers and developers in the Ukraine. The approach of both firms was characterised by constant communication within the firm, engendering commitment and value setting. In the case of Heavensent there daily meetings using video conferencing where each team or group gave a summary of where they were with projects, in order to chart progress and exchange information. Identifying problems meant that teams elsewhere could be tapped for solutions. Both companies believed that good collaboration was made up off a 'string of small conversations' and a culture of daily interaction on small issues.

The second shared feature of this approach was the necessity of engendering commitment as a way of 'getting the best' out of the employees and reducing turnover. Both case

study companies rejected the ‘body shopping’ approach where programmers were hired on a short term basis and paid an hourly rate.

‘Body shopping is all about you want ten people, ...interview some or all of them, that’s what you get, they’ll do what you tell them to do – that requires much more structure and discipline on your behalf to be successful, we are far more tell us what you want at a relatively high level and we will help you with the whole process, but what you really want is not fifteen engineers, you actually want a product out by 31 March....so we can focus on the end deliverable (Logiglob).

Contact was maintained not only by daily video conferencing, but also through company newsletters and offsite person to person meetings. The importance of integrating the company across national boundaries and making employees feel ‘part’ of the firm was a central part of their management of human capital. Further, giving developers and programmers interesting work was regarded as central to reducing turnover and maintaining commitment. They wanted to establish that their firms were ‘cool to work’ for even though employees may be able to get a higher salary elsewhere.

The third feature of this approach was the importance of establishing a strong corporate culture through value setting, which included trying to encourage ideas about creativity, transparency in decision making and work-life balance. *‘We are not swet shopping offshoring...they are part of our organization, even now ‘.* It was emphasized that the

process was not about the technology, but creating a culture where the whole organization buys into the mission and the vision.

...it's the way you do business... it's the way you treat people, it's the way people treat each other, open and transparent – a decision making process where people know what's going on. People are treated well whether they are inside the company or outsourced. Its about the customer and how they experience the product. Exactly the same message whether its Kentucky or Kiev.'

Extrembyte: Extreme programming

The management of software developers in Ukraine by Extrembyte lay at the other end of the spectrum, in that they explicitly described themselves as a hierarchical organization. Critical to the way in which they managed software engineers was through a task accounting system that they had developed for themselves

...people can walk in walk out see what needs to be done...get the code...download it, work on it and upload it again...it can be done anywhere...they could be on a beach in Tahiti if they wanted to be. The entire company is virtual there is no company in the US either. Our costs of doing business are as minimal as possible.

This project management system meant that they could track, the work, the clients, insert new people and see how long the work was taking. Although email, Skype and instant

messaging were used face-to-face contact was minimized. The team in the Ukraine had an annual Christmas party once a year, but the CEO had never met any of the team in the Ukraine over an eight year period. Video conferencing was considered to be gratuitous and oral communications 'simply a waste time'. A weekly meeting by telephone was held with the top programmer/ country manager and everything else was done using the task accounting system.

These people are here to get a job done, they don't care what we look like and we don't care what they look like... We track them by the numbers, we estimate in advance how long each task should take, and if a programmer is consistently taking longer to do a task, then we let them go.

A sophisticated means of checking who was doing what and where they were in time was key to being hands off; even new employees were hired over the internet. The CEO was scathing about meetings and face-to-face contact and describes the experience of subcontracting to a firm in the US in the following terms;

So many managers, so much design, there would be meetings, everyone would come for the meetings, then there would be pizza...there would have thirty people in a meeting, but by the time the code came out it was piddly it was nothing...it was just really inefficient.

There are implications of these two business models for the embeddedness of firms. In the first case the need to respond to clients flexibly and quickly and develop high quality

products necessitated developing skills, training and trust building within an organization. Firms using this model exhibited a higher degree of embeddedness and less inclination to move production, after having made an investment in human capital. In the second case labour was treated as an undifferentiated unit of production and production was seen as perfectly mobile between different global sites. Place was very transitory.

NETWORK EMBEDDEDNESS

The simple matrix presented in Table 2 which shows permutations of networks based on geography and ownership does not capture the complexities of offshoring/ outsourcing arrangements that were apparent from the interviews. In particular, three features of network embeddedness emerged from the data that related to the fast temporality of networks, the centrality of the team and place in the value chain.

First, the fast changing nature of networks meant that they took on a kaleidoscope quality. The sector was characterized by turbulence in terms of the life span of companies, and evident in the continual cycle of dissolving companies and the opening up of new ones, often by same managers. Many of these high tech start ups were funded by venture capital, some on the basis of one product; if the product was unsuccessful then the need the firm became defunct. In one case a firm was established in Kiev buying telephone calls in bulk and then reselling them to customers, and when this product was unsuccessful the firm was closed. The existence of projects where tasks had an end point or 'institutionalised termination' (GRABHER AND IBERT, 2006) served to further

increase instability, and therefore ‘...the transience of projects ...blurs the neat image of the clear formal (inter) organizational arrangements prevailing in the more robust strong tie architectures’ (IBID).

In another case Ukrainian, employees made redundant from one firm formed their own company and became sub-contractors to the firm they had previously worked for.

Therefore while the concept of networks is well elaborated in the literature, the software sector, in the Ukraine at least would be much better described as a kaleidoscope, where the industrial scene is constantly morphing into new configurations.

The second aspect of network embeddedness, was that the basic unit was not individuals or firms, but teams. All the firms interviewed were involved in building their own teams, building teams for clients or in the majority of cases ‘renting’ teams from a company based in the Ukraine. The CEO of Logiglob explained;

.We don’t build any of our products and we don’t have any of our own intellectual property...You come to me and say Dave – ‘I’ve got this software company and this is the product I’d like to build I would then assemble a team for you and that becomes your virtual subsidiary.

At one extreme there was a US firm which employed one country leader, who oversaw five team leaders, each of which had five members. The CEO explained;

Technically we only have one employee, all the rest are subcontractors and self employed and responsible for paying their own taxes...We have seen the emergence of people

whose firm is really just finding bodies and truly just giving you a body, so that you can integrate them into your team. So if you want cheap programmers to work in your project, you are not farming your project out, you are integrating them into your team and managing them directly.

At the other extreme one firm had bought six Ukrainian firms, ‘biting off the head and swallowing the body’, and ‘rented out’ 150 teams to clients in the West.

Typically we’ll build a team, almost a perfect analogy, you can almost think of us as a franchise operation, so there’s an infrastructure, physical, HR, IT, process, method and within that big box there’s 150 individual teams completely aligned with their customer.

Between these two extremes most European and US based firms offshored their work by hiring a team from a company (foreign or home owned) in the Ukraine. The notion of outsourcing or sub-contracting was variously described as ‘rude’ or ‘irrelevant’ and one interviewee claimed that he would have failed if he used such vocabulary. The way in which these teams were regarded as being temporarily part of the company to which they were contracted, was reflected in such comments as ‘they are like an extension of our firm...they could be sitting here’ or ‘we regard them as people working in our company’. Therefore teams were temporarily plugged into companies and encouraged to be psychologically part of that firm, wearing hats with the company logos and drinking coffee from mugs with the company logo. All of them had some sort of loyalty programme, for example several firms invited the Ukrainian to the country of the offshoring company, if they were located in Europe at least.

Third, with regard to place in the value chain, the process of software development and production in the Ukraine lay at the bottom end. At the top of the value chain were software users in non-software companies, which included firms across all sectors from retail to finance. Firms in all sectors are dependent on software, which involves customised software for complex and proprietary systems and the maintenance and updating of those systems. Software development functions were then outsourced to large service firms, or in the case of the Ukraine to software intensive high technology start-ups in Europe and the United States, where they were all headquartered. The order came from the client who retained the intellectual property (IP) rights, and all the business functions were located in the home country including human resource management, finance, marketing, sales and contact with the client.

Accounts of network embeddedness have suggested that the place of an operation in the value chain in terms of the functions it performs and its degree of autonomy have important implications for its impact on a locality. The fast changing landscape in terms of the nature of the operation, ownership and centrality of teams pose a significant challenge for analyzing its effects. The boundaries between offshoring and outsourcing are blurred and constantly changing. However, what is clear is that operations carried out in the Ukraine lie at the bottom of the value chain with little control resting with companies to which work was outsourced and even less to employees.

CONCLUSIONS

The offshoring and/or outsourcing of software development to the Ukraine has produced , for Kiev in particular, employment for highly skilled graduates in knowledge intensive work. However, with virtually no sunk costs the structural characteristics of the software industry make it highly mobile. Competitive conditions constantly drive a search for skilled labour at lower costs. However, the route of arrival had implications for the embeddedness of firms.

Companies that had entered the Ukraine through personal or business contacts exhibited greater commitment to location and were not considering other destinations. Those that had used the matrix systems for assessing the costs of competing destinations were recalibrating their information, particularly in relation to wage costs, and were considering other destinations such as South America and Nigeria. The place of Ukrainian sub-contractors make them dependent both on their ability to be cost competitive and also on the demand for the final product.

Cognitive and cultural influences were an important influence on the time horizon for firms operating in the country. The need for firms to engender commitment and reduce employee turnover was addressed using different strategies which had implications for the quality of work on offer and degree of embeddedness in the locality. One approach could be loosely termed as ‘body shopping’ where firms paid high salaries to employ programmers and developers on a short term basis. Other firms invested more widely in

training, development and range of benefits, which included permanent contracts and the possibility of travelling to the offshoring country. In this case there was evidence of the transfer of managerial skills and expertise, particularly in relation to project management in a 'customer facing' environment. Further, Ukrainian firms benefitted from spillovers in terms of the quality requirements as a result of being locked into global networks, which also provided the possibility of further customer diversification.

Territorial embeddedness was very weak. There was minimal interaction with other firms in the city and institutions outside those that they were compelled to deal with. Rather than an industrial atmosphere where knowledge flowed between firm, there was competition in relation to employing the best graduates. None of the firms carrying out software development had intellectual property rights and they occupied the bottom point of the value chain. Firms in the Ukraine were nodes of knowledge that formed a small part of the value chains on TNCs. Their lack of power within the value chain meant that they absorbed the risk if the customer firm at the top of the value chain cut back on a project or on IT development. Temporal embeddedness was short term, because the work could quickly be switched to another location, and the firms that were most cost driven continually searched for new sites. For these firms the Ukraine had provided a brief window of opportunity to arbitrage wages and knowledge.

Table 1

Summary of firms interviewed which outsource to the Ukraine

Interviewee	Company	Activity	Country of origin
CEO	Digitploy	Employment agency for IT	UK
Director of Development	Communibyte	Buying calls in bulk and reselling	UK/US
Director of Marketing	Logiglob	Design and build software	US
CEO and Founder	Heavensent	Mapping APIs, Tools and Services	US
CEO	Extrembyte	Internet based services firm	US
CEO	Adaptdotcom	Adaptation of software for demand purposes for PCs	Netherlands and US
MD	Vikinglog	Business systems developer for fashion retailer and mail order	Sweden
CEO and Founder	Webspecbyte	Web sites	Netherlands
CEO and founder	Marketlogi	Web-based system that helps marketing consultants	Switzerland
CEO	Ticket-toU	Tickets for travel, sport, entertainment	US
CEO	Phonebyte	Software development for mobile telecommunications	UK
Senior manager	Dotcomploy	Executive recruitment IT	UK

Source: Author

Table 2

Offshoring, outsourcing and ownership permutations for sourcing

	on-site	near-shore	offshore
complete ownership	Status (neither outsourced nor offshores)	In house, near shore (captive centre in nearby location)	Captive offshore
shared ownership	Joint venture onshore	Joint venture near shore	Joint venture offshore
no ownership	Onsite vendor	Offsite near shore vendor	Offshore vendor

Source: GUPTA et al, 2006

Table 3

Influences on and dimensions of embeddedness

INFLUENCES ON EMBEDDEDNESS	DIMENSIONS OF EMBEDDEDNESS
Structural influences on embeddedness	Low cost versus knowledge seeking
	Disintegration of value chains and mobility
Cognitive-cultural influences on embeddedness	Agglomeration and tacit knowledge
	Accessing tacit knowledge internally
	Institution bending
Network influences on embeddedness	Temporality of networks
	Role of teams
	Place in value chain

Source: Author