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Creating Customer Value through SOA and Outsourcing: A NEBIC Approach

Benazeer Md. Shahzada, Verelst Jan, Van Grembergen Wim, Mannaert Herwig

***Abstract*—**This article is an extension and a practical application approach of Wheeler's NEBIC theory (Net Enabled Business Innovation Cycle). NEBIC theory is a new approach in IS research and can be used for dynamic environment related to new technology. Firms can follow the market changes rapidly with support of the IT resources. Flexible firms adapt their market strategies, and respond more quickly to customers changing behaviors. When every leading firm in an industry has access to the same IT resources, the way that these IT resources are managed will determine the competitive advantages or disadvantages of firm. From Dynamic Capabilities Perspective and from newly introduced NEBIC theory by Wheeler, we know that only IT resources cannot deliver customer value but good configuration of those resources can guarantee customer value by choosing the right emerging technology, grasping the right economic opportunities through business innovation and growth. We found evidences in literature that SOA (Service Oriented Architecture) is a promising emerging technology which can deliver the desired economic opportunity through modularity, flexibility and loose-coupling. SOA can also help firms to connect in network which can open a new window of opportunity to collaborate in innovation and right kind of outsourcing. There are many articles and research reports indicates that failure rate in outsourcing is very high but at the same time research indicates that successful outsourcing projects adds tangible and intangible benefits to the service consumer. Business executives and policy makers in the west should not afraid of outsourcing but they should choose the right strategy through the use of emerging technology to significantly reduce the failure rate in outsourcing.

***Keywords*—**Absorptive capacity, Dynamic Capability, Net-enabled business innovation cycle, Service oriented architecture.

I. INTRODUCTION

IN this high velocity [1] and hyper competitive [2] business environment, inter-organization collaboration is becoming a tool of survival. Inter-organization networks provide opportunities to exploit complementary resources that reside beyond the boundary of the firm [3]. Everything the business does, need collaboration. So what is collaboration in business? It can be said as passing information back and forth between entities. The entities can be organizations or departments. So we have inter and intra organizational collaboration in business. In this article, first, we are addressing the issues relating to the importance of inter and intra organizational collaboration. Our discussion will also highlight the importance of SOA and outsourcing as a tool to achieve competitive advantage. Second, we discuss briefly about absorptive capacity and here in our discussion, we provide sufficient academic references linking SOA and outsourcing to innovation. In the last part of this article, we are mapping SOA and outsourcing on newly introduced Wheeler's NEBIC theory which is followed by the contribution, future research direction and conclusion.

Benazeer, M. S. is with the Department of Management Information Systems, University of Antwerp, Antwerp 2000, Belgium. (Corresponding author); Phone: +32 (0) 3 220 48 76; Fax: + 32 (0) 3 220 40 64;
e-mail: shahzada.benazeer@ua.ac.be.
Prof. Dr.Verelst, J. is the vice chairman, Department of Management Information Systems, University of Antwerp, Antwerp 2000, Belgium.
e-mail: jan.verelst@ua.ac.be.
Prof. Dr. Van Grembergen, W. is the former chairman, Department of Management Information Systems, University of Antwerp, Antwerp 2000, Belgium. e-mail: wim.vangrembergen@ua.ac.be.
Prof. Dr. Mannaert, H. is the chairman, Department of Management Information Systems, University of Antwerp, Antwerp 2000, Belgium.
e-mail: herwig.mannaert@ua.ac.be.

II. SOA: A SOLUTION FOR THE FLEXIBLE FIRMS

Before the internet era, the techniques used for collaboration, were mostly defined by the technology that was available at that time. Business used postal mails, telegrams, telephones, faxes etc for this purpose. Afterwards, ERP (Enterprise Resource Planning) came to the scene and solved most of the intra collaboration needs of an organization. Soon organizations realized that, an ERP doesn't address everything that an organization needs. So the organizations bought CRM (Customer Relationship Management), PLM (Product Lifecycle Management) etc. and sometimes an extra ERP altogether. But above mentioned software are frequently not compatible among each other. The reasons can be many things, no viable technology, lack of standards etc.

Under dynamic business environment, the effective renewal of products/services and how they are delivered are critical capabilities for many high-technology industries [4], [5], [6], [7], [8], [9]. But it was becoming more and more complex to integrate, with each purchase of new software or acquisition of new companies. This introduced the spaghetti in to the organization's IT, trying to integrate all these multiple software.

Intra organization collaboration is already a problematic issue and now what about the inter organization collaboration? Software industry made some headway in to these uncharted waters, so we can see the emergence of CORBA (Common Object Requesting Broker Architecture), DCOM (Distributed Component Object Model) etc. But it still

proved to be challenging, if not impossible, to collaborate with the business partners. The software ecosystem of one organization is completely different from the software ecosystem of its partner. The internet showed that, when there is a standard set of protocols, it is easy to work with a network of different computers. People realized instead of hard wiring particular software with every other software; we can use the internet and define the standard to exchange data between computers. So the internet and standard based protocols is solving the organization's need to collaborate with its partners. This is how SOA emerged and fulfilled the long waited thrust of organizations.

SOA is a set of design principles for building software systems. SOA adopts a service-centric approach that is significantly different from previous application-centric architectures. At its core, SOA is about factoring functionality into shared, reusable services, and applications are built by assembling those services into automated business processes. SOA can be defined as an architectural style promoting the concept of business-aligned enterprise services as the fundamental unit of designing, building, and composing enterprise business solutions. Multiple patterns, defining design, implementations, and deployment of the SOA solutions, complete this style (Lublinsky, B., 2007) [10]. In his research paper Huysmans, P., [11], compiled the definition of SOA, in very details and divided it in two categories: definitions in technical level and definitions in business level.

A. Benefits of SOA

Service-oriented architecture (SOA) is a design style that enables businesses to increase flexibility and agility. But in order to achieve these advantages, an organization must embrace SOA as a lifestyle change. SOA is a new way to design systems, and this technology shows a new direction to its user's to think differently about business process. SOA requires a different mindset, and it requires discipline. To improve the chances for success, an organization must establish discipline through a strong governance program. In addition to increasing flexibility and agility, SOA can realize the following benefits:

- Reduced costs
- Reduced redundancy
- Better consistency, security, and compliance
- Improved productivity, efficiency, effectiveness, and satisfaction

III. SOA and Outsourcing: The Dynamic Capability

Teece et al. [12] introduced the notion of dynamic capabilities through which managers integrate, build and reconfigure internal and external competencies to address changing environment. Due to the emergence of SOA, organizations are enjoying flexibility and inter-operability to achieve the above mentioned goals. In fact, Dynamic Capability perspective is an extension of RBV (Resource Based View). In highly dynamic business environment, RBV has some limitations and due to this the original proposition of the RBV has been challenged as static and neglecting the influence of market dynamism [13], [14], [15]. Dynamic capabilities are organizational routines deployed to alter a resource base by acquiring, creating, shedding, integrating and recombining existing resources to generate new value creating strategies [16]. The new value or the real value is coming from the resource configuration but not from the resources itself.

Competitive advantage cannot be achieved through the manipulation of resources available with in the boundary of a single firm but rather from with in a network of heterogeneous firms. So, we can say that competitive advantage can be achieved through SOA and outsourcing because both expands the boundary of the firm and also enhance inter-organization collaboration. Research is beginning to illustrate how organizational forms such as "network" are being deployed to access new technologies and new business opportunities [17], [18].

IV. Absorptive Capacity Perspective: A Dynamic Capability

Organizations develop their capabilities not only through internal learning but also through the absorption of knowledge from external sources such as competitors, trade associations, suppliers, customers, and formal and informal meetings [19], [20]. In this context, it will not be irrelevant to say that from outsourcing or from service providers, service consumers have the opportunity to enhance their internal knowledge capability.

External sources of knowledge are critical to innovation. [21], [22], [23], [24]. March and Simon [25] have suggested that "borrowing" is the catalyst for innovation, not "invention."

Here again we can see a positive co-relation between outsourcing and innovation. A service consumer firm is able to absorb information or knowledge from the service provider firm. The service provider firm definitely has some advantage in technology, economy of scale or in time scale. This "borrowing" frequently forms the basis for the development of capabilities which evolve over time as new knowledge is learned and integrated into any organization [10].

Organizations have an 'absorptive capacity' which is the ability of an organization to evaluate and assimilate external knowledge and is a function of the level of a firm's prior related knowledge [26]. Absorptive capacity enables a firm to recognize valuable new information, assimilate it, and apply it to the development and refinement of dynamic capabilities. Interfacing with the external environment is critical to an organization's dynamic capabilities. The structure of communication between the external environment and the organization enhances the learning capacity of individual firms. Some recent work develops the absorptive capacity construct as a change oriented dynamic capability [27].

V. NEBIC, SOA and Outsourcing

As Barney's RBV has been extended by Teece et al. as the notion of Dynamic Capabilities to address the highly dynamic nature of business environment, in the same way Wheeler has introduced NEBIC as an extension of Dynamic Capabilities to

make it more specific for IS research. NEBIC is an ideal theory for IS research because it is addressing the issue of tacit resources and capabilities, such as Emerging Technology (ET), Economic Opportunity (EO), Business Innovation (BI) and Customer Value (CV).

According to Wheeler [28] net-enablement is a dynamic capability because net enabled organizations continually reconfigure their internal and external resources to employ digital networks to exploit business opportunities. Net enabled organizations exemplify the characteristics of dynamic capabilities as they engage routines, prior and emergent knowledge, analytic processes, and simple rules to turn IT into customer value [29], [30]. Wheeler's NEBIC theory is a promising perspective on how organizations can benefit from digitally induced transformations.

NEBIC is an applied dynamic capabilities theory for measuring, predicting, and understanding a firm's ability to create customer value through the business use of digital networks. The theory incorporates both a variance and process view of net-enabled business innovation. It identifies four sequenced constructs: Choosing new IT, Matching Economic Opportunities with technology, Executing Business Innovation for Growth, and Assessing Customer Value, along with the processes and events that inter-relate them as a cycle. The sequence of these theorized relationships for net-enablement (NE) asserts that choosing IT *precedes* rather than aligns with corporate strategy. The theory offers a logically consistent and falsifiable basis for grounding research programs on metrics of net-enabled business innovation.

Wheeler's cycles of *"choosing enabling technologies" and "matching with economic opportunities"* are two very important factors in an uncertain business environment. If companies go ahead with emerging IT technologies, (SOA, web-service), then the question remains, how they will match their strategy regarding outsourcing? Will the volume of outsourcing increase or decrease? Which mode of outsourcing will prevail: co-sourcing, out-tasking or outsourcing the entire process?

VI. THE FOUR CONSTRUCTS OF NEBIC

The four constructs proposed by wheeler are not specific to any new technology or business process. In this paper, we will try to narrow down this proposed theory to a specific technology and to business process. By choosing "SOA" as an emerging technology and "outsourcing" as an economic opportunity, we will see if combination of this two selected constructs lead towards the 3rd and 4th construct; business innovation and customer value.

A. Choosing Emerging Technology

"Things should be made as simple as possible, but no simpler." -- Albert Einstein

NEBIC theory is opening a new window in IS research. This field is very dynamic and hyper competitive due to the rapid and frequent change in technology. First of the four theorized construct proposed by wheeler is the Emerging technology. Choosing emerging information technology is very difficult task because it remains unclear when or will this chosen technology ever become a pervasive enabling technology. Due to this risk, ET construct is represented on Fig. 1 at the lowest on the potential value vertical axis. Because only choosing the right ET, is not a guarantee of producing customer value. Customer value is the outcome of the good configuration of other three constructs.

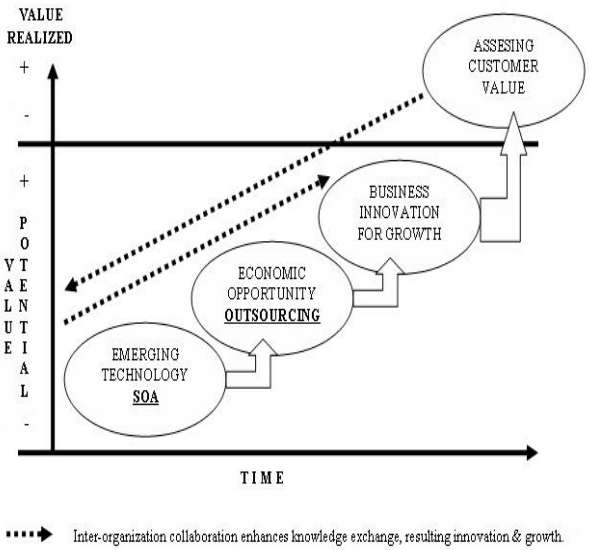

Fig. 1. NEBIC (MODIFIED)

We consider SOA as an emerging technology which has many characteristics (loose coupling, reusability, coarse granularity) to contribute in achieving customer value. SOA directly supports organizations in achieving agility, flexibility and fast adaptation to change. Enterprise architects believe that SOA can help businesses respond more quickly and cost-effectively to changing market conditions [31]. In 21st century, business became highly competitive and the market is very volatile. Organizations should adopt technologies which can neutralize the effect of unstable market and can absorb the undesirable shocks. SOA architecture is capable to support organizations in uncertain atmosphere [32].

B. Matching Economic Opportunity

Now the question remains, if we choose SOA as emerging technology then how SOA can drive firms towards economic opportunity? Due to the standardization [XML (Extensible Markup Language), WSDL (Web Service Description Language), SOAP (Simple Object Access Protocol), UDDI (Universal Description Discovery and Integration)] in software programming, SOA enhances inter-organization collaboration. This increased inter-organization collaboration can create new opportunities in outsourcing. As SOA enhances interoperability, applications can be integrated among the organizations. Outsourcing of the entire processes may not be necessary any more. New mode of outsourcing can emerge, such as out-tasking, co-sourcing, custom-built outsourcing and ready-built services. SOA could open the

opportunity to outsource functionality to a group of service providers which we can call a 'marketplace' [33]. Since information systems support processes, standardization allows uniform information systems within companies as well as standard systems interfaces among different firms. Standard processes also allow easier outsourcing of process capabilities [34].

Problems from outsourcing can partially be avoided by Information System that is based on SOA. Due to the use of accepted standards, the technical dependence can be reduced, and by keeping the control of the process, the essential competences are kept in the company [33].

In spite of high failure rate in IT / IS outsourcing [35], [36], [37], [38] this trend is growing and is pervasive [39], [40]. If we see the above remark [31], it is no more a difficult issue of retaining the IS core capabilities but at the same time achieving competitive advantage through successful and meaningful outsourcing. In last decades, it was a very difficult task but due to the significant and rapid technological advances in general, and trend towards IT architecture maturity, in particular, organizations can minimize the risk from outsourcing. If we look a decade past, Feeny & Willcocks (1998), proposed in their article that IS core capabilities are retained, enhanced and maintained by three most important constructs [41]. These are '*business and IT vision'*, '*IT architecture*' and '*outsourcing*'. The 1st and the 3rd construct were always in place but the only problem remained was the IT architecture. But now SOA can be a tool which fulfils this deficiency in above construct and organizations are much more confident that in near future they will be able to minimize the risk and maximize the benefits from outsourcing.

C. Executing Business Innovation for Growth

Outsourcing or off-shore outsourcing is simply a natural evolution in modern business process. In fact this was already in practice since centuries in different parts of the world probably in different form and bearing different name. Since last fifty years, it was more pervasive in manufacturing sector but now service sector is also competing equally due to new business practices, enabled by advances in telecommunications and information technology, organizations are heavily committed in outsourcing to achieve competitive advantage. When automation emerged in business process in 60s, there were also concerns about the rising unemployment and loosing competencies etc. But this didn't happen. We learnt to cope up with new developments. This view is also expressed by Feenstra [42] and Jaffee [43] by asserting that off-shoring like automation in the 1960s, is simply another innovative way to efficiently reallocate existing factors or production.

Deloitte surveyed 300 business and IT executives involved in outsourcing deals, 70% said they were satisfied with their relationships, and 83% said outsourcing projects had met their return-on-investment goals, with an ROI averaging just above 25%. But only one in three executives surveyed said they had gained important benefits from innovative ideas or transformation of their operations [44]. We should be optimistic here because 83% projects benefited average ROI of 25% and one third of them benefited from important innovative ideas. If service consumer organizations give more importance to innovation during their negotiations with service providers, it is reasonable to expect many more organizations benefiting from important innovative ideas and processes.

Off-shore service providers are not only specialized in low cost delivery of lower value jobs. They can be a partner in innovation, R&D and knowledge based job. Another emerging business practice of particular importance is off-shoring of knowledge work such as research and development. Examples include numerical analysis studies and software maintenance and development [45]. Firms are also off-shoring high technology research work [46], [47], [48]. Intel added to its engineering workforce by employing 600 engineers to its research and development operation in Russia [49].

A worldwide survey of 104 senior executives from a range of technology driven industries conducted by the Economist Intelligence Unit found that 70% of the respondents firms now employ R&D talent abroad and 52% plan to increase their investments in off-shore research in the next 3 years [50]. This trend is expected to continue [51]. Off-shoring R&D units can allow access to local knowledge not readily available at home, and can enable learning about complementary technologies [52], [53], [54], [55], [56]. Firms increasingly decide to locate their innovation effort wherever they believe the most propitious environment exists [57].

This is the conclusion after conducting a case study analysis: "With increasingly intensified competition in global market, outsourcing strategy has attracted more and more attention in recent years. However outsourcing does not merely rest on the relationship between outsourcer and supplier but tends to form a huge innovation network through the connection with the third and fourth party" [58]. We found further evidences in literature which supports our view that outsourcing can have a positive impact on innovation. Firms typically off-shore non-core activities, providing more time for higher value-added activities such as innovation [59], [60], [61]. Specialist suppliers to which the work is outsourced can find solutions that fragmented internal sources could never imagine – and they can implement those solutions rapidly without disruptive internal politics [62]. Outsourcing has emerged as one of the most important strategies to achieve innovation. Rather than doing everything by oneself, an organization can hire experts and specialists, and get the job done more efficiently and effectively. By outsourcing, the partner's resources when combined with internal capabilities can result in tremendous benefits [63].

D. Assessing Customer Value

The ultimate goal of any business is profit. In long term strategy, this is only possible if firms can create customer value. From Dynamic Capabilities Perspective and from NEBIC theory we know that customer value can be achieved if organizations appropriately adapt emerging technology, integrate and reconfigure it with economic opportunities, use internal and external organizational skills, resources and

functional competences to generate business innovation for growth and to match the requirements of a changing environment [64].

This is the last construct proposed by Wheeler, where we have to asses if this entire process (last three construct) is able to offer customer value. Company level assessments note that off-shoring is a complex and often risky endeavor, but contend that, if done right, can have definite benefits for the firm [65], [66], [67], [59], [62]. Off-shoring can offer lower prices for customers, and the creation of the new business opportunities for existing firms and new entry [65], [68]. Existing macroeconomics studies suggest that off-shoring information technology and services is beneficial to the firm as well as the home nation [69], [70], [45].

VII. Implications and Future Research Direction

We believe that our view is supported by a large number of studies that were cited in this paper.. This paper has uncovered fertile ground for a new debate on this issue and will encourage future empirical research. The NEBIC theory is very promising and can be an excellent tools for IS research but unfortunately, till to date we didn't found any empirical research where efforts have been made to make this theory operational. For the current study, we relied on academic references but empirical research can establish our view firmly. We all know that outsourcing now became pervasive and all the forecasting indicates that it is going to stay with us for a longer period. It is important to find a technological solution where most of the major negative impacts of outsourcing can be addressed. We found some evidence in academic literature that SOA has the characteristics to address the negative impacts of outsourcing [32], [33]. If this proves true then we can get the benefits of outsourcing such as, sustainable competitive advantage, efficiency, business innovation and customer value.

VIII. Conclusion

From the above discussions and references mentioned, we can conclude that SOA is a viable technology to standardize IT architecture among organizations. This standardization can make organization agile, flexible and can enhance the ability to execute innovations. Fast competitive moves are an essential business capability to compete effectively in the current business environment. Research indicates that more agile firms outperform less agile firms [71].

Standardization and interoperability among firms can contribute to take right decision about outsourcing. It means that the decision making process in outsourcing will be less painstaking and as a result it will significantly improve the success rate in outsourcing. The most benefit, however, might arise, due to the use of accepted standards, the technical dependence can be reduced, and by keeping the control of the process, the essential competences are kept in the company.

Combining SOA and outsourcing and a good configuration of this two can offer firms in one hand, enhanced innovation capability and on the other hand, competitive advantage. This can lead to a sustainable growth and firms will be able to deliver customer value.

Some researchers believe that the ability to foresee technological change and adopt the appropriate strategies may, in fact, create a trajectory of growth that would create and sustain a competitive advantage [72]. Both the timing and cost of the change-oriented strategy would influence a firm's ability to create and sustain a competitive advantage.

"It is not the strongest among the species that survive nor is it the most intelligent. It's those that are most adaptive to change." Charles Darwin

The above quote of Charles Darwin is absolutely correct in a high velocity and hyper competitive business environment. Due to the uncertainty, hostility and rapid changes in global business environment, quick adaptation to changes is very crucial in obtaining and sustaining competitive advantage. It is relevant to say more specifically that the global economic crisis we are facing at the end of 2008, reminds us about the above quote of Charles Darwin. In this uncertain situation businesses are struggling to survive. Flexible and agile technology and business process can be helpful for struggling companies. The under mentioned remark can be a source of relief from present crisis and it is more viable and realistic approach due to the significant advancement of information technology.

- The 20th century enterprise:
- Move the workers, where the work is.

- The 21st century enterprise:
- Move the work, where the workers are.

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