Lessons from Dutch IT-outsourcing success and failure

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Abstract

We present the findings from a Dutch field study of 30 outsourcing deals totaling more than 100 million Euro, where both customers and corresponding IT-outsourcing providers participated. The main objective of the study was to examine from a number of well-known factors whether they discriminate between IT-outsourcing success and failure in the early phase of service delivery and to determine their impact on the chance on a successful deal. We investigated controllable factors to increase the odds during sourcing and rigid factors as a warning sign before closing a deal.

Based on 250 interviews we collected 28 thousand data points. From the data and the perceived failure or success of the closed deals we investigated the discriminative power of the determinants (ex post). We found three statistically significant controllable factors that discriminated in an early phase between failure and success. They are: working according to the transition plan, demand management and, to our surprise, communication within the supplier organisation (so not between client and supplier). These factors also turned out to be the only significant factors for a (logistic) model predicting the chance of a successful IT-outsourcing. Improving demand management and internal communication at the supplier increases the odds the most. Sticking to the transition plan only modestly. Other controllable factors were not significant in our study. They are managing the business case, transfer of staff or assets, retention of expertise and communication within the client organisation. Of the rigid factors, the motive to outsource, cultural differences, and the type of work were insignificant. The motive of the supplier was significant: internal motivations like increasing profit margins or business volume decreased the chance of success while external motivations like increasing market share or becoming a player increased the success rate. From the data we inferred that the degree of experience with sourcing did not show to be a convincing factor of success. Hiring sourcing consultants worked contra-productive: it lowered chances of success.

Keywords: IT-outsourcing, field study, IT-outsourcing success, controllable success determinants, rigid success determinants, measuring success determinants, logistic regression, sourcing consultant.

1 Introduction

Outsourcing is becoming a common alternative for in-house development and maintenance for Information Technology (IT). The complete gamut from hosting services to entire business processes is available in the global outsourcing market. Next to the
strongly evolving practice of outsourcing it has also become an established field of research. Nowadays there is an abundance of publications dedicated to IT-outsourcing in scientific journals which has been growing rapidly during the last decades. Typical topics are determinants of IT outsourcing success, IT-outsourcing strategies, the risks of IT-outsourcing, and more [26].

This article reports on a substantial longitudinal case study where 30 IT-outsourcing deals that were closed in the years 2007–2010 were followed during a two-year period. It was verified that the sample was a reasonably representative sample out of the population of Dutch IT-outsourcing deals in the years 2007–2010. The 30 pairs of outsourcing organisations and their IT-service providers were interested in early warnings of apparent failure in an early stage of service delivery. And if so, whether there are measures to be taken in order to prevent failure.

A number of factors that played a role in success and failure cases were identified in Dutch IT-outsourcing practices. Comparable factors were also found in the literature on IT-outsourcing. Therefore, we used these well-known factors as a starting point for further exploration.

An experimental design model was constructed to assess the impact of each of these factors on the chance of success of an outsourcing deal. The conjecture was that the chance on success would increase if more attention is paid by both outsourcer and vendor to the success determinants of IT-outsourcing. In other words: is well-known also well-understood? So, data was collected through 253 interviews based on five different questionnaires. The fundaments for these questionnaires were meetings with the 60 participating organisations. The design of the questionnaires has been tailored particularly to obtain information about the factors. For instance, multiple questions for the same concept were formulated to get sufficient trust in the measurements of the variables of interest. For, single item measures tend to be less accurate and less reliable. Over the two-year period we collected 28 thousand data points. A complete overview of the five questionnaires, the given answers and related data is publically available [38, 33, 37]. Some aspects are made anonymous for competitive reasons.

To determine whether an IT-outsourcing project is a success or failure, sounds easy but is in fact complex. For example, Standish Group judgments the success of an IT project by considering estimation accuracy of cost, time and functionality. However, their definition of success has serious drawbacks. We quote from [15]:

Standish Group defines its success measure as a measure of estimation accuracy of cost, time, and functionality. In reality, the part of a project’s success that’s related to estimation deviation is highly context dependent. In some contexts, 25 percent estimation error does no harm and doesn’t impact what we would normally consider project success. In other contexts, only 5 percent overrun would cause much harm and make the project challenged. In that sense, there is no way around including more context (or totally different definitions) when assessing successful and challenged projects.

Clearly, success and failure are context-dependent concepts. If time-to-market is important and the project suffers from a 5 percent time-overrun, the project might be called a failure, regardless of its cost and functionality performance.

To overcome these complexities we measured the perception of success of both outsourcer and vendor and not invented some quantitative measure of success based on plan accuracy or something else. So failure and success is in our study a perception-based notion. However, one should be aware of the fact that also this approach has its
limitations. We know cases where perception of success or failure and factual reality are not in alignment, which can turn perceived success into failure once the facts are known. We give a small example of such a situation. Suppose $A$ outsources to $B$, and $B$ informs $A$ that they found a lot of problems in one of $A$’s systems. They propose a quality improvement at a cost. The perception of $A$ is favorable: they indeed want to improve the quality of the IT-landscape, so they agree. The perception of $B$ is favorable: they get the money to improve the quality. So everybody happy. But hired expertise on behalf of $A$ assessed the system and its evolution history. It turned out that the quality problems were due to changes by $B$, and as soon as this was known to $A$ their positive perception flipped to negative. Likewise, the perception of $B$ turned to negative as well, since they had to solve the problems at their own cost. Should we conclude from this that measuring the success or failure of a deal as the perception of the involved parties is valueless? Of course not. It is generally accepted practice by both practitioners and academic researchers to measure abstract concepts (such as success and failure) as the perception of the involved parties. For example, Kim and Chung [24] define success as a function of both satisfaction and perceived benefits. Also Cullen, Seddon and Willcocks conclude from the cases they studied that it makes no sense to focus on general success factors, instead one should take the goals the partner started with into consideration and also how these goals changed over time [8].

Key lesson from our example is that one should be aware that it is perception that we measure, which can flip sides once new information has become available. In our study for none of the cases there were indications that the perception we measured was far from the factual situation, as substantial time passed between the first interview and the concluding interview and we did not observe any dramatic change of mind-set.

So for each case we measured its perceived outcome in terms of failure/success. Based on that we investigated the discriminative power of the determinants in an ex post manner. Namely, given the outcome, did the factors make a difference or not? We found three statistically significant controllable factors that discriminated in an early phase between failure and success. A controllable factor can be influenced, and therefore can help in avoiding upcoming failure. They are: working according to the transition plan, demand management and, to our surprise, communication within the supplier organisation. Communication within the outsourcer organisation, however, did not show discriminative power in our study.

Next to discriminating between failure and success we were also interested in the odds for such outcomes. We used logistic modeling to that end. The logistic regression showed that the same controllable factors turned out to be significant in estimating how much the chance of success will increase if one succeeds in improving the scores on these factors. It turned out that improving demand management and internal communication within the supplier organisation increased the odds the most. So a key-lesson is that excellent demand management and seamless internal communication at the supplier are both important factors to assess an IT-service provider, and vice versa that service providers will add value by superior management of the customer’s demand and effective internal communication. We would have expected that sticking to the transition plan was key. For instance since requirements volatility can seriously jeopardize a successful outcome [25]. However, although sticking to the transition plan also turned out to increase the odds in our study, it did not have that much effect.

Other controllable factors did not show predictive power in our study. However, this does not need to mean that these factors are not important. For example, if it has become a commonly accepted IT-outsourcing practice to monitor some factor scrupulously and therefore all scores of that factor are about just as high, then the variance in
the outcome of the cases cannot be explained from the variance of the scores of that factor.

One would have expected that retention of expertise within the client organisation would have been key in increasing the odds. Providing more control by internal experts who know the drill of the IT-systems is likely to aid in increasing a successful sourcing. However, the impact on the chance of success of paying more attention to retention of expertise could not be estimated from the available data of our study. In spite of that, we do think that having in-house expertise is crucial for the user organisation. First of all, the expertise is needed to be able to manage the service provider. Next, if the user organisation lacks sufficient expertise, perception of success or failure and factual reality can be far apart, which can turn perceived success into failure once the facts are known, as discussed earlier. Paying less attention to retention of expertise will presumably result in more failed cases, but from the available data we could not estimate how much the chance on more failures increases. Also the impact on the chance of success of paying more attention to managing the business case could not estimated from the available data, although a solid business case that is properly managed throughout the project is of course a useful addition.

Transfer of staff or assets is something that can be part of a deal. An argument that is sometimes heard is that the local IT-personnel will benefit from the new environment of the IT-service provider whose core business is obviously IT. And although this is presumably beneficial for the personnel of the client organisation, the available data of our study did not indicate transfer of staff or assets as a factor that significantly increased a positive course of action for the sourcing. Remarkably, transfer of staff looked like to be a risky endeavor. There were 8 cases in which no transfer of staff occurred and 7 of these cases turned out to be successful. The number of observations was too small, however, to provide statistical evidence that transfer of staff would lower the chance on success of the deal.

Finally, communication within the client organisation turned out not to be a factor with predictive power. It makes sense that effective internal communication would make organisations more successful. So maybe that is true in general, but the impact on increasing the odds for a favorable sourcing deal could not be estimated from the available data of our study.

We also addressed factors that you cannot alter easily. We call them rigid factors. A number of them turned out not to be significant. For instance, the motive to outsource did not show up as a significant factor that made the difference between failure and success. So short-term cost reduction or guaranteeing operational continuity, access to knowledge and experience of the IT-service provider, focus on core activities, and more such factors did not show a significant influence on whether the deal was perceived to be successful or not.

Another rigid factor is cultural differences between the owner and supplier. There are an abundance of papers focused on the effect of cultural differences between vendor and outsourcer on the success of an IT-outsourcing deal. See, for example, the literature surveys by Dibbern et al. [12] and Lacity et al [26]. We took culture into account by the perceived levels of formality within organisations: formal, informal and in between. We found statistically significant evidence that there is no relationship between matching of organisation cultures of outsourcer and vendor and the success of the deal: whether they were similar in formality, or not.

Finally, the rigid factor of the type of work that is being outsourced turned out to be insignificant. The wisdom of the crowds is however that if you outsource or offshore the more simple and high-routine work to low-wage countries the chance of success
will be high. Think of well-defined scopes, large volumes, etc. This type of work would be cost-effective, whereas complex and low-routine tasks need intimate business IT-alignment and should better be done in-house. Outsourcing complex work would decrease the chances on success. But in our sample this was not at all the case. There is strong statistical evidence that the type of work being outsourced is independent of the chance on success. We think this is a surprising finding.

The motive of the supplier appeared to be a significant rigid factor. There were motives that lowered chances of success and vice versa. For instance, internal motivations like increasing profit margins or business volume decreased the chance of success, while external motivations like increasing market share or becoming a player increased the success rate. A key-lesson for user organisations is to investigate the true motive of the supplier before signing a deal.

We did not come across research on IT sourcing that deals with a vendor’s empathy capability. We analysed its relationship with the success of the deal. Indeed, the capability of suppliers to imagine themselves in the position of their clients turned out to be a significant factor for success of a deal.

Next to these factors we also explored the data for other dependencies. Hiring sourcing consultants turned out to be contra-productive: it lowered chances of success. We found this by investigating the apparent dependency between three variables: (in)experience of the outsourcer, hiring external expertise, and perceived outcome of the deal. It turned out that the degree of experience with sourcing did not show to be a convincing factor of success. You would expect that having more experience with sourcing would increase the odds, but this was only weakly present. But, there is a strong statistical indication that hiring consultancy support works contra-productive. Our finding illustrates that you better do not outsource outsourcing.

Organisation The rest of this paper is organized as follows. First, in Section 2 we go into the process of data collection. Next, we show in Section 3 that the sample can be considered as a representative sample of the Dutch IT-outsourcing practices during the research period (2007–2010). In Section 4 we explain how we diagnosed whether a case is to be considered a success or a failure. We list 5 different sources of information to measure the perception of outsourcers and suppliers about the success of the deal. In Section 5 we describe the 9 controllable determinants of IT-outsourcing success we highlighted in our study. In Section 5.1 we relate these factors to success determinants that have been reported in recent IT-outsourcing literature. In Section 6 we explain how we tested the power of the controllable success determinants to distinguish between successful and failed cases. First, in Section 6.1 we deal with the problem of measuring the success determinants. Next, in Section 6.2 we show how we statistically tested their power to discriminate between successful and failed cases. In Section 7 we describe how we used logistic regression modeling to assess with what percentage the chance on success increases if more attention is paid to the controllable success factors. In Section 8 we describe how we also investigated the discriminative power of rigid factors that may have value as warning signal before closing a deal. Although the initial goal of our field study was to assess the impact of a number of well-known success factors on the chance of success of an outsourcing deal on the basis of data taken from practice, the study also yielded some interesting and surprising spin-off results. In Section 9 we present a research finding with respect to the effect of hiring sourcing consultants that sets one thinking. We conclude by summarizing the most prominent findings in Section 10.
In the rest of the paper we will adhere to the definitions and terminology introduced by Bergstra et al [5, 4]. In particular we will not use ‘sourcing’ as a generalization of ‘outsourcing’. Moreover, we will use the term ‘sourcement’ to refer to the state arrived at after the act of transfer of a source. Further, note that we will use vendor, supplier, service provider and insourcer as synonyms. We will also use the term ‘determinant’ and ‘factor’ interchangeable.

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2 Data collection process

2.1 Symbiosis

In the Netherlands over 60 business partners decided to join forces to gain insight in the discriminative power of determinants of IT-outsourcing success. For that purpose the Symbiosis project was set up, together with academic researchers of the University of Amsterdam, the VU University of Amsterdam, and the Amsterdam University of Applied Sciences. The business partners together put in data of 30 IT-outsourcing cases. In each case at least two business partners are involved: the outsourcing party and the vendor. In 9 cases also an IT-outsourcing consultant was involved.

Data about the cases were collected through 253 questionnaires in total. In this section we will provide global information about the types of inquiry forms used. As stated in Section 1 the Symbiosis study can be classified as a multi-client field study according to Gonzales et al. [19]. The Symbiosis database has opened the possibility to study a large number of outsourcing contracts from both the perspective of the outsourcing company and its vendor. The scope of Symbiosis encompasses onshore as well as near- and off-shore outsourcing. However, it remains limited to outsourcing issues from the Netherlands. In Symbiosis IT-outsourcing deals were followed during different phases of the contract period. An introduction to Symbiosis including first results can be found in (Bergstra et al. [6]).

Although it is generally recognized that two different parties are needed to play the IT-outsourcing game, almost all models primary focus on the role of the outsourcing company, leaving the role of the vendor underexposed. Symbiosis was set up to gain information from all parties involved in a deal, and, moreover, over a period stretching the decision phase to a point deep in the service delivery phase. The different phases of the outsourcing process can be visualized as has been done in Figure 1. The model is symmetrical in the way it deals in an equal way with the roles the outsourcer and service provider play in the IT-outsourcing process.

2.2 Respondents

Over 60 companies were involved in answering the questionnaires. According to the role they played 3 categories can be distinguished: outsourcers, service providers and IT-outsourcing consultants. In most cases the vendor-client relationship is of the type
preparation and maintenance of outsourcing strategy by outsourcer

business case analysis

supplier selection

transition:
- disentanglement,
- transfer
- transformation

contract negotiation

outsourcer selection

service delivery

end of contract

preparation and maintenance of insourcing strategy by supplier

business case analysis

paper focus is on this phase

feedback

Figure 1: Adaptation of the Platform Outsourcing Nederland (PON) outsourcing life cycle to encompass a symmetry between outsourcer and supplier.
single vendor - single client. In 7 cases the relationship was of the type multiple vendors - single client. Nevertheless, in these cases there was always one main contractor. In half the cases a consultant was involved in the decision phase of the outsourcing process to support the outsourcer in negotiating the best deal with its vendor(s).

All parties were familiar with the questions, as the questionnaires were discussed during preparatory Symbiosis meetings. The advantages of this approach are obvious. Although there was no real need to hold a trial inquiry to rule out misunderstandings regarding the meaning and purpose of the questions a trial inquiry was carried out. The questions of the questionnaires were in many cases answered by representatives of 3 different echelons, independently from each other: strategic management, tactical management, and operational management.

2.3 Questionnaires

Each outsourcer-vendor pair was asked to answer the questions of 5 different questionnaires. Questionnaire 1 was answered by outsourcer and vendor together, while questionnaires 2 and 4 and respectively 3 and 5 were answered separately by outsourcer and vendor. The structure of the questionnaires addresses many aspects of outsourcer and vendor perceptions about the cooperation. The questions consist of a mix of Likert scale, nominal scale and open-ended questions. The 5 questionnaires cover a large part of the outsourcing life cycle.

**Questionnaire 1** collects information regarding the IT sourcing preparation phase. The list of questions is meant to gain insight in the maturity of the outsourcer and vendor to start the business partner selection process.

**Questionnaire 2** collects information from the outsourcer regarding the vendor selection process. The questionnaire also contains questions with respect to the carefulness of the transition of employees, software, hardware and knowledge to the vendor. Finally, the questionnaire contains a number of questions to check the satisfaction of the outsourcing company with the performance of the vendor shortly after the execution of the contract has started.

**Questionnaire 3** collects information from the vendor regarding the client selection process. The same types of questions as asked to the outsourcer are asked to the vendor company. Besides, the vendor is asked to make an assessment of the opinion of its business partner (the outsourcer) about a number of matters.

**Questionnaire 4** collects information from the outsourcer regarding his opinion about the execution phase. There are also questions regarding the confidence of the outsourcer in further cooperation with the vendor.

**Questionnaire 5** collects information from the vendor regarding his opinion about the state of affairs during the execution phase. Finally, a number of rather open questions are posed. For example the vendor is asked what he expects to be happening in the future.

For a complete overview of the questions of the five questionnaires we refer the interested reader to document ‘The cross-reference of Symbiosis’ questions and database columns’ (van Vlijmen and Peters [38]). The database can be found on-line as well.
as a codebook [33, 37]. For those who want to have the picture complete in all details there are facsimile prints of the original questionnaires [39].

3 Size and Representativeness of the Symbiosis sample

In the Netherlands over 60 business partners decided to join forces to learn from experiences acquired in the early phase of service delivery of IT-outsourcing. Together they put in data of 30 IT-outsourcing cases that roughly took place in the years 2007, 2008, 2009 and 2010. In those years some 700 comparable deals were closed in the Netherlands. They were presented in the overviews of a well-known Dutch professional weekly on IT called Automatisering gids, say the Dutch Computer Weekly. One of the editors of this journal (Rolf Zaal) is an outsourcing watcher who gathered and compiled the material that we will use to show that our sample is representative [41, 42, 43, 44].

A sample of 30 outsourcing deals from a target population of 700 deals is from an acceptable size (4.3%). Of course, the larger the sample the better from a statistical point of view. However, the population of IT-outsourcing deals in the years 2007–2010 is not easily accessible as a whole: information is scattered among many parties. It would have been highly impractical and inhibitive expensive to contact all pairs of companies involved in IT-outsourcing in those years. Even if one had tried to do so there would have been no certainty that all parties had been willing to cooperate. It was feasible given our research budgets to contact a sample of 30 pairs of outsourcers and service providers.

Next to the sample size it is crucial whether the sample is a representative cross-section of the Dutch IT outsourcing population. The representativeness of a sample is an important factor in determining how useful it is. In case of a biased sample we cannot make probabilistic statements about the entire population. In choosing the sample we proceeded as follows. First, the research team made the outsourcing community aware of the research project though many channels and invited them to join. Next, the team carefully picked a set of outsourcing organizations both small and large measured in the number of outsourcing deals. IT-service providers, domestic, near-shore, and offshore deals were chosen to participate. Also, IT-mediators were represented, since they are involved in sourcing as well. Next to that, we verified that the thus resulted sample is a reasonably representative sample out of the the population of Dutch IT-outsourcing deals in the years 2007–2010. Thereto, we carried out three goodness of fit tests, which are described below.

First, we took the sectors of the Dutch economy that are represented in the Symbiosis sample. See Figure 2 for a comparison of the distribution of the participants over the sectors of the Dutch economy with the benchmark compiled from data published by the Dutch computer weekly. We carried out the Goodness of Fit to test the null hypothesis that the observed sample distribution does not differ from the distribution compiled from the benchmark data. We found the chi-square statistic of 17.18, which has the chi-square distribution with 14 degrees of freedom. Let $\chi_{.95}$ denote the 95th percentile of the $\chi^2$ distribution. For 14 degrees of freedom $\chi_{.95} = 23.68$. Since the observed value of 17.18 is notably smaller than 23.68 we accept, at the 5 per cent level of significance, that the observed sample distribution does not differ from the distribution compiled from the 700 deals published in the Dutch computer weekly. So the sample is representative for economic sectors of the Dutch economy.

Next, we compared the distribution of the contract durations of the sample with
Figure 2: Composite bar chart with a comparison of two relative frequency histograms across sectors of the Dutch economy: one compiled from the Symbiosis data and one compiled from the data published in the Dutch computer weekly.
Figure 3: Composite bar chart with a comparison of two relative frequency histograms re contract duration: one compiled from the Symbiosis data and one compiled from the data published in the IT-weekly professional journal.
those of the 700 deals described in the Dutch computer weekly. Figure 3 tells us that contract terms of 2–3 years seem underrepresented in the Symbiosis sample. On the other hand short term contracts of 0–1 years seem overrepresented. The average contract duration of the Symbiosis cases is 4.53 while the benchmark average is 4.58. This difference is almost negligible. We carried out the Goodness of Fit to test the null hypothesis that the observed sample distribution does not differ from the distribution compiled from the 700 durations published in the Dutch computer weekly. We found the chi-square statistic of 11.84, which has the chi-square distribution with 7 degrees of freedom. For 7 degrees of freedom $\chi^2_{0.05} = 14.07$. Since the observed value of 11.84 is smaller than 14.07 we accept, at the 5 per cent level of significance, that the observed sample distribution does not differ from the distribution compiled from the data published in the IT-weekly professional journal. So the sample is representative for the durations of the deals.

Finally, we focused on the type of the outsourced work. See Figure 4, in which the distribution of the types of outsourced work derived from the Symbiosis data is compared with the benchmark distribution compiled from data published by the Dutch computer weekly. Figure 4 shows that application development seems overrepresented in the Symbiosis sample compared with the benchmark. For the rest both distributions do not seem to differ much. We carried out the Goodness of Fit to test the null hypothesis that the observed sample distribution does not differ from the distribution compiled from the data published in the Dutch computer weekly. We found the chi-square statistic of 15.76, which has the chi-square distribution with 11 degrees of freedom. For 11 degrees of freedom $\chi^2_{0.05} = 19.68$. Since the observed value of 15.76 is smaller than
19.68 we accept, at the 5 per cent level of significance, that the observed sample distribution does not differ from the benchmark. So the sample is representative for the type of outsourced work.

In view of the size of the sample and the three tested null hypotheses we conclude that the Symbiosis sample is a reasonably representative sample out of the Dutch IT-outsourcing population: the size is more than 4 per cent of the total population and the sample reflects the Dutch economic sectors, the duration of the deals and the types of work of the total population.

4 Success perception measurement

The classification of the cases into successes and failures is a prerequisite to be able to test hypotheses regarding case characteristics that discriminate between successes and failures. As discussed in Section 1 we measured IT-outsourcing success as a perception-based notion. This approach is in line with the views of many authors in recent literature on measuring IT outsourcing outcomes. In Section 4.1 we start with giving a short overview of recent literature on defining and measuring IT sourcement success. In Section 4.2 we explain how we decided in our study whether a case should be considered a success or a failure.

4.1 Overview recent literature

Cram performed a meta-analysis on success factors for information systems outsourcing in 2009 [7]. In his meta-analysis he also discusses definitions and measurement of “IS outsourcing success”. As our library search returned almost the same papers as Cram discusses, and we moreover agree with his analysis, we will first paraphrase his results and then go on to discuss other related work.

First of all, Cram points to Grover, Cheon and Teng’s work from 1996 that defines success in terms of “strategic, economic and technological benefits” [21]. Second, he discusses adaptation, reference to, and critique of these three benefits. Goo, Huang and Hart adapt the benefits, and consider the three principal benefits to be “functional, strategic, and technological” [20]. Not referenced by Cram, is the study by Dahlberg and Nyhiren that promulgates “strategic, economic, technical and social success factors” [9]. Others refer and built upon the model of Grover et al.: Lee [28], Lee et al. [29] and Han et al. [22], according to Cram.

The three benefits as put forward by Grover et al., however, also “attracted criticism within the discipline due to psychometric problems” put forward by Rouse [34]. A widening of the benefits was proposed by Kim and Chung [24] “who define success as a function of both satisfaction and perceived benefits.” Rouse then uses Kim and Chung’s analysis and “builds on it by suggesting three themes within the literature related to the methods of IS outsourcing success measurement: measures of outsourcing satisfaction, measures of outsourcing benefits, and measures of the fee and service aspects of outsourcing.”

In line with this is a paper by Cullen, Seddon and Willcocks [8], not cited by Cram. From the cases they studied they conclude it makes no sense to focus on general success factors, instead one should take the goals the partner started with into consideration and also how these goals changed over time. They present 25 outcomes, which they partition in four groups: 1) Value for money, 2) Improved Financial Results, 3) Operational, and 4) Strategic. Technological aspects are placed under “Operational”
in this model. In our view the value of this study is twofold. First, the partitioning corresponds again at the abstract level with the models Grover et al. and of Goo et al. Second, it acknowledges the case specific character of success at the detailed level.

Interesting, the Symbiosis project team put together a questionnaire around the same time as Cullen et al. put down their paper. See questionnaire 2 and 3, as discussed in Section 2.3, in which is asked for goals perceived by outsourcer respectively insourcer. In the questionnaire was also room for an open answer. When aggregating all goals to a certain level of abstraction we also found around 18 rationales/goals/outcomes for the outsourcer and around 13 for the insourcer. Some of these goals are highly case specific, for instance, “pressure to outsource by a higher authority”.

Finally, the mutual trust between customer and provider plays an important role in the assessment of outsourcer and supplier, as extensively discussed in literature [31, 30, 2]. That mutuality is important was already noted earlier by Hirschheim and Lacity after a multiple case study that, moreover, also hinted already on the idiosyncratic character of goals and outcomes [23].

Wrapping it up one could say that mutual, subjective and case specific aspects enter the success assessment in more recent literature in concert with more general and abstract benefits based on management insights as strategic, technological, economic and functional benefits. In Section 4.2 we present the Symbiosis approach in measuring success perception. We will see that this in line with the accepted practice as above-mentioned.

4.2 Success perception measurement in the Symbiosis study

We concluded in discussing the recent literature on measuring IT-outsourcing outcomes that mutual, subjective and case specific aspects enter the success judgement in concert with more abstract strategic, technological, economic and functional benefits. This is the approach taken here. It is an approach which on the one hand finds support in the literature and on the other hand came out naturally after considering many candidate measures ourselves.

We considered 5 different sources of information to measure the perception of the outsourcer and his supplier about the success of the deal.

**Outsourcer:**

1. The extent in which the outsourcer has reached his specified outsourcing objectives and his unspoken expectations;

2. The extent of satisfaction of the outsourcer with the quality of the services;

3. The trust of the outsourcer in further collaboration with his service supplier.

**Supplier:**

1. The extent in which the vendor has reached his insourcing objectives;

2. The trust of the service supplier in further collaboration with his client.

The questionnaires contain a set of questions (items) in which the respondents are asked to respond on a statement in terms of their own degree of agreement or disagreement. All questions relate to opinions formed in an early stage of the service delivery phase of the IT outsourcing life cycle. In some cases the questions are asked twice in succession. The questions read as follows:
Questions to measure outsourcer’s success perception (respondent is outsourcer):

1. I trust my supplier.
2. I’m satisfied with the results of the sourcing.
3. The goals as indicated in the first interview round and classified under goal 1 have been achieved.
4. The goals as indicated in the first interview round and classified under goal 2 have been achieved.
5. The goals as indicated in the first interview round and classified under goal 3 have been achieved.
6. The agreements in the present SLA meet the expectations of the management of my company.
7. The agreements in the present SLA meet the expectations of the middle management of my company.
8. The agreements in the present SLA meet the expectations of the end users of my company.
9. We receive the services as agreed upon in contract and SLA.
10. I’m satisfied with the quality of the service.

Questions to measure vendor’s success perception (respondent is vendor):

1. I trust my customer.
2. I’m satisfied with the results of the sourcing.
3. The goals as indicated in the first interview round and classified under goal 1 have been achieved.
4. The goals as indicated in the first interview round and classified under goal 2 have been achieved.
5. The goals as indicated in the first interview round and classified under goal 3 have been achieved.
6. The quality of the demand management of the outsourcer is: ( ) much worse than expected ( ) worse than expected ( ) as expected ( ) better than expected ( ) much better than expected ( ) non applicable.
7. The financial results of the insourcing are: ( ) much worse than expected ( ) worse than expected ( ) as expected ( ) better than expected ( ) much better than expected ( ) non applicable.
8. The building up of knowledge as a result of the insourcing is: ( ) much lower than expected ( ) lower than expected ( ) as expected ( ) higher than expected ( ) much higher than expected ( ) non applicable.
9. The synergy with existing activities is: ( ) much lower than expected ( ) lower than expected ( ) as expected ( ) higher than expected ( ) much higher than expected ( ) non applicable.

All questions are of the Likert scale type. A Likert scale question knows 6 possible answers: strong agreement, agreement, neutral, disagreement, strong disagreement, and non applicable. We recoded these possible answers into 100, 75, 50, 25, 0 and NA. The questions that had been filled in with NA (non applicable) were left out of consideration and we calculated the average of the scores of the remaining questions to quantify the perception of the outsourcer and his supplier of the success of the deal.

To check the internal consistency of each set of questions we calculated Cronbach’s alpha reliability coefficient of internal consistency [18]. Table 1 shows the calculated Cronbach alphas for the two success indicators.

Cronbach’s alpha reliability coefficient normally ranges between 0 and 1, although there is actually no lower limit to the coefficient. According to the rule of George and Mallery a Cronbach alpha larger than 0.9 is excellent, between 0.8 - 0.9 is good and between 0.7 - 0.8 is acceptable [17]. Below 0.5 the internal consistency of the items in the scale is unacceptable. From Table 1 we conclude the Cronbach’s alpha reliability coefficients are high enough to have sufficiently trust in the measurements of both success indicators.

We used the following rule to classify the cases in successful cases and failed cases:

1. If the scores on both success indicators are \( \geq 50 \), then the case is called “successful”;
2. All cases that do not satisfy condition 1 are called a “failure”.

Table 2 shows the scores on the two success indicators for the 30 cases of our sample. So applying the classification rule we obtained the following result in Table 3.

## 5 Controllable success determinants

In this section we start with stating the 9 controllable success determinants of which we tested the impact on the chance of success of an outsourcing deal. In drawing up this list of factors we gratefully made use of the test results of a study of Delen. In his thesis study Delen [10] distills out of a number of well-known factors that played a role in success and failure of IT-outsourcing deals in Dutch practice 10 factors that can be identified as “critical success factors” during the service delivery phase of the IT-outsourcing life cycle. Delen based his selection both on an extensive review of

<table>
<thead>
<tr>
<th>Success indicator</th>
<th>Items in multi-item scale</th>
<th>Respondents</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outsourcer’s success perception</td>
<td>10</td>
<td>27</td>
<td>0.9</td>
</tr>
<tr>
<td>Vendor’s success perception</td>
<td>9</td>
<td>27</td>
<td>0.76</td>
</tr>
</tbody>
</table>

Table 1: Cronbach’s alpha for the success indicators.
<table>
<thead>
<tr>
<th>Case #</th>
<th>Score outsourcer</th>
<th>Score supplier</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2145</td>
<td>75.00</td>
<td>80.99</td>
<td>1</td>
</tr>
<tr>
<td>2146</td>
<td>63.89</td>
<td>40.44</td>
<td>0</td>
</tr>
<tr>
<td>2147</td>
<td>44.44</td>
<td>67.45</td>
<td>0</td>
</tr>
<tr>
<td>2149</td>
<td>55.56</td>
<td>66.29</td>
<td>1</td>
</tr>
<tr>
<td>2150</td>
<td>66.67</td>
<td>76.49</td>
<td>1</td>
</tr>
<tr>
<td>2151</td>
<td>69.44</td>
<td>78.35</td>
<td>1</td>
</tr>
<tr>
<td>2152</td>
<td>69.44</td>
<td>71.61</td>
<td>1</td>
</tr>
<tr>
<td>2153</td>
<td>72.22</td>
<td>49.26</td>
<td>0</td>
</tr>
<tr>
<td>2154</td>
<td>77.78</td>
<td>65.48</td>
<td>1</td>
</tr>
<tr>
<td>2155</td>
<td>46.43</td>
<td>79.09</td>
<td>0</td>
</tr>
<tr>
<td>2156</td>
<td>65.63</td>
<td>75.74</td>
<td>1</td>
</tr>
<tr>
<td>2157</td>
<td>66.67</td>
<td>56.25</td>
<td>1</td>
</tr>
<tr>
<td>2158</td>
<td>22.22</td>
<td>26.93</td>
<td>0</td>
</tr>
<tr>
<td>2159</td>
<td>55.56</td>
<td>29.84</td>
<td>0</td>
</tr>
<tr>
<td>2160</td>
<td>55.56</td>
<td>59.90</td>
<td>1</td>
</tr>
<tr>
<td>2161</td>
<td>38.89</td>
<td>32.14</td>
<td>0</td>
</tr>
<tr>
<td>2162</td>
<td>83.33</td>
<td>80.97</td>
<td>1</td>
</tr>
<tr>
<td>2163</td>
<td>61.11</td>
<td>68.68</td>
<td>1</td>
</tr>
<tr>
<td>2164</td>
<td>72.22</td>
<td>42.55</td>
<td>0</td>
</tr>
<tr>
<td>2165</td>
<td>69.44</td>
<td>70.60</td>
<td>1</td>
</tr>
<tr>
<td>2166</td>
<td>61.11</td>
<td>69.23</td>
<td>1</td>
</tr>
<tr>
<td>2167</td>
<td>69.44</td>
<td>63.10</td>
<td>1</td>
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<tr>
<td>2168</td>
<td>55.56</td>
<td>54.69</td>
<td>1</td>
</tr>
<tr>
<td>2169</td>
<td>50.00</td>
<td>40.36</td>
<td>0</td>
</tr>
<tr>
<td>2170</td>
<td>66.67</td>
<td>35.71</td>
<td>0</td>
</tr>
<tr>
<td>2172</td>
<td>52.78</td>
<td>38.10</td>
<td>0</td>
</tr>
<tr>
<td>2200</td>
<td>53.57</td>
<td>23.74</td>
<td>0</td>
</tr>
<tr>
<td>2201</td>
<td>52.78</td>
<td>66.22</td>
<td>1</td>
</tr>
<tr>
<td>2203</td>
<td>72.22</td>
<td>96.88</td>
<td>1</td>
</tr>
<tr>
<td>2204</td>
<td>61.11</td>
<td>66.15</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2: Success indicator scores of 30 sample cases.

<table>
<thead>
<tr>
<th>Result</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>18</td>
</tr>
<tr>
<td>Failure</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 3: Partition of cases in successful cases and failed cases.
the literature and his own practical experience as an IT-sourcing consultant. Delen refers to these factors as control factors. In Section 5.1 we will elaborate more on Delen’s work. For a detailed description of the work of Delen the reader is referred to the treatment of the factors Delen gives in the Handbook of Network and System Administration [11]. Although inspired to a large extent by the findings of Delen’s study we did not adopt his list of 10 factors without further consideration. In view of the available data collected through the Symbiosis questionnaires and the focus of our study on controllable success determinants during the service delivery phase of the IT-outsourcing life cycle we decided to combine some factors to one factor and to narrow the scope of other factors. Finally, we decided to add the following two factors to Delen’s list of control factors:

1. communication inside the outsourcer’s organization;
2. communication inside the vendor’s organization.

We did so, because the communication aspect was not explicitly included in Delen’s list of control factors. Transparency within the outsourcer and vendor organisation is generally recognized as an important success factor in implementing an outsourcing deal made. See for example [12, 20, 21, 27]. Usually there are many different stakeholders who are involved in the IT-outsourcing process and an effective communication network must be in place to inform them timely. Of course also the communication between outsourcer and service provider is of great importance for a successful teamwork. This aspect of communication is covered by the success factor Demand Management. Putting it all together, we focused attention on the 9 controllable success determinants listed below.

**D1 Working according to the transition plan:** After the outsourcer and service provider have decided to close an outsourcing deal, the transition of staff, software, hardware, and knowledge to the service provider needs to be transferred. It is of utmost importance that the transfer takes place in a controlled way according to a well-defined transition plan in time phases, which has been agreed upon by both outsourcer and service provider. Usually, the outsourcer takes the lead in creating the transition plan. The outsourcer and service supplier should adhere to the transition plan during the sourcing phase to safeguard the successful implementation of the IT-outsourcing arrangement.

**D2 Managing the business case for outsourcing:** Success in the long run is granted only when the outsourcer continues to use his business case during the execution of the IT-outsourcing arrangement to evaluate the outsourcing process and the service delivery of the provider.

**D3 The service supplier should manage his business case:** The business case of the service supplier is highly symmetrical to the business case of the outsourcer and should serve as a frame of reference during the service delivery phase.

**D4 Transfer of staff:** It is reasonable to assume that working according to the transition plan will be beneficial to a successful transfer of personnel. However, it is not a sufficient condition for that. In the transfer of personnel ample attention should be given to cultural differences, communication, handling resistance, the workers council, and more. Even without a transition plan or not sticking (fully) to it, the transfer of personnel may turn out well. It therefore makes sense to distinguish D4 apart from D1.
D5 Assets transfer: It is reasonable to assume that working according to the transition plan will be beneficial to a successful transfer of hardware and software and accompanying knowledge. However, it is not a sufficient condition for that. Transferring assets to a different environment may be a risky endeavour and should be managed carefully. For example, planning for back-up facilities just in case serious problems arise. Even without a transition plan or not sticking (fully) this plan, the transfer assets may turn out well. It therefore makes sense to distinguish D5 apart from D1.

D6 Demand management: Sourcing success in the long run is granted only when the outsourcer remains sufficiently able to manage the service provider that takes over the outsourced IT functions. This is called demand management. Contract management, management of the financial agreements, and performance management form part of demand management. An outsourcing contract is valid during the lifetime of the sourcing deal, and in the ideal case it remains in the filing cabinet during that period. A transparent cost price calculation is of paramount importance for a healthy outsourcing relationship [36, 14]. Anything which is not explicitly included in the contract and the SLA is charged separately, so it is important to manage the concluded financial agreements carefully.

Though we will find in Section 6.2 that D6 is an important discriminative factor, we do not discuss the question what is a good contract. A theoretical effort to do so has been put forward by Fitoussi and Gurbaxani in their work on properties of IT Outsourcing Contracts [16].

D7 Retention of expertise: After the transition, so during the service delivery phase, it becomes important for the outsourcer to retain his expertise. Without retention of expertise he loses the free option of back-sourcing or changing from service provider at the end of the contract period and becomes permanently dependent on the one provider that he has (Willcocks et al. [40]). Moreover, the expertise is needed to manage the service provider during the service delivery phase.

D8 Communication inside the outsourcer’s organization: Communication is an aspect of relationship management, i.e., paying close attention to the position of all different stakeholders who are involved in the IT-sourcing process. Various authors stress the importance (Dibbern et al. [12]; Lacity et al. [27]; Goo and Huang [20]; Grover [21]). In the set-up of the Symbiosis questionnaires specific attention has been paid to communication with all stakeholders.

D9 Communication inside the vendor’s organization: also for the service provider it holds that paying close attention to the position of all different stakeholders who are involved in the IT-sourcing process is of the utmost importance.

Each determinant of success corresponds to a condition which must be satisfied sufficiently to safeguard the successful progress of the deal concluded between the outsourcer and his service provider(s). In Section 5.1 we investigate whether the 9 determinants of IT-outsourcing success we addressed in our study are anchored in the IT-outsourcing literature.
5.1 Literature check

In this subsection we want to show that the controllable success factors we considered cover in a complete way the same aspects of outsourcing processes as noted by other researchers. The leading questions here are: what factors have been put forward in recent literature and how do they relate to the factors addressed in our study?

In carrying out our literature study we gratefully made use of four articles which give a survey of the publications about IT-outsourcing during preceding decades. The first survey article is from Dibbern, Goles, Hirschheim and Jayatilaka [12]. The second survey article is by Gonzalez et al. from 2006 [19]. It is an update of the study done by Dibbern et al. The third survey article is by Lacity et al. and from 2009 [26]. Finally, we studied the survey article of Terzioglu et al. regarding methodology employed in IT-outsourcing from 2010 [35]. Specific other related work will pass in the course of the section below.

Here we present a concise overview of work on factors that may determine source-management success. We will conclude that on the one hand most of the factors we addressed in our study, although described and named in various ways, have been identified by various researchers and are considered relevant. On the other hand, not much large-scale empirical research seems to have been done to support their usefulness as predictor of success. This does not come as a surprise: the survey by Gonzalez et al. shows that up to 2006 only 3.9% of the outsourcing articles discusses determinants of outsourcing success [19, Table 4, p. 826]). We may assume that only a part of this fraction reports on large-scale empirical research with the focus on the control phase of a project.

We took three routes: 1) searches in relevant library databases on relevant keywords as “factor”, “determinant”, “quantifying”, “success” “sourcing”; 2) the outsourcing surveys mentioned above; 3) experiences from IT-outsourcing consulting practices in the Netherlands. We will start with the last, because the selection of the controllable success determinants addressed in our field study has been inspired strongly by the findings of the thesis study of Delen [10]. In his thesis Delen tries to find out which factors influence the success or failure of IT-outsourcing. As a starting point, he identifies 10 deciding factors from literature and from his practical experience. The role of such “deciding factors” varies throughout the outsourcing life cycle. During outsourcing decision time, the critical factors indicate whether the right decision is taken. When the factors are favorable, it is responsible to continue the outsourcing implementation, but during that process the “same” critical factors must be controlled in order to retain success. Because the factors then change in role and appearance, they are renamed control factors in the implementation stage. So, in practice, decision factors serve to make the right outsourcing decision and control factors control the correct implementation of that decision. In time, there comes an end to every outsourcing contract, and at that point the outsourcer can decide to renew the contract, switch to another provider, or back-source to himself. At that time, the critical factors again resume the shape of decision factors, but in a different context. Depending on that context, they are then called follow-up factors or back-source factors. Delen’s set of decision and control factors was put together on the basis of his own experience as an outsourcing consultant and from an extensive study of the literature. Various earlier papers in Dutch give testimony to this. For a detailed description of the work of Delen the reader is referred to the treatment of the factors Delen gives in the Handbook of Network and System Administration [11]. Delen’s factor model seems to stand out in completeness as almost all papers that Delen used to support his factors are directly or indirectly (same authors
with similar paper(s)) found in a survey paper of Lacity et al., in which the authors refer to 86 articles on the “determinants of IT-outsourcing success”.

Lacity et al. categorize the success determinants discussed in literature and come to three very general groups of determinants: “ITO decision”, “contractual governance” and “relational governance” (ITO stands for Information Technology Outsourcing). The first group covers how “in particular the degree of outsourcing, top management commitment and the evaluation process have affected ITO success.” The second group “was made operational most frequently as contract detail […], contract type […], contract duration […], and contract size […].” And the third group “covers the softer issues of managing client-supplier relationships, including trust, norms, open communication, open sharing of information, mutual dependency, and cooperation.”

Dibbern et al. present a more refined model of characteristics of a sourcement [12, Section 4.4.1]. Nevertheless, at an aggregate level it boils down to “Structuring of Contract and/or Service Level” and “Relationship Characteristics” which coincide with the “contractual governance and relational governance” of Lacity et al. in their survey. As one can easily see, most of the success determinants listed in Section 5 fit in the categories of the surveys. However, a lot of detail is lost as well with these survey categories as they are very general categories. Whether “Working according to the transition plan” (D1), the factors that focus on the transfer of means and people (D4 and D5 respectively), and finally “Retention of Expertise” (D7) are included is hard to judge from the surveys. For that we turn our attention to Cram. Cram performed a meta-analysis on success factors for information systems outsourcing in 2009 [7]. His aggregate factors are the following (we immediately linked the success factors listed in Section 5 to it):

1. Communication (D8 and D9)
2. Strategy (D2, D3)
3. Business relationship (D2, D3)
4. Finance (D6)
5. Management (D1, D6)
6. Duration (D2, D3)
7. Human capital (D4)
8. Knowledge sharing (D7)
9. Technology (D5)
10. Quality of service (D6)

In addition to this, “Working according to the transition plan” (D1) is of course nothing new as it can be found in any textbook on project management. Also in the outsourcing literature for the practitioner, for example, in The Outsourcing Handbook, drawing up a plan and then executing it is a recurring issue (Power et al. [32]). It’s surprising though that this obvious operational aspect has not attracted much attention in the academic study of sourcing, at least we did not find a paper on it. As we will show in Section 6.2 it turns out to be a strong predictor in our case study.

Needless to say, knowledge management is a significant theme in the management literature. Nevertheless, Retention of Expertise was not so sharply identified by us a
factor of importance in the four surveys, though Dibbern et al. refer to two papers, that however do not present extensive empirical research. Maybe it’s because most literature looks towards the first phases of outsourcing: the decision phase, the vendor selection phase, and the contract phase. So, less attention is given to transfer, control, contract ending, backsourcing or follow-up sourcing. In papers and books where these latter phases are in focus, knowledge management is a key factor [29, 1].

6 Discriminative power of the controllable success determinants

In Section 5 we listed 9 factors during the service delivery phase of the IT-outsourcing life cycle which are presumably vital for an outsourcing deal to be successful. In this section we will show how we tested the power of these factors to discriminate between successful and failed cases. In Section 6.1 below we first explain how we measured the success factors. After that we show in Section 6.2 how we statistically tested the discriminative power of the factors.

6.1 Measuring success determinants

Because the factors are not directly measurable we used multi-item Likert scales and summated ratings to quantify the constructs. In their influential paper Gliem and Gliem state that it is better to use multiple questions for the same concept than to base the measurement on one single question [18]. The reader can find an overview of the various sets of questions used to measure the 9 success determinants D1, D2, D3, D4, D5, D6, D7, D8, and D9 via Internet [33, 37, 38, 39]. This allows the reader to form his own opinion on the extent in which the questions are adequate to measure the constructs. Each set contains multiple questions for measuring the same concept. To give the reader some notion of the type of questions we provide the reader with a full listing of the questions we selected from the questionnaires to measure the success determinants D1, D6, and D9. As will be shown in Section 6.2 these success determinants showed a strong power to discriminate between successful and failed cases in our field study.

Multiple questions to measure D1 (Working according to the transition plan). The outsourcer was asked:

1. The transfer of the hardware was executed according to plan.
2. The transfer of the software was executed according to plan.
3. The transfer of staff was executed according to plan.

Supplier was asked:

1. The plan for the transition of staff of the outsourcer has been followed.
2. The plan for the transfer of hardware of the outsourcer has been followed.
3. The plan for the transfer of the applications of the outsourcer has been followed.
4. The transfer of the applications of the outsourcer proceeds in clearly defined.
5. During the transition not only the software but also the related knowledge (e.g. the design) is transferred.

Multiple questions to measure $D6$ (Demand management). The outsourcer was asked:

1. Agreements between users and supplier are being routed through demand management.
2. Agreements reached between users and suppliers are being supervised by demand management.
3. Clear, measurable agreements concerning existing services have been made between outsourcer and supplier and laid down in SLAs.
4. When requesting extra ICT services, clear agreements are made concerning the expected functionality of the new services.
5. When requesting extra ICT services, clear agreements are made concerning the expected quality of the new ICT service.
6. The SLA has been adjusted constantly to the changing business needs.

Supplier was asked:

1. Agreements between users and supplier are being routed through demand management.
2. Agreements reached between users and suppliers are being supervised by demand management.
3. Clear, measurable agreements concerning existing have been made between outsourcer and supplier and laid down in SLAs.
4. When requesting extra ICT services, clear agreements are made concerning the expected functionality of the new services.
5. When requesting extra ICT services, clear agreements are made concerning the expected quality of the new ICT service.
6. The SLA has been adjusted constantly to the changing business needs.
7. The formal relationship with the client is such that demand and supply of services are geared to one another regularly.

Multiple questions to measure $D9$ (Communication inside the vendor’s organization). For this only the supplier was contacted. We made the following selection:

1. The involved managers of the service departments have been informed about the arrangements made with the outsourcer and about the services to be delivered.
2. The involved staffs of the service departments have been informed about the arrangements made with the outsourcer and about the services to be delivered.
3. The involved account managers of the supplier have been informed about the arrangements made with the outsourcer and about the services to be delivered.
4. The involved managers of the service departments have been informed about and involved in the decision to insource.

5. The involved staff of the service departments have been informed about and involved in the decision to insource.

The respondents answer the questions in terms of their degree of agreement or disagreement with a statement regarding the extent in which the condition for success concerned has been met. All questions are of the Likert scale type. As discussed before a Likert scale question knows 6 possible answers: strong agreement, agreement, neutral, disagreement, strong disagreement, and non applicable. We recoded these possible answers into 100, 75, 50, 25, 0 and NA. We ignored the questions that had been answered with NA (non applicable) and calculated the average of the scores of the remaining questions to quantify D5.

To check the internal consistency of the multiple questions we calculated for each set the Cronbach’s alpha reliability coefficient of internal consistency [18]. In Table 4 below we show the Cronbach’s alphas we calculated for the various 9 sets of multiple questions.

From Table 4 we conclude the Cronbach’s alpha reliability coefficients high enough to have sufficient trust in the measurements of the success determinants.

6.2 Testing on discriminative power

In Section 4.2 we explained how we classified the cases of our sample into two groups of successful cases and failed cases. Given this dichotomy it is possible to test the discriminative power of the success determinants. An appropriate test is the Mann-Whitney test. We will now show for D1, as an example, how we performed this test.

The group of successful cases consists of 18 cases. We can look at the D1 scores of this group as a random sample of 18 out of the D1 scores of the population of successful IT-outsourcing cases. We don’t know the size of the population of successful cases, but we know that we have drawn a sample of 18 out of that population. From the population of failed cases we have drawn a sample of 12. If the distribution of the D1 scores substantially differs for both groups, then the null hypothesis: “the two distributions do
Table 5: D1 scores of the successful cases and the failed cases.

<table>
<thead>
<tr>
<th>Result</th>
<th>D1 scores</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>69.44, 97.5, 71.88, 91.67, 79.95, 100, 87.5, 75, 75, 70, 93.75, 50, 77.08, 75, 82.29, 79.17, 70, 80.99</td>
<td>79.23</td>
</tr>
<tr>
<td>Failure</td>
<td>66.67, 85.16, 79.17, 75, 71.88, 75, 46.88, 59.38, 52.05, 71.43, 70.83, 67.26</td>
<td>68.39</td>
</tr>
</tbody>
</table>

Figure 5: Frequency histograms of D1 for successful cases and failures.

not differ substantially”, will be rejected at a low per cent level of significance. Usually one demands 5% level of significance.

We statistically tested our null hypothesis: “the two distributions of D1 do not differ substantially for the group of successful cases and the group of failures” by applying the Mann-Whitney test. This test is a non-parametric method for testing equality of population medians between groups. The test makes minimal assumptions about the underlying probability distributions (e.g. a normal population is not assumed) and is a test for independent samples. The test requires at least an ordinal scale of measurement of the data and this requirement is met in our case. Table 5 shows the D1 scores for the two different success groups.

Table 5 tells us it that the mean score of D1 is different for the two groups. The average score of the group of successful cases is clearly higher than the average score of the group of failed cases. See Figure 5 for the frequency histograms of D1 of the group of successful cases and the group of failed cases.

It is not possible conclude from Figure 5 whether the D1 is a discriminative characteristic of an IT-outsourcing case. Although the figure strongly suggests that the D1 distributions of the 2 groups substantially differ, visual inspection is not a proof.

The Mann-Whitney test gave us the answer. We tested the null hypothesis that the location parameters of the distributions of D1 are the same in each group and found the low $p$-value of 0.0185. This $p$-value is certainly low enough to reject the null hypothesis if one demands the usual 5% level of significance. From this we conclude that there is a strong statistical indication that D1 has power to discriminative between successful and failed cases.

We obtained the Mann-Whitney $p$-values for the other control factors D2, D3, D4, D5, D6, D7, D8 and D9 in a similar way. In Table 6 we present our findings and give a
<table>
<thead>
<tr>
<th>( D_n )</th>
<th>Description</th>
<th>( p )-value</th>
<th>Relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>Working according to the transition plan</td>
<td>0.0185</td>
<td>strong</td>
</tr>
<tr>
<td>D2</td>
<td>Managing the business case for outsourcing</td>
<td>0.1493</td>
<td>weak</td>
</tr>
<tr>
<td>D3</td>
<td>Managing the business case of the service supplier</td>
<td>0.5958</td>
<td>absent</td>
</tr>
<tr>
<td>D4</td>
<td>Transfer of staff</td>
<td>0.1672</td>
<td>weak</td>
</tr>
<tr>
<td>D5</td>
<td>Transfer of assets</td>
<td>0.1688</td>
<td>weak</td>
</tr>
<tr>
<td>D6</td>
<td>Demand management</td>
<td>0.0028</td>
<td>very strong</td>
</tr>
<tr>
<td>D7</td>
<td>Retention of expertise</td>
<td>0.5767</td>
<td>absent</td>
</tr>
<tr>
<td>D8</td>
<td>Communication inside client organization</td>
<td>0.7508</td>
<td>absent</td>
</tr>
<tr>
<td>D9</td>
<td>Communication inside supplier organization</td>
<td>0.0030</td>
<td>very strong</td>
</tr>
</tbody>
</table>

Table 6: Mann-Whitney \( p \)-values and meaning for all the factors.

description of the variables already discussed in Section 5.

From these tests it follows that there is strong statistical evidence that, besides \( D_1 \), the deciding factors \( D_6 \) and \( D_9 \) also have significant power to discriminate between successful and failed cases. Or, in other words, besides \( D_1 \) also \( D_6 \) and \( D_9 \) are useful predictors of the chance of success and failure in an early stage of the service delivery phase of the IT-outsourcing life cycle.

Although the Mann-Whitney test is useful in finding what control factors have discriminative power to distinguish between successful and failed cases, it does not tell us how much the chance on success will increase if one succeeds in improving the scores of \( D_1, D_6 \) and \( D_9 \). In Section 7 we use logistic regression as modeling technique to answer this question.

## 7 Logistic Regression

In this section we show how we applied binary logistic regression as modeling technique to predict the chance of success given the scores of the critical success factors (risk drivers). Binary logistic regression is a specialized form of regression that is designed to predict and explain a dummy variable (coded as 0 or 1) rather than a continuous variable. It can and must be used when the basic assumptions for ordinary least squares (OLS), particularly normality of the independent variables, are not met. Also other well-known multivariate statistical techniques such as linear discriminant analysis to predict the membership of a group also are not to be considered, as the assumptions necessary for applying the method (multivariate normality of the explanatory variables and equal variance covariance matrices in the two groups) are not fulfilled.

Since it is inconvenient to model the probability directly, we decided to apply the logistic model. If we assume that the logistic transformation of the chance of success of case \( i \), to denote by \( \text{logit}(p_i) \), depends on a linear combination of the explanatory variables (determinants) then we get the following regression equation:

\[
\text{logit}(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = \beta X_i
\]  

(1)

Here \( p_i \) represents the chance of success of case \( i \). The vector \( X_i = (1, D_{1i}, D_{2i}, D_{3i}, D_{4i}, D_{5i}, D_{6i}, D_{7i}, D_{8i}, D_{9i}) \) denotes the vector of observations with respect to case \( i \). The vector \( \beta \) is the vector of coefficients to be estimated:
The probability of the observed results $Y_1, Y_2, \ldots, Y_{30}$ in the sample given a specific set of parameters $\beta_0, \beta_1, \beta_2, \ldots, \beta_9$ is known as the likelihood of that model. It is customary to take $-2$ times the log of the likelihood, so $-2LL$, since the likelihood is a very small number less than 1. The number $-2LL$ is also called the Deviance (DEV) of the model. The DEV of a model can be interpreted as the deviation of that model from the perfect model, the model that explains all variability of the dependent variable. DEV$_0$ refers to the deviance of the so-called null model, the model in which no explanatory variables are included but just the constant. DEV$_{full}$ refers to the deviance of the ending model, the fitted model found. One starts with the null model with a fixed deviance and hopes to find a model with a much smaller deviance, explaining a much larger part of the variability of the dependent variable. The likelihood-ratio test is used to test whether the difference in deviance between two models is statistically significant.

### 7.1 Modeling chance of success through logistic regression

In this section we show the logistic regression formula we found for the chance of success of an outsourcing deal. We have used the logistic regression procedure of the statistical R package\(^1\) to carry out our computations. The logistic regression procedure of R does not just yield the estimated regression coefficients of the regression equation, but also the standard errors for the estimated parameters. If the sample size is sufficiently large, each regression coefficient is normally distributed by approximation.

The simplest estimator of the probability of success is obtained by counting how many projects in the sample displayed success and divide it by the total number of projects. For our 30 projects we obtain $p = 18/30 = 60\%$ chance of success. This is a very simple constant model for failure risk: given a new project, the chance on failure is $40\%$. The same result is obtained when one determines the optimal solution of the null model in logistic regression.

However, we have much more information at our disposal and it is likely that we can do a better job in predicting the chance on success. Therefore, we take into account all variables in the Symbiosis dataset $D1, D2, \ldots, D9$ that potentially influence the chance on success of the outsourcing deal. If we allow all nine potential risk drivers to enter the logistic regression model and search for the optimal solution then we find the following logistic regression equation:

$$
\ln\left(\frac{p_i}{1-p_i}\right) = -36.7664 + 0.06806D1_i + 0.22886D6_i + 0.22926D9_i (13.953) (0.050) (0.101) (0.102)
$$

Here $p_i$ is the probability that case $i$ will be successful. The standard errors of the estimated regression coefficients are given between brackets. The deviance of the null model is 40.381 and the residual deviance of the estimated model found is 16.381. If we test the difference of the estimated model from the null model (the model with no

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\(^1\)www.r-project.org
risk drivers), we find that it is a significant improvement at the $\alpha = 0.01$ level when comparing to the null model.

The variables $D_2, D_3, D_4, D_5, D_7$ and $D_8$ are not statistically significant based on the likelihood-ratio test. This is what would be expected given the results of the Mann-Whitney tests that show very low $p$-values found for $D_1, D_6,$ and $D_9$ and large $p$-values for the other control factors (see Table 5 in Section 6.2). The Mann-Whitney test already told us that $D_1, D_6$ and $D_9$ have strong discrimination power. The surprising thing is the relatively large standard error of the regression coefficient of $D_1$. From the Mann-Whitney test one would expect $D_1$ to have a strong discriminative power ($p$-value of 0.0185) but the estimated regression coefficient of $D_1$ does not appear significantly different from 0, using a significance level of 5%.

The coefficients of the success determinants can be interpreted meaningful. They tell us that better management increases the chance on a successful progress of the cooperation between outsourcer and service provider. A logistic coefficient can be interpreted as the change in the log odds associated with a one-unit change in the explanatory variable. So, one can estimate the increase of the chance of success due to an increase of the score of $D_1, D_6,$ or $D_9$. The most important risk driver is communication inside the supplier organization, which, if organized well, significantly increases the chance on success. This finding is rather surprising as we were not aware of any suggestion in this direction in the literature. Next, there is demand management, which, if managed well, increases the chance on success of the outsourcing deal to a large extent. Finally, strictly working according to the transition plan increases the chance on a productive cooperation.

7.2 Goodness-of-fit of the model

In the case of a linear regression model the correlation coefficient, $R^2$, is a number between zero and one, which provides a quality measure for how good a linear regression model fits. Also for logistic regression such so-called goodness-of-fit measures have been developed. We used McFadden’s Pseudo $R^2$ as goodness-of-fit metric. McFadden’s $R^2$ statistic is one of the simplest and most popular $R^2$ measures for logistic regression. It depicts the amount of reduced deviance by the estimated model as a percentage of the deviance of the null model. The formula of McFadden’s Pseudo $R^2$ is as follows:

$$R^2_{\text{mf}} = 1 - \frac{DEV_{\text{full}}}{DEV_0}$$

The ratio suggests the level of improvement over the intercept model offered by the full model. Thus a small ratio of the log likelihood indicates that the full model is far better than the intercept model.

In our case the deviance of the null model is 40.381 and the residual deviance of the estimated model found is 16.381. So McFadden’s Pseudo $R^2$ amounts to 0.594. Considering that a pseudo $R^2$ is to be expected much less than what would be expected in an ordinary least square model, a pseudo $R^2$ of approximately 0.6 indicates a reasonably good model.
8  Additional determinants of IT-outsourcing success

We have also tested the discriminative power of other case characteristics of which information was collected through the 5 questionnaires:

1. the motive of the outsourcer to engage in an IT-outsourcing deal,
2. the motive of the service provider to engage in an IT-outsourcing deal,
3. the match of the organization cultures of the service provider and his client,
4. the experience of the outsourcer with IT-outsourcing practices,
5. the type of outsourced work,
6. the capability of the service provider to put himself in the position of his client (vendor’s empathy capability).

These case characteristics differ from the success determinants discussed in Section 5 as they cannot be adjusted or improved by the provider or the vendor during the service delivery phase. We therefore did not include them among the potential explanatory variables in carrying out the logistic regression analysis.

Testing the discriminative power of the motives of the outsourcer and vendor to engage in a deal is justified by the fact that one can find ample literature on research to the determinants of IT-outsourcing decisions; see for example (Baldwin et al. [3]). In their review of the IT outsourcing literature Lacity et al. mention 143 articles in total that deal with motivation for outsourcing [26]. So the issue can be recognized as a hot research topic. One can also find an overwhelming number of articles that are focused on the effect of cultural differences between vendor and outsourcer on the success of an IT-outsourcing deal. See, again, for example, the literature survey articles by Dibbern et al. and Lacity et al. Therefore we decided to test the hypothesis whether the match or mismatch of management cultures affects the chance on success of the sourcing deal.

Finally, we tested the hypothesis whether the capability of the service provider to imagine himself in the position of his client affects the chance of success on the sourcing deal. We collected information which enables us to test such a hypothesis. We did not find any paper on IT sourcing that deals with this issue.

8.1  Motivation of the outsourcer

In Figure 6 we show a multiple bar chart of the motives of the outsourcers to outsource (some) of their IT functions. The partition of the diagrams shows how many times a motive was ranked on the first place, the second place and the third place (we did not depict fourth, fifth, . . . , ranking as this turned out to have no added value).

Most reasons relate to cost savings. The next popular reason is strategic: focus on core capabilities, increasing flexibility, safeguarding continuity, etc. Access to high quality employees comes at the third place. We clustered the 19 motives mentioned by the respondents at the first rank into three main groups:

1. strategic motives;
2. financial motives;
3. HRM (Human Resource Management) motives.
Figure 6: Frequency histogram of the motives at rank 1, 2 and 3 of the outsourcer. Legend: a. pressure by shareholders, b. injection of capital, c. shared services center, d. follow-up sourcing, e. pressure by regulatory supervisors, f. extended working hours, g. career of IT staff, h. pressure from higher management, i. mandatory public tender, j. short term reduction of costs, k. guarantee business continuity, l. continuity in case of illness and turnover of staff, m. cover IT risks, n. predictability of costs, o. access to specialized staff, p. more flexibility, q. access to knowledge and experience of supplier, r. focus on core activities, s. long term reduction of costs.
A table is shown relating the outsourcer's main motives and success classes. The table includes motives such as strategic, financial, and HRM, with data for successful and failed deals. The test of independence for contingency tables (chi-square test) is applied to determine if there is a relationship between motive and success or failure. The null hypothesis is tested, and a strong statistical evidence is found that there is no relationship between the motive of the outsourcer to engage in an outsourcing deal and the success of the deal.

### 8.2 Motivation of the service provider

In Figure 7, a multiple bar chart shows the first, second, and third ranked motives of service suppliers to insource IT functions. Most reasons are indicated with strategic (become well known, access to the market, increasing volume of business in the long term, etc.). Increasing volume of business in the short term comes at the second place. The next popular reason is building up (specific) knowledge. Also increasing the profit margin and synergy benefits are frequently mentioned motives. An interesting question is whether there is a relationship between the motive of the service provider and the success or failure of the outsourcing deal. We clustered the motives into two groups: externally addressed and internally addressed. Examples of externally addressed motives are: “become well known”, “access to the market”, and “increasing the market share”. Examples of internally addressed motives are: “increasing volume of business” and “increasing profit margin”.

Subsequently, we applied the test of independence for contingency tables (chi-square test) to test the null hypothesis that there is no relationship between the motive of the service provider and the success or failure of the outsourcing deal. The contingency table is shown in Table 8.

We found the very low $p$-value of 0.001, which strongly indicates that the two classification criteria are not independent of each other. In other words, the nature of the motive of the service supplier increases or decreases the chance on success of the deal.
Figure 7: Frequency histogram of the motives at rank 1, 2 and 3 of the supplier. Legend: a. professionalizing of services, b. reinforcement of market position, c. growth, d. reciprocal business opportunity, e. external pressure, centralization public services, f. acquisition of specialized staff, g. attractive profit margin, h. knowledge acquisition, i. short term turnover, j. synergy with existing activities, k. access to the market, l. visibility as supplier, m. long term turnover.

<table>
<thead>
<tr>
<th>MOTIVE</th>
<th>RESULT</th>
<th>External</th>
<th>Internal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>12 (8.4)</td>
<td>6 (9.6)</td>
<td><strong>18</strong></td>
<td></td>
</tr>
<tr>
<td>Failed</td>
<td>2 (5.6)</td>
<td>10 (6.4)</td>
<td><strong>12</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>16</strong></td>
<td><strong>30</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Relating suppliers’ main motives and success classes.
### 8.3 Matching of organization cultures

An interesting question is whether there is a relationship between the match of organisation culture and the success or failure of the outsourcing deal. We first clustered the cases in three groups:

1. No difference in organisation culture: informal ↔ informal, between ↔ between, or formal ↔ formal.
2. Strong difference in organization culture: informal ↔ formal
3. Weak difference in organisation culture: informal ↔ between or formal ↔ between

Table 9 shows the result of the clustering.

Remember that the figures between brackets refer to the frequencies one would expect if both classification factors (organisation culture and IT sourcing result) are completely independent from each other.

We tested the null hypothesis that the two classification factors are independent (chi-square test) and found the $p$-value of 0.503. From this we conclude at the 5% level of significance that the sample does not contradict the null hypothesis. In other words there is statistical evidence that there is no relationship between the matching of the organisation cultures of outsourcer and vendor and the success of the deal.

### 8.4 Does the type of outsourced work matter?

Some managers and sourcing consultants think that if you outsource or offshore simple and high-routine work to low-wage countries this would be cost-effective, whereas outsourcing complex and low-routine tasks will need intimate business IT-alignment and should better be done in-house. In other words, it is not unreasonable to think that the chance of success of the outsourcing deal is not independent of the type of outsourced work. In questionnaire 1, see Section 2.3, the outsourcer is asked to give details about the type of outsourced work. The following types of outsourcing work were mentioned.

1. Application management
2. Application development
3. Application maintenance
4. Business Process Outsourcing (BPO)
5. Data communication and telephony
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>7 (7.8)</td>
<td>6 (6)</td>
<td>5 (4.2)</td>
<td>18</td>
</tr>
<tr>
<td>Failed</td>
<td>6 (5.2)</td>
<td>4 (4)</td>
<td>2 (2.8)</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>10</strong></td>
<td><strong>7</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

Table 10: Relating type of outsourced work and result case

6. Technical system maintenance and management
7. Data center, hosting and housing
8. Work area management
9. General support and management services
10. Helpdesk
11. Office Automation

We clustered the types of outsourced work in three groups:
1. Software (13)
2. Technical Infrastructure (10)
3. End User Support/Office Automation (7)

Subsequently, we applied the test of independency for contingency tables (chi-square test) to test the null hypothesis that there is no relationship between the type of outsourced work and the success or failure of the outsourcing deal. In Table 10 the observations are classified by the two criteria: the type of outsourced work and the result of the deal.

The figures between brackets refer to the frequencies one would expect if both classification factors are completely independent from each other. The other figures refer to the observed frequencies. If the observed frequencies do not differ too much from the figures between brackets, there is a strong indication that the two classification factors are mutually independent. We tested our null hypothesis that the two classification factors are independent and found the high *p*-value of 0.887. From this we conclude at the 5% level of significance that the sample does not contradict the null hypothesis. There is strong statistical evidence that there is no relationship between the type of outsourced work and the result (success or failure) of the deal. As the general feeling is that the type of outsourced work influences the chance on success of an outsourcing deal this finding can be considered as remarkable.

8.5 **Is vendor’s empathy a success factor?**

In questionnaire 3, see Section 2.3 the vendor is asked to judge his client. He is asked to answer the following questions regarding his client’s appreciation:

1. Does client’s top management appreciate the quality of the delivered services?
2. Does client’s middle management appreciate the quality of the services delivered?

3. Do the client’s end users appreciate the quality of the delivered services?

In the questionnaire intended for the outsourcer, the outsourcer is asked to answer the same questions:

1. Does the quality of the delivered services meet the expectation of top management?

2. Does the quality of the service delivery meet the expectations of middle management?

3. Does the quality of the service delivery meet the expectations of the end users?

All questions are of the Likert scale type and the possible responses are recoded into the numbers 100, 75, 50, 25 and 0. If the vendor judges his client perfectly the difference between his assessment of the answer of his client and the actual answer of his client is 0. In case of underestimation the maximal difference is 100. The same holds for overestimation.

To measure the capability of the vendor to put himself in the position of its client we compute the average of the underestimations, overestimations and correct assessments. If each of the 3 questions has been answered by both the vendor and outsourcer we compute the average of three numbers. In case of missing data (vendor or outsourcer or both have not answered some question(s)), the concerned question(s) is (are) left out of consideration in calculating the norm. In that case the computed assessment capability is the outcome of the division of two numbers or just consists of one number. In a formula:

$$AC = \frac{\sum_{j=1}^{n} |x_j - y_j|}{n}$$

Here $AC$ stands for the vendor’s assessment capability, $x_j$ for the vendor’s score on question $j$, $y_j$ for the score of the outsourcer on question $j$, and $|$ for the absolute difference between the answers, and $n$ stands for the number of questions that have been answered by both the outsourcer and service supplier.

The assessment capability cannot exceed the number 100 and its minimal value is 0. If the assessment capability is in the range of 0–25 the vendor shows that he is very well capable to put himself in the position of the client. An assessment capability is in the range of 25–50 indicates a moderate empathy of the vendor. An assessment capability in the range of 50–100 indicates that the vendor is unable to put himself in the position of his client. In Figure 8 we show the frequency histograms of the assessment capability scores of the vendors for the group of successful cases and the group of failed cases.

We statistically tested the null hypothesis that the assessment capability scores of the cases that come into the failure class are statistically significant higher than the assessment capability scores of the cases that come into the class of successful cases. To that we applied the one sided Wilcoxon test on the data recorded as in Table 11. We found a $p$-value of 0.08. This $p$-value is not low enough to reject the null hypothesis that there is no relationship at the 5% level of significance. However, at the 10% level the null hypothesis would not have been rejected.
Figure 8: Assessment capability scores of successful and failed cases.

<table>
<thead>
<tr>
<th>RESULT</th>
<th>AC scores</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>12.5, 12.5, 12.5, 12.5, 25.0, 16.7, 8.3, 16.7, 12.5, 25.0, 16.7, 16.7, 16.7, 41.7, 0.0, 0.0, 0.0</td>
<td>14.0</td>
</tr>
<tr>
<td>Failed</td>
<td>8.3, 8.3, 33.3, 16.7, 16.7, 25.0, 12.5, 16.7, 75.0, 25.0, 16.7</td>
<td>23.1</td>
</tr>
</tbody>
</table>

Table 11: Assessment capability of the two different success groups.
Of the cases which come into the class of successful cases, case 2168 is the most doubtful one (see Table 2). According to our classification rule a case is called successful if the scores on both success indicators are $\geq 50$. With the scores 55.56 (score outsourcer) and 54.69 (score service supplier) case 2168 comes into the class of successful cases by the narrowest margin. If we leave out case 2168 out of consideration in calculating the Wilcoxon statistic we find a $p$-value of 0.05. This fact gives support to the conjecture that a high assessment capability of the service supplier to imagine himself in the position of his client increases the chance on success of the outsourcing deal.

9 The effect of hiring sourcing consultants

In 15 cases the outsourcer hired a consultant. In 11 cases a consultant was hired to compensate for lack of experience of the outsourcer. In 4 cases a consultant was hired although the outsourcer was experienced. See Table 12 below. The information regarding the experience status of the outsourcing companies that participated in the longitudinal study was collected through the various questionnaires.

One would expect that the chance on success of an outsourcing deal increases when the outsourcer has built up experience with IT-outsourcing in the past or hires experience from consultancy offices to compensate the lack of in-house experience. In this section we analyse the joint effect of experience with outsourcing and hiring consultancy support. The question to be answered is whether experience built up in the past is helpful to gain success in the future and/or whether consultancy support is helpful when in-house experience is lacking. To that end we started with classifying our sample of 30 cases according to 3 classification criteria:

1. Criterion A: whether or not the case was successful;
2. Criterion B: whether or not the outsourcer had built up experience with outsourcing;
3. Criterion C: whether or not a sourcing consultant was hired.

To test whether these 3 classification criteria are mutually independent we constructed a $2 \times 2 \times 2$ contingency table; see Table 13.

The numbers between brackets show the theoretical frequencies if there is no relationship between the 3 classification criteria. Based on our sample of 30 cases the best estimate of the probability of a case to be successful is $18/30$; the best estimate of the probability that a consultant is hired amounts to $15/30$, and the best estimate of the probability that the outsourcer has gained experience with outsourcing in the past is $13/30$. If the three classification criteria are mutually independent one would expect $(18/30 \cdot 15/30 \cdot 13/30) \cdot 30 = 3.9$ experienced cases with a consultant to be successful. The other numbers between brackets are computed in the same fashion. We now test the null hypothesis that the A, B and C classifications are independent. Or, in a formula, we test the null hypothesis:

$$p_{i,j,k} = p_i \cdot p_j \cdot p_k, \Sigma p_i = 1, \Sigma p_j = 1, \Sigma p_k = 1.$$

Here $p_{i,j,k}$ is the joint chance of which we assume it is the product of the individual chances $p_i, p_j, p_k$; that of course sum up to 1.

The chi-square statistic is computed from the eight categories as follows:

$$\chi^2 = \frac{(3.9 - 2) \cdot 2}{3.9} + \frac{(5.1 - 4) \cdot 2}{5.1} + \frac{(2.6 - 2) \cdot 2}{2.6} + \ldots$$
<table>
<thead>
<tr>
<th>Case #</th>
<th>Experience with outsourcing?</th>
<th>Consultant hired?</th>
<th>Outcome of the case</th>
</tr>
</thead>
<tbody>
<tr>
<td>2145</td>
<td>Yes</td>
<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>2146</td>
<td>Yes</td>
<td>Yes</td>
<td>Failure</td>
</tr>
<tr>
<td>2147</td>
<td>No</td>
<td>No</td>
<td>Failure</td>
</tr>
<tr>
<td>2149</td>
<td>Yes</td>
<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>2150</td>
<td>No</td>
<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>2151</td>
<td>Yes</td>
<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>2152</td>
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<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>2153</td>
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<td>Yes</td>
<td>Failure</td>
</tr>
<tr>
<td>2154</td>
<td>Yes</td>
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<td>Success</td>
</tr>
<tr>
<td>2155</td>
<td>No</td>
<td>No</td>
<td>Failure</td>
</tr>
<tr>
<td>2156</td>
<td>Yes</td>
<td>Yes</td>
<td>Success</td>
</tr>
<tr>
<td>2157</td>
<td>Yes</td>
<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>2158</td>
<td>No</td>
<td>Yes</td>
<td>Failure</td>
</tr>
<tr>
<td>2159</td>
<td>No</td>
<td>Yes</td>
<td>Failure</td>
</tr>
<tr>
<td>2160</td>
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<td>Success</td>
</tr>
<tr>
<td>2161</td>
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<td>No</td>
<td>Failure</td>
</tr>
<tr>
<td>2162</td>
<td>No</td>
<td>Yes</td>
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</tr>
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<td>2163</td>
<td>No</td>
<td>No</td>
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</tr>
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</tr>
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<td>2167</td>
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<td>No</td>
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</tr>
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<td>2168</td>
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<td>2200</td>
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</tr>
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<td>2201</td>
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</tr>
<tr>
<td>2203</td>
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<td>No</td>
<td>Success</td>
</tr>
<tr>
<td>2204</td>
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<td>No</td>
<td>Success</td>
</tr>
</tbody>
</table>

Table 12: Experience with outsourcing and hiring consultancy support.

<table>
<thead>
<tr>
<th>Consultant</th>
<th>Experience with outsourcing?</th>
<th>No experience</th>
<th>Experience</th>
<th>Failure</th>
<th>No experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2 (3.9)</td>
<td>4 (5.1)</td>
<td>2 (2.6)</td>
<td>7 (3.4)</td>
<td>15</td>
</tr>
<tr>
<td>No</td>
<td>8 (3.9)</td>
<td>4 (5.1)</td>
<td>1 (2.6)</td>
<td>2 (3.4)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>8</td>
<td>3</td>
<td>9</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 13: Three-way contingency table to test whether the three criteria A, B, and C are mutually independent.
experienced / no consultant  

inexperienced / no consultant

Success 8 (5.4) 2 (2.4) 4 (3.4) 4 (6.6) 18

Failure 1 (3.6) 2 (1.6) 2 (2.4) 7 (4.4) 12

Table 14: Two-way contingency table to test whether the A classification is independent of B and C.

\[
\frac{(3.4 - 7) \cdot 2}{3.4} + \frac{(3.9 - 8) \cdot 2}{3.9} + \frac{(5.1 - 4) \cdot 2}{5.1} + \\
\frac{(2.6 - 1) \cdot 2}{2.6} + \frac{(3.4 - 2) \cdot 2}{3.4} = 9.847
\]

Note that as a rule of thumb the \( \chi^2 \) approximation is adequate if the minimum theoretical frequency is 2 [13].

The statistic has the chi-square distribution with 4 degrees of freedom. Let \( \chi_{.95} \) denote the 95th percentile of the \( \chi^2 \) distribution. For 4 degrees of freedom \( \chi_{.95} = 9.49 \). Since the observed value of 9.847 is notably larger than 9.49 we reject the hypothesis of mutual independency of the three classification criteria at the 5 per cent level of significance.

Clearly, there is strong statistical evidence that the three classification criteria are not mutually independent. However, without further examination it is not clear to which classification criteria(s) the dependency has to be attributed. When we look at Table 13 it strikes that the observed frequency of 8 successful cases without consultant is much larger than the frequency one would expect if there is no relationship between success, experience of the outsourcer and hiring a consultant, which would be 3.9. The same holds for the observed frequency of the inexperienced outsourcer that hired a consultant. One would expect 3.4 failures, but the observed number of failures is twice as high, namely 7. So there is a good reason to look into more detail at the impact of hiring a sourcing consultant on the result of a case. For this purpose we carried out 4 additional contingency table tests.

In connection with Table 13 we can also test whether the A classification is independent of B and C. For that we constructed a two-way contingency table; see Table 14.

The figures between brackets again refer to the frequencies one would expect if both classification factors are completely independent from each other. For example, one would expect \( (18/30) \cdot 9 = 5.4 \) experienced outsourcers without consultant to be successful if the two classification criteria are independent. If we compute the \( \chi^2 \)-statistic from the eight categories we obtain the number 5.968. For 3 degrees of freedom \( \chi_{.95} = 7.81 \). Since the observed value of 5.986 is less than 7.81 we accept the null hypothesis of independency of the two classification criteria at the 5 per cent level of significance. So the outcome of the deal is independent of B and C.

Subsequently we tested the dependency between the A classification and the B classification; the dependency between the A classification and the C classification, and finally, for the sake of completeness, the dependency between the B classification and the C classification. To that end we constructed the three two-way contingency tables 15, 16 and 17.

From Table 15 it follows that the \( \chi^2 \) statistic equals 5 with a \( p \)-value of 0.06. So there is a strong statistical indication that hiring sourcing consultancy support does not
increase the chance on a successful outcome of the outsourcing deal. Even stronger, the opposite is at hand: the chance on a failure increases when a sourcing consultant is hired.

From Table 16 we infer that $\chi^2 = 2.738$, with a $p$-value of 0.143. So there is no convincing statistical evidence that past experience with outsourcing increases the chance on a successful outcome of the deal. This is surprising since you would assume that being experienced in outsourcing helps in future success.

Finally, from Table 17 we calculate $\chi^2 = 3.394$ with a $p$-value of 0.137. Hence, there is a very slight statistical indication that inexperienced outsourcers more frequently hire sourcing consultants than experienced outsourcers. This finding is not surprising.

From the additional contingency table tests out we conclude that the major cause of the mutual dependency of the three classification criteria A, B, and C is the absence or presence of a sourcing consultant. If we separate the effect of hiring a sourcing consultant from the experience of the outsourcer and test whether there is a relationship with the outcome of the case then there is a strong statistical indication that hiring consultancy support works contra-productive, whereas the relationship between having experience or not and success or failure is only weakly present.

At first glance the finding that hiring consultancy support works contra-productive appears to be surprising. Possible explanations can be as follows. When sourcing consultants take over the driving seat of the sourcing process, the company is not learning and not taking enough responsibility for the endeavour, which can easily lead to failure. Also when there is resistance to change, an outside player is more easily blamed in case of (staged) failure.

<table>
<thead>
<tr>
<th>Consultant</th>
<th>No consultant</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>6 (9)</td>
<td>12 (9)</td>
</tr>
<tr>
<td>Failure</td>
<td>9 (6)</td>
<td>3 (6)</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 15: Two-way contingency table to test whether hiring a consultant and the outcome of sourcing are independent.

<table>
<thead>
<tr>
<th>Experience with outsourcing</th>
<th>No experience with outsourcing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>10 (7.8)</td>
<td>8 (10.2)</td>
</tr>
<tr>
<td>Failure</td>
<td>3 (5.2)</td>
<td>9 (6.8)</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 16: Two-way contingency table to test whether experience of the outsourcer with outsourcing and the outcome of the case are independent.

<table>
<thead>
<tr>
<th>Experience with outsourcing</th>
<th>No experience with outsourcing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant hired</td>
<td>4 (6.5)</td>
<td>11 (8.5)</td>
</tr>
<tr>
<td>No consultant hired</td>
<td>9 (6.5)</td>
<td>6 (8.5)</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 17: Two-way contingency table to test whether hiring a consultant and the experience of the outsourcer with outsourcing are independent.
We shared our finding with problem owners in large outsourcing deals in the private sector (billions of Euros per annum). They were not surprised at all. They stated that flying in the best external expertise was indeed a reflex upon first outsourcing. But that turned out to be contra-productive. They characterized the expertise of sourcing consultants as overrated. They mentioned lack of insight into the constitutional idiosyncrasies of the organisation that is in transition and lack of understanding of the underlying motives of the outsourcing decision. This led to insufficient understanding of the customer needs and thus limited support in aiding transitions to external IT-service providers. Most of the times rigid models and work processes were adhered to by the junior and medior sourcing consultants that did the actual work. So the blind were leading the blind. This is a typical problem with consulting companies where the business model is that the top-consultants (often partners) bring in an army of well-educated but experience-lacking consultants that follow a relatively simple, coarse-grained and too rigid process. This creates a multiplier for the managing partners, but does not necessarily add enough value for their customers. As a consequence, later deals were mainly engineered by in-house teams that intimately knew the organisation. To bring them up to speed external expertise was used to close the knowledge gaps such as contracting and for reflections to the transition team.

We also shared our finding with an executive involved in a 15–20 million per annum government-to-government outsourcing deal. That hiring external sourcing consultancy is contra-productive in our case studies confirmed their own anecdotal inquiries. They interviewed parties with experience in outsourcing in both the private and public sector. These inquiries gave them the intuition that hiring sourcing consultants was probably not the best idea. This resulted in the decision to keep control themselves. They formed a team to prepare and carry out the transition to another governmental body more equipped for the IT-tasks. For specific aspects such as legal issues, technical knowledge gaps and coaching/reflection, external expertise was hired. This turned out to be successful, and the transition to the other party worked out properly.

We conclude that the motive of the outsourcing company to hire consultancy sourcing expertise is crucial for the effectiveness of the support the company gets. If the reason is that the company does not want to take the responsibility for the sourcing process itself and therefore invites an external consultant, explicitly or implicitly, to effectuate the taken outsourcing decision then the seeds have been sown for later failure. If the motive for hiring external sourcing expertise is to fill up specific knowledge and experience gaps in managing the sourcing process by in-house teams the conditions for an effective consultancy support are created. Also consultant companies can learn from the finding of our study. The lesson is that taking over the driving seat of the client’s sourcing process may cause a short term profit but apparently does not lead to good results in the long-term.

All in all, the finding from our study that hiring external expertise did work out contra-productive illustrates that you better do not outsource outsourcing.

10 Conclusions

In this study we investigated the discriminative power of nine controllable success determinants during the service delivery phase of the IT-outsourcing lifecycle. We made use of data collected from 30 pairs of outsourcing and service delivery companies in the Netherlands, that had concluded an IT outsourcing contract and had entered the service delivery phase. We verified that this sample is a representative cross-section of
the Dutch IT-outsourcing population of the years 2007–2010.

We found strong statistical evidence for three determinants that are good predictors of success or failure. First, there is the communication inside the vendor’s organization, next there is demand management, and then comes strictly working according to the transition plan. Particularly, the finding that the quality of the communication within the supplier organisation is an important controllable success factor is remarkable. We are not aware of any publication about IT-outsourcing on this subject. The three found determinants also turned out to be the only significant factors for a (logistic) model predicting the chance of a successful IT-outsourcing, given the scores of the factors.

The other six controllable success factors did neither show discriminative nor predictive power. From this it does not follow, however, that these success determinants do not matter. For instance, it certainly makes sense to keep track on them. The possible reason that these factors were not significant could be that they have become commonly accepted IT-outsourcing practice, so that they will not discriminate since they are present in all cases.

The available data did also allow us to test the impact of a number of case characteristics that are rigid on the outcome of a deal. Rigid, in the sense that they cannot be altered anymore, once the deal has been closed. We carried out a number of statistical tests that yielded some surprising results. For instance, the finding that the type of outsourced work did not turn out to be correlated with success or failure was surprising, considering the wisdom of the crowds that outsourcing high-routine work in contrast with work that demands intimate business knowledge to be done would increase the chance of success. Also the (mis)match between the organisation cultures of the service provider and his client was no significant factor in decreasing or increasing the chance of success of a deal.

Two other case characteristics did show a strong relationship with the outcome of the deal. First, the motive of the service provider to obtain the outsourcing deal turned out to a discriminating factor. If the motive was addressed externally such as access to the market or increasing their market share, the chance that the deal will be successful is notably larger than if the motive was addressed internally. Think of increasing business volume or increasing profit margins. Second, empathy turned out to be relevant. That is the capability of the service provider to imagine himself in the position of his client turned out to increase the chance of success of the deal. We are not aware of any publication about IT-outsourcing during the preceding decades that supports or contradicts this finding about vendor’s empathy capability.

Although the initial goal of our field study was to assess the impact of a number of well-known success factors on the chance of success of an outsourcing deal on the basis of data taken from practice, the study also yielded interesting and surprising spin-off results. Surprisingly, the degree of experience of the outsourcing company built up in the past with sourcing did not show to be a factor that positively influenced the chance of success. Another surprise was that it turned out that hiring sourcing consultants worked out contra-productive: it lowered the chance on success. At first glance this finding appeared to be counterintuitive, but on second thought there were plausible explanations for this. The key lesson learned was that outsourcing the responsibility for the sourcing process to an external party does not pay off. However, external sourcing experience can be very helpful if it used for closing specific knowledge gaps of an in-house team that is (and stays) responsible for running the sourcing process. So whatever you do, you better do not outsource outsourcing.
References


