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Organizational Implementation of Technology Platforms in Diversified Companies

*Guenther Schuh[1],Simon Ryschka[2]
[1]*Laboratory for Machine Tools and Production Engineering, RWTH Aachen University, Aachen, Germany*
[2]*Fraunhofer Institute for Production Technology IPT, Aachen, Germany*
*Corresponding Author: *Guenther Schuh[1]*

ABSTRACT: The significance of technology platforms as technology focused organization forms is growing in diversified companies. The reason is that technology platforms support diversified companies to handle the conflicting priorities of individualized innovations and generating synergies. Hence, the success of diversified companies can be significantly affected by the systematic design of technology platforms. Key prerequisite for such a systematic platform design is the consistent description of the various organizational implementation options for technology platforms. In practice however, companies find it difficult to consistently describe the various organizational implementation options for technology platforms. The reason is that there is no established opinion in theory on how to systematically describe the organizational implementation of technology platforms. As a consequence, a misalignment of technology platforms in diversified companies is noticeable, leading to unsustainable technology platform concepts. Therefore, the objective of this paper is the development of a model that enables the systematic description of the organizational implementation options of technology platforms in diversified companies.

Keywords: technology platform, technology planning, strategic technology management, organization, diversified companies

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I. INTRODUCTION

Shorter product and technology cycles and more complex customer demands for novel products increase the competition among diversified companies. One possibility to achieve long-term success is the creation of strategic prerequisites for the synergetic use of technological knowledge as well as the implementation of unique technological solutions [1]. That is why an increasing number of diversified companies organize their technologies within technology platforms as technology focused organization forms. These diversified companies use technology platforms mostly to exploit a defined set of distinctive technologies across multiple businesses and thus offer unique technological solutions for the customer [2,3]. Therefore, the technology platform concept constitutes for many diversified companies a huge factor for their corporate success [4].

However, in practice a low degree of systematization regarding the description of the organizational implementation options of technology platforms can be observed. This leads to an insufficient linkage between a diversified company and the organization of its technology platforms. Waste of resources ("over-engineering") or the rejection of key requirements and key stakeholders among existing technology platforms ("under-engineering") are noticeable in the operational practice of diversified companies. From the theoretical perspective, there is a lack of research regarding the description of the organizational implementation of technology platforms within diversified companies. This is surprising, due to the huge problems in the daily practice of diversified companies and the negative economic impact of insufficiently defined and organized technology platforms.

Therefore, in this paper a model is developed that defines and describes the relevant organizational implementation options of technology platforms in diversified companies. With the assistance of this model, diversified companies will be able to identify the relevant organizational implementation options of technology platforms and thus will be able to manage a sufficient linkage, in order to initiate sustainable platform concepts. Additionally, it is intended with this paper to develop a fundament for future research in the academic field of technology platforms.

Section II illustrates the applied methodology within the paper. Subsequently, section III gives a definition for the technology platform term and the term 'diversified companies' for the purpose of this paper. Section IV comprises a literature review of previous research, concerning the organizational implementation of technology platform in diversified companies. Based on the need for further research, the description model for

the technology platform organization in diversified companies is developed in section V. The conclusion and the outlook on future research in section VI complete the paper.

II. METHODOLOGY

A continuing methodical challenge in the technology management research can be seen in overcoming the 'academic-practitioner divide' [5]. While practitioners continue to emphasize the benefit of research, they criticize often a lack of focus on problems with practical relevance [6]. This paper adopts the research process of applied sciences, shown in figure 1, in order to overcome the 'academic-practitioner divide' and propose practical relevant results [7]. Applied sciences, according to ULRICH, focus on the description, explanation and configuration of reality extracts and aim on developing rules and models to create possible future realities [7]. Following the process of applied sciences, a problem of practical relevance with an underlying theoretical deficit has to be identified and structured at first (Fig. 1, step A). Projects and discussions with decision-makers in the field of technology management have been here the key input for the derivation of the underlying practical problem. Subsequently, in step B and step C problem-specific theories and methods of existing research have to be identified, analyzed and interpreted as the groundwork to identify the need for further research and the development of adequate solutions. Step B and C will be addressed within the paper in section III and IV with the illustration of the theoretical background and the literature review. Hereinafter, step D is focusing on the conception of an adequate model, in order to describe organizational implementation options of technology platforms in diversified companies. The following step E addresses the detailing of the model. Consecutively, the model must undergo practical testing and therefore needs to be evaluated in the context of industrial practice, according to step F. Once it has been validated, the model can be applied in industrial practice (step G). Both steps do not fall within the scope of the paper and therefore need to be addressed subsequently in future empirical research, as explained in the outlook on future research.

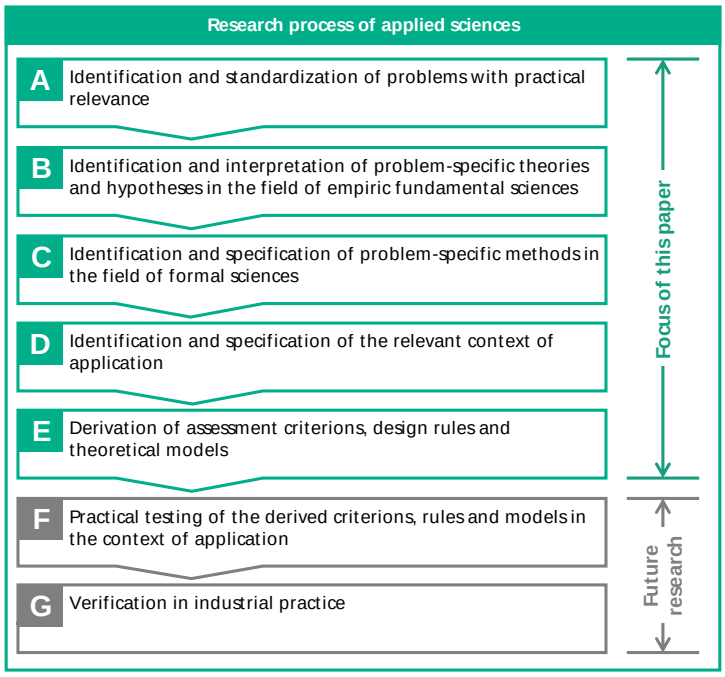

Fig.1: Structure of the choosen methodology based on the research process of applied sciences according to ULRICH [6]

III. THEORETICAL BACKGROUND

The following section comprises the definition of both the terms 'technology platform' and 'diversified company'. In this way, a theoretical foundation is prepared, in order to systematically describe the organizational implementation options for technology platforms in section V.

A. Technology platform

The term 'technology platform' (TPF) has no consistent definition in literature [2]. Therefore, it is necessary to define the term clearly for the purpose of this paper. It is defined that technology platforms represent a technology focused organization form in diversified companies and interconnect a certain aspect of a technological knowledge base [8, 9]. This interconnected technological knowledge base stretches over multiple

business units and central areas, in order to enable the exchange of relevant technological information and to enable the exploitation of a maximum amount of product applications [10, 3]. Organization wise, the technology platform concept cannot be attributed to a predefined and uniform designed structure. Instead it shows various numbers of expressions in practice [3]. CIBORRA states the following with regard to technology platform organizations: „A platform is a metaorganization, a formative context that molds structures, and routines shaping them into well-known forms, such as the hierarchy, the matrix and even the network, but on a highly volatile basis.“ [11]. Therefore technology platforms in diversified companies represent a “complementary ad-hoc organization” [12], which links separated divisions and central areas with each other along a defined technological focus area [8]. Thus, it becomes clear that the organizational implementation of technology platforms does not necessarily interfere with the existing organization of diversified companies and does not automatically lead to a visibility within the established organigram of a diversified company [13]. An implicit organizational implementation of technology platforms into the existing structures of diversified companies is therefore possible and moreover relevant for the further investigation in this paper.

B. Diversified company

Despite the great importance within the industrial practice, a “terminological confusion“ [14] can be observed with regard to the term diversification in scientific literature [15]. Due to this reason a closer examination of this term is needed, in order to generate a clear understanding for the purpose of the paper. First of all, it becomes apparent in the diversification literature that it can be differentiated between an input-related and an output-related perspective on diversification. In both cases the diversification term refers to a state as well as to a process of expansion [16]. The input-related perspective is rather rarely used in literature and defines the term as expansion of the existing company resource basis into new areas of resources that are untapped so far by the company [17]. The more common perspective on the term diversification, which is also relevant for this paper, focusses on output-related diversification and defines the term as the entry of a company into a new market based on expansion of its product range [17, 18]. If existing technologies are used to enter new markets, then it is referred to the term technology based diversification for the output-related perspective in this paper [17]. The following figure 2 shows the typical organigram of a company that is diversified based on their technology base. It is assumed that this type of diversified company has multiple divisions and central areas [19].

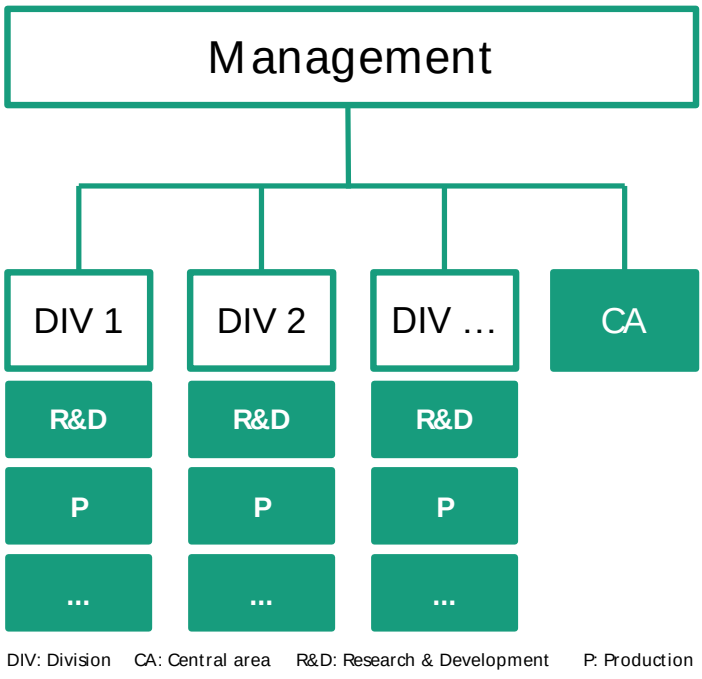

Fig.2: Typical organigram of a diversified company [19]

Functional activities such as the divisional R&D or the divisional production function are usually organized within the divisions. Another typical characteristic of a diversified company can be seen in permanently organized central areas for R&D. These corporate R&D functions typically work on technology and innovation tasks that are in an early, pre-divisional market state. The discussed typical organigram of

diversified companies serves as a logical foundation, in order to display and explain the organizational implementation of technology platforms in section V.

IV. LITERATURE REVIEW

The following section comprises the review of literature, illustrating the current status in research on the organizational implementation of technology platforms in diversified companies. The existing literature can be divided into two research streams. The first stream is directly linked to literature about technology platforms in diversified companies. The second research stream comprises literature about general organization forms of central areas and networks and has therefore only indirect implications for technology platforms in diversified companies. However, as the explanations in the following section will show, the indirect research stream about general organization forms is also highly relevant for the purpose of the paper. This section closes with a summarization about the contributions and deficits that can be extracted from the investigated literature.

A. Technology Platform Research Stream

BÖHLKE ET AL. as well as SCHUH ET AL. discuss in their publications several examples from their industrial experience about the organizational implementation of technology platforms in diversified companies [3, 20] The authors state that technology platforms that are implemented as real organizations consist of permanent workplaces for the platform staff. Contrary, virtually implemented technology platforms are characterized by communication tools, which are used across the participating divisions to coordinate the activities virtually (e.g. content-management system) [3]. Also, permanently implemented technology platforms are characterized by activities that are operated by the platform stuff daily as full time employees [3, 20]. In contrast, a temporary technology platform is implemented for long-time projects and disestablished after the project finalization [3, 20]. Even though the authors show examples from their industrial practice, they do not intend to establish a cohesive framework that systematically structures the organizational implementation forms of technology platforms in a logical order.

LEVANDOVSKI ET AL. discuss the importance of a close organizational interaction between the operational production systems and the technology platforms in diversified companies. They use the example of an engine supplier in the aerospace industry [21]. However, the authors describe only a single case study and focus solely on the interaction of relevant stakeholders in the production of aerospace engines with technology platforms. Also, the authors lack to bring their findings into a broader perspective of a framework that could be applied for further companies in the future.

SHAPIRO focuses also on the technology platform organization and describes how technologies in a technology platform can be seen as building blocks of a company's technology base and can be combined to form new technologies and subsequently new products. By using the case of 3M and their adhesives technology platform, the author accomplishes to generate an illustrative example [22]. As he states "3M is committed to the platform concept as an organizing idea. An innovation must either define a new platform or extend an old one; otherwise it does not fit comfortably within 3M". However, his case can be regarded as only a singular example and does not comprises an overall view at different organizational forms of technology platforms in diversified companies.

STIG focuses on the documentation of technology platform knowledge and discusses different forms of knowledge networks for different forms of operational company structures [10]. The author defines three different levels of knowledge networks, based on different operational structures within a diversified company [9]. Even though the author introduces an overview of different networks as organizational forms of technology platforms, he fails to put his results in a broader perspective, by not analyzing other organizational forms.

In total, five exemplary research papers have been analysed in the direct technology platform research stream, demonstrating different organizational implementation forms within diversified companies. However, the illustrated research stream lack a consistent organizational framework, which supports the systematic selection of organizational forms of technology platforms in diversified companies.

B. Organization research stream

In section III it was derived that technology platforms represent from an organizational point of view "a result of (…) existing organizational mechanisms and forms (…)" [12]. Hence, the identification and selection of already existing organizational structures that can be applied to the concept of technology platforms is crucial for the purpose of this paper. The organizational structures, which are considered to be relevant for the technology platform concept in diversified companies are the central area concept and the concept of company internal networks (see figure 3). The reason is that specific knowledge carriers within a certain area of technological expertise are often located within different divisions and central areas of diversified companies and the cross-functional and cross-divisional linkage of these knowledge carriers can be organized by

technology platforms [25]. This linkage, organized by technology platforms, is either possible in a decentralized way (without consequences for the primary organization) or completely centralized and therefore with consequences for the restructuring of the existing primary organization) [8].

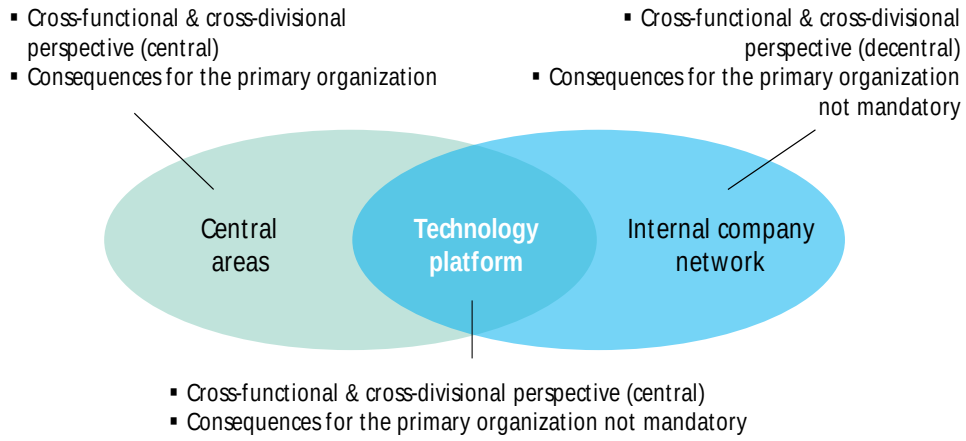

Fig.3: Organizational distinction and overlaps between central areas, internal networks and technology platforms in diversified companies

Therefore the central area concept as well as the concept of internal networks [26, 27], as shown in figure 3, serve as existing organizational structures that can be applied to the concept of technology platforms in diversified companies. Thus, these organizational structures are hereinafter detailed and the current state of research is described for the purpose of this paper.

1.) Central areas

The academic literature of FRESE is regarded as the foundation within the research stream of the central area concept. In his work, FRESE distinguishes between the following five types of central areas: 'core area model', 'guideline model', 'matrix model', 'service model', and 'staff model'. Simultaneously, the author presents the 'autarky model', which typically represents the smallest influence of central areas and therefore leads to self-sufficient divisions in diversified companies [26, 28]. According to the author, these five plus one models can be characterized based on the degree of potential influence of the divisions [28]. The core area model is characterized by the fact that a sub-function is completely removed from its original division and embedded in a separate organizational unit. In comparison to the core area model, the characteristics of a guideline model are that a given sub-function lies partly in the guideline organization and partly in the division. The guideline organization is responsible for fundamental decisions of the respective sub-function and has authority to issue directives towards the divisions. Similar to the guideline model, both the matrix model and the service model are characterized by a given sub-function that lies partly in the matrix respectively service organization and partly in the division. However, in contrast to the guideline model, the matrix organization and the division are only together entitled to make decisions with regard to the given sub-function. The service model in comparison represents an organizational structure where the divisions are responsible for fundamental decisions of a sub-function and are requesting services for this sub-function from the service organization. Contrary to the previously described types of central areas, the staff model is characterized by the fact that it can only prepare decisions and support the relevant divisions with necessary technology information, if needed. Finally, the autarky model is characterized by the highest possible level of influence of the decentralized divisions.

Therefore, autarky models are not centralizing sub-functions, like the other types of central areas and can be regarded in itself as self-sufficient divisions in diversified companies [26, 28]. It can be summarized that the current state of research with regard to the central area concept is described finely detailed in literature. As shown in figure 4, FRESE'S work on types of central areas serves as a broad perspective on suitable organizational structures for technology platforms in diversified companies. However, there is no literature existing, which adapts these contents to the organizational structures of technology platforms.

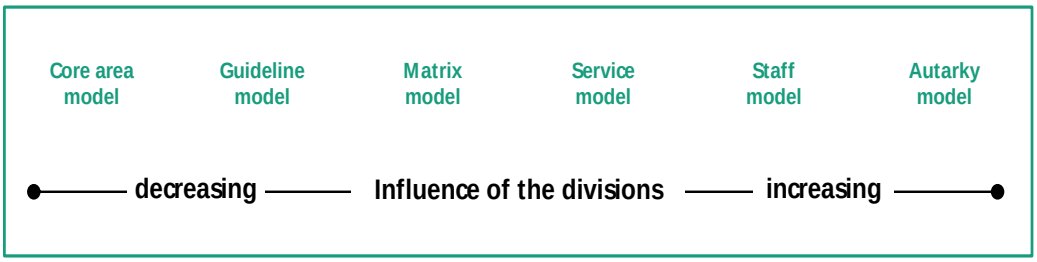

Fig.4: Types of central areas according to FRESE [26, 28]

2.) Networks

The organizational concept of networks has been described in various forms within different literature and research streams. However, within the management literature, there is a general distinction between intra-organizational and inter-organizational networks. Intra-organizational networks describe the relationship between stakeholders within a company. Inter-organizational networks, in comparison, characterize the relationship between companies itself. The focus of the following detailing lies on the characteristics of intra-organizational networks, due to the fact that technology platforms are understood as technology focused intra-organizational concepts within the scope of this paper. The intra-organizational concept of a network is defined by the existence of knots and edges. The knots represent the participants of the network, whereas the edges represent the connecting relationships [27, 29, 30]. In the case of intra-organizational networks, the participants consist either from individual employers or groups of persons like teams or departments [29, 31]. Aside from the participants, their connecting relations represent the other constitutive element of networks. Additionally, several types of relationships and connections between single individuals as well as groups of people such as teams can be found in intra-organizational networks [27, 30, 32]. These types of relationships can be either of formal or informal nature [27, 33]. Formal relationships on an individual level are represented for example by the power to direct and the duty to report within different layers of hierarchy in a diversified company [32, 33]. Contrary, the request of a colleague for help or advice is rather of informal nature [33]. Overall, this paper defines the term networks as an intra-organizational concept, which describes decentralized structures of individual participants that are in an informal, non-hierarchical mode of cooperation to each other. Based on this definition, a subsequent analysis has been conducted with the outcome that there no source of academic research that applies the concept of intra-organizational networks to the concept of technology platforms.

C. Summary of the literature review

The findings and deficits of the vast amount of literature regarding the technology platform research stream as well as the general organization stream are summed up in figure 5. The main findings on the technology platform research side include the fact that several organizational options for technology platforms have been exemplary provided by different authors. However, these contributions are relatively unspecific and lack a cohesive framework that systematically structures the organizational implementation forms of technology platforms. On the organizational research side there is broad and valid literature base regarding the general organization of central areas and networks. Due to its relevance for technology platforms as a "formative context that molds structures, and routines shaping them into well-known forms" [11], there is a high potential to adapt and use these known organizational forms for the purpose of technology platforms.

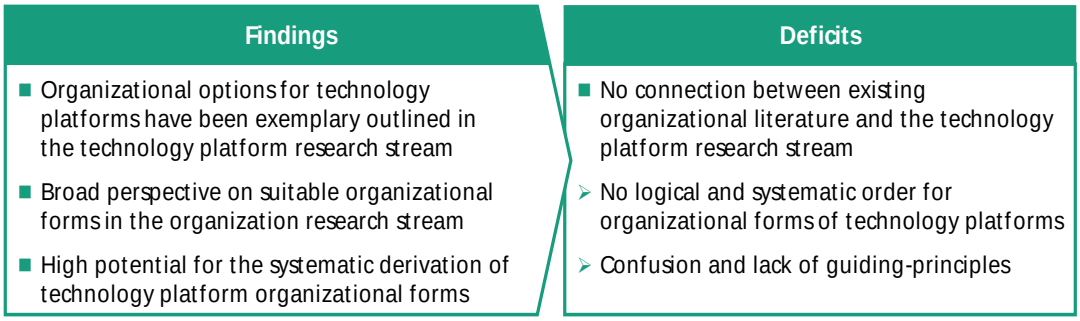

Fig.5: Findings and deficits of the literature review

However, it seems that the literature in the technology platform research stream has not picked up yet the prevalent potential of the findings in the general organization research stream. The reason is that no systematic connection between the existing organizational literature and the technology platform research has been conducted. Therefore, academics in the scientific community are not able to bring the existing literature

base in a logical order for the purpose of technology platforms in diversified companies. Confusion and a lack of guiding-principles for the practitioners are the consequence. The purpose of the paper is to address this need for research and to develop a cohesive set of technology platform organization options in a systematical way.

V. RESULTS

Based on the need for further research, the model to describe the organizational implementation of technology platforms in diversified companies is conceptualized and specified in the following section. At first, we will conceptualize the organizational implementation of technology platforms and select an applicable model. Afterwards, we will specify the organizational implementation of technology platforms by detailing and applying the existing organization research stream for the purpose of this paper.

A. Conception of the model

In literature a variety of approaches exist for the classification of models [34]. The classification that is used in this paper refers to the purpose of a model and differentiates between descriptive models, explanatory models and decision models, as shown in figure 6 [34, 35].

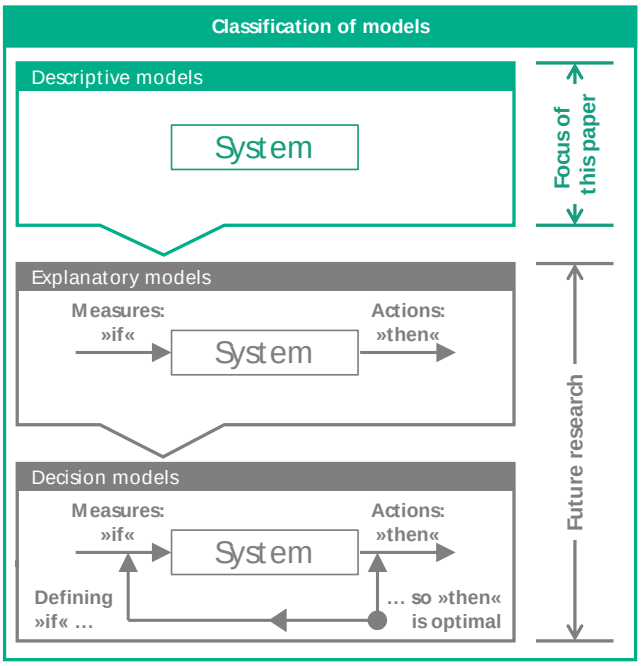

Fig.6: Classification of models according to KÜLL & STÄHLY [35]

A descriptive model is commonly applied, in order to display and characterize the logic of a system [34, 35]. Next, explanatory models are used to explain the cause-and-effect-relationship between the measures and actions of a system [35]. Finally, a decision model is based on the input of the two previous models. It comprises a target function respectively the preferences of the model's user, in order to determine the optimal actions according to preferable measures [34, 35]. The purpose of the paper is to develop a cohesive framework that describes the organizational implementation of technology platforms in diversified companies. This requires the selection of a descriptive model, leaving the other two models as a potential for future research.

The foundation of the descriptive model is defined by the types of central areas according to FRESE, which were discussed in section IV [26, 28]. However, the types of central areas have to be adapted in two different ways for the purpose of this paper. The first adaption has to be made with regard to FRESE'S autarky model. The reason is that this type of central areas is not relevant for the technology platform concept. The author argues from an overall company perspective and attributes the highest degree of decentralization to the autarky model, leading to an autarkic business unit or division in itself [26, 28]. However, it is defined in this paper that there is no fully autarkic and decentralized organizational model possible for technology platforms in diversified companies. From a technology platform-specific perspective, the company-internal networks represent the highest degree of decentralization. They can serve as an overarching model that connects the technological knowledge base in an informal and non-hierarchical manner without direct organizational consequences [8, 27, 33]. Thus, the term 'implicit organizational model' is used for this organizational form of technology platforms in diversified companies. The second adaption has to be made with regard to the logic

how FRESE is structuring and characterizing the types of central areas. While he uses the degree of potential influence of the divisions on the central areas as the determining logic for structuring his types, it can't be directly applied to the organizational implementation of technology platforms. Therefore, the logic of FRESE is adapted in this paper and the organizational forms of technology platforms can be differentiated hereinafter by the degree of autonomy with regard to specific the technology and its technology-related activities. While a technology platform organized as a central area has the highest degree of autonomy regarding its relevant technologies, a technology platform as an implicit organizational model has no technological autonomy and is solely determined by the decentralized technology decisions of the divisions and the central areas [28].

B. Specification of the model

Based on the two main adaptions of FRESE's work in this section and the groundwork, conducted in the former sections, the organizational implementation of technology platforms are specified subsequently.

1) Core area organization

As described in section IV in the literature review, a core area model is defined by the fact a sub-function is completely removed from its original division and embedded in a separate organizational unit. Therefore, the decision making authority for these sub-functions and the underlying activities lies only within the scope of the core area. Hence, the execution of these focused activities can happen in a consolidated way, which is independent and with no explicit order of a third party [26, 28]. With regard to technology platforms in diversified companies, this means that all the relevant carriers of technological knowledge are centralized within one permanent core area organization. The intra-organizational origins of these carriers of technological knowledge can be determined within the existing divisions as well as the relevant technology-related central areas. Technology platforms that are organized in a core area organization thus have the highest possible degree of autonomy regarding technology-specific decisions and activities. This implies that the outcome of such organized technology platforms, e.g. tangible technology developments etc., can be potentially delivered as a technological foundation for all further developments in the relevant central areas and divisions of a diversified company, regardless of explicit orders of these entities. Figure 7 is visualizing the organizational implementation of a technology platform as a core organization.

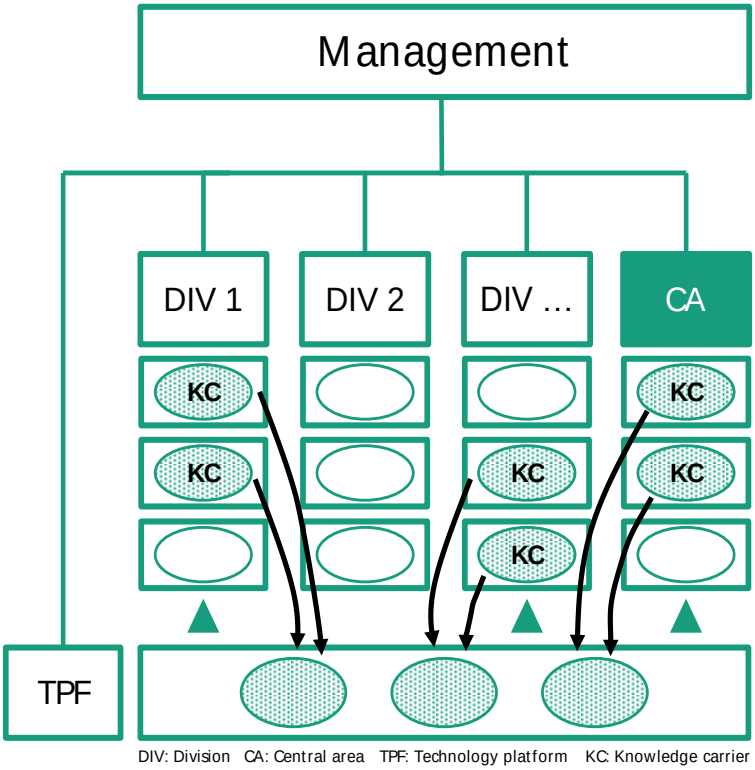

Fig.7: Organizational implementation of a technology platform as a core area organisation

2) Guideline organization

Compared to the previously outlined characteristics of the core area organization, technology platforms organized as guideline areas within diversified companies can be characterized by the fact that the relevant

technological knowledge carriers are embedded both in the new technology platform organization and the original divisions as well as central areas. In this constellation, the guideline area is authorized for fundamental decisions regarding the platform technology and therefore entitled to set obligatory technological rules and procedures for these divisions and central areas, which have a stake in the platform technology and its remaining technological knowledge carriers. However, the involved divisions and central areas have still the opportunity to vary and interpret the technological guidelines in a way that are the most suitable for their individual businesses or processes. In this way, a higher acceptance of the technological guidelines set by a technology platform is ensured in a diversified company. Also, these technological guidelines and rules and procedures don't refer to the entire diversified company, but only to those organizational units, for which the platform technology and its knowledge carriers have crucial relevance. The following figure 8 visualizes the concept of technology platforms organized as guideline areas in diversified companies.

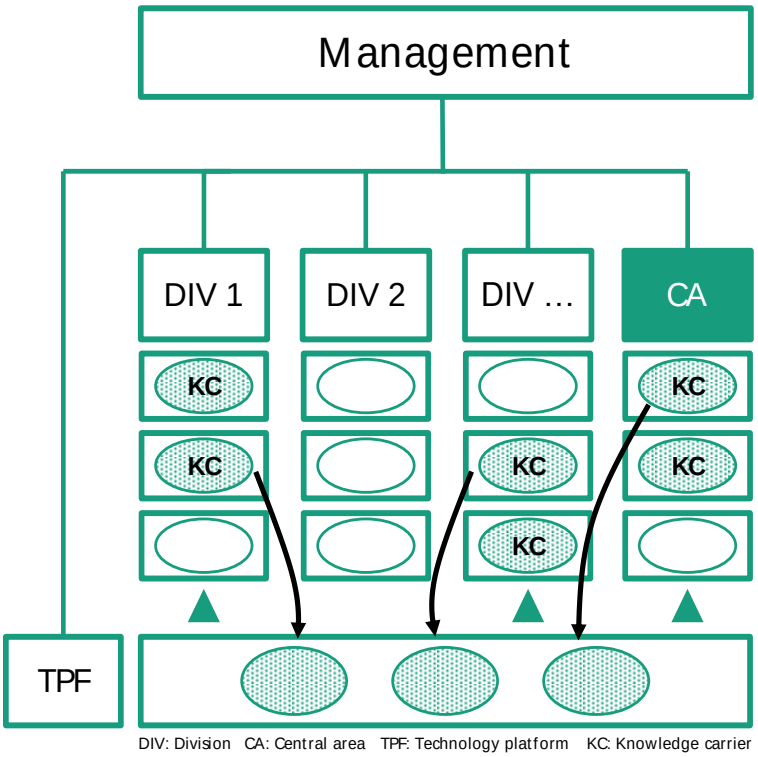

Fig.8: Organizational implementation of a technology platform as a guideline organization

3) Matrix organization

A technology platform implemented within a diversified company as a matrix organization is characterized, similar to the guideline organization, by the fact that the relevant technological knowledge carriers are embedded both in the new technology platform organization (called matrix unit) and the original divisions as well as central areas. However, the fundamental difference to the guideline organization is that the matrix organization itself is not authorized for fundamental decisions regarding the platform technology and its underlying technological knowledge within a diversified company. Instead, the relevant fundamental decisions about the rules and procedures are jointly made within a decision committee (called matrix committee) between the representatives of the technology platform as well technological stakeholders within the relevant divisions and central areas. Therefore, the relevant technological decisions can only be made in a common alignment of all technological stakeholders within a matrix committee. On the one hand this organizational implementation ensures a higher acceptance of decisions and developments of a technology platform among the relevant divisions and central areas. On the other hand, however, it slows down the decision process and lowers the degree of autonomy of a technology platform with regard to a platform technology. Figure 9 visualizes the relationships between the relevant technological stakeholders of a technology platform as a matrix organization within diversified companies.

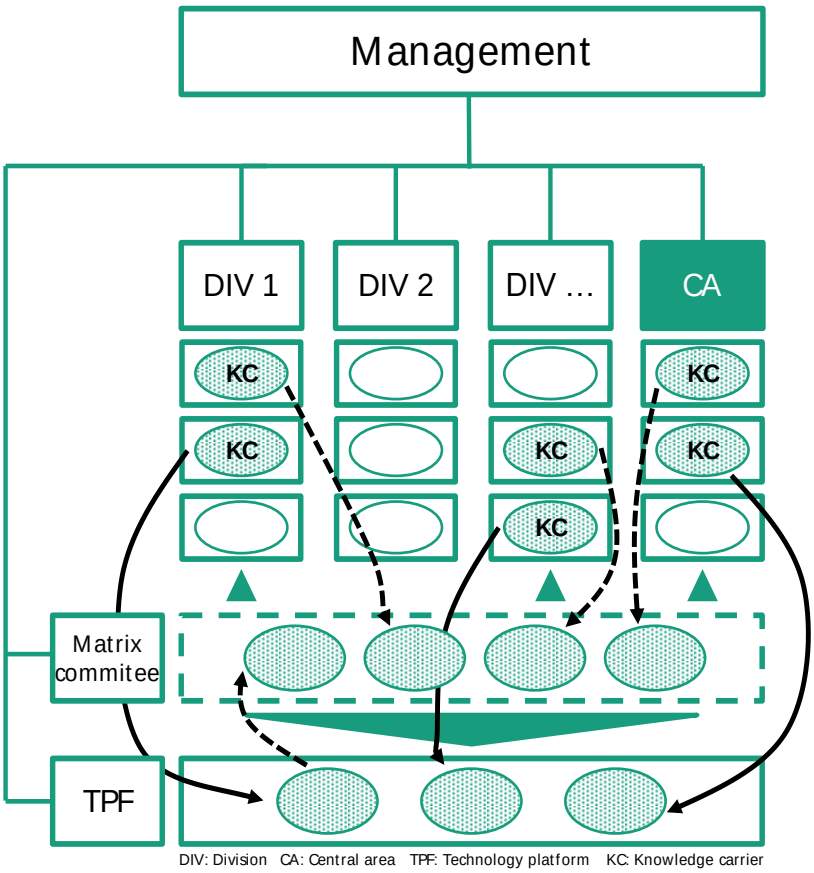

Fig.9: Organizational implementation of a technology platform as a matrix organization

4) Service organization

As shown in figure 10, service organizations are characterized, similar to previous organization forms, by knowledge carriers being embedded in both the technology platform and the divisions as well as central areas.

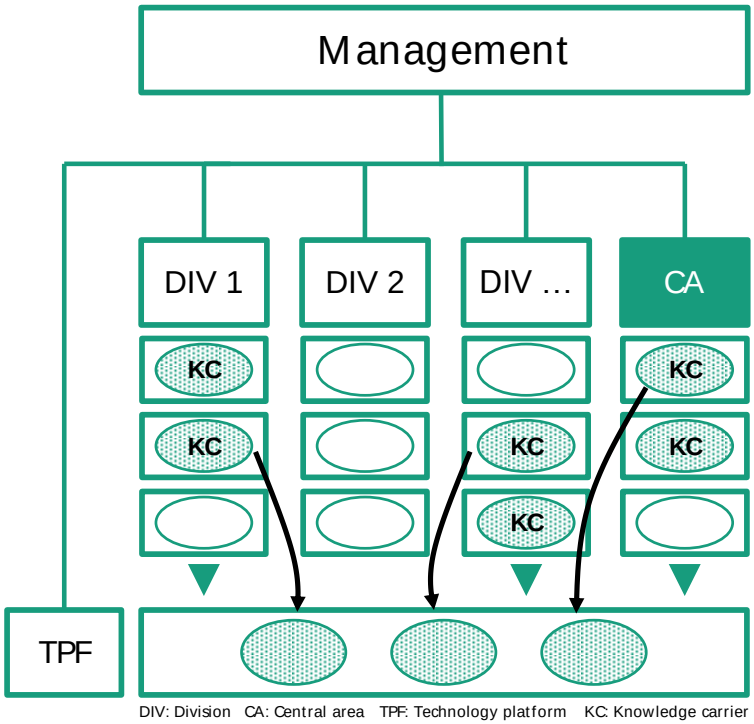

Fig.10: Organizational implementation of a technology platform as a matrix organization

However, technology platforms as service organizations don't have any authority regarding fundamental technological decisions within a diversified company. Instead, the divisions and central areas have the sole authority for all the relevant fundamental decisions, regarding the platform technology. The reason is that a technology platform is only regarded as a central and internal technology service provider with regard to technology developments as well as other relevant activities of the technology management process. In this understanding, technology platforms receive technology management related service requests regarding their platform technology and fulfill them for a company internal service fee. Therefore, technology platforms as service organizations can only fundamentally decide how they approach these service requests and have no authority to decide, whether a division or central area should make this decision or not.

5) Staff organization

The logic of technology platforms organized as a staff model also specifies (similar to the guideline organization, the matrix organization and the service organization) that relevant technological knowledge carriers are embedded both in the technology platform itself and the relevant divisions as well as central areas. However, contrary to the previously described types of organizational forms of technology platforms, the staff organization is characterized by the fact that it can only prepare decisions and support the relevant divisions and central areas with necessary technology information, if needed. This means that the staff organization is not authorized to define binding technological guidelines, but rather generates from a central perspective technological information and decision templates with an unbinding character. Due to its managerial and internal information provider character, staff organizations are organizationally implemented under the supervision of the management within a diversified company. Overall, a technology platform implemented as a staff organization has a low degree of technological autonomy and can only decide on how relevant technology information and decision templates are provided to the relevant divisions and central areas. Figure 11 is visualizing the organizational implementation of a technology platform as a staff organization.

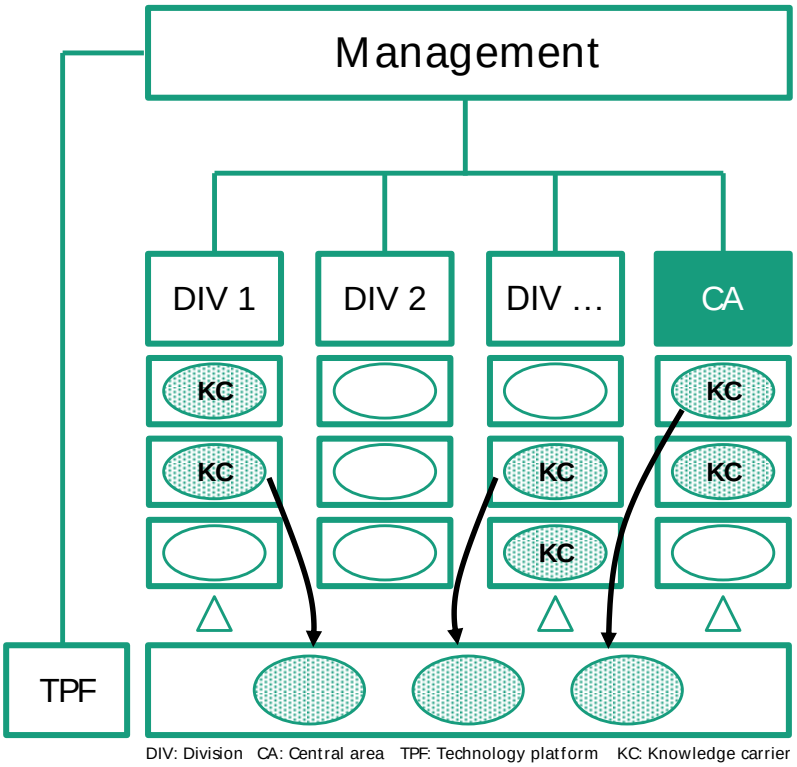

Fig.11: Organizational implementation of a technology platform as a staff organization

6) Implicit organization

Compared to the previous organizational forms, the implicit organization model represents the greatest form of decentralization of a technology platform. These technology platforms, which are organized in diversified companies on the principle of the implicit organization model, constitute internal company networks that are established for a specific technological topic. A technology platform as an internal company network is therefore defined as decentralized relationships between the relevant technological knowledge carriers that are in an informal, non-hierarchical mode of cooperation to each other. [32, 33]. As shown in figure 12, compared

to the previously presented organization models, this organizational form means also the lowest degree of autonomy for a technology platform for a defined technology topic. The reason lies in the platform-relevant knowledge carriers, which remain organizationally embedded within the relevant divisions and central areas. Thus, the decision-making authority on these knowledge carriers remains uniquely and exclusively in the responsibility of these divisions and central areas [26, 28]. Therefore, the technology platform concept in this organizational implementation form constitutes only an informal and implicit function without any formal technological decision rights [8].

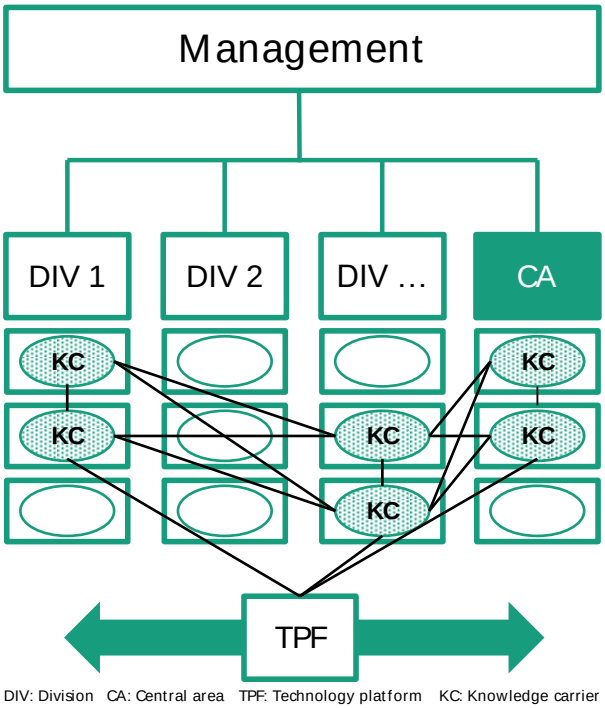

Fig.12: Organizational implementation of a technology platform as an implicit organization

VI. CONCLUSION AND FUTURE RESEARCH

The paper gives a comprehensive model for structuring the organizational implementation of technology platforms in diversified companies. In total, 6 individual implementation options have been identified that systemize possible forms of the organization of technology platforms within the context of diversified companies. The developed systematization is applicable for any diversified company and provides a clear guideline in structuring the organizational implementation of technology platforms in diversified companies. The research paper's outcomes emphasize the importance of a systematic description and systematization of the technology platform organization. Practitioners, responsible for the strategic management of technology platforms, are given a framework and therefore a valuable input that enables the systematization of the technology platform organization. However, future research in the form of empirical case studies is necessary to further validate the proposed results and complete the research process of applied. Also, the development of an explanatory model as well as a decision model would further promote the understanding of the technology platform organization in the context of diversified companies. Finally, it is also necessary in the next step to link the fundamental goals of technology platforms with the organizational options detailed in this paper, in order to accomplish a logical fundament for further research.

REFERENCES

[1]. D. Ford, and M. Saren, Managing & Marketing Technology, London, England: Thomson Learning, 2001.
[2]. D. Jolly, and M. Nasiriyar, Technology platform exploitation: definition and research boundaries, Proceedings of the 16th International Association of Management of Technology Conference (IAMOT) (2007), pp. 1-32, Miami, USA, May 2007.
[3]. U.H. Böhlke, T. Breuer, P. Dahlmann, A. Demarmels, K. Koglin, W. Pelzer et al., Technologieplattformen erfolgreich managen - Ein essentieller Beitrag zur Umsetzung der Unternehmensstrategie, in: C. Brecher, F. Klocke, G. Schuh, R. Schmitt (Eds.), Wettbewerbsfaktor Produktionstechnik: Aachener Perspektiven Shaker, pp. 393–415Aachen, 2005.

[4]. G. Schuh, and S. Ryschka, "Systemizing the Requirements of Technology Platforms in Diversified Companies," *International Journal Of Engineering Research & Technology*, 5 (12) pp. 276-285, 2016.
[5]. S.L. Rynes, Editor's Foreword: Carrying Sumantra Ghoshal's Editor's Foreword: Carrying Sumantra Ghoshal's Torch: Creating More Positive, Relevant, and Ecologically Valid Research, The Academy of Management Journal 50, pp. 745–747, 2007.
[6]. K. Starkey, P. Madan, Bridging the Relevance Gap: Aligning Stakeholders in the Future of Management Research, Br J Management 12, pp. 3-26, 2001
[7]. H. Ulrich, Management, Haupt, Bern, Switzerland, 1984.
[8]. T. Breuer, Management von Technologieplattformen in diversifizierten Unternehmen, Technische Hochschule, Dissertation, Shaker, Aachen, Germany, 2006.
[9]. C. Rosier, Zentrale Technologieentwicklung in diversifizierten Unternehmen, Technische Hochschule., Dissertation, Shaker, Aachen, Germany, 2006.
[10]. D. C. Stig, "Proposed Technology Platform Framework to Support Technology Reuse," in Proceedings of the Conference on Systems Engineering Research (CSER), pp. 918-926, Atlanta, USA, Mar. 2013.
[11]. C. U. Ciborra, The Platform Organization: Recombining Strategies, Structures, and Surprises. Organ. Sci., 7(2), pp. 103–118, 1996.
[12]. K. North, Wissensorientierte Unternehmensführung, Wissensmanagement gestalten, Springer, Wiesbaden, Germany, 2016.
[13]. G. Specht, C. Beckmann, J. Amelingmeyer, F&E – Management, Kompetenz im Innovationsmanagement, Schaeffer – Poeschel, Stuttgart, Germany, 2002.
[14]. R. Reed, G. A. Luffman, Diversification: The growing confusion, in Strategic Management Journal, vol. 7, issue 1, pp. 29-35, Jan. 1986.
[15]. M. Knecht, Diversification, Industry, Dynamism, and Economic Performance, The Impact of Dynamic-related Diversification on the Multi-business Firm, Springer Gabler, Wiesbaden, Germany, 2014.
[16]. V. Chiesa, R. Manzini, Competence-based Diversification, Long Range Planning, vol. 30, issue 2, pp. 209-217, April 1997.
[17]. M. Stephan, Technologische Diversifikation von Unternehmen, Ressourcentheoretische Untersuchung der Determinaten, Springer, Berlin/Heidelberg, Germany, 2003.
[18]. T. Röhrig, Ressourcenorientierte Messung der Diversifikation im Unternehmen, Eine empirische Überprüfung eines neuen Maßes aufbauend auf dem aktuellen Stand der Forschung, Pro BUSINESS, Berlin, Germany, 2011.
[19]. R. L. Daft, Understanding the Theory and Design of Organizations, Thompson South-Western, Mason, United States, 2007.
[20]. G. Schuh, S. Ryschka, Strategy Framework for Technology Platforms within the Context of Diversified Companies, 2015 IEEE International Conference on Industrial Engineering and Engineering Management, pp. 1514-1519, Singapore, 2015.
[21]. C. E. Levandowski, D. C. Stig, D. Bergsjö, A. Forslund, U. Högman, R. Söderberg, H. Johannesson, An Integrated Approach to Technology Platform and Product Platform Development, Concurrent Engineering, vol. 21, no. 1, pp. 65-83, 2013.
[22]. A. R. Shapiro, Measuring innovation: Beyond revenue from new products, Research Technology Management, vol. 49, no. 6, pp. 42-51, 2006.
[23]. S. Andereggen, F.A. Zoller, R. Boutellier, Organizational Principles for the Management of Technology Platforms: A Case Study, Working Paper, Zurich, 2011.
[24]. C. Blaser, S. Andereggen, R. Boutellier, Zentrale Technologieplattformen: Zwischen Forschung und Services: Organisationskonzepte und das Beispiel ETH Phenomics Center an der ETH Zürich, wissenschaftsmanagement 5, pp. 38–43, Zurich, Switzerland, 2012.
[25]. G. Marquardt, Kernkompetenz als Basis der strategischen und organisationalen Unternehmensentwicklung, Springer Deutscher Universitätsverlag, Wiesbaden, Germany, 2003.
[26]. E. Frese, M. Graumann, L. Theuvsen, Grundlagen der Organisation, Entscheidungsorientiertes Konzept der Organisationsgestaltung, Springer Gabler, Wiesbaden, Germany, 2012.
[27]. O. Rank, Unternehmensnetzwerke, Erfassung, Analyse und erfolgreiche Nutzung, Springer Gabler, Wiesbaden, Germany, 2012
[28]. E. Frese, A. v. Werder, W. Maly, Zentralbereiche, Theoretische Grundlagen und praktische Erfahrungen, Schäffer – Poeschel Verlag, Stuttgart, Germany, 1993.
[29]. J. Allen, A.D. James, and P. Gamlen, Formal versus informal knowledge networks in R&D: A case study using social network analysis. R&D Management, vol. 37, issue 3, pp. 179–196, 2007.
[30]. C.C. Snow, R.E. Miles, H. J. Coleman Jr., Managing 21st century network organizations, Organizational Dynamics, vol. 20, issue 3, pp. 5-20, winter 1992.

[31]. D. J. Brass, J. Galaskiewicz, H.R. Greve, and W. Tsai, Taking stock of networks and organizations: A multilevel perspective. Academy of Management Journal, vol. 47, issue 6, pp. 795–817, 2004.
[32]. T. K. Das, and B.-S. Teng, A resource-based theory of strategic alliances. Journal of Management, vol. 26, issue 1, pp. 31–62, 2000.
[33]. V. Gilsing, B. Nooteboom, W. Vanhaverbeke, G. Duysters, and A. van der Oord, Network embeddedness and the exploration of novel technologies: Technological distance, between centrality and density. Research Policy, vol. 37, issue 10, pp. 1717–1731, 2008.
[34]. S. Zelewski, H. Corsten, M. Reiß, Grundlagen, Betriebswirtschaftslehre, 4th ed, pp. 1-98, Munich, Germany, 2008
[35]. R. Küll, P. Stähly, "Zur Planung und effizienten Abwicklung von Simulationsexperimenten," in Simulation als betriebliche Entscheidungshilfe: State of the Art und neuere Entwicklungen, J. Biethahn, W. Hummeltenberg, B. Schmidt, P. Stähly, T. Witte, Eds. Heidelberg: Physika, pp. 1-21, 1999

*Guenther Schuh. "Organizational Implementation of Technology Platforms in Diversified Companies." International Journal Of Engineering Research And Development , vol. 13, no. 12, 2017, pp. 05–18.