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Rays of Uniqueness - Cloud in Multinational Organisations: Challenge to Traditional Business System Alignments

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Abstract. Cloud computing initiatives support multinational corporations in optimizing resource utilisation and at the same time provide ubiquitous capacity to satisfy expectations of users within it. However, research carried out in the early 1990s demonstrated consequences when there were mismatches between business and IT strategies. The advent of utility computing through cloud based resource development seems to have altered both the perception of IT resources as well as the expectations of their use. In this paper by using a resource based view of cloud computing we examine the nature of unique capacity development in multinational organisations. Evidence for the research was gathered through interviews conducted in two well-known multinational companies in the oil and natural gas and the car manufacturing sectors respectively. The lessons drawn in this research is likely to be beneficial for organizations implementing Cloud based solutions.

Key words: IS strategy, Business strategy, IS assets, Cloud Computing, Resource sharing

1. Introduction

Although cloud computing is a term associated with a new innovative development in the world of computing yet the idea of sharing resources originated in the 1960s and 70s [1]. At the same time the contexts of the two developments couldn't be more different. While computing used to be a scarce resource in the 1960s and 1970s it is not so now with the advent of PCs for end users as well as the ubiquitous enabling role played by the Internet. Cloud computing and time sharing are connected to the notion that computing resources can be used as a utility that is distributed as a service like electricity and water. Evidently, cloud computing characterises a fundamentally different way of invention, development, deployment, scaling, updating, paying for information and communication services [2]. Many organisations that are considering moving onto the cloud are initially challenged by the notion of billing at point of use and subsequently by the whole changes to decision making that this sort of service orientation creates. Adoption of core technologies like cloud can also have influence

on organisational adaptations as reported in the context of management innovations [3]. Mitra (2001) found [4] duality of impact to be a key feature of technology adaptation processes within British local government. As surplus capacity and re-use or sharing of resources becomes the prevalent obtaining reality, the sharing features of cloud computing will be increasingly an attractive arrangement of choice.

In the quest to estimate cloud use effectiveness it seems obvious that the resource based view (RBV) of the firm would be a credible analytical approach. RBV is based on the notion that organisations succeed in gaining competitive advantage by using its assets as well as sustained competitive advantage is gained by using its existing capabilities. According to Wade and Hulland (2004) [5] Information system resources of firms may be visualised through a couple of categories that include IS assets (technology based) and IS capabilities (systems based). IS assets have an inherent disadvantage in that they can be easily copied by competitors and therefore is fragile with regard to sustainability of competitive advantage [cf. 6, 7]. An important issue for this paper is the fact that there is growing evidence to show that competitive advantage often depends on the firm's superior deployment capabilities[8, 9]. It is clear that certain key criticisms of the RBV [10] have stemmed from the static assumptions of the nature of resource, value and sustainable competitive advantage, for the purposes of this paper we'd like to presume both dynamic settings and unique capabilities enable organisations to develop sustainable competitive advantages.

Multinational companies constantly seek to develop unique inimitable capacity so that they can create competitive advantage over their competitors, despite the fact that initiatives for changes are difficult to implement due to resistance.. MNCs that succeed in implementing change by overcoming such resistance usually are supported by leadership that has foresight, is able to handle risk at the same time become considerably unique in the way their business systems operate[11]. Such an orientation as for instance in the study conducted within Nestlé by Mitra and Neale (2014) [11] is in contrast to findings which showed that co-ordinating IS plans with business plans impedes effective IS planning[12]. Despite many successful IS implementations yet instances of IS failure has lingered that has enabled the issue of alignment to be pre-eminent in the context of large MNCs. Just like Mitra (2001) [4] identified maturity to be a key parameter in Geographic Information Systems implementation within British local government similarly, Luftman (2003) categorises [13] alignment to be dependent on six categories of maturity. It would be interesting to see if Hayward's Rigs and Nihon Motors are able to look more closely at how cloud computing can support individual processes [14] rather than how it can support an entire strategy.

2. Nature of cloud based resource capabilities

In a context where overwhelming evidence shows [15, 11] that IS capacity development leads to inimitable resource advantages, it is clear that both Hayward's Rigs and Nihon Motors did not doubt the possibility of developing cloud based capacities. At the same time maturity of using competencies can make a difference to the way organisations eventually acquire competitive advantages. In the study [4] on British local government based implementations of geographic information systems,

Mitra (2001) found that levels of maturity in IS use usually leads to a couple of distinctly different formats in which organisations develop IS capacity. According to Mitra (2001) [4] *adoption* and *adaptation* of IS may be manifestly linked to maturity levels of the organisation's implementations of specific IS. Indeed organisations that strive to adapt also seek alignment between businesses and IS strategies for acquiring competitive advantages. Successful alignment of business and IS objectives is a 'process of continuous adaptation and change'[16]. In this study, adoption of cloud computing was never in question. However, Hayward's Rigs and Nihon Motors went through varied adaptations of cloud use to garner specific capacities.

Following Armbrust et al (2010) [17], cloud computing in this paper would refer to both the applications delivered as services over the Internet and the hardware and systems software within data centres that provide those services. Alignment of business strategy and information systems strategy has been a longstanding research pivot around which various organisations and their ISs have been explored. It must be borne in mind that the notion of introducing cloud computing is probably somewhat different in contrast to traditional systems. Whilst Bharadwaj (2000) implies[15] that IT capability is a rent generating resource that is not easily imitated or substituted in large companies yet, Armbrust et al (2010) have clarified [17] that pay as you go as used in cloud computing is clearly tied to usage. Renting usually involves paying a negotiated amount over a fixed period of time irrespective of use. Pay as you go involves metering usage and charging based on actual usage, independently of the time period over which the usage occurs. With the advent of cloud computing, this is perhaps a key difference that has come about in the estimation of IT resources. Dwelling on scale and simplicity as the new dimensions that cloud brings to the context of multinational companies, Grossman (2009) concurs[19], that pay as you go to use cloud capacity is a facet that has hitherto remained unknown. In the context of MNCs as operations scale to international contexts using multiple proprietary providers could lead to challenges in application of security policy [20]. Reductions in budgets and higher space requirements as computing becomes more web based, there is a compulsion that is driving large organisations to rethink their current capacity provisioning [21]. Cloud obviously provides a veritable option that is increasingly being taken seriously by large organisations.

3. Methodology adopted

Data were collected in two multinational companies that have significant operations within the UK. The first is a British multinational that is well known in the oil and natural gas sector. The second is a Japanese car manufacturer that has significant UK based manufacturing capacities. Prevalent non-disclosure conditions do not permit us to use either the names of the organisations or the staff who have been interviewed for the study. For the purposes of this paper the companies will be referred to using pseudonyms as Hayward's Rigs (HR) and Nihon Motors (NM) respectively. Both companies have assets and personnel spread across various local and global locations that need to seamlessly interact for efficient delivery of business. It is clear that further to their experiences, both companies have realised that merely transferring all of their data across to cloud based repositories is unlikely to work [25]. There were

also documents that were used to enrich the analysis that is referred to in this paper. Whilst both companies have been considering using some cloud services ever since 2007 yet faced with various local and global challenges both companies had embarked around 2010 to seriously integrate cloud computing into their operational needs.

A case study approach [26] was used to collate evidence on HR and NM.

Table 1: Antecedents of cloud use

Dimension	Hayward's Rigs	Nihon Motors
Industry expectations	Increased demand from business managers to deploy functionality quickly. HR executives, like many of their counterparts in other organisations, are increasingly "tech savvy"; that is to say they are becoming more alert to the possibilities that developments in technology offer and are keen to utilise these technologies to improve organisation performance. Cloud services are attractive because they allow organisations to seize opportunities quickly and "strike whilst the iron is hot".	Although Nihon Motors began exploring cloud based solutions ever since 2008 yet the need for websites to load swiftly and address customer expectations was a key driver. Personnel within Nihon Motors viewed reliance on cloud services would provide a use and dispose advantage as their envisaged web services could be located in external clouds that needn't be integrated with the rest of the company's operations.
Process standardisation	Moving to cloud-based solutions encourages the adoption of standard configurations and discourages the tendency towards excessive customisation of services for individual users. It focuses attention on the costs of providing customised solutions and encourages organisational members to examine practices and procedures that they previously took as givens.	In a business where there is always a possibility of disruptions to the supply chain (as, for example, the earthquake in Japan highlighted) or the need for parts recall (as, for example, in the recent recalls of cars by Toyota due to airbag faults) providing customers and collaborators with up-to-date information is critical. Cloud technologies have the potential to provide more flexible, efficient and effective communication channels.
Scalability	In the oil and gas industry, as the recent Gulf of Mexico incident vividly demonstrated, it is important to be able to scale up capacity at very short	Host providers have far bigger Internet pipelines than individual firms and flexible charging mechanisms make this provision particularly attractive to firms

	<p>notice to deal with unforeseen events. In addition one-off activities, for example HR's involvement with the Olympic games or its 'commitment to America' advertising campaign, require temporary increases in information and communications capacity. Evidence suggests that flexibility is achieved more easily and cost-effectively through the Cloud.</p>	<p>facing intermittent surges in activity. To quote, "<i>We could have put in a much bigger pipe to the Internet but that would have been a big pipe that was only used one percent of the time and was unlikely to be cost effective.</i>"</p>
<p>Investment optimisation/ Green credentials</p>	<p>Maintaining "evergreen" in-house capability and capacity requires on-going capital investment that is often difficult to justify from a business perspective. Capital expenditures on upgrades to back office and IT systems add value in indirect ways and, in a climate of resource constraint, are often difficult to defend. Moving to the Cloud alters the structure of costs - in particular it reduces the need to commit large amounts of capital to continuous upgrade and renewal of infrastructure and systems.</p>	<p>The car industry places importance on green factors within its procurement processes. For NM, in particular, it is important that it produces its cars in as environmentally friendly a way as possible. Whilst the main emphasis within the company is on 'greening' its manufacturing plant, NM as a whole strives to be greener where ever it can and this includes its provision of computing services. Cloud computing delivers environmental benefits to NM in a number of ways. First, the economies of scale available to specialist cloud service providers implies that it is in these vendors' interest to incorporate sophisticated, eco-friendly features into the design and operation and their data centres.</p>
<p>Focus on core capacities</p>	<p>As the pace of development in information and communication technology speeds up so it becomes more difficult for IT departments to keep up with latest developments in all fields. Attempting to maintain leading edge knowledge in areas that support rather than constitute the core business can be a distraction to</p>	<p>Whilst it is possible to develop equivalent capacity and capability in-house, the experience NM gained through its tendering processes suggests that specialist providers offer much cheaper solutions because of they can exploit economies of scale, scope and learning through the re-use of knowledge. Further, cloud vendors offer enhanced search capabilities that can be bought off-the-shelf.</p>

	managers' attention. Handing over responsibility for non-core activities to specialists is likely to produce better results.	This enables firms like NM to improve the performance of web-sites from the end-users perspective quickly and relatively cheaply.
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4. Scenario at Hayward's Rigs

4.1 Moving email services to the cloud

One of the key decision parameters for HR was the extent to which the email services it was seeking to procure needed to be customised to HR's specific organisational context. On the one hand the company sought to get the economic and commercial benefits associated with standardised Cloud offers, but on the other hand, recognise that the nature and complexity of its business required some significant elements of custom-build. As one of our respondents explained, "it became a conversation about where we wanted to get Cloud economics and Cloud commercials but actually the reality was that it always looked like more of a custom-built environment."

Following a number of detailed rounds of discussion and negotiation, the contract was eventually awarded to T Systems, the corporate customer division of Deutsche Telekom in July 2012. Under the terms of the contract T Systems will provide a secure private cloud which will enable HR's 830,000 plus employees around the world to access email services from a range of mobile and computer devices. The contract is for a five-year period and is based on a "pay-per-use" model.

4.2 HR's exploration of moving an information management platform to the Cloud

HR's exploration of this option has followed a similar path to that of email services in terms of the procurement process. It issued a request for information (RFI) to test the market and to identify potential suppliers and entered into discussion with some of the dominant players like Amazon Web Services (AWS).

These large providers of public Cloud services have presented HR with a new and rather unexpected set of challenges. Providers like AWS provide a standardised service that takes little account of the size or nature of the purchasing organisation. As one of our respondents explained:

"you can forget trying to have a conversation with Amazon in the way we used to with Hewlett Packard (HP) where they (HP) will take on certain service levels and undertake to do special things for you as a customer. No chance [with Amazon]. HR as an organisation has as much firepower with Amazon as I have as an individual customer. It makes no difference whatsoever to them so you need a different set of levers to manage your risk exposure around that and that leads you actually to a different ... architecture and a completely different dynamic."

As this quote demonstrates the balance of power between provider and purchaser is currently very different from that which large multinationals have come to expect. HR, like most other global organisations, is used to having a degree of bargaining strength

in its negotiation with suppliers but the dynamics of public Cloud services are unusual. A few large players dominate segments of the newly emerging Cloud industry and these first movers have been able to exploit the economies of scale and experience to bring costs down, tipping the balance of advantage in their favour.

4.3 Strategic implementation at HR

Moves to Cloud-based provision can seem to be relatively inconsequential from the end-users perspectives but from a broader organisational perspective, they can have far-reaching and unexpected effects. HR managers, for example, have found that the exploration of Cloud-based solutions has required them to rethink many of their existing practices and processes. Executives involved in the decision-making process report that there is a potential impact on everything from legal frameworks, through billing and charging for IT services to the way performance is measured.

From the end-users point of view a change in the provision of email services or an information management platform can go almost unnoticed but the adoption of cloud services means that *“every decision has a new complexion to it”*. For example in terms of legal contracts, HR’s legal teams are used to negotiating specific clauses in contracts but in a “multi-tenant” environment that doesn’t make sense and Amazon, for example, requires its customers to adopt standard terms and conditions. The adoption of standard terms and conditions has knock-on implications for the way risks are managed. For instance if AWS went down, how would disaster recovery be managed in this new environment? Similarly, the fact that charges for cloud services are consumption-based means that the way IT services are billed for internally, needs to be altered to reflect this and incentives need to be in place to create economies on the “consumption” of chargeable services. As a respondent put it:

“it’s like a prism – take the example of how we charge for IT internally – here we have a specific way of charging the business for services which is not hour by hour/consumption based, it is pretty much year by year consumption. So you can have a situation where, by the very nature of the Cloud, you can peak, move in, see lots of different things and your internal charging models encourage that level of use and variability but that isn’t an advantage anymore, that’s a problem. So it’s how you begin to start to chip away at a series of financial mechanisms of governance that might have been in place for twenty years and ... there are lots of dead bodies in stuff like that. You have to work your way through (myriads of issues like this) to begin to leverage the advantage that this other thing (the Cloud) gives.”

The same sentiment is expressed in the following comments and illustrates how difficult it is to implement changes that on the surface can appear quite modest but have wide-scale implications.

“When you are trying to create a business case for this (Cloud), You’re having to force fit a new world model into an old world model so you try to explain the new world model in old world terms and those things are not natural bedfellows. So even trying to – apples for apples- make financial comparisons can be difficult.”

“It took me a long time to actually get to grips with the change. You can intellectually understand it quite quickly but to sort of emotionally buy what you are being told and really begin to deeply understand how to might actually do that [implement a transition to Cloud provision] takes a bit more time.”

4.4 Cloud led competitive advantage at HR

Cloud solutions, for example, allow HR to do the things it has always done more speedily. For instance a successful national marketing campaign could be scaled up globally very rapidly or ERP systems could be deployed in ways that achieve further cost savings but the “commodified” nature of the cloud means that adoption of cloud solutions is unlikely to be allowed to encroach into areas of core expertise. HR’s has distinctive capabilities in finding new oil and gas reserves, in geo-space analysis and in many other areas that are supported by high-performance computing environments. Strategically it is important that HR retains and develops its knowledge of crucial technologies. Cloud-based computing will allow HR to cut costs, be quicker to market and stay at the leading edge of support technologies so it is perceived to be an important tool that HR needs to deploy but not something that will allow HR to differentiate itself from competitors. In other words from HR’s perspective the ability to deploy cloud computing solutions is a very important threshold capability but not a distinctive one.

5. Scenario at Nihon Motors

5.1 First move to the cloud

Having made the decision, in principle, to move to a cloud-based solution for its web-sites, NM selected its provider through a traditional tendering process. It approached around five vendors who were known leaders in the web-hosting marketplace and put out a Request for Information (RFI). The RFIs paved the way for formal tenders that were evaluated using NM’s usual internal protocols and scoring systems. The contract was awarded to a vendor who had the advantage of being located in the Thames Valley close to NM’s own offices and the stand-by site was in London’s Docklands.

5.2 NM’s subsequent cloud ventures

NM’s next major cloud venture accompanied its launch of its sporty, hybrid car, the BS-Y. The marketing team responsible for the launch was keen to utilize the power of social media and came up with the concept of Mode Art. Mode Art was described as a web-site and Facebook application which turned the user’s life into art. User information was pulled from Facebook and then merged into a unique art composition based on one of the NM BS-Y’s driving modes, namely Sport, Urban or Economy. The resulting artwork could be shared on Facebook, sent to friends or downloaded on to a mobile phone and was designed to act as a catalyst for viral marketing. The challenge for IT was to provide sufficient capacity for storing and processing users’ images, particular given there was considerable uncertainty about possible uptake.

The ICT team supporting this launch decided to buy cloud-based storage capacity from Amazon, paying for it by gigabyte per month depending on utilization. This enabled the company to put storage capacity in place in a matter of days and also had the advantage of allowing the company to specify where its data was to be stored, hence avoiding some of the legal issues concerning data protection that can be very complex when data is stored off-shore. Purchasing data storage from Amazon was,

however, a commodity transaction and, at the time, Amazon was not geared to corporate customers as our respondent's experience vividly illustrated:

"Amazon weren't geared to corporate buying. It actually ended up with me paying [for data storage] on my own corporate credit card. This was the only way we could do it because they weren't in a position to corporate purchase orders or to invoice the company."

Whilst NM as the purchaser had to accept Amazon's standard terms and conditions and had to navigate a payment system designed for individuals rather than corporates, the big benefit was in terms of price. As it turned out the take-up for this campaign was much lower than expected but the low sunk costs meant that the failure of this particular marketing experiment contained as the following quote illustrates:

"... it does illustrate one of the great benefits of the Cloud in that this particular marketing campaign was not successful in terms of attracting people... But the great advantage was that I was paying something like 5 pence per month for the storage we got from Amazon whereas if we tried to provision it internally, we would have put, I don't know maybe a hundred gigs of storage or so behind it and we would have had to pay for it, provision it etc. --- you would probably have been talking at least five to ten thousand pounds of infrastructure. ... The flexibility of Cloud storage and Cloud computing can give you some substantial cost advantages."

Whilst in NM's case its marketing teams had always been urged to take a creative approach to new product launches and were encouraged to take calculated risks, the changes in the cost structure associated with cloud-based web provision mitigates against downside risks and facilitates experimentation.

The choice between private and public cloud solutions required NM to engage with some difficult trade-offs. On the one hand buying off-the-shelf public cloud services provided by firms like Amazon offered significant cost savings and flexible capacity but it also meant that NM still had to do a large amount of work in-house because they were "just buying the infrastructure rather than the solution." On the other hand the specialist providers like Rackspace offered high-end services and "get web-sites up and running quickly with little effort [on the buyer's part]" but highly customized solutions are expensive. In the end NM went for a middle of the road solution that involved some degree of customization.

"The company that runs the IT helpdesk for NM (Europe) has its systems based in India. That involved getting data protection agreements signed with all the NM companies in Europe to say we approve employee data being held in systems in India. It's just a headache."

In terms of cost savings, the move to a quasi-public cloud was estimated by our respondent to

"result in a 30% reduction in annual operating costs and ... to deliver a better solution. ... They call it the virtual team but if you look at the people that they [Phoenix] have supporting the web-site added to the people we had internally supporting the web-site there is definitely a higher level of support."

5.3 Strategic implementation at NM

One of the concerns commonly expressed about moves to cloud-based solutions is that there may be resistance to these kinds of developments from in-house IT staff, in

part because the move to the cloud has the potential to reduce employment opportunities. This does not appear to have been an issue at NM because there were more than enough new projects continuously coming on stream to fully deploy the existing staff's time and expertise. In addition, many of the capabilities required did not exist in-house.

“Computing is an area where there are always new technologies and new projects and you've got to decide where you are going to put your people. If you look at the skills required we have never had those in-house. Yes, we ran virtual servers in-house but running virtual servers between two sites that requires a level of N-ware expertise that NM never really had in-house and would struggle to afford having in-house. We get 24/7 monitoring from the provider but if that was provisioned in-house we'd have to put our people on to shift systems which we can't do and we want the system to be scalable on demand so that the website automatically adds capacity if there are peaks in usage.”

5.4 Cloud led competitive advantage at NM

Our respondent drew parallels between cloud computing technologies and outsourcing. In just the same way as it is not sensible for a firm to outsource activities that were the basis of its competitive advantage so it is not prudent for a firm to move computing activities to the Cloud if those activities formed part of the organisation's distinctive capabilities. To quote our respondent:

“The only way Cloud computing helps in delivering competitive advantage is in a secondary way. Cloud computing can give you cost and speed market advantages so if part of your competitive advantage is getting to market quickly then Cloud computing can help. But, if you view computing in its own right as your competitive advantage then you don't outsource it because, by definition, you're using public things that people can easily copy, easily reproduce and so it very quickly doesn't become your competitive advantage anymore.”

Looking to the future, however, it is likely that Cloud computing solutions will take on increasing significance for the car industry. There is a trend towards cars becoming network nodes in their own right – that is to say more information and communication technology being incorporated into vehicles so that cars are permanently online from the manufacturer's perspective. Whilst all car producers would like to gain an advantage by exploiting the opportunities that 'always online' cars potentially offer, it seems unlikely that a single car manufacturer could afford to invest the sums of money necessary to build unique systems and distinctive advantages.

“We'd very much like to have a competitive advantage but, realistically, we probably can't because the cost of provisioning an 'always online' car and having the nationwide networks to do that is well outside the scope of a single car producer. We will probably have to collaborate with mobile network providers. We're going to be using other people to help us and we will need to tap into publicly available services so that is never going to be our competitive advantage. Our competitive advantage will have to be closer to home, for example by designing the interfaces, helping people to use the features of the car and so on.”

The fact that Cloud solutions are ubiquitous and easily replicable means that careful consideration does need to be given to which activities are transferred to the Cloud. In the case of CRM and data mining, for example, our respondent was of the opinion that the interrogation of customer data is best done in-house.

“[Interrogating customer data] and data mining is difficult in some ways. You are handling large volumes of data and, yes, that could be a candidate for the Cloud but then you look at the tools you need to handle those large volumes and to what extent are they Cloud-based? You can’t shift large data over the network or the Internet. It needs to be closer to home. Lots of the data-mining people are now doing in-memory computing, holding databases in memory [to undertake their analysis]. If you’re not careful you will erode your performance advantage by hosting remotely.”

NM sees its core capabilities as located in its design of cars and in its manufacturing capabilities so it needs its computing capacity next to the production line. Whilst cloud solutions and external hosting are helping the company to improve the efficiency and effectiveness of its overall operation, its production-related computing activities are likely to remain firmly in-house.

6 Conclusion

It is clear that the motivations and expectations of both companies vary somewhat. At the same time both realise that there are specific advantages that they could garner by using cloud solutions. For instance, HR realises that they’d be able to cut costs, be quicker to market and stay at the leading edge of support technologies. However, HR doesn’t consider cloud to be able to provide it with a capability that would allow it to differentiate itself from competitors. In contrast to the oil and natural gas sector, the car industry is quite heavily customer orientated. In such a context as was evident through the facebook exercise initiated by NM for its BS-Y model there are serious limitations on what can be achieved in-house. Further as hybrid cars become more network reliant, cloud based capacity may become an imperative. Probably the most fascinating outcome of the research for this study is embedded in the challenges being experienced by both MNCs in implementing cloud solutions. Both HR and NM have reported that decision making is getting affected as provisioning of computing resources becomes more commodified. Here the duality dimensions of influence as found by Mitra (2001) [4] seems to become gradually evident as the companies move towards fully cloud orientated organisations.

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