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Coping with IT Carve-out Projects – Towards a Maturity Model

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Abstract. The management of IT carve-out projects is very challenging due to the strict time frame, the severe contractual penalties, the huge number of stakeholders and the various as well as unique IT tasks that have to be conducted. Up to now, there is no instrument for evaluating the readiness of the IT for a carve-out and also not for managing such a project. In order to address this, we develop a maturity model based on expert interviews and a literature review on success factors of IT carve-outs. The elements as well as the usage of the IT carve-out maturity model are explained. The maturity model has been evaluated theoretically based on design principles and during a case study in the financial services industry. The developed maturity model can be used by practitioners for the management of IT carve-outs and also by researchers to examine IT carve-outs in empirical research.

Keywords: IT Carve-out, Project Management, Maturity Model, Success Factors, Financial Services Industry

1 Introduction

The management of IT carve-out projects is very demanding. Many case studies can be found in literature where the IT carve-out project caused major challenges [1-3]. The term IT carve-out refers to the operational activities to separate an organizations information systems (e.g. an ERP system) in the course of a divestiture [2, 4]. Depending on the carve-out approach, information systems may need to be duplicated or discontinued, data must be cleansed and temporal access to former systems might be required. They are different to other IT projects due to the strict time frame, the severe penalty clauses that could arise, if targets are not met, the huge number of stakeholders and the numerous as well as unusual IT tasks that have to be conducted [4, 5]. Furthermore, the IT carve-out project often represents the largest share of the total carve-out costs [4].

Since the first version of the Capability Maturity Model (CMM) has been introduced by the Software Engineering Institute in 1991 [6], more than 150 maturity models have been developed for several domains [7, 8]. They are useful instruments for the management of IT, because they assess the as-is situation and show areas for further improvement [7, 9].

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Up to now, there is no instrument for evaluating the readiness of the IT for a carve-out and also not for the management of IT carve-out projects. A maturity model could address these issues. It could be used during the due diligence and the planning of the carve-out to obtain knowledge about the readiness of the IT for a carve-out. This prevents unrealistic time frames and therefore decreases the probability that penalty clauses arise. Furthermore, a maturity model could be useful during the execution of the IT carve-out as it would give advice which IT tasks have to be conducted and which ones should be addressed first. All in all, a maturity model for IT carve-outs would decrease the IT carve-out costs and increase the likeliness for a successful overall demerger. Therefore, the aim of this article is to develop such a model for project managers that prepare or conduct an IT carve-out.

As this article follows a design science research (DSR) approach, it is structured similarly to the publication schema for a DSR study of Gregor and Hevner [10]. First, there is a brief overview of IT carve-outs and a literature study about their success factors. These factors form the basis for the construction of the maturity model, which is explained in the next section. After that, the developed IT carve-out maturity model is presented and explained. Then, there is a theoretical and a short practical evaluation of the model. Finally, implications as well as limitations and possible further research are discussed.

2 State of the Art of IT Carve-outs

Cascorbi [11] and Böhm et al. [2] define "demerger" as the separation of an organization into several independent parts. A carve-out "covers all operational activities needed to implement a demerger" [2]. A similar definition is used by Cascorbi [11] for "disintegration". The IT carve-out is part of the overall carve-out and focuses "on the separation of all information and communication technology related issues […] due to the fact that they cannot be shared any longer" [4].

In general, mergers and acquisitions as well as demergers are common measures for multi-business organizations to adopt a new strategic orientation [12]. Worldwide, roughly 12.000 demergers took place every year between 2006 and 2010 [13]. There are several reasons for demergers: the strategic business unit (SBU) is not anymore core to the business strategy of the owner, the need for cash or capital by the owner, weak economic results of the SBU or the SBU is too risky for the owner [4, 11]. After the carve-out, the SBU is either operated as a new standalone business or it is integrated in another multi-business organization [14]. No matter which of the two strategies is chosen, an IT carve-out has to be conducted as the operations of large organizations cannot be conducted without information systems [3].

A literature review about success factors for IT carve-outs has been conducted, because they show which capabilities are necessary for a successful IT carve-out and therefore form the basis for the development of a maturity model. The key words, that were used on the databases "google scholar", "Emerald", "ACM Digital Library" and "EBSCOhost" consisted of a combination of different expressions for IT carve-out ("IT carve-out", "IT disintegration", "IT demerger") and for success factors ("success

factors", "success", "best practice", "guidelines"). They led to 266 publications, but many of them were irrelevant, because most search engines are case insensitive and interpret "IT" as "it". Therefore, the titles of the publications have been checked to sort out undesired ones. Then, the remaining publications have been screened in detail. In total, 13 relevant publications have been identified. Six of them are reports from consulting companies or research institutions [5, 15-19], three are conference papers [1, 3, 4], one is a book [20], two are from business journals [21, 22] and one has been published in a scientific journal [23]. The identified success factors should be generalizable, because none of the publications focused on a specific industry. Case studies or expert interviews have been employed as research method most of the time. The identified success factors have been grouped in a concept matrix after Webster and Watson [24], which is not presented here due to length restrictions. A new concept of success has only been added to the matrix, if it has been mentioned by at least two of the 13 publications. For example, the consideration of IT security during the IT carve-out project as a success factor has only been named by Matthes et al. [17]. The following concepts have been identified:

Future IT Landscape. The demerger might change the business models and therefore also the required IT landscapes of the buyer and the seller [1, 5, 19]. They should be designed at the very beginning, as they influence the scope of the IT carve-out [18, 20]. The design has to consider the current state of the IT landscapes [21] and should focus only on the truly needed requirements [18].

Collaboration between Seller and Buyer. It is necessary that the needs of the seller and the buyer are harmonized, because otherwise huge problems and redundant work could occur [4]. Leimeister et al. [23] state that open communication and close collaboration should be established. A good way to do this, is an agreement that unanticipated costs and savings are shared between the seller and the buyer [23].

IT Awareness. The IT carve-out should be a fully recognized project with its own dedicated resources [4, 18]. Additionally, IT representatives should be involved in the decision-making team and an IT due diligence should be conducted, because this ensures that IT is considered adequately [4, 5, 17-19, 21-23]. The fact that the IT of regional subsidiaries might significantly differ from the central systems has to be considered during an IT carve-out [3, 4, 23].

Resources for the Project. The IT carve-out know-how of the employed resources has a huge influence on the success [4, 19, 21, 23]. However the appropriate know-how might not be available within many IT departments, because an IT carve-out is not routine business. The employment of external consultants can fill up this knowledge gap [4, 17, 19, 23], but it is necessary that these external resources are monitored by internal staff [17]. Another important point is, that there is sufficient knowledge about the current IT landscape within the carve-out team [15].

Project Management. An IT carve-out is different from normal IT projects as the time frame is shorter, the scope is bigger, there are more stakeholders and the risks are greater [5]. Because of this, an effective and efficient project management is very important [4, 5]. Extensive planning and to phase the project is also advisable [18, 19, 22]. The planning should be based on the future IT landscape and consider possible "Quick Wins", that could be realized [20].

IT Carve-out Organization. The organization of the IT carve-out should be set up in a way that there are short escalation paths and that decisions are made quickly [4, 5, 18]. It is also necessary to have a clear organizational structure with defined responsibilities [17, 19] and there should be dedicated managers that are responsible for the IT carve-out in the regional subsidiaries, if the regional IT differs [23].

Transitional Service Agreements (TSAs). The employment of TSAs makes the separation of the IT easier, because the applications and data do not have to be physically separated when the ownership of the SBU is transferred [3, 22, 23]. However, they can be risky as they "lock the seller into the status quo" [23]. Therefore, the TSAs should be flexible and only comprise services that are truly needed [5, 15, 18, 23]. The design has to cover the following areas: service definition, service levels, duration, pricing, exit-cost relief and exit support [18]. A seller with experiences as an external IT service provider is more likely to establish well-designed TSAs [23].

Integration of Information Systems (IS). If the IS of the SBU are not heavily integrated or even completely separated from the parent, the complexity of the IT carve-out decreases, because they can easily be decoupled [1, 3, 5, 16, 20]. A modular design and well-designed interfaces facilitate the separation [15, 17]. However, simply cloning shared IS before an IT carve-out might not be a good solution, if the systems are oversized for the SBU [20].

Documentation. Documentation is critical because of two aspects. First, an up-to-date documentation of the IT landscape eases and speeds-up the IT carve-out, as it is needed for the due diligence, the contract negotiation and the planning of the carve-out project [17, 23]. There should be documentation about the business processes, the applications, the infrastructure and the IT organization [21]. Second, documentation should be used for cloning the know-how for the management of the IT of the SBU. This duplication of know-how is necessary in order to preserve it in the seller, but also to transfer it to the buyer [3].

IT Contracts and Licenses. It has to be ensured that the IT contracts and licenses that are needed by the SBU are transferred and that those which are unnecessary are cancelled [20]. An up-to-date inventory list of the employed contracts and licenses can be of value in doing so [17]. It is a good idea to proactively include clauses in the contracts that deal with the transfer or the cancellation [17].

IT Department. The IT department of the SBU ought to be established early during the IT carve-out project [16] and needs to have the appropriate resources for independently supporting the IT in the future [17, 18, 20]. If this is not the case, the hiring of new employees can fill up the gap [17, 18].

IT Personnel. The selling of a business unit creates uncertainty among the employees and some might start looking for a new job, which leads to a loss of know-how [3, 17]. However, their knowledge is needed for a successful IT carve-out as well as for the operation of the IT [5, 16]. Therefore the retention of key IT personnel is an important point. A dedicated team should manage the retention and the transfer to the buyer [23]. Retention can be increased through regular and well-planned communication [5, 20] as well as giving individual incentives to key personnel, if they do not leave [23]. It is also important to provide recognition to the IT personnel to acknowledge their work [15].

As it can be seen, quite a lot of factors that contribute to the success of an IT carve-out have been identified in literature. They form the basis for the development of the maturity model, which is presented in the next section.

3 Research Method

This article follows a DSR approach and is in accordance with the guidelines of Peffers et al. [25] and Gregor and Hevner [10]. It belongs to the "Improvement" category of the DSR knowledge contribution framework of Gregor and Hevner [10], because a new solution for a known problem is developed.

In general, maturity "implies an evolutionary progress in the demonstration of a specific ability or in the accomplishment of a target from an initial to a desired or normally occurring end stage" [8]. It is possible to divide maturity models into three groups [26]. Staged fixed-level models have a fixed number of generic maturity levels, usually around five. In order to achieve a certain level of maturity, pre-defined focus areas have to be implemented adequately. The CMM and the staged representation of the Capability Maturity Model Integration (CMMI) belong to this group. Continuous fixed-level models also have a fixed number of generic maturity levels, but the focus areas are not attributed to a certain level. Each focus area has its own generic maturity level. An example for this group is the continuous representation of the CMMI. Focus area models are different. They do not have a fixed number of generic maturity levels, but each focus area has its own specific maturity levels. The overall maturity is a combination of the maturities of the individual focus areas.

A focus area model has been selected for the IT carve-out maturity model, because this allows assessing more than one dimension of maturity. Most maturity models focus on the process dimension [8], but this is too restrictive for IT carve-outs. Leimeister et al. [23] grouped their success factors into "Managing Carve-out Projects", which corresponds to the process dimension of an IT carve-out, but also into "Creating a Divestiture-ready IT Environment", which focuses on the state of the IT assets. It is also necessary that each focus area has its own maturity levels and is not forced to have a fixed number of generic levels. Furthermore this kind of maturity model considers dependencies between capabilities of different focus areas and is also more fine-grained, which allows a detailed evolution path [26].

Focus Area	0	1	2	3	4	5	6	7	8	9
FA1		A			B			C		
FA2					A		B			C
FA3			A			B				

Fig. 1. Handling of a focus area maturity model

As a focus area maturity model is developed in this paper, this kind of model is explained in more detail. Figure 1 shows an exemplary focus area maturity model. On the left-hand side, the different focus areas are named and on the right-hand side, there are several columns, which are numbered starting with zero. They represent the different levels of maturity which increase from left to right. These columns are also

called maturity matrix. Each focus area has its own specific capabilities that are abbreviated with upper-case letters starting with "A". The letters are positioned in the maturity matrix according to their relative importance, which decreases from left to right. If a capability of a focus area is fulfilled, all fields in this line up to the next capability are grayed out. The overall maturity is determined by the rightest column where all fields are gray. In the example of figure 1, the overall maturity is 3. In order to move to an overall maturity level of 4, the capability "B" of FA1 and the capability "A" of "FA2" have to be implemented. The profile of the maturity matrix quickly identifies areas where improvements are needed.

Many maturity models lack documentation about the motivation for the development, the development process and the evaluation of the model [9]. In order to address these issues, frameworks for the maturity model development have been proposed [9]. The framework of Steenbergen et al. [27] has been employed, because it has been designed particularly for the development of focus area maturity models. The following steps have been covered:

1. **Identify and scope the functional domain**: As previously stated, the scope of the maturity model is IT carve-outs. There is no maturity model for IT carve-outs yet and it is also not possible to build on maturity models from other domains, such as outsourcing, where the process of giving parts of the IT to an external provider could be compared to an IT carve-out. None of these maturity models [28-32] covers how to manage the separation of the IT.
2. **Determine focus areas**: The previously discussed success factors and the constructed concept matrix form the basis for the focus areas of the maturity model. Additionally, the completeness of the focus areas has been addressed during three expert interviews which were conducted between August and October 2013. Two of the experts had a senior management position in the IT carve-out of a multi-billion euro demerger within the European financial service industry that took place in recent years. The third expert consulted the senior management during a difficult IT carve-out of a mid-sized SBU from a large European engineering firm. They have been chosen because of their leading roles in quite large IT carve-outs. Additionally, their careers suggest that they possess huge knowledge about the management of large IT projects.
3. **Determine capabilities**: Each focus area has several capabilities. The capabilities of the IT carve-out maturity model are based on the identified success and they were also addressed during the expert interviews.
4. **Determine dependencies**: There are dependencies between capabilities within one focus area, which have been used for setting the maturity path of the focus area. But also dependencies between capabilities of different focus areas exist. The dependencies are as well based on the identified success factors and were addressed during the conducted expert interviews.
5. **Position capabilities in matrix**: In order to position the capabilities in the matrix, their relative importance has to be determined. Therefore, a delphi study with the three interviewed IT carve-out experts has been conducted. It consisted of three iterations and took place between December 2013 and February 2014. The experts

were asked to rate each capability with numbers between 1 and 10, where 10 means "very high influence" and 1 "very low influence" on the success of an IT carve-out project. This rating scale has been chosen, because "many people are familiar with the notion of rating 'out of ten'" [33]. Schmidt [34] suggests using Kendall's coefficient of concordance (W) [35] as a measure for the level of agreement between the raters during delphi studies. It allows to measure the strength of the consensus and whether it has increased between two iteration [34, 35]. Normally, it is a measure for ranking and not for rating, but it can be used in this case, because nearly 50 items have been rated and almost always the whole rating scale has been used by the raters. This circumstance makes it possible to interpret the rating of the items as a ranking. However, to be sure, also a measure for rating, the a_{wg} of Brown and Hauenstein [36], has been applied, which lead to similar results.

Table 1. Results of the delphi study

	1. Iteration	**2. Iteration**	**3. Iteration**
Kendall's W	0.482	0.719	0.852
$\mathbf{a_{wg}}$	0.321	0.759	0.914

The delphi study stopped after the third iteration, because a Kendall's W of 0.852 was achieved, which indicates a strong agreement [34]. The capabilities were rated on a scale from 1 to 10 during the delphi study, which is too coarse grained for a maturity model, because too many capabilities would be on one level. Because of this, the average of the three ratings has been linearly transformed to a range of 1 to 20, because average ratings of .5 should be represented in the maturity matrix.

The delphi study revealed the importance of the different capabilities, but the dependencies between them had not been considered during the study in order to simplify the rating for the participants. This led to cases where the prerequisites of a capability had been rated as less important. However, the positioning of the capabilities in the maturity matrix has to consider the dependencies as well as the importance. Therefore, the following optimization problem has been solved.

$$\text{Min} \sum_{f \in F} \sum_{c \in C_f} \left(x_{f,c} - r_{f,c}\right)^2 \tag{1}$$

$$\text{s.t} \quad x_{f,c} > x_{f,c+1} \qquad \forall f \in F, \forall c \in \{C_f \backslash C_{f\,max}\} \tag{2}$$

$$x_{f1,c1} > x_{f2,c2} \qquad \forall (x_{f1,c1}, x_{f2,c2}) \in D \tag{3}$$

$$x_{f,c} \in \{1; 20\} \tag{4}$$

The objective function (1) is the minimization of the sum of the quadratic distances between the transformed average rating of capability c of focus area f, $r_{f,c}$, obtained from the delphi study and the assigned column in the maturity matrix, $x_{f,c}$. In this case, the columns are counted from right to left, as the importance increase in this direction. The first set of restrictions (2) makes sure that the ordering within all focus areas F is correct. The consecutive capability $x_{f,c+1}$ of $x_{f,c}$ needs to be assigned to a lower column. This has to be fulfilled for all the capabilities C_f of focus area f, except for the last capability $C_{f\,max}$ as there is no successor. The second set of restrictions (3) deals with the dependencies that exist between capabilities of differ-

ent focus areas. They are stored as a tuple ($x_{f1,c1}$, $x_{f2,c2}$) in the set of dependencies D, where $x_{f1,c1}$ is a prerequisite for $x_{f2,c2}$. The last restriction (4) makes sure that $x_{f,c}$ can only attain numbers from 1 to 20, because it represents the number of columns in the maturity matrix. Solving this optimization problem orders the capabilities in the maturity matrix in a way that considers all dependencies, but also makes sure that the deviance to an ordering exclusively based on the results of the delphi study is minimal. The final version of the maturity matrix contains 15 columns, because those with no assigned capabilities were deleted as they are meaningless.

6. **Develop assessment instruments**: A questionnaire for assessing the current level of maturity has been designed. There are several yes-no questions which have to be fulfilled for achieving a certain capability. The questions are based on the description of the capabilities and were evaluated during the interviews.
7. **Define improvement action**: They should show practitioners how to move to a certain capability. They were formulated in a suggestive way as the concrete actions will be situation specific.
8. **Implement maturity model**: In order to evaluate the developed model in practice, a case study about the carve-out of the banking SBU of a financial service company has been conducted. This case has been chosen because it is among the largest carve-outs that took place in Europe in recent years and therefore should reveal a lot of useful insights. This case has already been analyzed in earlier research conducted by the authors. Because of this, the previously conducted interviews and the available documents were used for answering the assessment questions. In order to validate the previously attained results and to get further information, an interview with the IT project manager of the carve-out has been conducted. We followed the suggestions of Yin [37] for conducting case study research.

Table 2. Overview of conducted interviews and secondary sources

Source	Role/Topic	Type	Length
Mr. Alpha	IT project manager	face-to-face interview	24 min
Mr. Beta	IT licenses	telephone interview	39 min
Mr. Gamma	Output management	face-to-face interview	33 min
Mr. Delta	IT vendor management	face-to-face interview	40 min
Mr. Epsilon	IT infrastructure separation	face-to-face interview	25 min
Mr. Zeta	IT infrastructure	face-to-face interview	18 min
Mr. Eta	IT operation	telephone interview	15 min
Mr. Alpha*	IT project manager	face-to-face interview	35 min
Doc. Alpha	Description of carve-out	presentation of EuBank	21 slides
Doc. Beta	Interview with CIO of EuBank	article in IT magazine	3 pages
Doc. Gamma	Interview with CIO of EuBank	article in IT magazine	4 pages

*Exclusively focused on the IT carve-out maturity model

Becker et al. [9] argue for an iterative development. Because of this, the steps 2, 3 and 4 were conducted based on literature first and afterwards also during the expert interviews. It was not possible to do step 5 iteratively, because no ranking of the identified success factors has been found in literature. The steps 6 and 7 were also conducted first theoretically and then during expert interviews. This approach of theoretically

develop artifacts and subsequently evaluate them in practice is similar to the action design research which has been proposed by Sein et al. [38].

The step "9. Improve matrix iteratively" has not been executed yet. However, case studies are planned for the near future to address this issue. The last step "10. Communicate results" is partially covered by this paper. The complete documentation of the maturity model can be obtained by emailing the authors.

4 Towards a Maturity Model for IT Carve-outs

The developed IT carve-out maturity model is shown in figure 2. Focus area groups, which were derived from the dimensions of IT during carve-outs after Buchta et al. [20] and discussions during the expert interviews, have been introduced to give a better overview of the focus areas. The first group is "IT Strategy" and covers the overall strategy that guides the IT carve-out. "IT Carve-out Execution" focuses on the execution of the IT carve-out project. "IT Assets" describes the maturity of the assets that are important for an IT carve-out. "IT Organization" is about the readiness of the IT department and the IT personnel.

The focus areas are based on the conducted literature study. They were evaluated and enhanced during the expert interviews. "IT Transition Strategy" has been added as a focus area because a lack of strategic orientation has been named in two interviews. The consideration of the IT operations has been described by one of the interviewed experts as one of the most important success factors for IT carve-out projects. Therefore, the focus area "IT Operations" has been added to the model. Another difference to the literature study is the division of IS into applications, infrastructure and data. This has been done in order to consider IS in more detail.

Focus Area Groups	Focus Area	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
IT Strategy	IT Transition Strategy							A	B	C							
	IT Landscape			A			B										
IT Carve-out Execution	Collaboration between Seller and Buyer				A											B	
	IT Awareness					A		B				C	D				
	Resources for IT Carve-out Project								A	B							
	Project management							A	B								
	IT Carve-out Organization					A	B	C	D				E				
	Transitional Service Agreements										A	B				C	
	IT Operations		A								B		C				
IT Assets	Applications										A		B			C	
	Infrastructure													A		B	C
	Data							A			B		C				
	Documentation					A										B	C
	IT Contracts					A		B	C								
IT Organization	IT Department												A	B	C		
	IT Personnel								A	B	C	D	E				

Fig. 2. IT carve-out maturity model

The model consists of 16 columns, 15 ones with capabilities and one for representing the no maturity case. They represent the different stages of IT carve-out maturity. The capabilities of the focus areas are put in the columns according to their relative im-

portance as described in the previous section. In total, there are 16 focus areas and 49 capabilities, which can be found in the appendix. The capabilities of the focus areas "IT personnel" and "IT carve-out organization" are next to each other, because some predecessors have been evaluated lower than the successors during the delphi study. The solving of the optimization problem leads to this pattern.

Each capability has the following attributes: "Name", "Description", "Assessment Questions", "Prerequisites" and "Improvement Actions". Table 3 shows this exemplarily for the capability C "Show a future to IT personnel" of focus area "IT personnel".

Table 3. Capability C "Show a future to IT personnel" of focus area "IT personnel"

Name	Show a future to IT personnel
Description	A future is designed for the key IT personnel and it is communicated pro-actively.
Assessment Questions	1. Has a future been designed for the key IT personnel? 2. Is this future based on the designed future IT landscape? 3. Has this future been communicated pro-actively?
Prerequisites	"Future IT landscape and strategy" of focus area "IT landscape"
Improvement Actions	1. Design a future for the IT personnel based on the future IT landscape 2. Communicate the future pro-actively

Mettler and Rohner [8] argue that situational characteristics should be included in maturity models. As some capabilities or focus areas might not be relevant for a specific case, it should be possible to exclude them from the maturity model in order to prevent being stuck on a certain level. The IT carve-out maturity model can be configured according to three different dimensions.

The first dimension deals with the IT integration strategy that is chosen by the buyer. It is possible to distinguish the following three strategies [2]: complete integration, partial integration and co-existence. If complete integration is chosen, the capabilities "Applications are right-sized for SBU", "Infrastructure is right-sized for SBU" and "Data is right-sized for SBU" are not relevant as the IT of the SBU is absorbed by the buyer. If the integration strategy is "partial integration", "Infrastructure is right-sized for SBU" is removed from the model, because the infrastructures normally are unified. The second dimension is about the phase during which the IT carve-out maturity model is used. If a SBU should be prepared for a demerger, the buyer is not known and there is no execution project yet. Because of this, only the focus area groups "IT assets" and "IT organization" are relevant. For the evaluation of the complexity and for the execution of the IT carve-out project, all focus area groups are part of the maturity model. The third dimension deals with the regional differences that might exist in the IT of the SBU. The capabilities "Consideration of regional IT" and "Dedicated regional IT carve-out manager" are only relevant if a regional IT exists at all.

5 Evaluation

Since the first maturity models came up, there has been criticism [39]. One criticism is that many maturity models only focus on the process perspective [8]. As a focus

area maturity model has been developed, it was possible to integrate more than one perspective of IT carve-outs. According to Becker et al. [9], many maturity models lack documentation about their motivation and the development process. The motivation has been stated and the development process has been described.

In order to address the criticism of maturity models in general, Pöppelbuß and Röglinger [39] have formulated design principles that should be met. They divide them into three groups based on the purpose of use of the maturity model. Basic design principles should be fulfilled by all maturity models. There are also design principles for descriptive maturity models. Prescriptive maturity models should fulfill their own specific design principles, but also the design principles of the descriptive models. Based on a self-evaluation, it has been checked which design principles are met by the developed model. The design principle "Decision calculus for selecting improvement measures" of the prescriptive principles is the only one which is not met. However, this is less severe than at other maturity models as focus area maturity models are more fine-grained than other maturity models [26, 27]. This narrows down the number of capabilities that need to be implemented for reaching the next maturity level. The developed model fulfills the design principles for a descriptive maturity model. All of the required principles for a prescriptive model could not be fully met, but it is still possible to use the model for prescriptive purposes to some extent.

In order to assess the usability of the developed model in practice, a case study has been conducted. The European financial service company FinServCo decided to demerge its banking subsidiary FinBank. The European bank EuBank acquired FinBank for a single digit billion euro sum and migrated the IT of FinBank to its existing IT landscape, which lasted nearly 3 years.

This case reached an overall maturity level of 10, but there are many focus areas with the maximum maturity level. The capabilities "C: IT involvement in contract negotiation" of focus area "IT awareness" and "E: Incentives for IT personnel" of focus area "IT personnel" hindered a higher overall maturity level. The interviewed experts and the analyzed documents indicate a smooth execution of the IT carve-out. This coincides with the profile of the maturity matrix that is indicated by the IT carve-out maturity model. This case shows that not only the overall maturity level is important, but also the profile of the maturity matrix should be analyzed.

6 Discussion of the model

6.1 Implications

Up to now, there is not yet a maturity model for IT carve-outs. They are very challenging projects due to the strict time frame, the severe penalty clauses that could arise, if targets are not met, the huge number of stakeholders and the various as well as unique IT tasks that have to be conducted [4, 5]. Furthermore IT is often responsible for the largest share of the total carve-out costs [4]. The developed maturity model is meant to support IT managers during such complex projects. Its usage ensures that the most important success factors are considered and therefore increases the likeliness of a successful IT carve-out project. It can be used for the preparation of the SBU

for a possible carve-out, for the evaluation of the complexity of the project as well as during the IT carve-out execution. The model can also be used by researchers that examine IT carve-outs in empirical research. The conducted case study did not reveal any weaknesses of the model and its results correspond to the real world situation. However, further case studies are required to evaluate the models explanatory power.

All of the identified literature about the success factors of IT carve-outs has been published since 2008. This paper is the first that conducts a meta-review and provides a consolidated overview. The delphi study ordered them according to their relative importance, which has not yet been done in literature. This revealed an interesting insight. The IT strategy and the IT carve-out execution seem to be more important than the IT assets. Another scientific implication is that the developed model could be the basis for explaining why IT cave-outs often cause major challenges [1-3].

6.2 Limitations and Further Research

Some criticisms of maturity models have already been named and how the IT carve-out maturity model copes with them. However not all points of criticism of maturity models could be weakened. Only one evolutionary path is proposed and the existence of other equally good ones is neglected [39]. Another criticism is that the focus on formalized improvement actions leads to bureaucracy and hinders innovation [8].

Not all steps of the framework proposed by Steenbergen et al. [27] have been covered. In order to address the step "9. Improve matrix iteratively", additional case studies are planned. The description of the conducted case study is limited due to length restrictions, but a detailed one will be presented in future research.

A strong agreement has been reached after the third round of the delphi study. However, there were only three participants. But the selection of the participants focused on quality and not on quantity. Their profiles suggest that they have a deep understanding of IT carve-outs. Two of the three experts come from the financial services industry and the conducted case study also took place in this industry. Therefore, it could be the case that the results are industry specific. In order to address this issue, the additionally planned case studies will take place in different industries.

IT security has been omitted, because it has only been mentioned by one publication. The completeness of the focus areas has been addressed in the conducted expert interviews and IT security has not been mentioned. However, the completeness will be addressed additionally in the interviews of the planned case studies.

Another limitation is that it is not clear which maturity level should be sought. Röglinger and Kamprath [40] argue that trying to achieve the highest maturity level is economically not necessarily the best solution. The conducted case study has shown that the success of the carve-out is rather determined by the profile of the maturity matrix than by the overall maturity level. Further research could develop a decision calculus for finding the optimal maturity profile for a specific IT carve-out.

As previously mentioned in this paper, the process of separating the IT is similar between carve-outs and outsourcing. This could be a second application of the developed maturity model and could be addressed in further research. This has also been mentioned during one of the expert interviews.

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8 Appendix

Table 4. Capabilities and focus areas of IT carve-out maturity model

Focus Area	**Capability**
IT Transition Strategy	A: IT carve-out strategy
	B: IT strategy communication
	C: Strategic alignment
IT Landscape	A: Future business model is defined
	B: Basic future IT strategy and landscape
Collaboration between Seller and Buyer	A: Regular communication meetings
	B: Unanticipated costs and savings are shared
IT Awareness	A: IT carve-out as separate project
	B: IT due diligence
	C: Consideration of regional IT
	D: IT involvement in contract negotiation
Resources for IT Carve-out Project	A: Appropriate resources are available
	B: Collaboration within the carve-out team
Project Management	A: IT carve-out planning
	B: Level 3 of Project Management Process Maturity $(PM)^2$ Model of Kwak and Ibbs [41]
IT Carve-out Organization	A: Project steering committee
	B: Dedicated CO project manager
	C: Clear defined responsibilities
	D: Short escalation paths are established
	E: Dedicated regional IT CO manager
Transitional Service Agreements	A: Overview of IT services that are needed by the SBU
	B: TSA approving process
	C: Technical capabilities for acting as service provider
IT Operations	A: Stabilization of IT operations
	B: Develop measurements if IT operations fail
	C: Implement measurements
Applications	A: Weak integration of applications with parent
	B: Completely separate applications
	C: Applications are right-sized for the SBU
Infrastructure	A: Modular infrastructure
	B: Completely separate infrastructure
	C: Infrastructure is right-sized for the SBU
Data	A: Data ownership
	B: Separate data
	C: Data is right-sized for SBU
Documentation	A: Basic documentation of the IT landscape
	B: Comprehensive documentation of the IT landscape
	C: Update process
IT Contracts	A: Overview of all IT contracts and licenses exist
	B: Overview of in the future needed IT contracts and licenses
	C: Transfer or cancellation is clarified
IT Department	A: Early forming of SBU department
	B: IT department of seller has enough employees
	C: Separate IT department of SBU
IT Personnel	A: Dedicated HR team
	B: Key personnel is identified
	C: Show a future to IT personnel
	D: Train IT personnel for future
	E: Incentives for IT personnel