publish-Ing.
Journal of Production Systems and Logistics
Volume 1 | Article 2
Published: October 2020

Transferring Innovation From Corporate Incubators To Its Parent Company: Derivation Of Requirements For The Interfaces

Günther Schuh[1], Florian Vogt[1], Maximilian Künstner[1]

[1]*Fraunhofer Institute for Production Technology IPT, Aachen, Germany*

Abstract

The transfer of innovations into the parent company is one of the major challenges that separate innovation paths, such as corporate incubators, are facing these days. So far there is no specific design model for the transfer of innovation from corporate incubators. This research paper therefore focusses on the development of requirements for the configuration of the interfaces between these two entities. Based on an intensive literature study as well as interviews within a German automotive supplier, requirements for the transfer process between corporate incubator and its parent company are derived and discussed.

Keywords

corporate incubator; interfaces; innovation transfer

1. Introduction

Established, market leading companies tend to struggle to keep up their innovative strength in the long run [1]. They often fail to continuously develop innovative solutions, or they struggle to keep pace when their industry or market is affected by new trends or innovations [2]. Although especially well-established companies often possess the necessary resources to invest into their innovation capabilities, there is a long list of formerly successful companies that - challenged by innovative products and competitors - have lost their growth dynamics or even disappeared completely, e.g. the producer of camera-related products Kodak. A major reason for this phenomenon stems from the fact that established companies struggle to manage the balancing act between exploiting their current core business while at the same time exploring new business opportunities and developing innovative solutions for their long-term competitive advantage and corporate success. In short, they often exclusively focus and rely on their historic success [3,4].

Within the described balancing act between exploitation and exploration, two different types of innovation can be distinguished: incremental and radical innovations. While incremental innovations refer to the step-by-step further development of the existing portfolio, radical innovations refer to those developments that lie outside of a company's current core business and thus might involve completely new products, product features, manufacturing technologies, services, etc. [3]. Large corporations often perform well in terms of incremental developments, however they struggle to pursuit radical innovation [2]. The characteristics of both development types differ greatly. While incremental projects can be well planned, mostly have definable goals and are less risky, radical development projects are characterized primarily by their high level of uncertainty and their unpredictable market success. To manage the balancing act between both types of developments, companies must approach them differently. Practice shows that at this point well-

This Paper has been reviewed by the Certified Reviewer Community of publish-Ing. – 2 reviews – double blind

established companies struggle when they address radical development projects by using the same development approaches as for incremental developments [5]. Numerous reasons are mentioned in the literature: the perception of new developments rather as a threat to the current business than an opportunity to expand, a corporate culture that punishes rather than rewards risk-taking, a lack of entrepreneurial spirit, a strong focus on efficiency and cost optimization and the tendency to classify projects from the very beginning as unpromising due to unpredictable market success [4]. Ultimately, radical development projects are nipped in the bud or are categorically less prioritized than incremental development projects.

An approach to promote the parallel development of incremental and radical development projects that is often described in the literature is referred to as organisational ambidexterity, the structural and organisational separation of exploit (incremental) and explore (radical) activities [6–8]. In this way, companies intend to meet the different requirements for the development environment of both types of activities and aim to provide the appropriate framework conditions: while exploit activities are executed by means of conventional development methods (stage-gate-process, problem-orientation, etc.) in a conventional development environment (clear division of labonalar, hierarchical structure, etc.), explore activities require modern development approaches (agile development, interdisciplinary, cross-functional cooperation) [9]. One approach to bundle explore activities are incubators, a dedicated unit that represents an alternative development path for radical innovations outside the established R&D departments. If such an incubator is founded by and belongs to a larger company, it is referred to as corporate incubator [10]. Such corporate incubators are the focus of this paper. By bundling radical innovation projects in a corporate incubator, corporations seek to create two separate development paths in order to equally promote both types of development activities. As long as both paths act separated from each other, the respective properties serve the actual purpose of each path. However, difficulties can arise when an innovation of the corporate incubator must leave its innovative and concentrated environment to be further developed, scaled up and/or commercialized elsewhere. Generally, there are several considerable options how to proceed with innovations that evolve in a corporate incubator: the innovation can be further developed in a newly formed spin-off, the innovation can be sold externally, or the innovation can be transferred into the mother company. The transfer of innovations into the parent company is the focus of this paper. It is stated that the integration of innovations developed on the radical development path back into the established R&D structure is one of the greatest challenges of such an ambidexter development approach for larger corporations [11,12]. A successful transfer process and the goal-oriented design of the interface between both paths are therefore essential success factors of the entire development process. If they are not designed in accordance with the specific circumstances, the desired effect of the separated development paths will not be reached.

This paper aims to present levers that enable and improve the transfer of radical development projects between both development paths. Therefore, it is assumed that radical development projects are developed in a corporate incubator. Due to a high strategic impact on the corporate core business and needed resources for the serial development these projects are transferred into the established development structure of the parent company. In order to ensure a high practical relevance, potential design options were identified based on an extensive literature analysis as well as interviews with a German automotive supplier for internal combustion engine (ICE) express components, which uses a corporate incubator to develop components for the electrified powertrain. The following research question is answered within the paper:

What are the major requirements for the interface between a corporate incubator and its parent company?

The goal of this paper is therefore to address the research question and derive requirements for the transfer of innovations. An assessment of the suitability to the actual situation as well as a design recommendation will be part of future studies and not be addressed within this paper.

2. Methodology

In the following subchapters the methodology of this research paper is presented. At first the research methodology used in this paper is discussed and the structure of this paper is explained. Following the methodology of the conducted interviews is explained.

2.1 Research methodology

A continuing methodical challenge in the technology management research can be seen in overcoming the 'academic-practitioner divide' [13]. While practitioners continue to emphasize the benefit of research, they criticize often a lack of focus on problems with practical relevance [14]. This paper adopts the research process of applied sciences by Ulrich, shown in Figure 1, in order to overcome the 'academic-practitioner divide' and propose practical relevant results [15]. 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 [15]. The research methodology of applied science according to Ulrich is based on seven sequential steps. This paper is covering the first five steps of the research process. The practical testing and verification in industrial practice are going beyond the scope of this paper. Following the process of applied sciences, a problem of practical relevance with an underlying theoretical deficit has to be identified and structured at first (Figure 1, step A). For this step, interviews with developers of both units – the corporate incubator and the established development department – were conducted at a German automotive supplier that uses a corporate incubator to pursue radical innovations.

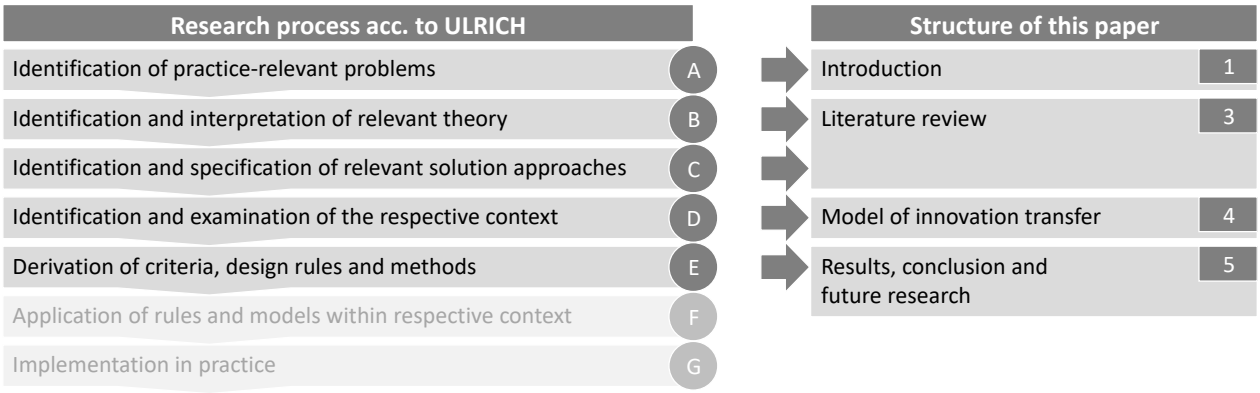


Figure 1: Structure of this paper according to [15]

These interviews serve as the key input to derive the underlying problem, to ensure its practical relevance and will be used as input factors for the derivation of the results. Subsequently, in step B and step C problem-specific theories and methods of existing research must be identified, analysed and interpreted as the groundwork to develop adequate solutions and to identify the need for further research. Step B and C will be addressed within the paper in section 3 with the illustration of the theoretical background and the literature review. Step D is focusing on the conception of an adequate model, in order to describe levers that enable or improve the transfer of radical development projects between a corporate incubator and the receiving development department. The following step E addresses the detailing of the model. As mentioned above, step F and G (implementation and validation in practice) go beyond the scope of this paper and will not be covered.

2.2 Methodology of the interviews

The interviews were conducted at a development centre of the German automotive supplier in Brazil during a 6 month period in which the author was working there within the corporate incubator. Based on prediscussion with the head of the R&D department the case of the automotive supplier was chosen because they had major problems to transfer innovation from the corporate incubator to the serial development.

In total nine interviews, five within the corporate incubator and four within the series development department were done. Each of the interviews had a duration of 1,5 hours. The series development department is clustered into four teams, whereby each team has a distinct focus on a specific product/product group. All teams of the serial development department were addressed separately within the interviews.

3. Literature review

Due to its practical relevance, there are more and more discussions about the problem of the innovation transfer from corporate incubators to its parent company. However, in literature there is still a lack of approaches to design this specific transfer process. Therefore, the different transfer processes of technology transfer, knowledge transfer and research transfer, which are already well discussed in literature, will be analysed to derive possible impacts on the transfer process from corporate incubators. Furthermore, existing challenges for the interface management will be described from literature review.

3.1 Transfer processes in research and industry

By pursuing ambidexterity, companies seek to strengthen their innovative power through the organisational separation of exploration and exploitation activities. As already outlined before, an essential challenge in the innovation process occurs, when the innovation must be transferred between different development paths. This transfer creates an interface between different development functions that must be bridged through a transfer process. The more diverse the environment and the working methods of the involved transfer actors are, the more difficult a successful transfer becomes. [16] As companies seek to shorten the time-to-market of their development projects, the management of transfer processes is increasingly gaining strategic importance [17]. Accordingly, the scope of transfer-related research and theoretical approaches to transfer processes is extensive. The design of transfer processes depends strongly on what is being transferred and between whom. The transfer models found in today's literature differ accordingly. In the following, three different types of transfer processes will be introduced: technology transfer, corporate knowledge transfer and research transfer.

3.1.1 Technology Transfer

Despite many differences, most definitions have in common that a technology transfer serves to transfer technical knowledge from a sender to a receiver. Besides that, definitions vary greatly. Geschka and Wünneberg define technology transfer as the transmission of technical knowledge and knowhow from a sender to a receiver and its application in products or processes [17]. Considering the complexity of technology transfers, such a transfer should not be understood as a single point in time. Instead, a technology transfer is a continuous process that includes at least the following tasks: planning of the transfer, preparation of decisions, support of transmission from sender to receiver and ensuring communication between all involved parties. For a technology transfer to be successful, it must at least fulfil two crucial requirements: the transfer object must generate an impact that the receiver itself is looking for and the transfer object must be mature enough to be removed from the sender's responsibility. [17]

According to Pleschak, technology transfer is not limited to the transmission of technology and knowledge, but it also involves investment decisions, changes in the structural and operational organisation of the receiver and includes information about appropriate use, maintenance as well as modernization of the transferred technology [18]. Besides the factors identified by Geschka and Wünneberg, Sabisch states that a successful technology transfer depends on the following eight factors [19]: Relentless market orientation of all innovations, an innovative culture, professional innovation management, intensive networking with partners, a protecting IP management, the exploitation of alternative development paths to shorten innovation

cycles, sufficient funding of innovation and transfer processes and professional training of the involved actors. These factors need to be considered in the development of the interfaces. [19]

3.1.2 Corporate knowledge transfer

The ability to create, store and access knowledge within corporations is commonly seen as a key factor for competitive advantage and is therefore of major attention of today's market leading companies [20]. To ensure knowledge management, efficient knowledge transfer within corporations is required. For their model of the corporate knowledge transfer, Vonkrogh and Köhne distinguish between tacit and explicit knowledge. While tacit knowledge is generated through experience and is integral to the entirety of a person's consciousness, explicit knowledge is more schematic and hence transferable via publications, books and manuals. [21] Against this background, the transfer of knowledge can be understood as phase model that includes three major steps [21]:

- **Initiation phase:** the initiation phase is triggered by the willingness of individuals, groups or departments within an organisation to transfer knowledge from the knowledge holder to the knowledge receiver. This phase already includes the screening and selection of a suitable transfer location and authority.
- **Knowledge flow phase:** during this phase, the knowledge object is being transferred through interaction and communication. Here, the distinction between tacit and explicit knowledge is crucial. While tacit knowledge requires intense personal contact and interaction to be transferred, explicit knowledge can be transferred in a larger scale through presentations and hand-outs. Generally, all measures to transfer tacit knowledge can be used to transfer explicit knowledge, but not vice versa.
- **Integration phase:** during this last phase, the knowledge recipient absorbs, structures and applies the received knowledge by falling back on his experiences and his existing knowledge basis. The final success of a transfer process can only be evaluated after the integration phase has been concluded.

The most critical factors for transfer success are the willingness and ability to learn, mutual trust of both transfer partners, the openness of all involved parties to actively engage into the transfer process, the support of the management for the transfer, an incentive system that encourages the transfer partners to achieve a successful transfer and the availability of sufficient time to invest into the transfer process. Thereby it becomes clear, that the knowledge flow phase is the most critical phase since most success factors have the highest impact on this particular phase. [21] The presented transfer phases will be implemented within the model of innovation transfer from corporate incubators.

3.1.3 Research transfer

Increasing specialization and interdisciplinary led to a clear separation between fundamental research, applied research and corporate development [22]. As a result, research institutes and companies establish research co-operations to combine such a clear separation of tasks with a joint strategic development approach. For the cooperation to be successful the transfer object must be transferred from an academic and scientific environment into a corporate setting [11]. Hence, with regard to the transfer itself, a research transfer is a technology transfer with the only difference that a research institute acts as the technology sender. Thereby, the scope of such a transfer may include both non-completed and completed results such as innovations or concrete applications [11]. However, the transfer of scientific research knowledge is specifically impeded due to the different characteristics and targets of both sender and receiver which results in a set of challenges for their mutual communication [22].

Since the transfer itself does not differ significantly from the technology or knowledge transfer apart from these special framework conditions, a detailed description is omitted, and reference is made to the findings on the topics of technology and knowledge transfer that were outlined above.

3.2 Interface challenges between a corporate incubator and its parent company

Assuming that an incubator's development projects are to be serialized and commercialized internally, the final innovation success of the incubator depends on the transfer of the innovation from the incubator to its parent company. Hence, the innovation success highly depends on a successful interface management between both units [23]. Unfortunately, in many cases there are no clear described interconnections between an incubator and its parent company [24]. A successful interface management between an incubator and its parent company is generally hampered by three typical characteristics of the parent company [23]: the not-invented here syndrome meaning that the receiving part reacts in a rejecting manner towards ideas that did not arise from its own environment, a lack of provided resources meaning that the parent company must focus on its day-to-day business and refuses to invest resources into the cooperation with the incubator and a lack of commitment meaning that the assignment of radical projects within the parent company is often critical due to its radical and unknown nature. Besides these three interface barriers, which can be traced back to the organisational behaviour and stiffness of the parent company, several other contradictions can be found in literature, that further impede a successful interface management and thus make cooperation among them difficult:

- **Vertical command structure vs. flat hierarchy:** Especially large corporations traditionally build on strong vertical hierarchies. The operating teams need the commitment and support of their management, which also determines the distribution of resources and gives official approvals. This top-down structure might accelerate decisions but also increases the possibility to follow non-ideal approaches. Incubators instead have flat hierarchies where decision are made through discussion and alignment. [9]
- **Stage gate processes vs. agile development:** Corporations often take a stage gate process as their preferred development process [23]. The stage gate process is a standardized model for the development of innovations that aims to ensure the desired quality of the innovation process. Incubators increasingly build on agile development methods to realize their full innovation potential.
- **Demarcated functions vs. comprehensive collaboration:** Since corporations are usually clustered in areas, departments and other affiliations, these units tend to limit their share of responsibility of a given development project to their specific area [25]. Incubators instead push comprehensive collaboration, where the operating individuals take responsibility for the development project from its kick-off to its final launch or hand-over process.
- **Risk aversion vs. venturesome attitude:** Depending on the company culture, large corporations can evoke risk averse behaviour of their development teams. Since incubators are created to focus on radical ideas and rapid innovation, they naturally act more venturesome and encourage a do-it-yourself attitude. [26]
- **Problem oriented vs. solution driven:** Corporations struggle to pursue radical ideas when organisational stiffness, individual prioritization and risk aversion promote problem-oriented thinking. Since incubators pursue radical ideas by thinking from a customer's perspective, they rather think solution driven than problem-oriented. [27]

3.3 Interim conclusion

Throughout this literature review different types of transfer processes as well as two different types of corporate interfaces were described and analysed. The importance of transfer processes as a main success factor of the corporate innovation process could be shown as well as several inhibiting barriers were presented that impede such a transfer at their respective interfaces. Today's literature provides several solution approaches aiming to explain how to overcome these interface barriers e.g. Nobelius, Eldred et al. [28,29] However these solution approaches are often highly generic. Particularly with regard to the focus of this paper, the literature lacks a description of concrete transfer steps and the associated design options for the respective interface between an explorative incubator and the exploitation-oriented established development function of its parent company. The literature, which investigates the design of organisational interfaces, lacks a clear systematization of the various design options. Although the approaches will not be discussed further at this point, one can conclude that the attempts to categorize potential design options are extremely diverse. The selection and systematization are highly determined by the objective and the subject of the respective study [30,31]. Thus, in the following section, the challenges that were identified in the literature will be used to systematically derive requirements for a successful transfer process between a corporate incubator and the development structure its parent company. These requirements will be further supported by the outcome of nine interviews that were conducted with developers of both units at a German automotive supplier. After deriving these requirements, concrete design options for the interface will be elaborated, showing opportunities how to realize the transfer in practice.

4. Requirements for the interface of a corporate incubators to its parent company

In the following section possible design options for the interface between the corporate incubator and its parent company will be derived. Therefore the timeframe of the cooperation will be discussed and following a generic transfer process from corporate incubators will be developed. Following the transfer requirements are derived from literature review as well as the on-site interviews.

4.1 Transfer phase model

The generic model of a transfer process from corporate incubator to its parent company can be adapted based on the model of knowledge transfer from Vonkrogh and Köhne, described in section 3.1.2. The transfer phase model from corporate incubators therefore consists of three phases: the initiation phase, the implementation phase and the integration phase. The designed transfer phase model aims to enable a smooth integration at the parent company's development function. When the transfer is concluded, the transfer object is in the domain of the development department that subsequently supervises the series production and the commercialization. In the following, the three phases of the transfer phase model will be described. Thereby, the description focuses on the final stage of each phase. Instead of focusing on the single activities and subtasks during each transfer phase (they vary for every transfer), the derived requirements were used to determine conditions that must be fulfilled at the end of each phase. When the conditions are fulfilled the respective phase is concluded and the subsequent phase begins. The transfer phases and conditions derived from literature analysis are displayed in Figure 2.

The **initiation phase** is dedicated to the preparation of the actual transfer itself [32,21]. At the beginning of the initiation phase, the receiving department is merely involved in the development process. Through an increased involvement, at the end of the initiation phase, the incubator and the receiving department are willing and able to jointly continue the development process. Required conditions at the end of the initiation phase are listed in Figure 2. The incubator is responsible for most of the conditions at the end of the initiation phase while the receiving department still has a more passive role but might be already involved in the

necessary subtasks. The management must ensure that the boundary conditions (e.g. budget) for the upcoming implementation phase are defined, authorized and available by the end of the initiation phase.

The **implementation phase** is the core phase of the transfer process. At the end of the phase the product development process is concluded, meaning that the product concept is adapted to the required conditions of the series production [32]. Besides a validated product design and manufacturing process, the financial implications of the project are determined. The conditions at the end of the implementation phase are listed in Figure 2. In contrast to the initiation phase, responsibilities shift from the incubator to the receiving department during the implementation phase.

The **integration phase** is the last phase of the transfer process. After the product concept was realized within the previous phase, at the end of the integration phase the employees in the receiving department are enabled to take over the transfer object and further utilize it without being dependent on the support of the incubator [21]. The conditions at the end of the integration phase are listed in Figure 2. Like the receiver in the initiation phase, the incubator has hardly any responsibilities during the integration phase. The receiving employees are responsible to ensure that the necessary knowledge and know-how regarding the transfer object is available in order to integrate it into its area of responsibility. In order to start the subsequent commercialization phase, the management must finally weight up the associated market opportunities and approve the necessary investments.

Transfer Phase	Condition & Description
Initiation Phase	• **The actual receiver is identified:** The receiver is not the entire series development department but a single engineer group • **The receiver is aware of potential risks of the project:** Potential risk refers to technical risk, financial risk, risk related to the target market or risk related to intellectual property • **Resources for the following phase are defined and allocated**
Implementation Phase	• **Adapted and verified product design:** The product design fulfils two requirements: it is mature enough to be produced in series production and it meets customer's demand and requirements • **Adapted and verified manufacturing process:** Manufacturing process is mature enough to serve as the template for the ramp-up process • **Elaborated investment cost analysis:** Required investments for a potential ramp-up and start of series production are determined
Integration Phase	• **The receiver is enabled to autonomously solve technical complications:** The receiver must be enabled to understand problems that may arise and work out solutions independently • **A commercialization strategy is elaborated:** An implementable and realistic commercialization strategy for the product is elaborated • **The required funds for series production are authorised**

Figure 2: The transfer phase model and its conditions

4.2 Requirements for a successful and efficient transfer

Specht distinguishes four categories of requirements for a successful transfer process: organisation related requirements, process related requirements, culture related requirements and informal related requirements [33]. However cultural and informal aspects have many interfaces because informal exchange has a great impact on cultural aspects, therefore these two categories will following be used as one. Employing Spechts classification, the requirements will be derived from literature and the conducted interviews within the German automotive supplier. In total, nine interviews were conducted. Of the nine interviewees, five work within the supplier's corporate incubator and four within the parent company's established development structure, precisely the series development department. All interviewees' hierarchical position was team leader or higher meaning that all of them had personnel responsibility.

4.2.1 Organisational requirements

Organisation related requirements determine the boundary conditions of the transfer such as the organisational embedding of the transfer, the availability of resources, the commitment of the management or the corporate innovation strategy.

From the interviews several aspects as organisational requirements were derived. Both the interviewees from the corporate incubator as well as the serial development stated that the transfer success decreases if the employees within the serial development do not have a defined working time for the innovation project. They are occupied with their day to day business and often prioritize internal projects higher then project from the corporate incubator. A lack of early involvement of serial employees into the strategic orientation of the corporate incubator reduces their commitment within the transfer process. Furthermore the support and commitment of the higher management is a decisive determinant for both entities. For the employees within the serial development a high market and customer focus of the innovation is demanded, only if these internal employees are convinced of the market potential they are intrinsically engaged into the transfer process. Finally, according to the corporate incubator, the geographic distance between both teams plays a significant role to ensure an efficient transfer. In contrast to that, the employees within the serial development state that a well-defined transfer process is more important than the proximity of both entity.

Through a literature analysis, these requirements can be complemented. Geschka emphasizes the importance to determine who the receiver is during the planning phase. He illustrates the importance through a simple analogy: pushing a soft rope through a narrow pipe remains difficult as long as the right person is not identified who is intrinsically motivated to pull from the other side [17]. Lohmann emphasizes the importance of a generally comprehensive collaboration among sender and receiver [34,35]. Sender and receiver often have different believe structures and targets what causes barriers for communication and collaboration. This might be the result of a different development focus, a different level of flexibility within their projects or their individual incentivization systems. Almost all literature sources emphasize the importance of sufficient funding of the development process and the transfer process in particular [36,17,34,35,16]. Closely related to the provision of financial resources is the general support and commitment to innovative development projects by the higher management. In this context, an official statement via a corporate innovation strategy is decisive [17,34].

In total five main organisational requirements were derived from the literature and the conducted interviews:

- **Resources are clearly defined and allocable:** The term resources not only refers to budget but also to the dedicated transfer time of all participants as well as the availability and access to further infrastructure. Besides their definition, resources must be clearly allocable. While the definition of available resources is mainly decided by the management, the transfer mechanism must enable their purposeful allocation.
- **Radical development projects are perceived as collaborative projects:** Since the corporate incubator is responsible for the early development stage, the team “automatically” shows a high level of engagement within the transfer. Contrarily, the engineers of the parent company must be actively included. Only when both entities perceive the project as a collaborative task, they will engage sufficiently.
- **The management supports and commit to radical developments:** The management must communicate the importance of innovative projects for the long-term growth and viability of the company. Further it must prove its statement by its management practices meaning that it provides enough resources and shows engagement.
- **Transferred projects have a clear market potential:** Only if all relevant stakeholders believe in the economic potential of the project, they will show sufficient engagement to enable the transfer

itself. The transfer mechanism must ensure that poor concepts are rejected and that the potential of promising projects is clear to all participants.

- **The transfer process is executed by the right employees:** "Right" refers to the employees' willingness and capabilities to engage in the transfer. While their motivation depends on the company's management style and incentivization system, their capabilities depend on the company's staff development program and recruiting performance.

4.2.2 Procedural requirements

Procedure related requirements refer to the design of the transfer mechanism itself. While organisation related requirements and culture related requirements define the boundary conditions of a transfer, the procedure related requirements refer to the concrete design measures of the transfer.

Different process determinants were derived from the interviews. For both entities defined modalities to exchange information are crucial to transfer success. The lack of clear communication channels causes confusion and misunderstanding. Transfer processes are generally completed faster if the serial development is involved into the decision which project from the corporate incubator will be transferred. When being involved early enough, the SDD engineers show higher commitment and engagement. According to both teams, the transfer process must entail clear gates to evaluate the transfer progress, to adjust deliverables and to define the following steps. For the corporate incubator the transfer success highly depends on a purposeful distribution of tasks and deliverables and thus the distribution of responsibility. If one entity alone is responsible for the transfer process, the other entity automatically under-prioritizes the project. Both entities agree that an involvement of the serial employees into the early project selection process increases the transfer success. The series development department further claims that, by being involved into the development of the corporate incubator itself, the number of promising projects increases.

Additional to the interviews a literature analyse of procedural requirements was done. It showed that in general, the transfer mechanism must be a well-defined and structured process [17]. Hence, it is not at all a mechanism, which can be repetitively successful if it is not managed appropriately but rather based on improvisation. As long as the transfer mechanism is not described as a well-defined phase plan, the frequency of failures increases [17]. Besides the decomposition into transfer phases, clear decision making processes and decision criteria foster the effectiveness of the overall transfer [17]. Cagan and Wünneberg emphasize the importance that the receiver obtains all required information depending on the current stage of the transfer process [37,38]. In this context, Stechhan describes the importance of information flow. Since communicated information triggers and drives a transfer process, creates alignment, facilitates the search for technical solutions and enables the integration among departments, the availability of the right information at the right time is decisive [16]. At all times during the transfer process sender and receiver must be aware of their individual tasks and deliverables [37,36,39]. Only if all participants know and understand their role within the transfer process and only if responsibilities are clearly allocated, the transfer can be executed efficiently [34]. Like the transfer success increases if the receiver is involved early enough, it increases if the sender follows the transfer object along the transfer process until its adaption to the conditions of the receiver. The sender's involvement throughout the transfer process drastically reduces the overall transfer time [17].

The consolidated most important procedural requirements derived from literature and the conducted interviews are displayed below:

- **The transfer mechanism is composed of defined phases and must include clear progress criteria:** Decomposing the transfer process into phases fosters its effectiveness. Every phase is connected to a set of tasks, roles and responsibilities what provides orientation, defines timelines and allows re-focusing along the transfer process.

- **The transfer mechanism creates clarity about roles and responsibilities:** Transfer participants must know their roles and responsibilities in advance. Providing clarity about roles and responsibilities makes it easier for all participants to see how they can contribute, and it increases the likelihood that they will be supporters of the project.
- **The transfer mechanism ensures involvement of the receiving employees within an early transfer stage:** To reach the desired development speed and to shorten time-to-market, the projects must reach the receiver in a premature development stage. Early involvement prevents the not-invented-here syndrome through mutual alignment.
- **The transfer mechanism must ensure involvement of the corporate incubator until a late transfer stage:** Even if the transfer phases and progress criteria are well-defined, the radical character of the transferred project causes the occurrence of unpredicted incidents and challenges that the receiver will struggle to solve only by himself.

4.2.3 Cultural requirements

The corporate culture is a system of shared values and assumptions that are critical to any organisational activity. It dominates how an organisation functions, how its employees interact, and how decisions are made. Thus, culture and mindset represent the core set of values that govern the attitude of any employee's approach regarding the introduction of something new [40]. Related requirements thus refer to the corporate perception of radical development projects.

Three cultural determinants were named within the interviews. Particularly with regard to radical development projects, which determine the future orientation of the company, a common vision of the two areas with regard to the potential opportunities of the company is decisive. As long as both areas are not convinced of the urgency of change in the company and do not evaluate the chances of a project equally, the commitment and the chances of success of the project decrease overall. Both entities stated that the corporate culture must reward independent and risk-taking behaviour. Furthermore it was important for the employees that the company gives employees opportunities and space to pursue their own ideas, interests and projects in addition to day-to-day business. Besides the provision of working time and budget, this also includes the allowance and support to attend external trade fairs, conferences and seminars

From the literature point of view it can be stated that if organisational members have internalized consistent values and norms or if they can identify with them, activities can be coordinated without the unconditional necessity of structural and procedural guidelines [31]. Especially in complex situations, when employees work together under increased uncertainty and must agree on insecure decisions, they will resort to common values and standards in order to decide how to proceed [41]. Especially when employees from different areas work together at organisational interfaces, the corporate culture and the promoted mindset play a decisive role for their collaboration [40].

In total three cultural requirements from literature and conducted interviews were derived:

- **Shared vision for strategic orientation of the company:** The incubator and receiving department must have a common perception of the challenges the company is currently facing, and they must have a shared vision what answers it can and should provide.
- **Mutual understanding and acceptance:** Since incubator and receiving department work under different conditions within their daily business, a mutual tolerance and acceptance of each other's working methods and goals must be created. This promotes cooperation since the involved actors also acknowledge the objections and pain-points of their respective counterpart.
- **Environment that encourages entrepreneurship and participation:** Particularly radical innovations require an open, tolerant and supportive corporate culture. If errors are hardly tolerated or if resource spending is excessively monitored employees tend to categorically avoid even low

risks and to postpone their own commitment. The corporate culture must intrinsically motivate employees to share their experiences, knowledge and know-how impartially and not hold it back believing that they secure their own position and power by doing so.

5. Conclusion and Outlook

By organisationally separating radical development projects from projects of the continuous improvement process, companies seek to specifically promote the development of radical ideas. These two development paths differ greatly, which is particularly critical when radical innovations are to be developed detached from the core business processes but are to be exploited within existing corporate structures. In this paper, requirements for the interface between a corporate incubator and the established development structure of its parent company were developed in order to enable a successful and efficient transfer between an explorative development team and the exploit-oriented development structure. The expected benefit of this paper is twofold, containing a practice-driven and a research-oriented component. From a practitioner's viewpoint, the presented requirements serve as a guideline for companies to support their individual transfer processes. By displaying all the identified requirements, executives can identify options in order to ensure they have a comprehensive and structured overview of potential measures to facilitate their transfer processes. From a research perspective, this paper lays groundwork for future research. The author develops a model of innovation transfer including all relevant aspects to be able to design a situation specific transfer process. Further research will investigate to what extent the design of the interface depends on other factors such as the transfer object or the organisational structure of the established development areas. In addition, since in this paper a description model was developed, further research will be carried out to develop a design model that allows the meaningful selection of options depending on a company's individual situational context.

6. References

[1] Christensen, C.M. The Innovators's DilemmaWhen New Technologies Cause Great Firms to Fail. Harvard Business School Press.

[2] Chang, Y.-C., Chang, H.-T., Chi, H.-R., Chen, M.-H., Deng, L.-L., 2012. How do established firms improve radical innovation performance? The organizational capabilities view. Technovation 32 (7-8), 441–451.

[3] Bullinger, H.-J., Spath, D., Warnecke, H.-J., Westkämper, E., 2009. Handbuch unternehmensorganisation: strategien, planung, umsetzung. Springer-Verlag.

[4] Robeson, D., O'Connor, G., 2007. The governance of innovation centers in large established companies. Journal of Engineering and Technology Management 24 (1-2), 121–147.

[5] Chen, H., Taylor, R. Exploring the impact of lean management on innovation capability, in: PICMET'09-2009 Portland International Conference on Management of Engineering & Technology. IEEE, pp. 826–834.

[6] Andriopoulos, C., Lewis, M.W., 2009. Exploitation-exploration tensions and organizational ambidexterity: Managing paradoxes of innovation. Organization science 20 (4), 696–717.

[7] O'Reilly III, C.A., Tushman, M.L., 2008. Ambidexterity as a dynamic capability: Resolving the innovator's dilemma. Research in organizational behavior 28, 185–206.

[8] Raisch, S., Birkinshaw, J., Probst, G., Tushman, M.L., 2009. Organizational ambidexterity: Balancing exploitation and exploration for sustained performance. Organization science 20 (4), 685–695.

[9] Koen, P.A., Ajamian, G.M., Boyce, S., Clamen, A., Fisher, E., Fountoulakis, S., Johnson, A., Puri, P., Seibert, R., 2002. Fuzzy front end: effective methods, tools, and techniques. The PDMA toolbook 1 for new product development.

[10] Schuh, G., Lau, F., Zimmermann, R., Vogt, F. Configuration Options for Corporate Incubators: Development of a Description Model Using the Morphological Analysis Method, in: 2017 Portland International Conference on Management of Engineering and Technology (PICMET). IEEE, pp. 1–10.

[11] Meißner, D. Wissens-und Technologietransfer in nationalen Innovationssystemen.

[12] Vanderstraeten, J., van Witteloostuijn, A., Matthyssens, P., Andreassi, T., 2016. Being flexible through customization− The impact of incubator focus and customization strategies on incubatee survival and growth. Journal of Engineering and Technology Management 41, 45–64.

[13] Rynes, S.L., 2007. Carrying Sumantra Ghoshal's Torch: Creating More Positive, Relevant, And Ecologically Valid Research. Academy of Management Journal 50 (4), 745.

[14] Starkey, K., Madan, P., 2001. Bridging the relevance gap: Aligning stakeholders in the future of management research. British Journal of management 12, S3-S26.

[15] Ulrich, H., 1984. Management-Gesammelte Beiträge. Haupt, Bern.

[16] Stechhan, M., 1988. Technologietransfer in Großkonzernen - Situationsdarstellung und Instrumente, in Geschka, H., Wünneberg, H.: Innerbetrieblicher Technologie-Transfer, 11, 59–99.

[17] Geschka, H., Wünneberg, H., 1988. [Duplikat] Systematik des Technologietransfers und seine Bedeutung für den Innovationsprozess, in Geschka, H., Wünneberg, H.: Innerbetrieblicher Technologie-Transfer, 11.

[18] Pleschak, F., 2002. Technologietransfer: Anforderungen und Entwicklungstendenzen. Fraunhofer IRB Verlag.

[19] Sabisch, H., 2002. Erfolgsfaktoren des Wissens- und Technologietransfers. Fraunhofer IRB Verlag.

[20] Sarnitz, A., 2011. Einflussfaktoren auf den Wissenstransfer in Projektübergabeprozessen und Handlungsoptionen für die Optimierung von Projektübergaben.

[21] Vonkrogh, G., Köhne, M., 1998. Der Wissenstransfer in Unternehmen: Phasen des Wissenstransfers und wichtige Einflussfaktoren. Die Unternehmung 5, 235–252.

[22] Meißner, D., 1999. Forschungstransfer zum externen Erwerb von Technologien und technologischem Wissen, in: , Innovationsmanagement. Springer, pp. 39–51.

[23] Schuh, G., Vogt, F., Lau, F., Bickendorf, P. Concept of Innovation Transfer from Corporate Incubators, in: 2017 Portland International Conference on Management of Engineering and Technology (PICMET). IEEE, pp. 1–11.

[24] Rubin, T.H., Aas, T.H., Stead, A., 2015. Knowledge flow in technological business incubators: evidence from Australia and Israel. Technovation 41, 11–24.

[25] Crawford, C.M., 2015. New products management. Tata McGraw-Hill Education.

[26] Schuh, G. and Vogt, F. and Maurer, D., 2019. Transfer von Innovationen aus firmeninternen Inkubatoren.

[27] Priest, S., Gass, M., 1997. An examination of "problem-solving" versus "solution-focused" facilitation styles in a corporate setting. Journal of Experiential Education 20 (1), 34–39.

[28] Eldred, E.W., McGrath, M.E., 1997. Commercializing new technology—II. Research-Technology Management 40 (2), 29–33.

[29] Nobelius, D., 2004. Linking product development to applied research: transfer experiences from an automotive company. Technovation 24 (4), 321–334.

[30] Hawranek, F., 2004. Schnittstellenmanagement bei M&A-Transaktionen. Deutscher Universitätsverlag, Wiesbaden.

[31] Reger, G., 1997. Koordination und strategisches Management internationaler Innovationsprozesse. Physica-Verlag Heidelberg.

[32] Corsten, H., 1982. Der nationale Technologietransfer: Formen-Elemente-Gestaltungsmöglichkeiten-Probleme. Erich Schmidt.

[33] Specht, G. Schnittstellenmanagement: Marketing und Forschung und Entwicklung. Darmstadt Technical University, Department of Business Administration …

[34] Lohmann, S., 2013. Interaktionsqualität im Technologietransfer: Theoretischer Ansatz, empirische Untersuchung und Implikationen. Ilmenau, Technische Unvesität Ilmenau. Ph. D.

[35] Stahlmann, K., 1988. Erkenntnisse zum Technology-Push von Innovationen und Möglichkeiten in Geschka, H., Wünneberg, H.: Innerbetrieblicher Technologie-Transfer, 11. Verl. TÜV Rheinland, Köln.

[36] Frank, A.G., Ribeiro, J.L.D., Echeveste, M.E., 2015. Factors influencing knowledge transfer between NPD teams: a taxonomic analysis based on a sociotechnical approach. R&D Management 45 (1), 1–22.

[37] Cagan, M., 1988. Der innerbetriebliche Technologietransfer in deutschen Großunternehmen - eine empirische Untersuchung.

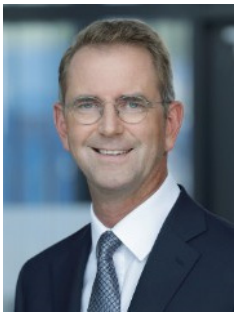
[38] Wünnenberg, H., 1988. Erfahrungen mit Technologie Transfer Projekten Verl. TÜV Rheinland, Köln. Verl. TÜV Rheinland, Köln.

[39] Lercher, H., 2017. Big Picture Das Grazer Innovationsmodell (Big Picture the Innovation Model).

[40] Lucas, L.M., 2006. Things are not always what they seem: How reputations, culture, and incentives influence knowledge transfer. The Learning Organization: An International Journal 13 (1), 7–24.

[41] Corsten, H., 1989. Die Gestaltung von Innovationsprozessen: Hindernisse und Erfolgsfaktoren im Organisations-, Finanz-und Informationsbereich. Erich Schmidt Verlag GmbH & Co KG.

Biography



Prof. Dr.-Ing. Dipl.-Wirt. Ing. Günther Schuh (*1958) has held the chair for Production Systematics at RWTH Aachen University since 2002. Furthermore, he is director of the FIR e. V., member of the board of directors of the WZL of the RWTH Aachen University and of the Fraunhofer Institute for Production Technology (IPT). He is also managing director of the electric vehicle manufacturer e.GO Mobile.

Florian Vogt, M.Sc. M.Sc. (*1986) holds the position of Head of Strategy & Operations at OneLife since 2020. Prior to this position he managed the Technology Planning Group at the Fraunhofer Institute for Production Technology IPT where he also concluded his PhD thesis on innovation transfer from corporate incubators.

Maximilian Künstner, M.Sc. (*1989) is a Consultant at Siemens Management Consulting since 2019. Prior to his position he wrote his Master thesis on corporate incubators at the Fraunhofer Institute for Production Technology IPT.