UNIVERSITY OF GOTHENBURG

An Exploratory Study on Strategic Software Development Outsourcing

Bachelor of Science Thesis in the Programme
Software Engineering and Management

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The cover picture is a word cloud generated based on the key words in our thesis.

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I. INTRODUCTION **4**

II. BACKGROUND AND RELATED WORK **5**

A. DEFINITIONS 5

B. RELATED LITERATURE 5

C. RESEARCH QUESTIONS 6

III. METHODOLOGY **6**

A. DATA COLLECTION 6

1) Method For Answering RQ1: 6

2) Method for Answering RQ2 and RQ3 6

B. DATA ANALYSIS 8

C. VALIDITY THREATS 8

IV. RESEARCH RESULTS **8**

A. STRATEGIC SDO 8

B. STRATEGIC SDO IMPACTS 10

1) Impacts on IT industrial organizations processes 10

2) Impacts on IT industrial Organizations Performance and Transformation 10

C. STRATEGIC SDO MANAGEMENT 11

1) Communication Management 11

2) Strategic SDO Service Management 11

3) Change Management 13

V. DISCUSSION **13**

A. THE IMPORTANCE OF UNDERSTANDING CHALLENGES IN SDO 13

B. CURRENT TRENDS IN SDO 14

C. IMPACTS ON RESEARCH 15

D. RELATED TO FUTURE RESEARCH 15

1) Determinants of SDO decision based on Company size 15

2) Satisfaction of SDO based on Company size 16

VI. CONCLUSIONS **16**

ACKNOWLEDGMENT **17**

REFERENCES **17**

An Exploratory Study on Strategic Software Development Outsourcing

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***Abstract*—Business organizations are realizing that Software Development Outsourcing (SDO) is now an imperative and strategic step for their system operation success and that SDO really means best practice. Many industrial organizations have or are in the process of implementing such business transformation. This research is to obtain information on strategic SDO in software industry, which is an essential procedure for organizations to guide their SDO decisions and actions. The research strategy used in this paper is as follows: Explanatory theories and mixed methodology were applied to a survey method and five case studies in the software industry. Simultaneously, evidence from a systematic literature review is provided concerning modern strategic SDO, impact on organization's performance, and ways to manage strategic SDO. The research unveils how industrial software organizations capitalize SDO as a strategic tool in their product development.**

Key words: Strategic software development outsourcing, software industry, Mixed methods, Operation success, SDO decision, Impact, Strategic SDO management.

I. Introduction

In the context of constantly changing global software development environment, industrial software organizations operate information systems efficiently and strategically in order to keep dominant positions in the competitive market. In order to evolve from primary focusing on cost savings to emerging emphasis on improving organizations' overall performance, decision makers bring forward many strategies to improve their capability and productivity. Strategic Software development outsourcing (SDO) is one of the strategies in the software development process worth to explore [31]. With the development of SDO and the consequent restructuring of industries [2][3], researchers are giving increased attention to three areas: strategic SDO's decision-making, the impact and strategic management.

However, existing academic research is lacking in terms of combining these three areas in the current software industry [40]. And the problems can be viewed from two aspects as follows.

From the software industry's perspectives, according to the existing practices related to SDO, many industrial organizations only focus on reducing software development cost instead of focusing on SDO essential procedure's impact on the organization's overall performance [25]. One challenge of SDO is difficult to handle complex co-ordination problems regarding culture and time separation [32][33]. In addition, some companies adopt standard SDO approaches to optimize their company's software process improvement [31]. Although the approach address to improve the organizations processes, the big problem is that it's difficult to manage the expectations of what can and what cannot be done in a distributed setting [24][31]. Besides, though companies benefited from accessing the specialist capabilities, many of them failed to capitalise this new outsourcing trend [12]. Thus success in SDO does not come from doing the same thing in the same way with cheaper labour or from the so-called standard strategic SDO approaches.

From the research academic perspectives, according to Fill and Visser, SDO has been one of the strongest and sustained trends in the recent years [5], but even though it has been a popular topic with highly interesting growth in the industrial business operation research, P. Engardio et al. claimed that the research community has not given SDO the strong shot as it should have [6][7]. Thus the influential citations of SDO are lacking systematic recommendations, as well as lacking greater credibility [5]. In addition, SDO as a strategy stem of industrialization has recently gained popularity for improving industrial organizations performance and modifying their supply chain structure [2], but there are not enough resources to maximize the academic impact of current strategic SDO research.

In consideration of these problems, the purpose of this strategic SDO research is to assist software development organizations to accomplish successful strategic SDO. The long-term research goal is to unveil how successful software industries manage their strategic SDO by a mixed methods consisting of survey and case studies, from both SDO supplier and client perspectives. And it is also about how to help organizations realize the importance to adopt strategic SDO.

The contribution of this research is to provide an analysis of executed SDO, impact of strategic SDO and ways of management for the research beneficiaries. And the beneficiaries are those software organizations who are seeking to improve their bottom-line benefits and overall performance, meanwhile apply strategic SDO to the real-world context for improving their industrial organizational transformations to adapt themselves to the current SDO trend.

The paper is structured as follows.

Section II, which builds on the existing literature and defines the theoretical background. With focus on the research

questions, the SDO current trend and phenomenon are addressed; the related work is connected to each research question in a consistent way. Section III discusses the research methodological choices. It addressed one research method, mixed methods, which included survey and case studies. Section IV presented the results by the order of answering the research questions. Section V addresses related discussions. Section VI summarizes the paper. Appendix consists of the survey details, such as survey questions and results, the research hypothesis of the research's preliminary stage and the time schedule.

II. Background and Related work

A. Definitions

1) Outsourcing

Outsourcing is defined as the transfer of activities and processes previously conducted internally to an external party [50], which is one of the most sustained trends in current business [5].

2) Software Development Outsourcing (SDO)

SDO is defined as a relationship based on contracts between clients and vendor's organizations, when clients outsource part of or whole software development projects to vendors who can provide agreed services for remuneration [2][30][31]. In the era of rapid information sharing, SDO is rapidly becoming an economic necessity to maintain competitive parity [1][2]. In the book "The Outsourcing Revolution", Michael Corbett describes software outsourcing as a phenomenon that has skyrocketed in recent years, which is gathering momentum in terms of the amount-taking place as well as of the importance of the strategy to the overall success of organizations [1].

3) Strategic SDO

Strategic SDO is defined as an essential part in information technology outsourcing (ITO) and has become a critical strategic decision that can allow organizations to develop and leverage the capabilities required to compete in today's global business environment [19]. Strategic SDO as a modern software engineering paradigm in the context of global software development, [24] and as a tool, has become a very important operating procedure in nearly all industries. It makes software organizations all over the world gain more efficient economic units in order to maximize the profits from their operations [1][2].

B. Related Literature

Concerning recent research about SDO and several different gaps in the existing literature (from 2000 and later), Some of the following theories are applied to the research findings.

Concerning the factors of making a strategic SDO decision, Strassmann who analysed statistical data on 324 companies with large scaled software development outsourcing contracts, he concluded the real factor of making a strategic decision to outsource is financial problem [38]. Hall and Liedtka identified high cost, poor organizational performance in terms of reduced profits, high levels of debt, high annual IT costs, and poor IT performance as determinants for large-scale SDO decisions in client organizations [57]. According to Lacity and Willcocks, SDO findings can be measured as cost expectations realized [21], the time period, quality [35], technical benefits and perceptions of technical and strategic benefits [36]. Another factor of making a SDO strategic decision such as size of SDO client organizations is debatable. Sobol and Apte found large-scaled client organizations are more likely to outsource [58], Geyer found small-sized software firms are more likely to outsource [59], Kim and Miranda argued there's no relationship between [10]. Therefore this part of research is missing empirical evidence.

Concerning the impact of strategic SDO on organizational performance. According to Oh et al., Galliers and Leidner indicated both industrial practitioners and academics are highly interested in more strategic uses of SDO, the preponderance of evidence is based on single-case study of exceptional firms [13][39]. *The strategic exploitation of ITO remains a minority pursuit* [18]. However, while global SDO resources pool is available for all software industries that are in need of adopting strategic SDO [19][25]. From Cullen, Doig et al. and Lacity's point of view, the access to SDO suppliers, reducing interaction costs, and improved information technologies and communications provided companies with opportunities to restructure and improve their businesses [20][21][52]. Also, Poppo found that contractual complexity was significantly related to organizational overall performance [43]. On the other hand, compared to the existing standard SDO that focus on working more strategically on the organization's internal resources and macroeconomic issues [2][31], the related research on strategic SDO aims at acquiring capabilities that do not exist internally [53]. Thus Lacity found SDO could bring both client and vendor organizations' greater capabilities on CMMI level [1] [18].

Concerning strategic SDO management research, it focus largely on the rationale behind the company's SDO decisions and actions. According to Gottfredson, Lacity and Willcocks, good strategy, processes, contracts and good relationship management between client and provider are key factors to SDO success [21][60]. Also according to Praveen Sinha, when organizations were unable to adapt to the rapid changes relying solely on their in-house development, Managed Services Model should be transformed from engagements to the service providers [44]. Therefore, there is no constant state where one grand strategic management can optimize all aspects of an organization's improvement [47]. Various theories related to change management such as Weick and Quinn, Mintzberg and Waters's concepts are adopted [48][49].

Based on the knowledge from SDO related work, the confirmation bias is displayed here to gather information selectively and to interpret the strength of ambiguous evidence from related work. The emphasis in this research is presented as: a) Current strategic SDO decisions determinants; b) "Saas/Cloud", "Innovation", "Change management in SDO

[1] (Capability Maturity Model Integrated) define five levels of software development maturity and specify what processes must be in place to achieve those levels.

setting", "strategic SDO impacts"; c) strategic SDO management. d) Current SDO challenges; e) Current SDO trends;

C. Research Questions

In this study, the following research questions are targeted:

RQ1: "What factors need to be considered when making a strategic decision to outsource software development?"

The aim of this question is to produce knowledge for SDO practitioners as well as for academics, starting from reasons why organizations outsource software development, through to the long-term outcomes of SDO from client's perspectives.

RQ2: "What are the impacts of strategic SDO on the industrial organizations?"

With this question, the research put emphasis on SDO in a global context, to carry out enormous implications on organizational performance and structure, corporate strategy and information technology. The aim is maintained, to improve software organization's processes and performance to let them produce better and more predictable outcomes.

RQ3: "How to manage strategic SDO to improve organizations' performance from a decision maker's point of view?"

This question is to analyse SDO in a management level, especially in the volatile and rapidly changing software industry. The objective of this question is to contribute literary knowledge to the existing literature on strategic SDO management.

(Below shows each RQ with corresponding method)

RQ1	Survey + Multiple-case study
RQ2	Multiple-case study
RQ3	Multiple-case study

III. Methodology

The mixed methodology consists of a survey and a multiple-case study, used to employ strategies of inquiry that involve collecting data sequentially [9]. Survey was adopted in the first phase to get more preponderance of evidence, also for researchers to get analysed statistical data, which is to prevent getting limited knowledge from one-side evidence. Multiple-case study is adopted in the second phase to get in-depth detailed exploration of the case companies' insight. **Figure 1** indicated the roadmap of this research methodology.

The reason for adopting survey initially is, after collecting, sorting and analysing the data from the survey, researchers could better prioritize the significant factors that should be considered when making a strategic decision. Therefore greater credibility for the evidence could be generated from the descriptive multiple-case study. That is, after survey study, the independent variables can be better controlled in the multiple-case study, such as providing more proper and topic focused questions during the multiple-case study, better attitude toward conversations and increased ability to handle object-orientation actions, etc.

A. Data Collection

In data collection and analysis process, while referring to Creswell's statement, the data will be organized categorically and chronologically, reviewed repeatedly and continually coded [26]. The statistical data from the survey is presented in the charts of ratio measures, and the categorical data from multiple-case study is presented in narrative form. The specific research strategy of data collection is as follows:

1) Method For Answering RQ1:

A survey is conducted to answer RQ1, to test the theories of related work and to fulfil the gaps. Researchers collected the representative data of a survey population in software industry [27]. The data was gathered from the survey to generalize findings from a drawn sample back to a population, within the limits of random error [27]. The survey is basically structured for the objective population (information technology domain) to answer 17 questions with the purpose of researching what factors that should be considered when making a strategic SDO decision. The population that are currently conducting outsourcing is to answer 12 questions; the one who are not currently outsourcing is to answer 9 questions. The target of survey group is software industrial organizations. The survey was published to 761 software industrial peoples' email lists and it takes approximately 3 minutes to answer: http://www.sogosurvey.com/k/SsSTTQVsWsPsPsP.

Besides this online survey, 34 copies were handed over in person to the employees of software companies. In addition, some data from multiple-case study also is support evidence to answer RQ1.

2) Method for Answering RQ2 and RQ3

A multiple-case study is conducted to answer RQ2 and RQ3, in order to gather the exhaustive and in-depth data for an insightful appreciation of strategic SDO impact. Multiple-case study is the empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident [15]. Thus the desire of multiple-case study is to derive a close understanding of a small number of cases set in their real-world contexts [14]. Furthermore, the research methodology characteristics of the multiple-case study are in an exploratory setting [29]. In this research, multiple-case study was chosen for getting different points of view from both SDO clients and service providers. Interview as a method is chosen to collect data from multiple case studies because it is easier to in-depth explore the typical case companies' experience of adopting the strategic SDO and its successful efforts of strategic management.

10 face-to-face interviews (2 for Ericsson AB, 4 for Wicresoft AB, 2 for Integrationsbolaget AB, 1 for Volvo IT and 1 for Accenture) are made to gather more extensive materials. By the interviews, the participants' important insights are provided into the centre topic in the construction of reality [28]. Strategic SDO decision as the major part is based on the manager's point of view, so in order to get further value of the insights, the key people of some IT organizations were interviewed: a Senior Manager, a CEO, a Senior Consultant, a

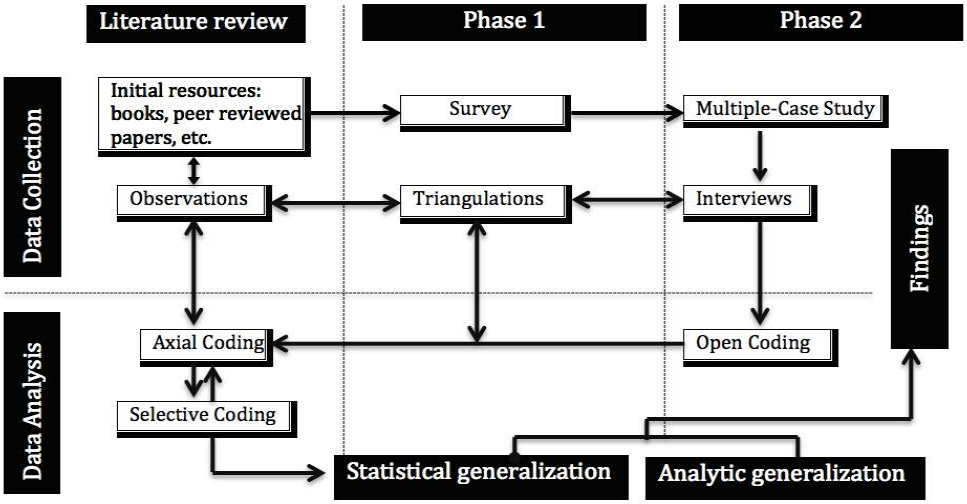

Figure 1: Roadmap of research methodology

IT product manager and a Strategy Analyst. The recording instruments are audio-visual devices.

Two types of interviews were used in this study. One is semi-structured interview. The purpose of a semi-structured interview is to let information or questions arise [9]. Before the interview, the time and place were arranged in advance. During the interview, the topic was first introduced to the interviewee and explained how the data would be collected and how it would be used in the research [29]. The other type is conversational interview. It happens without appointment. Interviewees may not know an interview is going to take place; interview questions are not advance prepared by interviewees.

All the interview questions are relating to the research questions. Here are some major questions that were asked during interviews, listed as follows.

1. *How do you feel about your Software Development Outsourcing (SDO) knowledge regarding any of your current outsourcing projects?* (Related to RQ1, asked to both client and vendor companies)
2. *What determinants do you consider when you make a SDO decision from the management point of view? (Financial, Quality, Industry organization's size?)* (Related to RQ1, asked to client companies)
3. *What are the impacts of SDO on your organization/company's performance?* (Related to RQ2, asked to both client and vendor)
4. *What determinants do you consider when you manage SDO?* (Related to RQ3, asked to both client and vendor)
5. *What do you think about the cross correlation between the strategic SDO and your organization/company's transformation?* (Related to RQ3, asked to both client and vendor)

Case company 1 (SDO Client): Ericsson AB, located in Gothenburg Lindholmen Sweden. Ericsson AB is the world's leading provider of technology and services to telecom operators. The reason for choosing Ericsson as an interview subject is because Ericsson (mainly as client in the SDO field) attends outsourcing area such as communications services, infrastructure services, application hosting platform, helpdesk, desktop support and output services. Besides, in some extent, Ericsson can act on behalf of part of large-scaled organisations' perspectives. Ericsson AB is advancing its vision of 'communication for all' through innovation, technology, and sustainable business solutions [34]. Ericsson started looking at outsourcing strategies since 2002 when they signed the outsourcing contract with Brasil Telecom. And until currently generated new revenue, such as in AXE Enabler, operators introduce value-adding services, they are always capturing the outsourcing trend among enterprises [34]. The semi-structured interview type was used.

Case company 2 (SDO Service provider): Wicresoft AB located in Askim, near Gothenburg Sweden, where is one of their operation centres worldwide in Europe. Wicresoft founded in 2002 as a joint venture created by Microsoft Corporation. The reason for choosing Wicresoft as an interview subject is because they are a software outsourcing service provider attending the SDO area, such as telecommunication, infrastructure services and distribution. Also as a successful outsourcing organization, they have in-depth understanding of SDO strategies and deep insights of SDO's further respective, as well as strategic SDO impacts that brought Wicresoft's SDO success. The semi-structureed interview type was used.

Case company 3 (SDO Service provider): Integrationsbolaget AB located in Stockholm. It is a specialized worldwide consulting organization with expertise in system integration on the Microsoft platform. It is a professional outsourcing vendor in providing system integration solutions to different clients. The reason for choosing them as an interview subject is because they don't expand their business in different aspects but focus on one specific area. The semi-structured interview type was used.

Case company 4 (SDO Client): Volvo IT is a competent and reliable provider of IT solutions. The reason for choosing the company as an interview subject is because with heritage in the complex and demanding automotive industry the company is today outsourcing software development to several major corporations and organizations. A conversational interview is conducted.

Case company 5 (SDO Service provider): Accenture is a multinational management consulting, technology services and outsourcing company. For gaining in-depth insights and

unparalleled successful experience of how to help SDO clients improve organizational performance [56], a conversational interview is conducted.

All the interviews' time, attendees, voice and video were recorded. Traditional observation was also used to collect data by taking filed notes as well as individual observations. To present findings from different points of view, a narrative of the views [28][26] of the software industrial organizations participants in the five case studies are created.

2) Triangulation: In order to make the findings as robust as possible, the consistency of the findings from the multiple sources is constantly reviewed [28]. Therefore this triangulating work is done as well as to establish the converging line of evidences [28].

B. Data Analysis

In the survey research, the data reported the number of members who did and did not submit the survey. Tables with numbers and percentages describing respondents and non-respondents were shown, and wave analysis was taken as the method to determine the response bias and examine returns on select items week by week to determine if average responses change [9]. The survey research also identified a representative subset as the sample and determines how to reach that subset for data collection [37]. For instance, the unit of survey data analysis is individual software manager; a random sampling might end up with the most of respondents working at a same company. In order to sample within each subgroup, *stratified sampling techniques* [37] are used firstly to identify the subgroups within the population. Secondly, the tables are provided to combine the items that were put in the survey into scales and identify the statistical procedure (factor analysis) for accomplishing survey data analysis [9]. Finally, identified the statistics for testing the three research questions, to compare if the test is similar to the analysed case study data, and to identify and measure the variables [9].

For the multiple-case study, data analysis was an iterative process, which started with interviewing people, recording the interviews and transcribing speeches. After that, drawing the conclusions was based on the direct observations and triangulating work. However, the phase of multiple-case study is the most critical phase to get the insights of strategic SDO as well as its impacts on organizations.

C. Validity Threats

According to Creswell [9] and S. Easterbrook et al. [37], there are several threats to validity that will raise potential issues about a researcher's ability to conclude that the intervention affects an outcome. Internal validity threats are experimental procedures, treatments, or experiences of the participants that threaten the researcher's ability to draw correct inference from the data in a research [9]. External validity threats arise when drawing incorrect inferences form the sample data to other people, other settings, and past or future situations [9]. In other words, threats to external validity occur when results of researches cannot be generalized. The validity of threats are summarised as follows:

1) Internal validity threats: there are many aspects of internal validity threats. a) Maturation: some of the respondents may feel bored and tired during the process. b) Statistical regression: some respondents have a strict attitude and can answer the survey correctly and carefully. But a small amount of people may treat the survey carelessly. c) Question design: from the survey side, it is a big threat to phrase the survey questions and make every respondent understand it in an exact same way; from the interview side, proper, open-ended but topic focused interview questions need to be provided, proper attitude toward conversations, object-orientation actions and the ability to handle conflicts.

2) External validity threats: not all interviewees will feel comfortable to share and explain their experiences and this might lose the insights of their perspectives.

3) Conclusion validity: Any threats impact in internal and external validity may influence in conclusion validity. Besides, the research might not get the insight knowledge, answers or conversations from interviewees in a natural setting, but it can affect the bias.

Except for the previously mentioned solutions, following are some other actions to the validity threats: (theoretical knowledge of common validity of threats is needed to avoid these threats) During the survey process, except sending emails to potential respondents, many IT companies were visited personally to ask them to answer the survey in a relaxed environment with a polite attitude. Before publishing the final survey, a lot of pre-tests and modifications had been made to make sure all the questions were easy to understand and directly to the point.

In the late stage [2], 10 interviews were conducted. Before each semi-structured interview, the main interview questions were sent to the interviewees at least one week before to be certain the industrial people were well prepared for the interviews. Each interview was filmed with permission, to help data transcribing, and the results are sent to them after all the data is analysed to get more accurate feedback.

IV. RESEARCH RESULTS

A. Strategic SDO

RQ1: "What factors need to be considered when making a strategic decision to outsource software development?

Before making the decision to outsource software development, decision-makers should carefully consider the reasons to outsource. Strategic SDO decisions are indeed based on a strategic vision from the company's decision makers when the demand of SDO is coming [38]. The decision making

[2] Action research is NOT adopted here to investigate results. Findings will not "sell" to companies through the approaches e.g., starting more interviews or communications with IT industries or holding a conference to spread out findings, etc., According to observations from Susman and Evered's, action research is cyclicality indeed involves five stages as the foundation and warranty, which is the fact that they will not be accomplished in a thesis research time period [30][31].

process should be an open system where IT facilities' communications are freely among integrated features, and the rapid information sharing is critical to software organizations that view employees as their main competitive advantages [4][22][46]. Thus a strategic SDO decision has to be driven by organizations' overall vision, role, value, operations and culture. These ingredients are the most important assets as well as the prerequisites for decision makers to realize organizational visions.

The survey and case studies both deeply analyse the business environment of strategic SDO decision-making among IT industries. The range of the survey research is among software industries that are currently outsourcing software development expertise/project, so the results are mainly concerning on-going SDO organizations. The online survey had 139 respondents in total, with 18% response rate, among the total respondents, 78 respondents are currently outsourcing and 61 other respondents are currently only developing in-house software.

The principal propositions of this paper are that implementing a successful strategic SDO should involve an analysis of terms of elements including determinants of SDO decisions. The statistical generalization based on the survey, **Table 1** shows that "cost savings", "focus on core competence" and "Improve business development strategy" are actually key points to make a strategic SDO decision. The table indicates that cost-efficiency is at 55% among the TOP THREE factors for SDO, which is the main determinant for considering and implementing strategic SDO.

Determinants	Freq. (n=139)	%
Cost savings	76	55
Improve business development strategy	37	27
Focus on core competence	58	42
Lack of in-house experience	23	17
Pressure from investor	18	13
Top management	36	26
Improve software product quality	34	26
Culture and communication	35	25
Time savings	26	19
Improved compliance	21	15
Shortage of domestic IT skills & resources	11	8
Free in-house resources	34	24
Technical capability	12	8

Table 1: Determinants of SDO decision

The financial problem is always the top consideration for the worldwide business. In the industrial side, according to Gottfredson [60] and the interviews with Volvo IT and Accenture, the decisions of which part or which types of the future software products to outsource is according to the overall saving cost, rather than how the SDO decision impacts upon the long term capabilities of the organization. Also as mentioned before, according to Strassmann [38] and the statistical analysis of the online survey on 145 software companies, the real reason for enterprises to outsource is obvious: "*strategy isn't the one major driving outsourcing, they are likely in financial trouble* [38]." It is not surprising that "cost savings" is the main determinants of SDO approaches.

Apart from cost savings there are other determinants, for example, large-sized organisations such as Ericsson, would like to outsource their documentation and old product maintenance parts to an outsourcing vendor because they want to keep their core competence in new IT development and be the leader of the domain, they don't want to waste time and effort on old products maintenance parts etc. Furthermore, focus on core competence leads to improved business development strategy as well. On the other hand, from the manager's point of view, said by the section manager at Ericsson, "*it is tough to negotiate the price with us as a large-scaled company. Actually we are more focused on the expertise of the service they provide.*" In that case, the expertise is put forward among the SDO determinants. And a good outsourcing vendor will not only helps the client solve problems, but also provide good quality products. Such as Integrationsbolaget AB, an outsourcing service provider, who pays more attention on the skill for the deployment. From their point of view, a skilled person can provide efficient and professional work, which leads to good quality of the final product and the satisfaction of clients.

In addition, it's found that the level and size of organizations are also main factors for SDO decision. **Figure 2** generated the results of surveyed companies. According to the survey results, among the 78 respondents who are currently outsourcing, 46 of them that belong to large-scale (300-1000+) industry IT departments are more likely to outsource, but most of them are focusing on the one of the most important determinants of SDO, cost saving. But some of them focus on business impact, such as improving business processes. In total one-third of the surveyed IT industries lean on their large scale to improve their performance on SDO service at a consistent and reasonable cost for both clients and providers, which is another advantage of SDO. The survey indicates that despite the financial attributes, the size and industry attributes are also important determinants of SDO decisions. However concerning

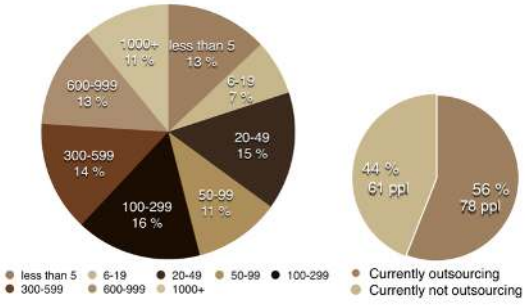

Figure 2: IT industries size and SDO decision

this part, according to the case study with Ericsson, the section manager has different opinions. So further analysis concerning the relationship between size and strategic SDO decision is presented in the section Discussion.

Finding #1:
The current main factors that need to be considered when making a strategic decision to outsource software development are as follows:

1) Cost savings
2) Focus on core competence
3) Size of organizations

B. Strategic SDO Impacts

RQ2: "What are the impacts on the industrial organizations when adopting strategic SDO, from a decision maker's point of view?"

1) Impacts on IT industrial organizations processes

Business organisations are realizing that software development outsourcing really means best practice. And clients are now trying to build strategic frameworks and position themselves for core business and how they are going to align strategic goals and capabilities to grow and leverage the top line. The clients' interest in driving costs out under almost any circumstance has now shifted to a focus on productivity. Therefore, there is a big trend of clients looking at the total impacts to operations.

Cost advantage: the first impact that comes to mind is the lower cost that outsourcing might bring about. But it all depends on the real-world market demands and specific requirements of industries. More descriptions are followed later.

Efficiency advantage: people who take the outsourcing projects have years of experience in these typical areas. They can bring the experience into practices, which lead to the increase in productivity and efficiency in the process. The efficiency is a key factor to help companies snatch the marketplace. The faster you deliver your products the more possible chance you have to lead the market.

Flexible in business: outsourcing part of or whole projects would free some attention to focus on other core areas, such as investing in research, providing higher services to customers.

Risk share: outsourcing part of or whole projects also means shifting certain responsibilities to the outsourced vendors. As the expected outsourced vendors have years of experience, they can deal with the risks better.

Access to skilled resources: the resources those outsourcing vendor have are more skilled and specialist. With outsourcing projects you can also easily access to the expertise resources. One point that needs to be mentioned is, in evaluating the suitability of a company's process for SDO. Whether an organization performs certain processes relative to competitors and suppliers, it allows an organization to focus on whether it will be detrimental to its competitive position to outsource certain organizational processes [19] [21]. Simply saying, the competitive advantage is the central contribution of the outsourcing process. Ronan also clearly stated "*processes that are critical to competitive advantage have a major impact upon the ability of an organization through the ability to achieve a lower cost position or create higher levels of differentiation than competitors* [19]*."* Thus, by well performing a company's processes, gaining competitive advantages are critical for having positive impact on organization's competitive performance, meanwhile it's improving organization's financial performance.

Therefore, the effects of strategic SDO are carried out. The effects of SDO on large-scaled IT industries at an organization level are assessed by using measure metrics, such as financial or stock-price performance. Also based on the Oh et al's 9 year IT outsourcing investigation, the conclusion is drawn: *"investors reacted favourably to outsourcing announcements about smaller contracts, outsourcing contracts intending to reduce costs, transactions with low asset specificity and contracts signed with larger supplier firms.* [39]*"*

On the other hand, Ericsson's case evidently reflected the importance of relational governance that is shown in **Figure 3**. It is certainly related to strategic SDO decisions, but when it comes to the impact, according to Poppo and Zenger's point of view, the enforcement of obligations, promises and expectations occurs through social processes that promote norms of flexibilities, solidarity and information exchange [43]. The manager who participated in this research also supports the point of view of systematic literature review that relational governance and the change management in both parties' organizations, which are both essential procedures for strategic SDO's success.

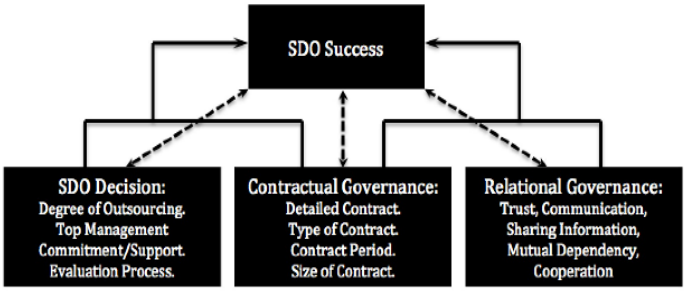

Figure 3: Complementary relationships of SDO Success

Therefore, the impacts of strategic SDO from a strategic SDO decision maker's perspectives are not only achieving the both parties organization's competitive advantages by their collaborating, but also increased the flexibility based on the coloration. Thus the partnerships can be readily developed with service providers in order to leverage skills and resources that are unobtainable by competitors [19]. Also the necessity of senior management and cross-functional teams as the key components in the governed partnerships, is improving the company's abilities to react to changing circumstances. It is always necessary to change and govern the partnerships in the software development outsourcing processes and internal organizational processes.

2) Impacts on IT industrial Organizations Performance and Transformation

During the interviews with Volvo IT and Accenture, one topic is about if SDO is a good way to improve industrial

organizations transformation in IT new era. The recordings were transcribed and analysed.

According to the interview with IT product manager of Volvo IT*: "It's not the outsourcing itself, it's about the competence and it's about to have good cost efficiency, it's about the quality, so it depends on what you can bring in your area today."*

All the matters concerning SDO are all the pieces of a successful path to achieve organizational transformation and its flexibility. When the outcome of the increased competition in globalization, along with communication costs and emergence of specialized service providers, organizations are moving towards outsourcing more critical core processes [2][18]. Therefore, company's structure shift from cost discipline to the development of customer value [19], then the increased value competence even accumulate company's ability to sustainable transform and restructure its value and supply chain [19][59].

SDO provides the organizational flexibility to respond rapidly to changing economic conditions and emerging market opportunities. Access to a large pool of skilled professionals enables industrial organizations to adapt quickly to new technologies without bearing the cost and learning curve of retraining internal staff [25][36]. Executives can scale operations up or down swiftly as needed and market requirements change. Also strategic SDO allows companies to shift personnel from fixed internal budgets to variable external cost efficiency. Therefore, SDO for industrial organizations' on-going changes within IT area, certainly provide variable pool of resources for improving and restructuring organizations' business process improvement, IT infrastructure or software process improvement [20][21].

According to the interviews with the strategy analyst of Accenture: *"It's a question of cost efficiency, it's very important in today, but it's not only that of course, it's also about increasing the quality."*

Greater effectiveness in handling core IT and business operations frees resources for value adding activities, such as launching new products and services, entering new markets, and serving customers better.

Implementing SDO real-world practices increases IT productivity to reduce backlogs and eliminates low-value activities to free IT resources for more strategic, value-adding opportunities [25][31]. The practices certainly improve responsiveness, shortening elapsed delivery times and bolstering nimbleness in addressing opportunities and competitive threats. Therefore, strategic SDO improved industrial organizations overall transformation.

Finding #2:
1. The impact of strategic SDO on software industrial organizations' processes are as follows: the advantages like cost advantage, efficiency advantage, flexible in business, risk sharing, access to skilled resources.
2. The impact of strategic SDO on software organization's performance focused on financial improvement and business process improvement; the transformation focused on strategic restricting competence.

C. Strategic SDO Management

RQ3: "How to manage strategic SDO to improve industrial organizations' performance in a decision maker's point of view?"

Industrial software development organizations are realizing that the successful management of the service provider requires a combination of additional skills and knowledge of the organizations and their outsourced service. In the SDO domain, same as the other IT areas, various managements are all required.

1) Communication Management

When outsourcing, it is crucial to communicate with all of your stakeholders and make sure that they are on the journey with you [30][41]. Not involving the different stakeholders can result in an outsourcing failure. To realize the full benefits of outsourcing, a comprehensive communication management and change management program is critical [25][30][41]. In this research, Ericsson's case study is discussed and analyzed here to provide evidence to RQ3, also to present the outsourcing strategies for SDO organizations.

Case description 1: Customer Documentation

Ericsson AB is constantly re-designing cross-functional development to integrate components with higher levels of functionality and with lower cost. In order to reduce time, focus on core business as well as to improve its organization performance, Ericsson outsourced writing customer documentation to specialist vendors in local Sweden and other countries. The cooperation between Ericsson and their SDO service providers is based on long-term contracts.

Case study 1 illustrates how a large-scaled company outsourced a project related to technical documentation to address a number of its importance and benefits. The above case description 1 was briefed and carried out by the conversations with a section manager in Ericsson AB, which is from the client's perspectives. This case's outsourcing method involved both local and international participants, which is an outsourcing method that can be defined as multiple outsourcing.

In communication management, effective communication is one of the most critical outsourcing success factors and its importance depends on the magnitude of the efforts. If just a segment/part of the project is outsourced, you may require only the project or contract managers on each side to communicate. But here is a rare case: team members on both sides collaborate on the same project, in which portions of the work are parcelled out with a clean definition of interface points. In this situation, multiple team members on each side need to communicate as well, and therefore it requires a detailed definition of roles and responsibilities, means and frequency of communication, and ways to resolve issues [18][19].

2) Strategic SDO Service Management

Case study 2 is a part of the research concerning the perspectives of service provider's organizations. It illustrates the importance of specialized capabilities for service provider's organization.

Case description 2: SharePoint 2013 application

Wicresoft AB has been supplying solutions according to the requirements from its client Microsoft. The current project is taking dual shore models including Redmond team and an offshore team to implement a SharePoint 2013 application, Kudos App. And it provided test and development services to Microsoft from June 2012. A group of local experts, developers' team and a management team participated in this project in Seattle. One part of the entire outsourcing project relates to the sourcing strategy for a software architecture design process. The problem of real-world practice was that, when the increasing customer demand and higher level of competition occurred, Wicresoft AB had been under pressure to achieve its economic units in the design and test of the software architecture components. So the potential options at that time were either to rely heavily on the other suppliers (outsource this part to another supplier again) or to invest in this expertise to build upon its current capabilities. In this circumstance, Wicresoft AB's strategic SDO decision makers decided to adopt a more focused approach that to allocate the design resources to enable to deliver long-term value for the company. Therefore, the company retained the design process internally and allocated additional resources to build upon its current position. As Wicresoft believed diverting the company's capability in the software architecture designing area would make the company lose an important source of competitive ability from both current and future's point of view.

Case study 2 was briefed and carried out by the conversations with the CEO of European Operation of Wicresoft Organization, which is from the service provider's perspectives. It is certainly an essential strategic SDO strategy to improve a company's current and future performance. When a core expertise is invested to be included in the company, though the current situation or cost might become more passive, the company itself would reach a long-term advantage, as such a capability is difficult for the other competitors to replicate. Also refer to Arthur, *"when there is no shortcut or straight-forward means of carrying out this process, it is referred to as path dependent"*[45].

Moreover, despite the importance of increasing the capabilities for the outsourcing service providers, Wicresoft AB's case also reflected the necessity to keep the software developing process internal when the service providers are in a strong position to sustain the performance advantages [35][19]. Also, Wicresoft as a known multi-sourcing organization, the aim for them is *the client gets best-of-breed solutions that are integrated and synergistic*. So their principles obviously can be seen: by adopting multi-sourcing, share the risks and get more efficient products and achieve cost savings from other vendors.

However, while Wicresoft is maintaining this strategy, they realized that the key in the future would center on bringing into outsourcing capabilities and the right level of innovation in infrastructure and management processes, upon which companies will compete. Therefore, the IT organizations have to transform the standard outsourcing approach into a service provider's managed service model [20][21][50], then they could maximize the economic units to gain more benefits from their operation systems. **Figure 4** is the roadmap of a service provider's managed services model.

Concerning strategic SDO service management, first of all, candidates' prioritization is one of the important phases in managing the sourcing projects, as well as managing the strategic SDO approaches. Prioritizing the projects processes, using tools, multiple tasks and necessary activities should all be categorized into different levels of importance rank and

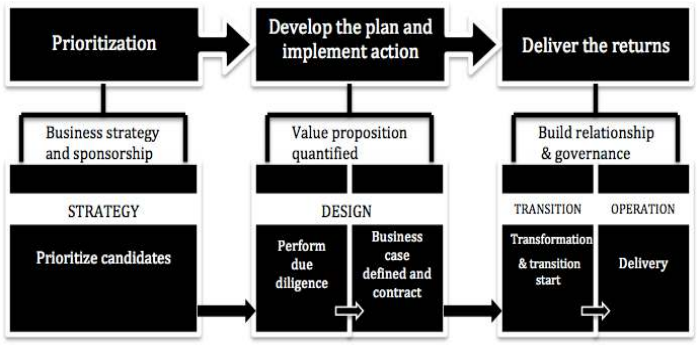

Figure 4: Strategic SDO Service Management (For Service Supplier)

complex priority. According to Praveen Sinha's management solutions, the plan development, the implement actions and the design involve creating IT operations service catalogue mapping IT processes through a contract managed operational solution [44]. About the last phase of the managed model, the delivery step involves overall project management and the contribution on the relationship with clients. Some transformation and design management explanations are generated as follows.

- Due Diligence: To understand the scope of work
- Transition: Actual knowledge acquisition happens as per the agreed transition plan between different stakeholders.
- Transition Planning: To make the plan and schedule for the actual transition. It also defines the team structure and the mode of training.

For the service providers' organizations, it's a party that should take the responsible for the end-to-end responsibilities to deliver the services, which were being managed by the organization's in-house IT department. Thus a managed service as a strategic SDO management method for improving effectiveness and efficiency, is required to adapt to the practice of transferring day-to-day management and operations responsibility to a third party service provider [44]. **Figure 5** shows the pros and cons between standard SDO and managed SDO. This engagement model is known as *Managed Services Model* [44]. The service providers should fully realise and deliver the services including plan, design, implement, maintenance and operations management. In order to improve the quality or evaluation of the overall service providers' performance, some strategic approaches for vendors organizations are suggested. Such as transforming the standard outsourcing model to the managed services, reduce clients' efforts on operational management, prepare application

management services category and document processes for each category.

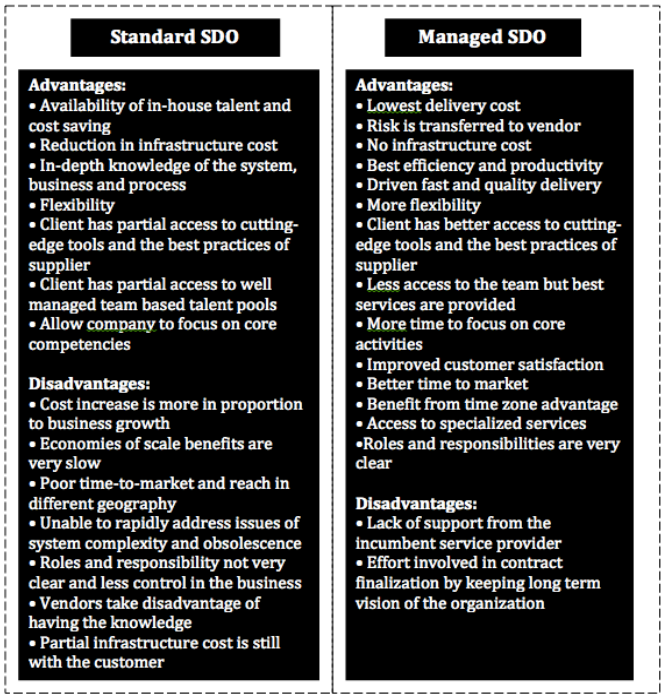

Figure 5: Standard SDO vs. Managed SDO (For Clients)

3) Change Management

Change Management is a key area in Strategic SDO Success. It closely aligns communication and change elements to project evolution and the issues that may arise for stakeholders [41]. For each project phase, road- tested tools and methods are in place, which all enable change management.

Between information technology systems and business enterprises, there is no constant state where one grand strategic plan can optimize all aspects of an organization's transformation [47]. Besides, they have to run parallel and complement each other, and the dynamics of enterprise business continuously drive sub-optimal and redundant. So when business investment and information system transformation begin to stifle innovation, increase operational costs and downward spiral accelerates, organizations need strategic SDO management that can ensure the information systems do not operate in a vacuum.

From Weick and Quinn's point of view, organizational restricting and strategic change should be based on effective diagnosis and benchmarking, information and incentive systems [48]. A key point following Mintzeberg and Waters's theories, strategic SDO changes can make the standardized portfolio into a balanced client and vendor's partnership that can flexibly meet the current and future business availability growth, security, compliance and manageability requirements [49]. Thus, strategic SDO is like a document explaining how an organization's information elements work towards achieving and implementing its objectives, and helping companies respond to changes in business and technology quickly and also helps reducing costs because of sharing of resources.

From the perspective of an organization, change management applies a structured process and a set of tools for leading the people side of change, allowing the organization to efficiently and effectively implement change to meet market demands. Change management can be roughly categorized into three aspects: (i) adapting to change; (ii) controlling change; (iii) affecting change. All these three aspects take systematic approaches in a proactive manner as the core part for dealing with change. Change management emphasizes the people side of change where leadership plays a crucial role within all levels of an organization. Successful change management makes people feel engaged in the change process, thus working collectively towards a common goal in responding to changes.

Finding #3:
Two specified case studies co-ordinately lead to SDO service management from both client's and service provider's decision maker's point of view.

Organisations should pay attention to 1) communication management; 2) Strategic SDO Service Management; 3) Change Management.

V. Discussion

A. The Importance of Understanding Challenges in SDO

Concerning the challenges of SDO, Lacity et al. and Rottman claimed the challenges are backlash from internal IT stuff, biased portrayal by service supplier, cultural difference between client and supplier, etc [18][11]. Therefore, many companies failed in the rapidly changing software development environment, so under the circumstance of the challenges, Carson suggested to create new market potential for all sizes software industries to capitalize on the external resources of capabilities [55]. The other advices can be seen from Lacity's point of view, outsourcing standard SDO services for which there are many suppliers capable of delivering good services [18].

Based on the survey results, the top three challenges of SDO are "*change management in organization*", "*poor project management on SDO partner(s) side*" and "*poor quality of delivered software product*" See **Figure 6**. Besides that, "*time*" and "*culture difference*" are also two major risks for SDO indicating that knowledge transfer between clients and providers' partnership is important to deepen the understanding and interacting cultural knowledge.

According to case company 3, Integrationsbolaget AB, which is a medium-sized outsourcing company, the most challenging parts when doing SDO projects are *quality*, *cost* and *time.*

For the purpose of overcoming the challenges as well as to have positive impacts on SDO clients in the selection of SDO

vendors, the vendors are addressed that they should focus on these key points to get more opportunities and have more positive impacts on their clients, to be able to attract more orders from their clients [18]. Also, the knowledge about these challenges will contribute to improve the readiness of SDO vendors, as vendor organizations will try to address the factors that have positive impacts on client organizations. Moreover, the positive results are bilateral. Strategic SDO played an important role in different industrial organizations and it has been praised as cost-effective, efficient and productive. Because of this, both client and providers organizations are realizing the benefits of SDO, which are low labour cost with better quality and improved innovation.

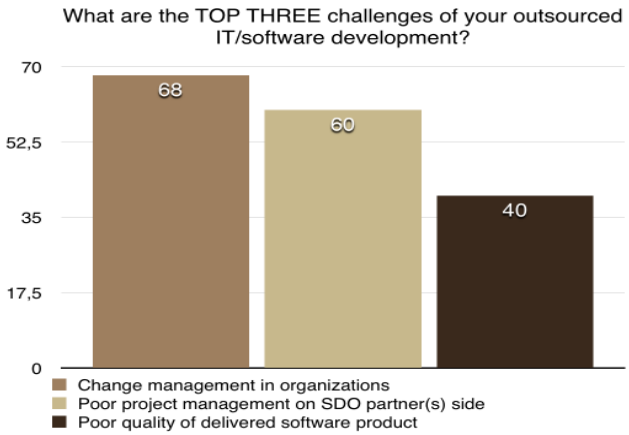

Figure 6: SDO Challenges

B. Current Trends in SDO

Concerning the current SDO trend, H Jussi indicated that the sustained trend with SDO's high growth in information technology outsourcing (ITO) is continuing and will even accelerate in the future [2]. Lawton and Michael also pointed out that the popularity of SDO had led to a situation in which outsourcing as such was no longer a competitive differentiator; it was a common way of doing business [51]. Also Pete Engardio and Linder et al's theories refer to transformational SDO as the new phenomenon of 21st century in industry era [53][54], which according to Jussi and Linder et al, is about changing the paradigm and change management, i.e. targeting the new adaptive and barrier less enterprises [2][3][4]. Thus one of the current SDO trend can seen from Madhura and Santosh claim, *"One fundamental aspect of this paradigm shifting is that data is being centralized or outsourced into the Cloud*[3]*"*[16] Also according to Butterworth et al's research, cloud computing is seen as the most important trend in the SDO market, although cloud is listed as the highest likely trend relevant to outsourcing [41], it is often seen as an enabler for big data and more flexible pricing models, thus also support these specific trends [41]. Also according to Global IT Trends Research, outsourced software development together with Software-as-a-Service (SaaS) computing are transforming data centre into computing service on a huge scale [17].

Comparing to the early decade's research, the survey indicated that the practice of SDO in the software development domain has now surprisingly fallen into the SaaS/Cloud computing [23], which is the top expertise and is seen as the most popular trend in the outsourcing market both in the survey research and seen in related work [41][53]. Followed by Cloud sourcing, SDO organizations in the Web, telecommunications and computer programming area are in high demand. In addition, based on the client's view of the successful outsourcing organization, for instance, Ericsson AB as the leading provider of technology and services to telecom operators, mainly multi-outsources the projects of communication services, mobile and fixed network development, broadband and multimedia solutions. **Figure 7** from the survey results indicates the difference in SDO services between IT industries.

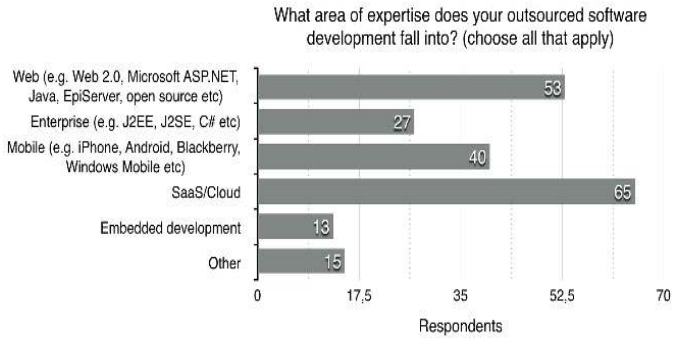

Figure 7: SDO Areas of expertise

In 2015, there was an increased adoption of the outsourced software development and a deeper penetration of SDO into the Web service outsourcing market compared to the previous survey research on outsourcing areas of expertise. As reported in the previous survey research "*Outsourcing in Europe 2013-2014*" [41], while a prevailing majority of the outsourced projects fell into the Mobile development, this year still remains a high demand. This comes in line with the rapidly growing global mobile apps market and its high demands for mobile solutions.

However in this year's trend, Cloud computing outsourcing is extremely rapidly growing to 46% among all outsourced expertise. Although Cloud sourcing is listed as the highest trend, it is often seen as an enabler for more flexible pricing models and supports the specific trends [25][41]. Therefore, it could bring the up and coming SDO trend of the 21st century.

Smart metering enables a dramatic increase of data collection frequency for companies in IT industry [25]. And to be able to win the SDO competition among software engineering domain, catching the upcoming SDO trend is one of the most key determinants of SDO success. Therefore, a trend of increased adoption of the outsourced software development is hidden between those fields, and which come pretty much in line with an extremely rapidly growing global

[3] Cloud computing, in simpler shorthand under the moniker "cloud", with SaaS as a Cloud service model, is a rapidly growing method of delivering technology [23]. At the time of writing in 2014, cloud as a computational resource is in the outsourced zone today. (Accessed 01 June, 2015)

mobile and Cloud sourcing market and demands for Cloud computing functions. Cloud sourcing is a good way to turn a fixed cost into a variable cost. By outsourcing cloud services, companies ensure that variations in cost become the provider's problem [35][41].

Certainly, more and more companies will turn to outsourced providers for cloud services and big data analyzing in the future. As learning how to analyze and use data properly is also becoming increasingly important in certain sectors. Using outsourcers to analyze a huge quantity of data in a short time [8][41], meanwhile resourcing the consuming work allows the client to stay focused on their core business and market place. So the clients can still receive the same insights that they would have otherwise generated themselves.

Therefore, catching the right "growing" outsourcing market trend, maximizing information and minimizing efforts, willing to share each other's responsibilities are important factors for a strategic SDO service supplier.

C. Impacts on Research

Despite the impacts of strategic SDO brought to software industries, the point of this research is to achieve the positive academic impacts or influences through advancing this discipline in software engineering field. During the past decades, academic researchers have been working on the impacts of software engineering projects. A. Kakabadse et al. indicate the impacts of Global Software Development (GSD) [25] focus on reducing software development cost, S. U. Khan et al. expound the impacts of Developing Offshore Process (DOP) is optimize the company's software process improvement (SPI), also R. Aron et al. elaborate the impact of adopting sophisticated outsourcing strategies and outsourcing core processes. They all aimed at developing strategic methods for measuring and evaluating the impacts of public science research. This research is an interest to the software engineering researchers to better focus on or to improve their research approach, or to achieve better visibility to capture the modern software engineering progression.

Part of this research objective is to build the guidance bridge for researchers who are interested in this ground, to give the researchers either inside or outside university community some valuable technology information and knowledge. There is a lack of systematic recommendations in regard to other citations of influence, and also a lack of greater credibility on how to maximize the academic impacts of software development outsourcing research. And this research provides appropriate methodologies, evidence-based research approaches, statistical deployment and real-life practices in expanding strategic impacts on software development outsourcing and management science research.

This research demonstrates an expanded dimension of modern developments, various suitable tools and new analytical methods to help readers observe detailed information of related fields and help adapt to a rapid information changing and sharing field. There is a hope that it will be of immediate practical value for software engineering academics: help software engineering area's researchers, academic faculty staff, research mentors and university students and teaching assistants etc. to prepare start up work and provide positive implications and improvements for their future work.

D. Related to Future Research

The following discussions are surrounding some new discoveries that are found as controversial issues, which need to be researched further with more adopted methodologies and future suggestions.

1) Determinants of SDO decision based on Company size

Using the organisation size definition provides by the Australian Bureau of Statistics [42], the results have been divided into three categories: Small (0 to >= 19 employees), Medium (20 to >= 199 employees), and Large (200+ employees).

In the results section, three top reasons for adopting SDO before making the decision are *"cost savings"*, *"focus on core competence"* and *"improve business development strategy"*. They are the leading results among all the respondents in the survey. However, when analysed separately it has been found that different sizes of organizations have different focus on these three factors.

The results showed that the small, medium and large-sized organisations are all involved in the 13 determinants. Among these 13 determinants, *"cost savings"* is the top determinant for small-sized (60%) and large-sized (76%) organizations, while for medium-sized organizations, *"Focus on core competence"* (41%) is the top determinant.

Determinants	Company size						Chi-Square test $\alpha = 0.05$		
	Small ($n = 30$)		Medium ($n = 63$)		Large ($n = 46$)		χ^2	df	p
	Freq.	%	Freq.	%	Freq.	%			
Cost savings	18	60	23	37	35	76	6.0263	2	0.04914
Improve business development strategy	10	33	10	16	17	37	4.1081	2	0.1282
Focus on core competence	9	30	26	41	23	50	8.5172	2	0.01414
Lack of in-house experience	10	33	10	16	3	7	4.2609	2	0.1188
Pressure from investor	6	20	8	13	4	9	1.3333	2	0.5134
Top management	9	30	18	29	9	20	4.5	2	0.1054
Improve software product quality	10	33	16	25	8	17	3.0588	2	0.2167
Culture and communication	8	27	13	21	14	30	1.7714	2	0.4124
Time savings	4	13	11	17	11	24	3.7692	2	0.1519
Improved compliance	8	27	7	11	6	13	0.2857	2	0.8669
Shortage of domestic IT skills & resources	7	23	3	5	1	2	5.0909	2	0.07844
Free in-house resources	8	27	16	25	10	22	3.0588	2	0.2167
Technical capability	4	13	3	5	5	11	0.5	2	0.7788

Table 2: Determinants of SDO decision based on Company size

Satisfaction	Company size						Continue Outsourcing or Not in next 12-24 months?			
	Small ($n = 30$)		Medium ($n = 63$)		Large ($n = 46$)					
	Freq.	%	Freq.	%	Freq.	%	Yes	%	No	%
Very satisfied	1	3.33	5	7.94	15	32.61	21	100	0	0
Satisfied	7	23.33	27	42.86	19	41.30	41	77.36	12	22.64
Somewhat satisfied	10	33.33	18	28.57	10	21.74	21	55.26	17	44.74
Somewhat dissatisfied	9	30.00	9	14.29	2	4.35	9	45.00	11	55.00
Dissatisfied	3	10.00	4	6.35	0	0	1	14.29	6	85.71

Table 3: Satisfaction of SDO based on company size

To test if the determinants have significant difference among small, medium and large organization, Chi-Square test was used. Chi-square can be used when the classification of test variables are identified. From **Table 2**, it shows that "cost savings" and "focus on core competence" have significant difference among different sized organizations because their p value is less than 0.05. Furthermore, from the boxplot **Figure 8** of the top three determinants, it shows that "cost savings" and

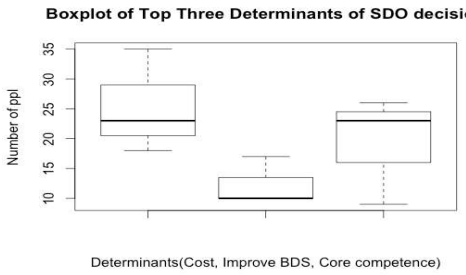

Figure 8: Boxplot of top three determinants of SDO decision

"focus on core competence" are more important than "improve business development strategy".

This new finding is worth studying because different sized companies would catch the main determinant at the first moment, thus reducing the time of consideration, and thereby decreasing the time to market of the final product.

2) Satisfaction of SDO based on Company size

In the survey, the last two questions concerns the satisfaction of the outsourcing: *"How satisfied are you with the outsourced services provided?"* and the intention of continuing outsourcing: *"Do you plan to continue outsourcing your software development in the next 12-24 months?"* From the survey result in **Table 3**, it has been found that there is a link between the satisfaction of SDO and the company size.

Table 3 shows that large-sized organisations (very satisfied 32.61%) are more satisfied with their current outsourcing than small-sized organisations (very satisfied 3.33%). Most small-sized organisations are somewhat satisfied and somewhat dissatisfied with currently outsourced projects, a number of medium-sized organisations are satisfied with their outsourcing work, while most of the large-sized companies are very satisfied with current outsourcing projects. The satisfaction is directly resulted in continuing outsourcing or not in future. The ones very satisfied with current outsourcing will 100% continue outsourcing in the next 12-24 months, while only 45% and less than 15% people will continue outsourcing when they are somewhat dissatisfied or dissatisfied with on-going outsourcing projects.

Besides survey results, during Ericsson's interviews, a IT section manager stressed that in other departments, they have over ten years collaboration with outsourcing companies. They outsourced their documentation part to outsourcing companies and are very satisfied with the cooperation so far. It can be concluded that large-sized organisations have started outsourcing business earlier, and after many years of attempt they already found balance in between, this is the key factor of the high satisfaction.

VI. Conclusions

This research process is based on the research plan and mixed methodology by using strategic software development outsourcing as the topic and around three problem-centric research questions. Through the survey research and multiple-case studies as well as adopting systematic literatures review method, the strategic SDO's importance and necessity are theoretically introduced, as well as its different strategic approaches, challenges, its impacts on IT industrial organizations and its various management methods.

This research shows that the strategic SDO trend is not only growing but also maturing; various explanatory theories are summarized to understand strategic SDO of information systems. This research also focused on analysing and presenting the potential and controversial issues that were found from three different but descriptive real-world case studies that share the different perspectives and threads of multi-outsourcing of customers' software development.

"We gain significant benefits by outsourcing our IT operations. It helps lower overall IT spending, reduces total cost of ownership and makes our IT structure more efficient. It also ensures we are flexible and able to adapt to changing IT demands. Our supplier has demonstrated it is the best-in-class provider and we are pleased to enter a long-term partnership. [34]" – the head of Group IT at Ericsson. It seems to be a suitable brief summary for the SDO trend.

In order to reduce risks or solve the unique challenges that IT industrial organizations are facing, the deep insights into

market places and rich hands-on experience in a variety of industries are required. By adopting strategic SDO, tailor-made IT solutions combined with IT infrastructure and business process outsourcing services can in a certain level be improved. Through cost-effective and strategic SDO management, it also in a certain level helps both clients and providers achieve significant cost reduction and improve core competence as well as organizational performance and transformation, therefore enabling a sustainable revenue growth.

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APPENDIX

Survey questions in quantitative research:

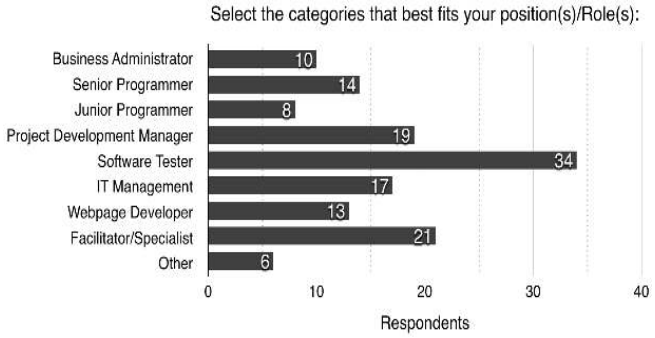
1. What is your company/organization size? (headcount)
2. What is your primary industry? (choose all that apply)
3. Select the categories that best fits your position(s) / role(s).
4. Do you currently outsource any element of your corporate IT function/ Software development onshore (within Sweden), nearshore or offshore (2+time zones away)? (Yes to Q.5, No to 13)

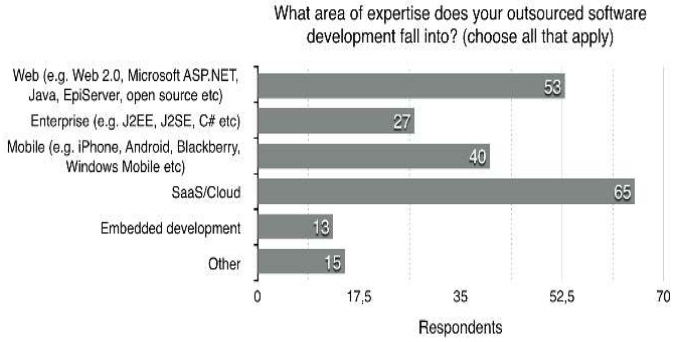
If answer Yes, to these questions:

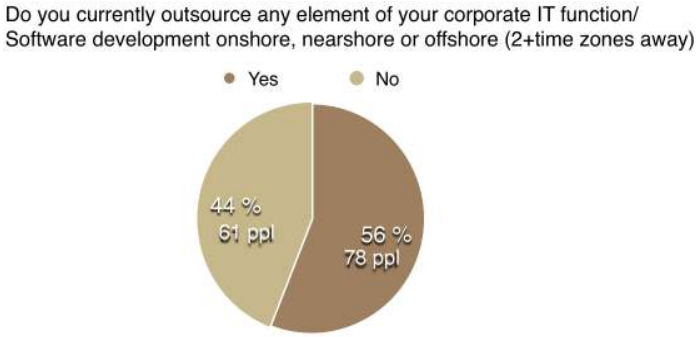
5. What area of expertise does your outsourced software development fall into? (choose all that apply)
6. What are the TOP THREE factors that drove your company's decision to outsource IT? (preferably choose three)
7. How would you rate the factors of your SDO partner(s)?
8. What business model do you use for your outsourced development?
9. What are the TOP THREE challenges of your outsourced IT/software development? (Preferably choose only three)
10. How would you rate the following SDO strategies components?
11. How satisfied are you with the outsourced services provided?
12. Do you plan to continue outsourcing your software development in the next 12- 24 months?
    (Survey Ends)

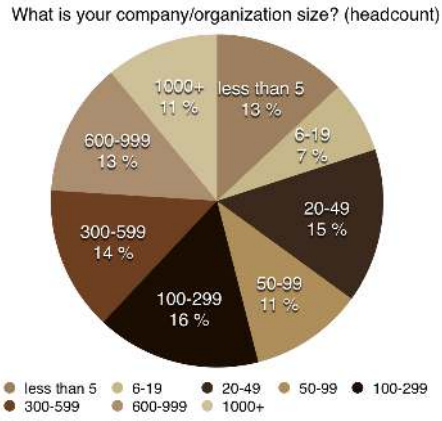
If answer No, to these questions:

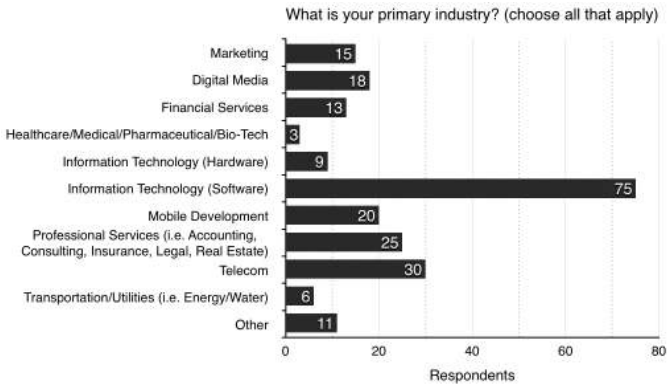
13. How do you develop your IT/software function(s)/products?
14. What are the TOP THREE challenges of your in-house software development? (choose preferably only three)
15. Are you satisfied with your in-house development outcomes?
16. How would you rate the likelihood of your company's/organization's future SDO?
17. Do you plan to outsource any part of your IT function/ software development in 2015?
18. (Survey Ends)

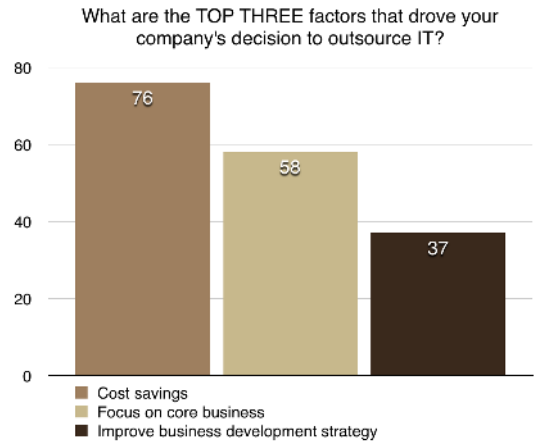


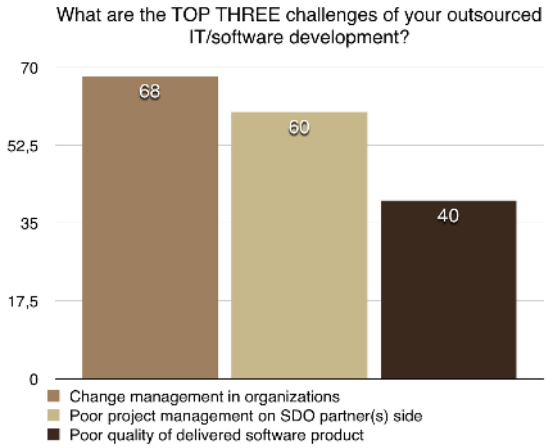


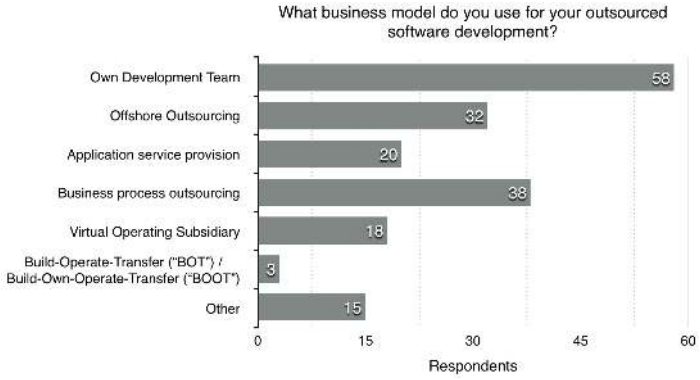


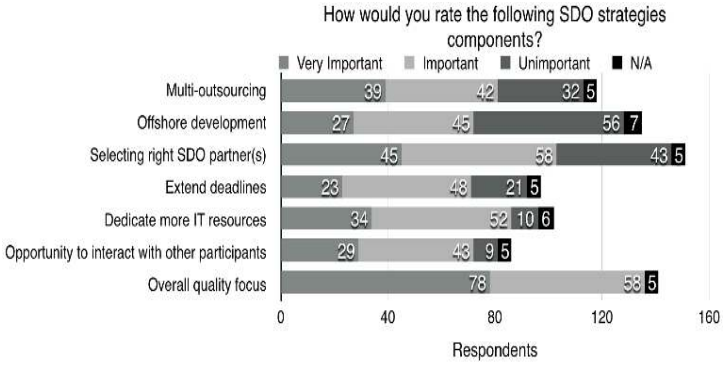


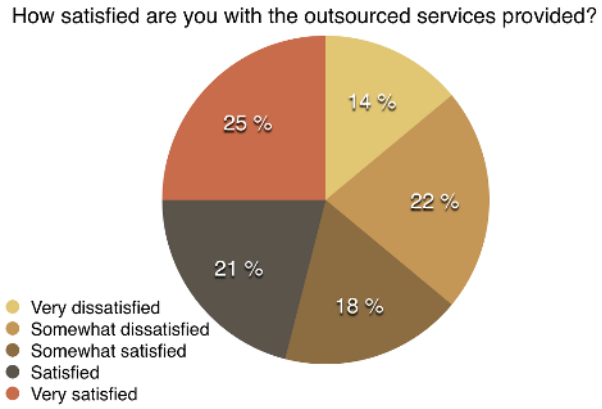


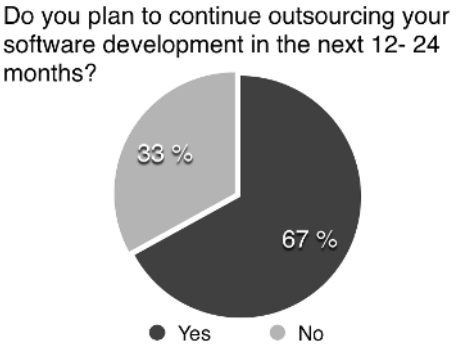

What are the TOP THREE factors that drove your company's decision to outsource IT?
80
60
40
20
0
76
58
37
Cost savings
Focus on core business
Improve business development strategy


What are the TOP THREE challenges of your outsourced IT/software development?
70
52,5
35
17,5
0
68
60
40
Change management in organizations
Poor project management on SDO partner(s) side
Poor quality of delivered software product


What business model do you use for your outsourced software development?
Own Development Team 58
Offshore Outsourcing 32
Application service provision 20
Business process outsourcing 38
Virtual Operating Subsidiary 18
Build-Operate-Transfer ("BOT") / Build-Own-Operate-Transfer ("BOOT") 3
Other 15
0
15
30
45
60
Respondents


How would you rate the following SDO strategies components?
Very Important
Important
Unimportant
N/A
Multi-outsourcing 39 42 32 5
Offshore development 27 45 56 7
Selecting right SDO partner(s) 45 58 43 5
Extend deadlines 23 48 21 5
Dedicate more IT resources 34 52 10 6
Opportunity to interact with other participants 29 43 9 5
Overall quality focus 78 58 5
0
40
80
120
160
Respondents


How satisfied are you with the outsourced services provided?
14 %
22 %
18 %
21 %
25 %
Very dissatisfied
Somewhat dissatisfied
Somewhat satisfied
Satisfied
Very satisfied


Do you plan to continue outsourcing your software development in the next 12- 24 months?
33 %
67 %
Yes
No

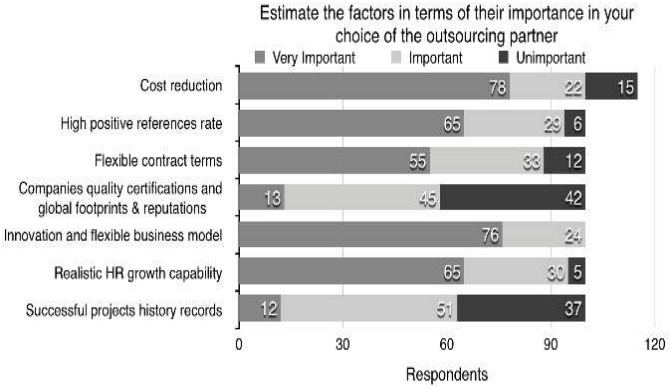

Estimate the factors in terms of their importance in your choice of the outsourcing partner
Very Important
Important
Unimportant
Cost reduction 78 22 15
High positive references rate 65 29 6
Flexible contract terms 55 33 12
Companies quality certifications and global footprints & reputations 13 45 42
Innovation and flexible business model 76 24
Realistic HR growth capability 65 30 5
Successful projects history records 12 51 37
0
30
60
90
120
Respondents

Table 4: Research Hypothesis (in the research's preliminary stage)

Potential Propositions/Inclusion	Research Question	Some Matched Sources
Strategic SDO approaches involve an analysis of terms of elements including determinants of SDO decisions.	RQ1	Survey's statistical generalization, Systematic Literature Review
Financial, Quality, Industry organization's size, Core competence focus are the SDO decisions determinants.	RQ1	Survey's statistical generalization, Personal experience and Systematic Literature Review
Strategic intents of SDO decisions involve cost efficiency, business development process (BDP) improvement and performance.	RQ2	Analytic generalization, Professional experience and Literature
Strategic impacts of SDO can be generalized to reciprocal 1) SDO decisions 2) contractual governance 3) relational governance.	RQ2	Analytic generalization, Personal/Professional experience and Systematic Literature Review
SDO strategies to keep balance between outsourcing and in-house development can be analysed by 1) company's capability 2) competitive advantages 3) opportunism management	RQ3	Analytic generalization, Personal/Professional experience and Systematic Literature Review
Strategic SDO in a certain level help improve organization's performance & transformation.	RQ2	Analytic generalization, Personal/Professional experience and Systematic Literature Review

Table 5: Time Plan of Research process*:*

Please also see the link of our progress on the online calendar: http://teamup.com/ksff10a2e71ce5b26c/

Tasks & Time Scale Plans	Week 11-12	Week 13	Week 14	Week 15	Week 16-17	Week 18-19	Week 20	Week 21	Week 22
Survey release, Research in-depth analysis, Methods' mature preparations	X								
Interviews with Volvo IT, Accenture. Transcribing visual records	X	X							
Supervisor meeting/Feedback	X			X	X	X		X	
Submission of proposal		X							
Survey statistical generalization due, Case studies' mature preparations		X	X						
Interviews with Ericsson AB				X1		X2			
Interviews with Wicresoft AB				X1	X2 X3	X4			
Interviews with Intergrationbolaget AB		X1				X2			
Case studies audio visual records transcription, data collection&analysis		X	X	X	X	X			
Case studies generalization, Final findings,			X	X	X	X	X	X	
Submission of final version of thesis, Oral presentation								X	X