A New Process Model for Optimizing IT Outsourcing Operations in the German Automotive Industry

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Abstract - **The outsourcing of IT services is a significant business activity for many companies and is a well-established element of services management worldwide. However, the process is neither well defined nor understood in many industries, including the automotive sector, where it is of growing importance. A review of existing literature reveals consideration of specific aspects of outsourcing in isolation, but relatively little material that provides a comprehensive framework for analysis. This paper thus identifies the main stages in IT outsourcing operations in the German automotive industry and seeks to establish the critical success factors that can help ensure quality outcomes. It suggests a clear definition of IT outsourcing and constructs a new conceptual process model, that provides the basis for a range of analytical materials to complement the existing literature, and which will also be of value to practitioners working in this field.**

Keywords - IT outsourcing; operations; success factor; service provider; process mode; CSFs

I. INTRODUCTION

Outsourcing as a business process or function is not new, especially in the field of information technology, systems and services, in which it has become increasingly important during the last few years [1]. In this context, when referring to 'IT (information technology) outsourcing', we assume the broader definition of IT that encompasses technologies, systems and services. "Information technology, in its narrow definition, refers to the technological side of an information system. It includes hardware, databases, software networks, and other devices. ... sometimes, the term IT is also used interchangeably with IS (information systems), or it may even be used as a broader concept that describes a collection of several information systems, users, and management for an entire organisation" [2].

The reasons for outsourcing are various, but potential cost savings and the transparency of costs are often to the fore [3]. The business case for IT outsourcing can contain a range of possible benefits, including economies of scale in the use of, for example, third party hardware and infrastructure, and the freeing up of 'human capital' to concentrate on core business activities or strategic IT issues. Nevertheless, many IT outsourcing operations fail or require renegotiation within the project life-cycle [4]. Groetschel [5] suggests that 30 % of all IT outsourcing projects fail or the expected results are not reached. Furthermore, it seems that

IT outsourcing success is generally the expected outcome and the risks are often underestimated.

The research centres on IT outsourcing in the German automotive industry, where the process of IT outsourcing is neither well documented nor researched. It is a dynamic technology environment with the life cycles for both software and hardware products continually shortening because of new developments [6]. In addition, the development of new technologies relating specifically to automobiles requires the integration of IT professionals and auto technology specialists. This has resulted in a rapid evolution of the IT function within the automobile industry to encompass technologies that are outside its traditional limits [7]. Technological and strategic decisions are taken within the organization, and a web of suppliers produces the components, which are often integrated within the car. The need for alignment of technology and business strategies is paramount.

Inevitably, these developments influence sourcing strategy. The engagement of specialized companies as business partners may be viewed positively as these firms have developed efficient structures for planning and controlling the entire IT life-cycle [1] [5]. Furthermore an "effective knowledge-sharing process over organizational boundaries" can ensure the right flow of information between outsourcing partners [8].

Within this dynamic technological and business context, this paper addresses three research questions (RQs):

RQ1. What are the main stages in the IT outsourcing process in the German automotive industry?

RQ2. What are the critical success factors (CSFs) for IT outsourcing performance in the German automotive industry?

RQ3. Can a new process model be constructed for IT outsourcing in the German automotive industry that helps ensure quality outcomes and deliverables?

The paper first reviews existing literature to establish a theoretical framework for the initial research activity (section II). Research philosophy and methodology are then considered (section III), before the research questions are fully addressed, focusing particularly on a new process model for IT outsourcing in the German automotive industry (section IV). The concluding section (section V) puts forward a new definition for IT outsourcing and suggests a hierarchy of success factors that impact upon the outsourcing process, looking also at future research activity in this field.

II. THEORETICAL FRAMEWORK

The analysis of the existing literature shows a paradigm shift in practice in the automobile sector as regards outsourcing: companies no longer ask themselves "Shall I outsource parts of my IT?" the question today is rather "How can I realize IT outsourcing in the best way for my company?" [9]. This has led to a more individual and more focused analysis of IT outsourcing options as measured against future business challenges.

The literature review suggests that the persons responsible for IT outsourcing often underestimate the complexity of the entire process. There may be a concentration on particular aspects (e.g. based on their professional background) without an appreciation of the whole process [10]. An important aspect in this context seems to be the need for clear objective formulation within each IT outsourcing project.

The review revealed two main trends in the automotive sector: first, a general increase in IT outsourcing as companies strive for improved cost-effectiveness; second, an increasing number of IT outsourcing projects fail or the expected results are not reached. The corollary to this second point is that many companies assume IT outsourcing will be successful and risks are often underestimated.

The entire IT outsourcing life-cycle is not widely analysed in the academic literature but existing studies allowed the development of a provisional life cycle model or conceptual framework that has been tested out and refined through primary research. A conceptual framework can be seen as a type of intermediate theory that attempts to connect all aspects of inquiry, i.e. problem definition and literature review, as well as methodology development, data collection and interpretation. In general, conceptual framework development has often been linked to exploratory types of research [22]. The constructed framework consists of eight key-stages and has been visualized in the form of a life-cycle (based on the plan, build and run approach – Fig. 2).

Analysis of the existing literature also allowed an identification of possible critical success factors (CSFs) that could be provisionally allocated to different stages in the life-cycle (Table I). In determining these factors, the different opportunities and risks within IT outsourcing were identified from the existing literature as well. These success factors suggested the potential measures that might be used to assess the degree of achievement in outsourcing projects.

Table I. Possible Critical Success Factors identified from existing literature

CSF1	Transparency concerning: - strategic orientation, - internal IT performance, - customer requirements	[11, 12, 13, 14, 15]
CSF2	Economic point of view: value-for-money (management of costs)	[11, 13, 15, 16]
CSF3	Transparency within the selection process of a provider (choosing the right service provider)	[11, 13, 17]
CSF4	Proper communication and information	[11, 13, 15, 18]
CSF5	Contract management and controlling	[11, 13, 15, 17]
CSF6	Service control and lessons learned (e.g. define service level agreements)	[11, 13, 15, 20, 21]

The literature review thus helped develop, but also provided some tentative answers to, the three main research questions for the primary research phase of the project. In general, the concept of IT outsourcing has been explored in a way that will generate a contribution to knowledge, i.e. advancing the understanding of the concept, and/or improving the outsourcing processes. This will be the basis for the development of a new process model for IT outsourcing in the automotive industry in Germany.

III. RESEARCH PHILOSOPHY AND METHODOLOGY

The research is based on linking practice and theory in a pragmatic way and is guided by practical experiences [23], [24], [25]. Indeed, the research will be based on the paradigm of pragmatism. "What?" and How?" become the main aspects of the research problem [26]. The research follows a step by step analysis for each RQ [27]. The research is a single in depth case-study based on qualitative research, which will be used to develop and justify a conceptual framework [28]. The information is being obtained through semi-structured interviews, which provide the opportunity to speak directly to stakeholders. Furthermore they allow different views to be examined very closely and in depth.

The analytical techniques for qualitative data are not well developed, as this kind of data consists of interpretable words and observations, and not numbers [28]. According to Taylor and Renner [29], qualitative data analysis (of narrative data) requires creativity, discipline and a systematic approach. Thus there is no single solution - the results depend on the RQs and available resources [29].

Based on eight different stakeholder-groups (Fig. 1), interviews were held in a two-step approach reflecting the RQs. The first stage enquired about the different stages of outsourcing projects to build a basis for further discussions. At the end of each interview, the findings from the literature were presented and discussed with the participants. In
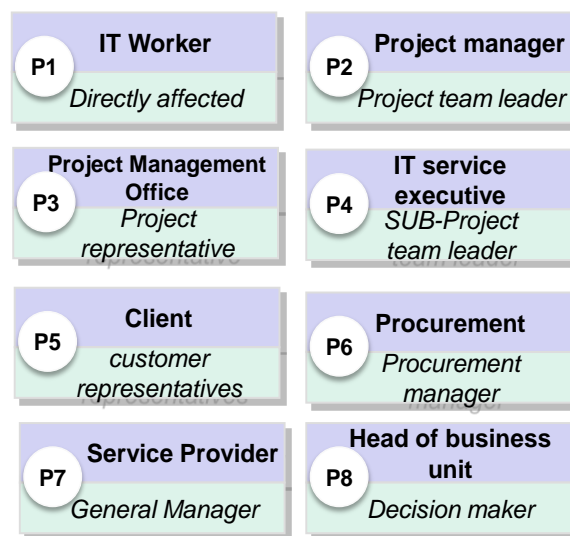

Figure 1. The Eight Stakeholder Profiles (P1-P8)

addition, each interview was completed with a self-allocation of the participants´ business activity in the outsourcing life-cycle. This ensured that all areas of the life-cycle were covered and queried more than once. Deviations from the set agenda can be made in order to explore new and particularly interesting points raised in the course of each interview [32].

The second stage concentrates on the CSFs for outsourcing delivery. The interviews lasted about two hours each, one hour per stage. The first person interviewed was the IT worker to get a general overview and to validate the pertinence of the questions [32]. The last interview was with the most experienced person (head of the business department) to elucidate uncertainties (until data saturation is reached). Finally, in order to verify the results, the developed model was sent to all participants for comments and will be sent to the company for final approval [32]. The analysis of the gathered data is being fully incorporated in a refined conceptual framework. In summary, the systematic literature review indicated potential critical success factors; the interviews gave the chance to validate and test these initial findings in order to come up with a solid set of factors for success in IT outsourcing.

IV. Towards a new Process Model for IT Outsourcing in the Automotive Industry

The primary research phase of this project focuses on eight interviews that have been undertaken as sub-cases. All interviewees have been anonymised, using the acronym P1 – P8, but Fig. 1 provides job titles and functions in the overall process. Analysis of this interview material suggests the following answers to the research questions.

A. Research Question 1: What are the main stages in the IT outsourcing process in the German automotive industry?
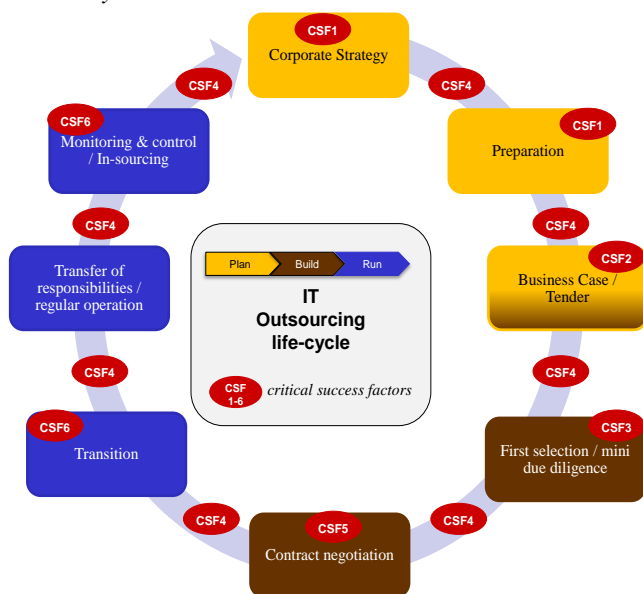

Figure 2. Initial Conceptual Model based on Plan-Build-Run Concepts

Interviewees were asked for their personal understanding of IT outsourcing. In general, the poor definition suggested in the literature review was confirmed. Each participant gave a different definition of the term "IT outsourcing". However, there was some common ground in all interviewees' perceptions, notably that the concept involves a transfer of a defined set of tasks to an external service provider. The main stages of the life-cycle garnered from the literature review were generally confirmed as logical and realistic. There is a correlation between the field of activity of the interviewee and his understanding of the overall process. Based on his practical experience and field of activity, P1, for example, described IT outsourcing as starting after the end of the 'build-stage'. For P1, IT outsourcing is a corporate strategic objective, which *has* to be realized. Consequently, P1 has no influence on the outsourcing decision itself. However, P1 is charged with determining 'how' the new service will be delivered. This implies that P1 has, in the main, two dimensions of activity:

- Design of the operational service (e.g. meeting structure, communication channels, setting up an operational manual)
- Setting up and measurement of service level agreements (SLAs) with service providers.

P4, however, has a very content-driven understanding of the life-cycle. For P4, IT outsourcing consists of twelve stages, starting with the analysis of the service providers' offers and ending with the completion of the transition to the third party and associated knowledge transfer process. The influence of professional background can again be seen in P4's perception of the overall process. Somewhat to the contrary, three interviewees (P2, P3, and P8) had a more top level or superficial view of the process.

Overall, however, the conceptual framework and the provisional stages in the outsourcing process were generally confirmed in the first hand interviews, with the addition of three new concepts or developments, and one new stage.

The first one new concept concerns the influence of mental models or preconceptions that each stakeholder may have regarding the outsourcing process. For example, P3 stated that "…the specific understanding of circumstances that people have, has to be considered continuously during the entire process starting even before the strategy is agreed…"

Second, some interviewees suggested that the transition stage could usefully be subdivided into two stages: transition and transformation, and this is reflected in the new model with transformation being a new stage 7 (Fig. 3). P8 distinguishes between 'transition' - "…the switch of the responsibility of the service from the client to the service provider…", and 'transformation' - that reflects the internal processes of the service provider to "…integrate the new process to the existing procedures and standards".

Third, the 'mini due diligence' stage could perhaps be relabelled. P8 noted that the investigated organization uses the term 'due diligence' as 'mini' may imply a short time phase or lack of significance (Fig. 3).

B. Research Question 2: What are the CSFs for IT outsourcing performance in the German automotive industry?

As already noted, the systematic literature review indicated possible critical success factors for the outsourcing process (Table I). The interviews afforded the opportunity to test out and/or validate these initial findings, and also to explore and develop new CSFs. The interviews by and large confirmed the initially developed CSFs but also generated some new ones. The eight interviewees mentioned a total of 79 CSFs.

Interview analysis has also reinforced the linking of specific CSFs to particular stages in the emerging process model; and some CSFs were clearly viewed as more significant than others. 'Proper communication and information' (CSF4), for example, was named by all participating persons. P2 suggested a development of this to introduce a transparent escalation structure, based on role and seniority, with the aim of protecting subordinate structures. New CSFs include the 'culture of trust' between the outsourcing partner and the outsourcer. In this context, P2 suggested team building activities to develop a feeling of solidarity and appreciation on both sides.

C. Research Question 3: Can a new process model be constructed for IT outsourcing in the German automotive industry that helps ensure quality outcomes and deliverables?

The main expected contribution of this research is to propose and develop a new conceptual process model for IT outsourcing in the German automotive industry. The contribution to knowledge builds on the exploration of the key steps and stages and their associated core activities, results and deliverables, and the relationship between them in IT outsourcing projects; and on an examination of the provisional CSFs and their development into a more concrete set of CFSs for maximizing IT outsourcing project quality outcomes. This is being achieved by studying the relationships between CSFs in different outsourcing stages, defining points of interconnection and establishing ways in which the process model can be used to improve quality outcomes and thereby reduce IT outsourcing project failure rates.

Taking into account the specific needs of IT outsourcing, and building on the provisional conceptual model, a generic overall process model can be constructed comprising nine stages: 1. Corporate Strategy, 2. Preparation, 3. Business Case / Tender, 4. First selection / due diligence, 5. Contract negotiation, 6. Transition, 7. Transformation, 8. Transfer of responsibilities / regular operation & innovation, 9. Monitoring & Control / In-Sourcing.

The mapping of the CSFs onto these stages in the process accommodates a significant number of new CSFs that were identified in the interviews (Fig 3). These are classified as "confirmation (c)" or "new (n)" CSFs in Table II, with provisional revised numbering shown in the right hand column. These have been applied to stages one and two in the process model as an example of the possible linkage
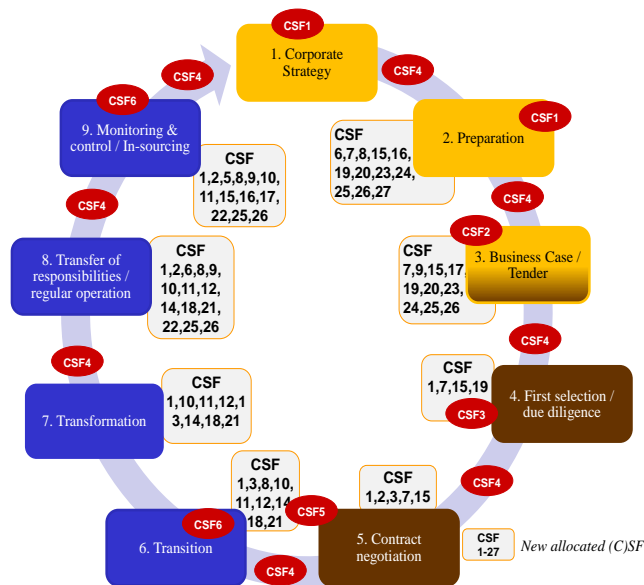

Figure 3. Nine-stage Process Model and (C)SFs

between CSFs and project stages (Table II).

Transparency was highlighted as a key factor. One respondent suggested that the existence of different mental models (mind sets) of stakeholders in IT outsourcing projects occurs out of a lack of transparency. Other major issues highlighted were proper communication and the availability of information regarding strategic alignments. Respondents indicated as many as 15 CSFs within the preparation stage. CSFs in this stage mostly concern the quality of the tender (e.g. by understanding the customer requirements) and the early definition of fall back scenarios if the outsourcing fails.

Respondents identified the standardization of documentation and harmonization of services as one of the main factors that can improve the quality of the service in stage 3 (business case development and tendering). This is reflected in CSF 19, which proposes an evaluation matrix for a transparent and comprehensible selection process of the service provider. With regards to stage 4 (the first selection / due diligence), this CSF also has a major bearing as both sides (client and service provider) get to know each other's views and positions for the first time.

Contract negotiation (stage 5) is characterized primarily by two tendencies epitomized in specific CSFs: transparency of operations and clarity of understanding of the substance of the outsourcing detail and organizational conditions. Integration of the procurement function as part of the overall outsourcing process is seen to have significant administrative and synergetic benefits.

For transition (stage 6), respondents highlighted CSFs with a strong human resource element e.g. "…encompass personal change processes of affected people…" and "culture of trust on both sides". Participant responses suggested that interpersonal relationships constituted the largest risk of failure in this stage. The same applies to the new stage - transformation (stage 7): the service provider integrates the new processes in their work routine including

the definition of the interfaces with customer personnel (be they retained by the customer or acquired by the provider).

Stage 8 focuses on the regular operation of, and innovation within, the new outsourced arrangement. Next to interpersonal factors, which play a critical role in this stage, the successful processing of new requirements and new technology developments during the contract period is a key contributor to deliver overall project success. The operation of the control model and the mapping of change requests into the tender/contract also surface as significant challenges. Stage 9 encompasses on-going monitoring and control activities as well as consideration of the option of in-sourcing. Clarity and transparency concerning strategic orientation (CSF 1a) is key for all stakeholders; and the business case has to be periodically revisited and questioned (CSF2). New service options may arise (e.g. offshore options), which were not an alternative at the start of the contract, and these need to be assessed. Transparency and clarity of communication and information (CSF4) are perceived as critical in this final stage of the outsourcing life-cycle.

Table II. CSFs for Stages 1 & 2 in the Conceptual Model

	n/c	Content	CSF
Stage 1	c	• Transparency concerning: ○ the strategic orientation ○ internal IT performance ○ customer requirements	CSF 1 CSF 1a CSF 1b CSF 1c
	c	• Proper communication and information	CSF 4
Stage 2 Preparation	c	• Transparency concerning: ○ the strategic orientation ○ customer requirements	CSF 1 CSF 1a CSF 1c
	c	• Economic point of view: value for money (management of costs)	CSF2
	c	• Proper communication and information	CSF 4
	n	• Service control and lessons learned (e.g. define service level agreements, documentation, etc.)	CSF 6
	n	• Include all knowledge carriers to improve the quality of the tender (e.g. controlling for the business case calculation)	CSF 7
	n	• Accompany the personal change processes of the affected people	CSF 8
	n	• Clear understanding concerning the support services of the procurement department (in scope / out of scope)	CSF 15
	n	• Early involvement of involved departments, e.g. the procurement department as a basis for bundling activities and achieve synergies	CSF 16
	n	• Development of a catalogue of criteria including qualitative and quantitative issues to evaluate the tenders and service providers	CSF 19
	n	• Tender documents comply with current standards, guidelines and criteria of the company.	CSF 20
	n	• Consideration of exit strategies	CSF 23
	n	• Definition of a fluctuation rate by the contracting authority	CSF 24
	n	• Clear definition of a control model and their mapping in the tender	CSF 25
	n	• Handling of new requirements and new technologies during the contract period	CSF 26
	n	• At the project level: definition of fall back scenarios, if the outsourcing fails	CSF27

V. CONCLUSIONS AND FUTURE WORK

The process model developed to date has built upon existing literature, and initial findings have been developed and verified through detailed interviews with outsourcing participants. This model is now viewed as a suitable basis for further analysis of each of its nine stages, in which sub-processes can be identified, allied to further definition and development of CSFs. This allows the development of templates and guidance materials to aid practitioners in the IT outsourcing process in the automotive industry.

Interviewee analysis has supported a new definition of IT outsourcing. Despite differences in perception of what the concept is, there is some common ground in all interviewees' understanding, notably that the concept involves a transfer of a defined set of tasks to an external service provider. After a process of identification of key themes, and feeding back options to participants, the 'best fit' definition is that "IT outsourcing is the transitioning of IT services to an outside vendor with the aim of creating value for customers and providing services based on a previously defined sourcing strategy and clearly formulated core competencies, encompassing budget and headcount issues, risk management, future control and communication processes". As regards the large number of CSFs that surfaced in the initial interviews, an onion model to validate the importance of named CSFs within the interviews was developed. This combines the frequency a single factor was named by the participants with the frequency of occurrence within the life-cycle. This has allowed the development of hierarchical tiers of success factors, with tier 1 being most important and tier 5 least important (Fig.4 and Table II), and only tiers 1 and 2 being deemed critical as discussed by Delmour [33]. Tiers 3 to 5 are seen as important influencing factors but not critical to project success, productivity and sustainability.

As one of the visionaries of recent times in the IT and business field has noted, "there is no relationship between expenses for computers and business profitability…..You
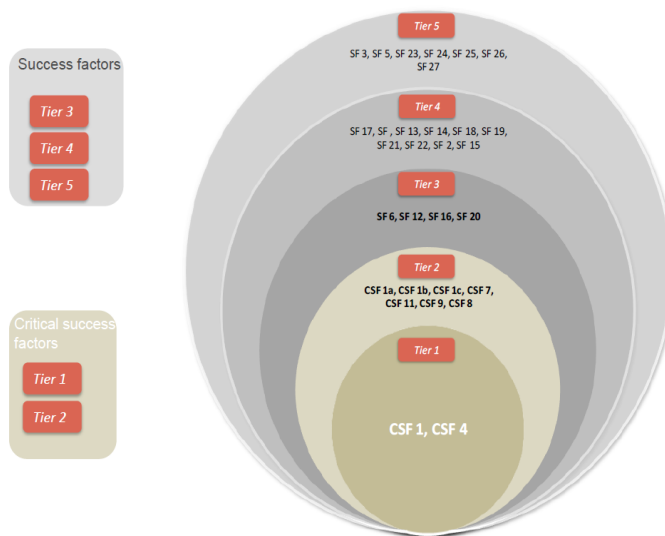

Figure 4. (C)SF Tier Model

will find that similar computer technologies can lead either to monumental success or to dismal failures."

Paul Strassmann [34] highlighted the importance of the management of the IT function and related processes in determining success or failure. This is particularly true of outsourcing operations, and the history of IT arguably evidences more outsourcing failures than successes. This research attempts to contribute to improving the outcome of IT outsourcing in the automobile industry. Results to date provide the platform for the future development of a range of learning materials to guide practitioners working in this field.

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