# AN EVALUATION OF STRATEGIC METHODS OF COMPLEXITY MANAGEMENT TO MANAGE LARGE OUTSOURCING PROJECTS SUCCESSFULLY

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**Abstract:**
The scope of this paper is to evaluate specific methods of complexity management used in long-term and large-volume outsourcing situations; these methods are created to handle uncertainties and unknowns. These strategic methods will be evaluated and compared with regard to their effects. Based on a literature review, the main complexity management methods will be analysed and will be compared with the strategic recommendations in outsourcing situations. By using an evaluation model, the methods of complexity management will be put into the context of a specific case of project management. The main finding is that some methods are very suitable, for all involved parties, to be established on a strategic level in real-life outsourcing deals. The results can be used in the set-up process of an outsourcing project, to avoid a complexity trap for the involved parties and make the whole undertaking manageable.

*Keywords: outsourcing projects, complexity management methods, complexity management evaluation model, tools of strategic management*

# 1. INTRODUCTION

The technological, global, demographic and economic development causes complexity in all areas of life, also in business situations. Reasons for this increasing are greater interdependencies, more data, more information, more knowledge, increasingly faster response times, more intangibles and less predictability. Other major causes of increasing complexity are, among others, strategic alliances, and outsourcing functions to third parties (Castellano, 2014). This means, that the motivation for "Outsourcing" is the existing complexity, but the outsourcing projects are very complex by themselves, especially if they are large in volume, in big organizations with many stakeholders and with a long-time perspective.

"Complexity has received wide attention from practitioners and academics alike. We have made significant progress in understanding the different aspects of complexity in projects, programmes and portfolios" (Oehmen et al., 2015, p.3).

In a real complex world there is always chaos. Apparent planning collateral arises only if one separates artificially the complexity of things (Vollmer, 2014).

The main question is, how complex can be projects under these conditions and their management and control? In science, some approaches have been only in the last few years formulated, to analyze complexity in projects and project organizations. Strategic options for action, that can be used in project management practice, do not yet exist so far. In an outsourcing environment, success factors were compiled from different perspectives. The following analysis is used to transform this success criteria on tools and methods of management, which are focused to manage uncertainties.

"Future research should continue to investigate how to mitigate or manage the operational day-to-day uncertainties with the long-term strategy of a company [...]. There is also a need for more research into what alternative strategies are available" (Nordigarden, Rehme, Chicksand, 2015).

Project management requires an intelligent and basic way to address the challenge of dealing with complexity (Dalcher, 2015).

## 1.1. Strategic Management methods in Outsourcing situations

For this paper the current state of research in 2015 was analyzed and used as a basis for the following analysis. The focus is on long-term-oriented methods, Complexity management for decision-making is excluded in this research (Budde, Nagler, Friedli, 2015).

*Project management in Outsourcing projects*

Mohd Ghozali Hassan et al. published in 2015 the paper *Practises Project Management Strategies in Outsourcing Best Practise*, in which different parameters were evaluated by outsourcing experts (Hassan et al., 2015). The result is comparable with similar studies in the past. Implication were seen in the following variables:
- Dependence and supplier-manufacturer relationship
- Communication behaviour and supplier-manufacturer relationship
- Supplier-manufacturer relationship relates to outsourcing success
- Environmental dynamism factor with supplier-manufacturer relationship and outsourcing success

Based on this analysis the following project management strategies were derived:
- Communication Management
- Performance Management
- Knowledge Transfer Management
- Relationship Management
- Crisis Management
- Risk Management
- Cost Management

In Table 1 below, these strategic recommendations are defined in more detail.

**Table 1:** Recommended strategies in outsourcing

| Strategy | Description |
|---|---|
| Communication Management | A bi-directional focused communication at all stages of the project supports a joint project success and avoid misunderstandings among the participating stakeholders. |
| Performance Management | An establishment of a permanent review of the project quality and adherence to the compliance allows to evaluate the performance of the project. |
| Knowledge Transfer Management | A continual knowledge transfer enables an increasing of the total project quality and ensure the agreed timeline. |
| Relationship Management | A distinctive respect management supports the project success. This can occur through continuous transparency and regular communication. |
| Crisis Management | A crisis management must be built up from beginning, around in case of the entry of a crisis the partners are prepared to continue the business. |
| Risk Management | A risk management support that potential risks can be identified and minimised and possible "back up" plans are provided. |
| Cost Management | All partner should reach their respective cost aims, so it is necessary that the costs are analysed constantly. |

Source: own text, 2015 (derived from Hassan, Ojeniyi, Razalli, 2015)

These strategy definitions will be used and reflected in the following study.
Such large-scale projects are often called mega-projects. Naomi J. Brookes analyzed this specific kind of projects and emphasizes that these mega projects are united by their extreme complexity (Brookes, 2015).

The business environment can be considered as a system. It is useful to break the system down to and assess it in an analysis on 4 different levels:
- Enterprise level
- Product / service level
- Business process level
- Technology / infrastructure level (Andler, 2015, p. 335).

Another approach to the classification, in the context of the systemic approach, is presented by Can Sun and Thomas Rose. Here, the overall architecture is divided into the following levels:
- System
- Subsystem
- Component
- Part (Sun, Rose, 2015)

*Management concepts with uncertainties and complexities*

First, for further scientific discussion, "Strategies for coping with complexity" were analyzed and presented. Wolfgang Vieweg has defined, based on past research objects, six main strategies (Vieweg, 2015, p.29):
- High sensitivity: pay attention to weak signals, establishing a broad radar, high attention and mindfulness.
- Interpretation of information, thinking through and play through of possible consequences, create and study the connections, promote variety of thought (simulation).
- Management is a permanent process of progressing and the road map is drawn just during the course of the process.
- Flexibility as perspectives change, from the view of the involved parties and contacts.
- High responsiveness by high problem solution ability and increased inside complexity (resources, potentials and options).

- Higher security to be able to master uncertainties better (stability and mistake tolerance).

A current method is presented in the following Table 2.

**Table 2:** Developed and recommended method: "LFP"

| Concept / method | Author | Description of the method |
|---|---|---|
| LFP (light footprint strategy): | Vieweg, 2015 | This method is originally based on the VUCA concept, which was developed in 1995 by the military and was always developed during the past years.<br>- V: Volatility<br>- U: Uncertainty<br>- C. Complexity<br>- A: Ambiguity<br>Basic idea is the thinking in options and chances. The management observes emphatically the development and investigates, preparations are made for well-thought-out options in parallel, at the right moment, measures will be initiated to perceive an expected chance. |

Source: own table, 2015

Nils Pfläging and Silke Hermann developed a new special concept, in which complexity and methods were linked, in German: "Komplexithoden" (translated: methods of complexity). Besides, three basic adjustments are pursued:
- Methods for performance
- Methods for agility
- Methods for learning

Within these basic adjustments concrete proposals for methods were developed (Pfläging, Hermann, 2015). Due to the limited extent in this research and paper, only three methods for each strategy category are listed and analyzed.

**Table 3:** Developed and recommended method: "Komplexithoden"

| Concept / method | Author | Description of the method |
|---|---|---|
| Bundle of complexity methods German wording: "Komplexithoden" | Pfläging, Hermann, 2015 | Methods for performance:<br>- Due to the uncertainty of the current status and future influences and developments only "relative targets" are set by management.<br>- Individual and team performance is measured also "relatively". This promotes dialogue within the team and prevents the simple assessment of the management level.<br>- Value-Based Pricing: This method means to know your customers benefit perception and identified with. The offer to the customer are aligned to these individual needs.<br>Methods for agility<br>- Dissolution of workplace: An intelligent work setting is to establish through geographical, temporal, and oriented to the needs of the value-added flexible design.<br>- Agile project work: This method supports social density, collaboration and self-control system in the project situation and promotes response capability, dialogue and innovativeness.<br>- Sense-making: Permanent questioning of assumptions and evaluation of the situation is the focus of this method. This can be carried out by repeated questioning with the different forms of "why".<br>Methods for learning<br>- Informal structure work: Every organization has got an informal structure. A healthy network pattern is |

| | | characterized by a balance of strong and weak links, as well as permeability and stability. |
| | | - Communities of Interests/Practice<br>The organization should create open spaces, where the know-how colleagues, experienced staff and groups organize themselves. |
| | | - Cultural observation:<br>Shared values, behaviour and rituals can be conditionally observed "from the outside" and also evaluate partially. If someone want to change the culture, concrete measures in the organization need to be made. |

Source: own table, 2015

Martin Wallner and colleagues published the current state of research on complexity management, with a focus on "supply chain management" (Wallner et al., 2015). After an extensive analysis of the external and internal complexity drivers, a method for visualization is presented. Based on this, methods for "change / reduce complexity" are discussed in detail.

These methods are designed for the strategy "Complexity design":
- Product/value analysis
- Equal parts management
- Classification and prioritization
- Order penetration point
- Supply chain design

The following methods were created for the strategy "Complexity control":
- Project planning
- Changing demand
- IT as an enabler
- Logic of communication

**Table 4:** Developed and recommended method: "Complexity design"

| Concept / method | Author | Description of the method |
|---|---|---|
| Methods for the strategy "Complexity design": | Wallner, et al., 2015 | - Product/value analysis<br>The aim is to carry out a value-oriented analysis and product design in order to reduce complexity.<br>- Equal parts management<br>Components of products are used in various products; This has a direct impact on the manufacturing process.<br>- Classification and prioritization<br>Products and processes are - based on the value-added content - analyzed and classified. Subsequently, appropriate measures are derived from the result.<br>- Order penetration point<br>Incoming orders were separated, based on specified criteria. This allows an efficient processing of standardized production units.<br>- Supply chain design<br>(Re-)design of supply chains in order to increase the efficiency and effectiveness. |

Source: own table, 2015

**Table 5:** Developed and recommended method: "Complexity control"

| Concept / method | Author | Description of the method |
|---|---|---|
| Methods for the strategy "Complexity control": | Wallner, et al., 2015 | - Project planning<br>The use of milestones are effective control mechanisms in the projects, in order to manage the complexity between the various planning and management layers. |

| | | - Changing demand<br>In Demand Management intelligent incentive systems should be established to enable that customer requirements can be structured and incorporated stably and forecasts are drawn up in order to avoid unpredictable effects in the processes.<br>- IT as an enabler<br>Many business processes are activated mainly through the application of information technology (IT). Rapid data access and integration of IT are key elements for the prevention and control of complexity.<br>- Logic of communication<br>The quality of shared information is of great importance. For this rules and regulations are to create in order to ensure that the transmitter and receiver interpret the information correctly. |
|---|---|---|

Source: own table, 2015

## 1.2. Pre-conclusion

The different methods and concepts have different general approaches. The LFP method is not so concrete in comparison to the other approaches, however, primarily supports the procedure, with future uncertainties. The "Komplexithoden" are rather derived methods from other science disciplines which support a complexity management. "Komplexithoden" have a very different character; on the one hand concrete recommendations "establishing complexity meetings" are recommended, on the other hand rather vague methods such as "culture observations" are suggested. The methods of Wallner and co-authors constitute similar concrete methods to support a complexity management (Wallner et al., 2015). The classification in the objective for "Control complexity and communication complexity design" cannot be considered exactly separated. A comprehensive implementation plan is very poorly developed in all methods. The enrichment of complexity management methods to the system-oriented dimensions would be useful, to assign the measures according to the observation levels. An effective project management system allows to manage the numerous difficulties in complex projects (Xie et al., 2009).

## 2. COMPLEXITY MODEL TO EVALUATE METHODS AND CONCEPTS IN OUTSOURCING SITUATIONS

### 2.1. Research logic of the Complexity evaluation

In Table 1 there are presented seven strategies. These recommended strategies have been identified as success criteria for outsourcing projects.

From another perspective of science, the complexity management provides different methods and concepts. The current state of the research was analysed and shown in chapter 1. The presented methods are used in the following study.

In this paper the possibility of the methods to support the strategies of Outsourcing to projects will be evaluated. In Picture 1 the assessment module is shown figuratively.

**Picture 1:** Model to evaluate the methods and concepts of complexity management for Outsourcing projects
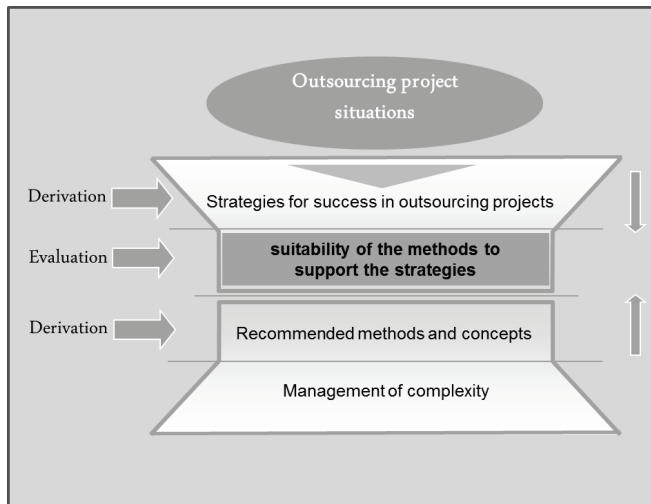
Source: own graphic, 2016

## 2.2. Planning and execution of the study

First, the reference for this study is defined and described.

*Use case Outsourcing project*
- Outsourcing of IT services, with 150 different concrete services
- Worldwide distribution of customer locations in 25 countries
- Slightly pronounced governance and standardization before the outsourcing project in the customer organization
- The organization of the outsourcing provider and of the customer are large companies with more than ten thousand employees, headquarters of each organization is established in Europe
- Industry of customer: Electrical Engineering
- Around 500 employees change the employment relationship, as part of the outsourcing project
- Period of Transition (furthest freezing of the current state, however, the operational responsibility changes to the service provider) is planned for two years.
- Period of the transformation phase (deployment of the existing customer environment in the FMO (Future Mode of Operation) environment.) is planned for three years.
- Project participants in both organizations: each about 300 (in addition to the employees who change the company)
- Deal volume in five years around € 1 Billion, contractual arrangements are written in a total of 3500 pages.

*Execution of the study*
The study was carried out in the period of time from November to December 2015 in Germany.
The 50 participants have a minimum professional experience about 15 years in the Service-, Delivery Management in a large-scale business environment and are European citizens.

*Assessment logic in the evaluation of participants:*
- 0 points:     The concrete method cannot support the outsourcing strategy
- 10 points:    The concrete method can support the outsourcing strategy to a high degree.

*Evaluation logic:*
About all individual values the average was calculated and rounded on one decimal places.
The results are averaged among all participants. To compare the effects to the different strategies, the values are summarized at the end of the table. To evaluate the different methods separately, the values were also calculated and presented on the right hand side of the table.

In the following table the results are presented in detail.

**Table 6:** Results of these study

| Methods and concepts of complexity | Outsourcing strategies | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Communication Management | Performance Management | Knowledge Transfer Management | Relationship Management | Crisis Management | Risk Management | Cost Management | average of the method |
| LFP (light footprint strategy) | 3,2 | 3,4 | 3,3 | 3,1 | 3,0 | 6,5 | 7,6 | 4,3 |
| "Komplexit-hoden" | 9,3 | 9,2 | 9,5 | 9,0 | 9,0 | 9,4 | 9,2 | 9,2 |
| Methods for the strategy "Complexity design" | 4,0 | 4,3 | 4,5 | 4,5 | 4,3 | 4,9 | 7,4 | 4,8 |
| Methods for the strategy "Complexity control" | 9,6 | 9,4 | 8,9 | 8,8 | 9,0 | 8,8 | 9,4 | 9,1 |
| Average of the strategies | 6,5 | 6,5 | 6,6 | 6,4 | 6,3 | 7,4 | 8,4 | **6,9** |

Source: own schema, 2015

## 2.3. Interpretation of the study results

The "LFP method" supports the outsourcing strategies only very limited (average value 4.3). Only "Risk Management" and "Cost Management" have values more than 6. The process model LFP allows that expenses and costs can be prevented, which is caused by a classical project planning with fixed milestones, in an uncertain environment (value 7.6). The "Risk Management" is supported, in the majority of potential risks can be avoided through the specific "step by step" procedure model. The "Komplexithoden" are valued consistently very high (average value 9.2). The interpretation is that the methods have a very extensive focus. Likewise, it should be emphasized that the content coverage rate of individual elements is almost identical to the strategies (for example performance management).

The "Methods for the Strategy - Complexity design" are, with one exception, rated rather low (average value 4.8). Only the support of the "Cost Management" is highly rated with the value 7.4 because the content of individual elements of the method highly targeted supports the strategy, for example "Product / Value Analysis". The "Methods for the Strategy - Complexity control" was rated with the average value 9.1 also very high. Some methods effect very directly and immediately to the outsourcing strategies, for example communication, the other methods, for example demand and project management are key issues in outsourcing projects.

## 2.4. Pre conclusion

As an overview, the current methods of complexity management are valued with an average value of 6.9 out of 10 points to be achieved. It is noteworthy, that two methods (packages) are evaluated on a high effect and two other methods (packages) on a very minor effect is attributed in outsourcing projects. The differences within of each complexity method are (with 3 exceptions) less than 1. It is concluded that the suitability of the method is assessed in each case on almost the same level. The strategic objectives "Cost Management" and "Risk Management" are most supported by the methods. When assessing the results, it must also be considered that there are individual characteristics that need to be specified in more detail in an application; these are, for example, the type of outsourcing project, the scope, the business sector and company-specific characteristics. The selected methods

are very different in the procedure, the reason for this is among other things, the different origin and history of the developed method. It is helpful to make an enrichment by adding an additional structure, for example, the systemic approach. This accumulation is a recommendation for the development in future research.

## 3. CONCLUSION

The conducted literature review has shown that the complexity management (also) has evolved scientifically in 2015. This answers the results of Bauernhansl's study from 2013, in which directors and executives of leading German industrial companies were interviewed and 82% of respondents answered that the relevance of complexity will increase in future while 56% of all respondents indicated that they don't have any method or IT system to deal with the complexity (Bauernhansl et al., 2014). Other researchers, like Rocha, developed different approaches by proposing a governance solution to the problem (Rocha, 2014). It must be emphasized that the approach often varies in content and that the individual methods approaches increasingly more different disciplines integrate, for example, "IT as enabler to and cultural aspects). A further development for complexity management for outsourcing projects has not taken place in 2015. The study in this paper proves that complexity methods also can be purposeful applied in outsourcing projects and that the desired effects are achieved.

A further development of the complexity model can be carried out in which the individual criteria are further specified and it is applied in further examinations. For the application of complex methods in outsourcing deals need to, due to the duration of these projects have a long-term character.

The future research should continue to develop the high-rated complexity methods for these kind of projects. Likewise, the methods should be supplemented by concrete implementation measures. Furthermore, the external factor which has a significant role in the provision of services, should be more integrated in future research. A holistic approach is currently developed by Marston Johnston and Rodney L. Stevens in 2016 with title: "A systematic approach to analysing environmental issues involving complex systems", in which the environmental systems of the involved stakeholders are characterized with corresponding criteria, like "Large-scale and long-term", "Multicomponent", "Real world conditions", "Multiscale and multidisciplinary" and "Multivariate and nonlinear".

Also an integration concept of these methods in outsourcing projects must be scientifically drawn up and prepared for practice.

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