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Venture Client Model - Process and methods to identify relevant problems in established companies

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Established companies face shortened product lifecycles, swift technological advancements, and heightened cost pressures. To maintain competitiveness, they are increasingly turning to collaboration models with start-ups. The venture client model represents a novel approach facilitating the integration of startup solutions into EC products or processes without equity involvement. However, despite its benefits, challenges persist, especially in the request phase, in which problems are identified and evaluated that should be resolved in collaboration. This paper addresses the scarcity of research in this area by analyzing various literature processes that describe the request phase on a high level. A new reference process consisting of 10 process steps clustered in three sub-processes was developed using the Design Science Research methodology, incorporating insights from literature and practical experiences. The process steps are supported with corresponding methods developed using the action design methodology. The process is validated in practical venture client projects and supports companies setting up venture clienting or improving their current processes. Furthermore, it contributes to academic discourse by emphasizing the need for more profound development of the other phases of the venture clienting process.

1. Introduction

Established companies (EC) face shorter product lifecycles, rapid technological change, and increasing cost pressure in today's dynamic markets. To differentiate themselves from the competition, they are increasingly shifting towards open innovation approaches to utilize external innovations and disruptive technologies for their innovation projects (Chesbrough 2008). Start-ups are promising innovation partners, especially because they deploy and capitalise advanced technologies, use new business models, are more agile, and are willing to take more risks than EC (Gimmy et al. 2017), (Trimi and Berbegal-Mirabent 2012).
In recent years, various forms of collaboration have been established between EC and start-ups, such as incubators, accelerators, or corporate venture capital (Gutmann 2018). The venture client model (VCLM) represents a new form of start-up collaboration. It aims to integrate the start-up's solution directly into the EC's products, processes, or business models (Kurpjuweit and Wagner 2020). Typically, a pilot project is carried out at first to validate the functionality and feasibility of the solution using prototypes (Gimmy et al. 2017). A successful pilot project can lead to a long-term partnership incorporating the start-up as a standard supplier, licensing the start-up's technology, or acquiring the start-up completely (Kurpjuweit and Wagner 2020).
The VCLM offers various advantages for ECs as it delivers fast results, requires fewer investments, and is less risky than equity-based start-up models (Gimmy et al. 2017), (Kurpjuweit, Wagner, and Choi 2020). However, several challenges are associated with the VCLM, such as slow internal processes (e.g., concluding NDAs or data protection agreements) or allocating financial and personnel resources for the pilot projects. Important challenges arise right at the

beginning of the collaboration – during the so-called request phase. Here, relevant issues for a start-up collaboration are identified within the EC that cannot be solved internally or with an established partner (Machon et al. 2023). The request phase is particularly relevant as it builds the foundation for the whole venture clienting process (Haarmann et al. 2023). As an innovative solution is sought to contribute to the EC's success and growth (Gassmann and Becker 2006) and to use the company's resources efficiently, the responsible organizational unit (the so called Venture Client Unit (VCLU)) must pay close attention to identifying the most relevant challenges (Faria et al. 2018), (Gassmann and Becker 2006). Also, the startup(s) with the best problem-solution fit must be found. The start-ups must also fulfill the EC's requirements for integration (e.g., technology fit, strategic fit, or culture fit) to ensure a long-term beneficial partnership (Corvello et al. 2023), (Faria et al. 2018).

However, despite its relevance in practice, research on the VCLM and the request phase in particular is still scarce. There is little information on the necessary process steps and suitable methods to identify problems and assess whether they could be solved with the VCLM (Haarmann et al. 2023). Hence, our objective is to close this research gap and propose a reference process with accompanying methods and tools for the request phase of the VCLM answering the following research questions:

1. Process: Which sub-processes and process steps need to be performed in the request phase to identify the problems with the biggest business impact and plan its implementation?
2. Tools: Which methods and tools support decision- making in the request phase?

To answer these research questions, we followed the iterative Design Science Research Methodology (DSRM) according to *Peffers et al.* to develop a reference process model for the request phase of the venture client process encompassing all relevant activities (Peffers et al. 2007). Applying the process to real-world cases, we utilized action design research techniques to develop suitable support (i.e., methods and tools) for certain activities. The resulting process may serve as an orientation for ECs to evaluate and adjust their request processes if necessary. Methods and tools give guidance on how to deal with the activities in practice. For researchers, the granular description of the activities allows to enhance and investigate this process in further detail. The results also encourage applying this level of analysis to the remaining VCLM process in further research.

The paper is structured as follows: Section 2 describes the current state of knowledge in literature of the process steps for venture clienting and the request phase in detail. Section 3 explains the research methodology. It is followed by the presentation of the results in section 4 which is divided into describing the process steps of the request phase and the corresponding methods to support each step. The paper ends with a discussion of the results, their limitations, and an overall conclusion.

2. Background

2.1 Venture Client Processes

The VCLM is a new form of collaboration between start-ups and established companies introduced by the automobile manufacturer BMW in 2015 setting up the BMW Startup Garage (Gimmy et al. 2017), (Siota et al. 2020). Although more ECs adopted this model as part of their innovation management, there is still limited research in this field. *Haarmann et al.*, e.g., identified just 16 papers related to the VCLM in their systematic literature review with only three publications dealing exclusively with Venture Clienting. The others mention the VCLM as a side note or deal with related forms of cooperation between EC and start-ups. They discovered six venture client-related processes and derived a generic VCLM reference process consisting of six main process phases (see Figure 1) (Haarmann et al. 2023).

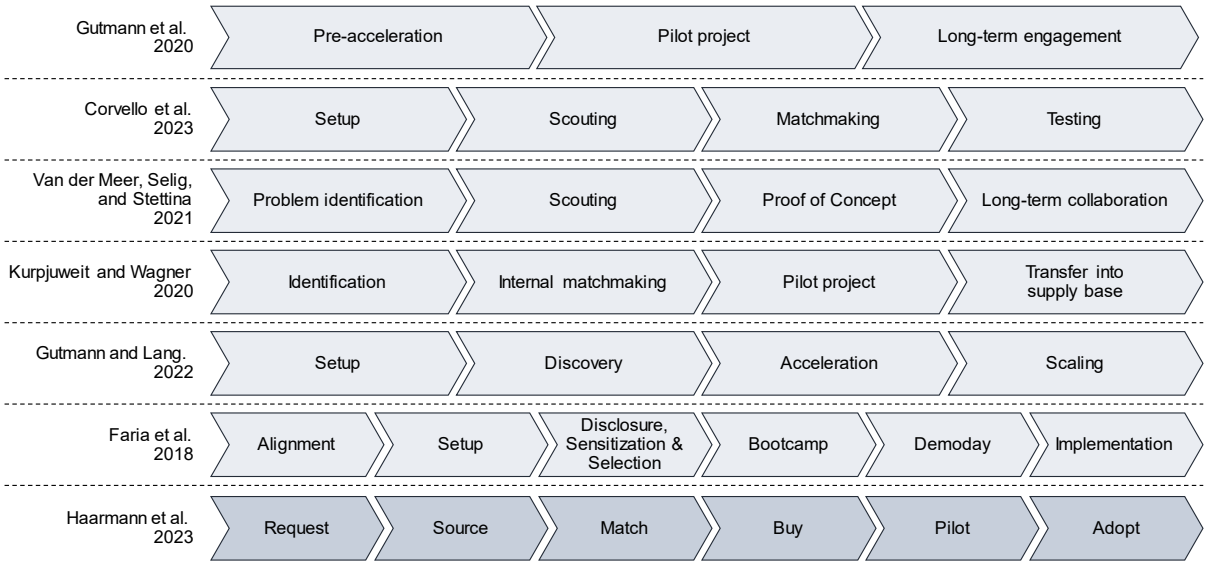

Figure 1: Venture clienting process steps derived from the knowledge base (Haarmann et al. 2023)

In the **request** phase, the VCLU aims to identify and specify a need or problem within a department or business unit that can be solved with a start-up´s technology (Haarmann et al. 2023). In literature, two approaches are distinguished: push or pull. Following the push approach, the VCLU identifies start-ups technologies that could benefit the EC (Enkel and Sagmeister 2020). Since there has not been identified a specific problem yet, the VCLU searches for an employee or a department that could have a use case for the start-up's solution, the so-called venture client (VCL) (Haarmann et al. 2023). The process continues either with an additional start-up scouting, as the start-up found initially may not be the one with the best solution fit, or with the match phase (Machon et al. 2023). In the pull method, a problem is identified before the start-up is scouted. The VCL identifies the problem alone or with the VCLU which is refined until a clear problem statement with a technology need is formulated (Corvello et al. 2023), (Kurpjuweit and Wagner 2020).

In the **source** phase, start-ups are scouted to meet the technology need (Haarmann et al. 2023). For this purpose, different scouting tools can be used. During passive scouting, the EC publishes the technology need on their website or social media channels and enables start-ups to apply to solve this problem with their technology (Kurpjuweit, Wagner, and Choi 2020), (Gimmy et al. 2017). A more time and cost-consuming approach is the active scouting of start-ups either via one's own research in databases or with an external scouting partner (Machon et al. 2023). The result of the sourcing is a longlist of start-ups. (Gutmann and Lang 2022)

The **match** phase consists of several steps for evaluating the scouted start-ups (Haarmann et al. 2023). Usually, the longlist gets assessed by the VCLU and the VCL using predefined assessment criteria to derive a shortlist of around five start-ups (Gutmann and Lang 2022). The most promising start-up is often selected in a pitch event (Richter, Jackson, and Schildhauer 2018). The selection committee comprises decision-makers from purchasing, business development, R&D, top management, VCLU, and VCL (Kurpjuweit and Wagner 2020).

After one start-up is selected, the commissioning is formalized in the **buy** phase (Haarmann et al. 2023). Usually, three to four formalities need to be conducted, such as setting up a non-disclosure agreement or a data security approval (Machon et al. 2023). The process phase ends with the definition of the scope of the pilot project and the creation of a purchase order (Gimmy et al. 2017).

In the **pilot** phase, a prototype is developed and tested in collaboration between the start-up and the specialists of the EC (Haarmann et al. 2023). Usually, an iterative approach is used where the technology is adapted to the EC products, processes, or business models after each test cycle. The pilot project's success is evaluated by defined criteria from the buy phase and usually calculating a business case to ensure economic success (Faria et al. 2018), (Gutmann and Lang 2022). The evaluation is the basis for a decision regarding the future of the partnership; either the partnership is terminated or transferred into a long-term collaboration.

Collaboration terms are set during the **adoption** phase (Haarmann et al. 2023). Different approaches are commonly used such as a follow-up joint development project, purchasing the startup's technology, licensing it, or investing in the start-up if its technology has a high strategic relevance for the EC (Machon et al. 2023).

2.2 Request Process

In the literature, different terms are used for the request phase. In addition to the term "setup" (Corvello et al. 2023), (Gutmann and Lang 2022), (Faria et al. 2018), the names "pre-acceleration" (Gutmann et al. 2020) or "problem identification" (van der Meer, Selig, and Stettina 2021) are used (see Figure 2). All papers focus on the pull approach described above. Only *Kurpjuweit and Wagner* limit their explanations to the push method (Kurpjuweit and Wagner 2020). *Gutmann et al.* remain very generic not providing further insights into the pre-acceration phase (Gutmann et al. 2020).

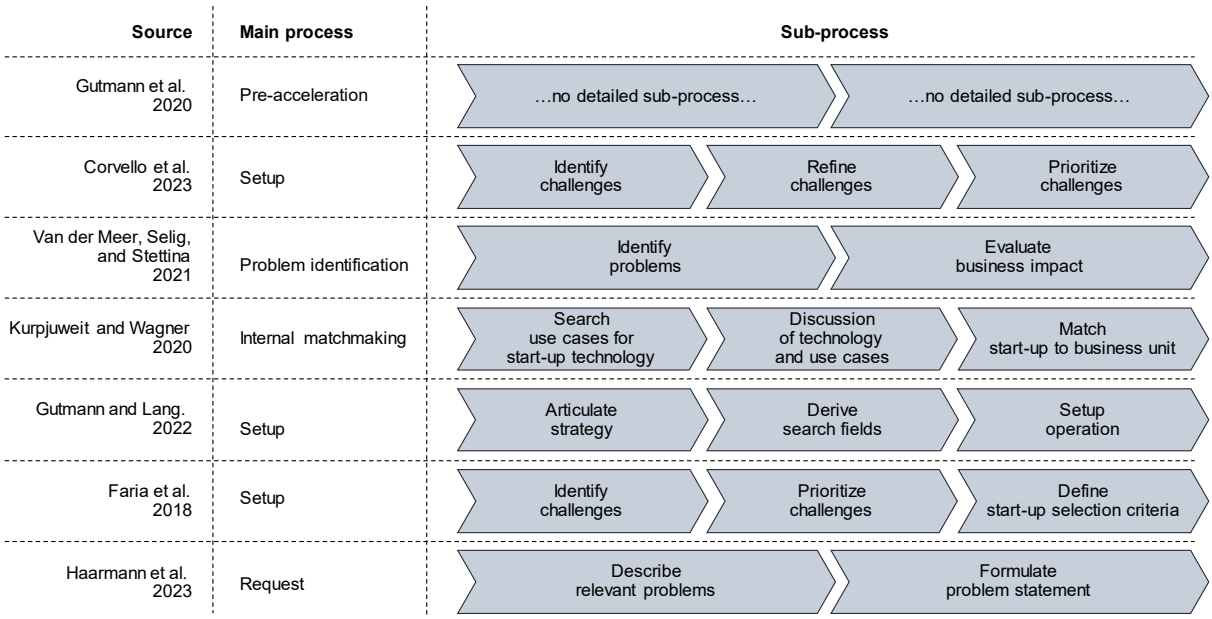

Figure 2: Process steps of the request phase in literature

Most of the time, the request phase begins with identifying or describing challenges within the company. Also in the push approach the VCLU searches for a use case to be solved with the identified start-up technology (Kurpjuweit and Wagner 2020). Only *Gutmann and Lang* derive the challenges or search fields from the innovation strategy defined by high-level managers consisting of innovation object, time horizon, expected outcomes from the collaboration, and adoption scenarios (Gutmann and Lang 2022). Other authors explain that the need is usually identified by a department in the core organization of the EC or a business unit sometimes supported by the VCLU (Corvello et al. 2023), (van der Meer, Selig, and Stettina 2021). After identifying the need, it is refined in a close exchange between the VCLU, the problem owner, and if necessary another expert (Corvello et al. 2023). In the push approach both the potential use case and the start-up technology are discussed between the parties above (Kurpjuweit and Wagner 2020). This serves to fully understand the problem, define all requirements, and estimate the business impact (van der Meer, Selig, and Stettina 2021). In the last step the gathered challenges are prioritized to select the ones with the biggest business impact for a pilot project (Corvello et al. 2023), (Faria et al. 2018). Planning for such a collaboration project requires setting up a team, calculating resources, and preparing the project to evaluate the project's expenditure (Gutmann and Lang 2022). Also, first selection criteria for the scouting phase can be derived from the problem statement (Faria et al. 2018).

3. Research Design

The development of the sub-process steps and activities of the request phase is conducted iteratively according to the Design Science Research Methodology following a problem-centered approach (Peffers et al. 2007). The proceeding is displayed in Figure 3.

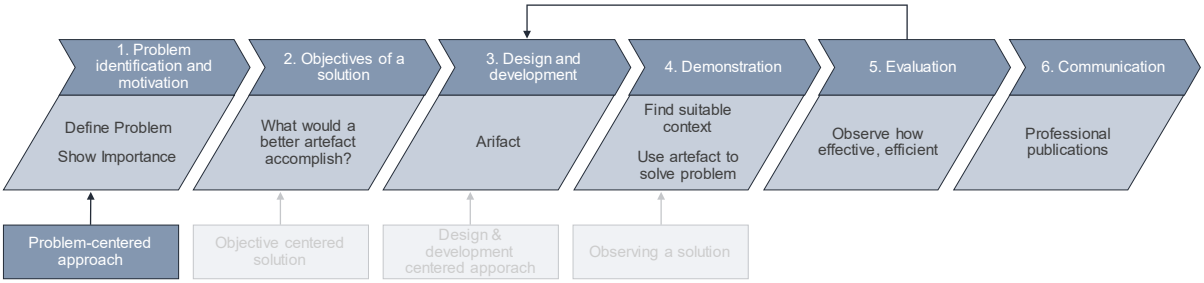

Figure 3: Adapted DSR process according to Peffers et al. (Peffers et al. 2007)

We utilized data from our systematic literature review (Haarmann et al. 2023) and further conducted an interview study with 15 VCLUs to substantiate the design process. The interviews were conducted using a semi-structured approach with managers from start-up units in German companies of different sizes and industry sectors applying the VCLM. The interviews lastet about 60 minutes and were recorded and transcribed. We then engaged in the design and development, demonstration, and evaluation cycle. We evaluated and validated the artifcats with two of the interviewed companies during the first two iterations. In the last iteration, another of the interviewed companies and an additional company that had not been interviewed before also participated. All information on the companies interviewed and those that took part in validating of the artifacts can be found in Table 1.

Table 1. Data sources for interviews and validations

No.	Industry	Number of employees	Maturity	Interview	Validation iteration 1	Validation iteration 2	Validation iteration 3
1	Automotive	1.000 - 10.000	Beginner	x	-	-	-
2	Automotive	10.000 - 50.000	Beginner	x	-	-	-
3	Automotive	10.000 - 50.000	Intermediate	x	-	-	x
4	Automotive	> 100.000	Intermediate	x	-	-	-
5	Automotive	> 100.000	Intermediate	x	-	-	-
6	Electronics	1.000 - 10.000	Intermediate	x	x	x	x
7	Finance and insurance	10.000 - 50.000	Expert	x	-	-	-
8	Logistics	50.000 - 100.000	Expert	x	-	-	-
9	Mechanical Engineering	1.000 - 10.000	Beginner	-	-	-	x
10	Mechanical Engineering	10.000 - 50.000	Beginner	x	-	-	-
11	Mechanical Engineering	10.000 - 50.000	Expert	x	x	x	x
12	Mechanical Engineering	50.000 - 100.000	Expert	x	-	-	-
13	Mechanical Engineering	> 100.000	Expert	x	-	-	-
14	Retail	50.000 - 100.000	Expert	x	-	-	-
15	Technical Services	10.000 - 50.000	Beginner	x	-	-	-
16	Technical Services	> 100.000	Expert	x	-	-	-

The DSRM starts with defining a problem and showing its importance (step 1). Because the VCLM is still in the early stage of its application in industry and research, ECs are still figuring out how to handle venture clienting in their organization. Interviews with VCLUs showed that although most companies have set up a process, they test it anew with every project and adapt it if necessary. They lack an overview and best practice examples of how to carry out the process efficiently. Problem identification is seen as the biggest challenge. Some companies lack promising submissions, others cannot filter out the most important problems from the many submissions, and they fail to enrich the problem description with requirements and inevitable integration options for the upcoming processes. This phase is particularly crucial as it is

the foundation for the rest of the process and determines the success or failure of integrating the start-up solution into the EC.
In the second step, the objective of the solution is derived from the problem (Peffers et al. 2007). Currently, a standardized request process does not exist. The current processes are described only at a high level and are insufficient to give companies concrete support to set up a process or improve their current ones, as shown in chapters 2.1 and 2.2. This is why we chose to set quantitative objectives to develop the process, enriching it with more detailed and feasible methods for practical application.
The artifact was developed, demonstrated, and evaluated iteratively in the next three phases (phases three to five). If the evaluation showed that the artifact did not solve the problem sufficiently, an iteration was necessary to return to the development phase (Peffers et al. 2007). In this research, three iterations led to a satisfactory result.
In the first iteration, the request process was developed by condensing the process steps of the literature resources (see Chapter 2.2). The result was presented to two companies to evaluate the new process based on their experience practically applying the VCLM. It was identified that the process was lacking in detail in the identification of problems. The companies emphasized distinguishing between identifying known and unknown problems is important. On the other hand, they criticized the process for requiring the details of the problem before deciding whether to reject it or to proceed with slowing the process.
The second version of the request process was enhanced using prescriptive knowledge from the 15 interviews with managers from VCLUs in German companies. Integrating this expert knowledge, it was possible to find further process steps to actively and passively identify problems that focus on disclosing unknown or known problems from VCLs. Furthermore, evaluation and detailing steps were added that either lead to transferring the problem into a pilot project or rejecting it. The two VCLUs used this version of the request process in two pilot projects each. After the practical application, the feedback was retrieved in interviews with the VCLUs. Both argued that the process was now very detailed and hard to implement, especially in the first pilot project. The ten process steps provided by this version of the process seemed too many, especially with support from appropriate methods lacking.
In the last iteration, the ten process steps were clustered into three sub-processes to make the process more comprehensible. The final process was evaluated by four ECs with different experiences in venture clienting and the researchers. Two experienced companies used the process in their daily work and the researchers validated the process by applying it to consultancy projects with the other two companies. During those projects we engaged in Action Design Research (ADR) practices utilizing the BIE process (build, intervention, evaluation) (Sein et al. 2011) as a micro cycle to generate suitable methods and tools to support the process. The application in the different companies showed that the process is suitable for different maturity levels of companies and is comprehensible and includes all necessary steps for efficient problem identification and detailing.

4. Results

Based on the formulated research questions, the results section is divided into two chapters. In section 4.1 the sub-processes and process steps of the request phase are described. In section 4.2 methods to support different process steps are outlined.

4.1 Request Process

The final process of the request phase consists of 10 process steps clustered in three sub-processes (see Figure 4).
The first sub-process deals with determining problems suitable for venture clienting (sub-process 1.1). Sub-process 1.2 describes the problem's required solution and its implementation effort to understand the problem's application and requirements. In sub-process 1.3 the problems with the biggest business impact are selected. In the following each sub-process and its process steps are described in detail.
The **determination of problems for venture clienting** is initiated by either an active (1.1.1a) or a passive problem identification (1.1.1b). These process steps are suitable either for known or unknown problems. Known problems mostly focus on the optimization of existing products or processes of the EC and rather lead to incremental innovations (Schuh et al. 2017). The affected departments usually recognize them themselves, for example, because internal resources cannot fulfill certain requirements (i.e. a technology is not part of the company's core competence) or the market launch would be too late. Unknown problems may be of relevant to the EC's future success but are not obvious to organizational units. They can be related to existing products or processes and future ones whose development must be driven forward to be successful in the long term (Enkel and Sagmeister 2020). Examples of unknown problems can include the ineffectiveness of processes invisible to the people carrying them out, hidden customer requirements or dissatisfactions, or even backlogs in developments that competitors may already be implementing and whose introduction will create a decisive competitive advantage. Unknown problems therefore have a higher potential to generate radical innovation.

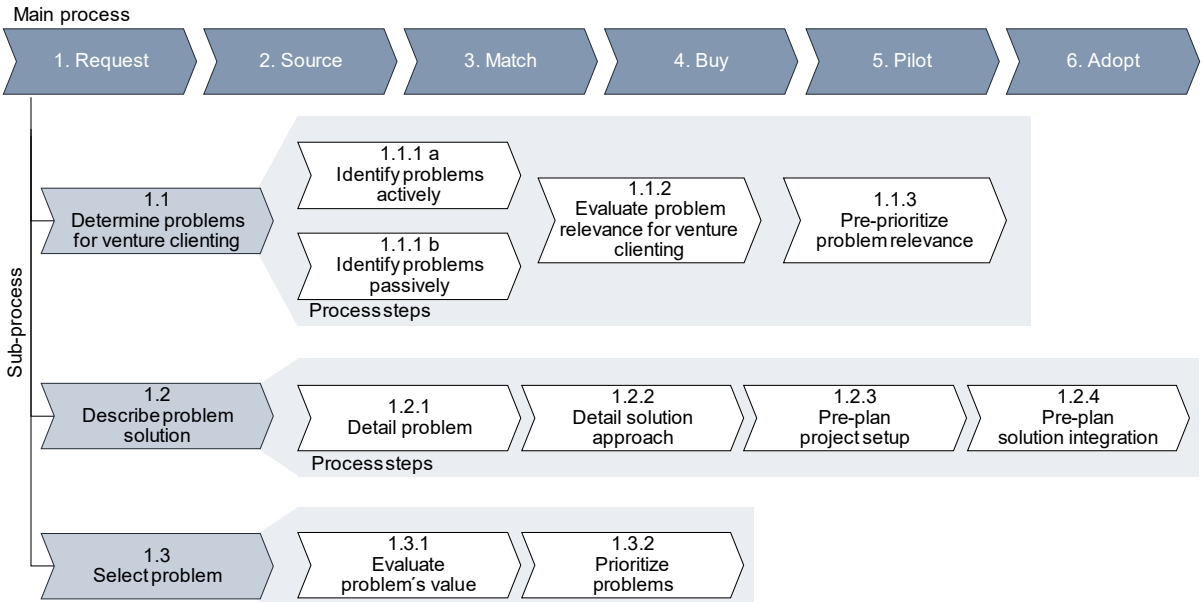

Figure 4: Request process divided into three sub-processes and 10 process steps

To actively identify problems, the VCLU works together with employees and managers from corporate or business functions. Therefore, they can either focus on the EC itself or analyzing the company´s environment. To identify company-related problems, methods such as process or product roadmap analysis, involvement of the VCLU in the strategy process or dedicated problem interviews or workshops can be used. To identify problems related to the company´s environment, methods such as competitor or trend analysis, customer surveys, or technology foresight can be employed. An active identification addresses both known and unknown problems.

The passive approach focuses on already known problems inside the organization. Therefore, the VCLU offers the employees the opportunity to submit their problems themselves (see chapter 4.2.2) using a standardizes platform. However, as the employees submit the problems themselves, awareness about the VCLM, its benefits and the existence the platform are a prerequisite.

Once the problems have been identified, they are pre-evaluated using process steps 1.1.2 and 1.1.3. Firstly, the VCLU must ascertain whether the problem suits the VCLM. Several interviewees described that they were confronted with a variety of problems that seemed to be inappropriate for the VCLM. However, the technologies were part of the core expertise of the EC itself or an ES. These problems need to be rejected to focus on those more fitting for venture clienting, characterized by their innovativeness, risk of own realization or realization effort with existing competencies or those from an ES. Sure instinct is required when rejecting a request from a department in order to avoid any potential damage to the willingness of that department to collaborate in the future. In step 1.1.3, the problem is pre-evaluated regarding its relevance. Based on the basic information the VCLU received in the problem identification step, the required effort to solve the problem and the expected added value for the company are estimated. Then it assigns the problem to a problem prioritization portfolio (see chapter 4.2.4) to compare it to other problems. Based on the placement in the portfolio, the problem is either rejected, put on hold, or pursued.

If evaluated positively, a possible solution to solve the problem and its integration is described in sub-process 1.2, consisting of four process steps. This is conducted by the VCLU together with the VCL and, if necessary, with further experts. All steps serve to fill in the necessary information in a problem definition canvas (see chapter 4.2.3). The initial process step is designed to enhance the existing description of the problem by describing the current situation and solutions that might have been tested unsuccessfully (process step 1.2.1). Furthermore, the preferred solution approach and its requirements (e.g., technical requirements such as resolution of sensor or requirements on the start-up such as reference customers) is defined (process step 1.2.2) that serves as input for start-up scouting. The requirements are also used to pre-plan the pilot project (process step 1.2.3) regarding timing, budget, and resources. The sub-process ends with specifying an integration plan for the start-up solution in products or processes, including its potential to scale (process step 1.2.4). The close involvement of the VCL also serves to increase its buy-in and commitment to provide resources and budget for implementing the pilot project.

In the last sub-process 1.3 - **select problem** the problem is evaluated first regarding its influence on the company's future success (process step 1.3.1). Either the solution should lead to a cost reduction, an increased turnover resulting from increased sales numbers, or the customers' willingness to pay more increases due to a product improvement. However, the advantage does not just have to be economic but can also enhance the company's reputation, e.g., because it is seen as an innovator or contributes to sustainability. A value-benefit analysis or a business case are appropriate tools for this evaluation. In the last step, the problem is finally placed in the problem prioritization portfolio based on the cost for realization as an outcome from step 1.2.3 (project pre-planning), and its value is determined in process step 1.3.1.

4.2 Methods to support the request phase

Various methods and tools were developed for each activity/ step of the request phase. The four methods with the greatest practical impact are described in the following sections. They are aimed at process steps 1.1.1 a, 1.1.1 b, sub-process 1.2, and process steps 1.1.3 and 1.3.2.

4.2.1 Interview guide to identify problems actively

A problem interview can be used to identify problems actively (process step 1.1.1 a). This method enables the targeted uncovering of problems within a department. The preparation must be carried out conscientiously to find a suitable interview partner and develop an appropriate questionnaire. To find an interviewee, an excellent internal network of the VCLU is required, as well as broad organizational and industry knowledge to prepare the questionnaire (van der Meer, Selig, and Stettina 2021).
In our projects, questionnaires for different purposes are used. In Figure 5 a questionnaire specific for business processes is displayed.

1. Building an understanding of everyday working life

1. What goal would you like to achieve in your team with your work? Explain it in one sentence!
2. Tell us about your typical working day, what tasks do you have? Which tasks are you / is your team responsible for?
    a. Which company processes are you involved in or responsible for? Can you describe these in more detail?
    b. Which tools are you using?
    c. Which data and documents are necessary for your tasks?

2. Challenges of the daily work routine

3. What would you like to change about the work in your team or with other departments?
4. Are there inefficient processes, where you think a lot of time, or resources are wasted? Why?
    a. Where do you still use paper?
    b. What are still manual activities?
    c. Are you using inefficient/ ineffective tools?
5. Have you already tackled problems in your team that you have not yet been able to solve internally or together with external partners?
6. Are there any topics that have not yet been tackled due to a lack of capacity and are in the backlog?
7. Do you already have planned projects that you have not yet started? Topics for 2024 that are on the agenda?

3. Wishes and outlook for the future

8. Have you already learned about a start-up solution that you would like to try out?
9. If you were a consultant, what would you recommend to your company for your area?
10. Have you already looked at trends and technologies in the team that will influence your work in the future, what would they be?

Figure 5: Questionnaire for a problem interview with focus on business processes

The questions in our questionnaires are divided into three parts, which examine the current situation and an outlook for the future. The first part builds a basic understanding of the employee's day-to-day work. This The questions in our questionnaires are divided into three parts, which examine the current situation and an outlook for the future. The first part builds a basic understanding of the employee's day-to-day work. This helps the VCLU to focus the following questions on the employee's description of the situation, ask for further details, and enable the employee to reflect on their daily work consciously. The second part aims to identify known problems in the daily business either to optimize the efficiency of processes (e.g., using digital tools), or to solve previously failed challenges. The last part is suitable for investigating unknown or potential future problems. The VCLM and its possibilities are deliberately brought into a dialogue to familiarise the employee with it and to come up with ideas in this context that can lead to a competitive advantage but are not part of their or an ES's core competency. Question nine is designed so the interviewee slips into an external role to recognize a need for action without bias. Trust between the two parties is necessary for a successful interview. The VCLU must ensure that sensitive information is treated confidentially or without reference to the interviewee.

4.2.2 Canvas to identify problems passively

To receive problems directly from the specialist departments without the involvement of the VCLU, a standardized touchpoint is required (process step 1.1.1b). For this purpose, we propose a problem collection form (see Figure 6). Integrating it as a survey in Microsoft Forms or with a dedicated start-up intelligence tools into the intranet page of the VCLU or other means of company-wide communication is especially useful as all departments of the company should have access. The VCLU can also provide further information on venture clienting and successful pilot projects to motivate the departments to participate in the VCLM. In addition, explanatory videos or best practice problem submissions can be prepared to make the inquiry process as simple as possible for a department.

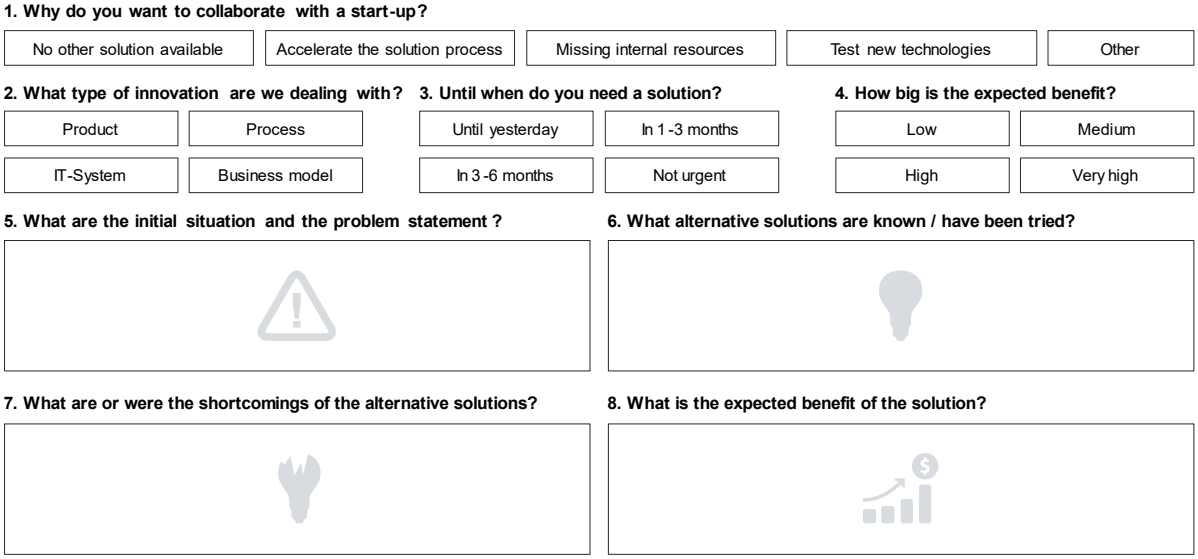

Figure 6: Problem collection form

The problem collection form contains all the information required for the VCLU to gain an increased problem understanding and to pre-evaluate its VCLM suitability and added value for the company. Basic questions are answered about why the department wants to cooperate with a start-up, what type of innovation is involved, how urgently the solution is needed, and how great the expected benefit is. This enables assessing whether the challenge should be pursued and with what intensity. In this step, the urgency and benefits are qualitatively evaluated to keep the hurdle for the VCL as low as possible. Sometimes a precise statement (e.g., for the expected turnover) at the beginning of the process is not possible, or further experts are required for this assessment. Therefore, this information can only be used for a preliminary decision, and further detailing, for example, in workshops with additional stakeholders, is indispensable. Additionally, the initial situation and the problem itself are described. Providing explanations about whether other solutions have already been attempted and what their deficiencies were enables the VCLU to search more targeted for a start-up solution and potentially exclude start-ups in the initial scouting step.

4.2.3 Canvas to define and detail problems

To evaluate the realization effort and the problems' impact on the company's success, a deeper understanding of the problem and its solution is needed. This is why the pre-evaluated problem is detailed applying four different steps in sub-process 1.2. A problem definition canvas documents the results (see Figure 7). The VCLU, the VCL, and additional experts collaborate to complete the document.
In the beginning, the solution´s objective needs to be defined to describe the desired outcome of the solution precisely. The objective should be formulated according to the SMART criteria (specific, measurable, assignable, realistic, and time-related) (Doran 1981). It can be either quantitative (e.g., increase in revenue or time-saving) or qualitative (e.g., adding a new feature to a product). In the first column, the problem is defined clearly. This includes the description of the status quo and which alternative solutions have been tested already that have failed to solve the problem. The preferred solution approach and the correlating requirements for the start-up's solutions are identified in the second column. They serve as input for scouting start-ups and for evaluating the pilot project. The third column defines necessary budget, timing, personnel, and resources for the pilot project. To do so, the VCLU needs to understand the management of pilot projects,

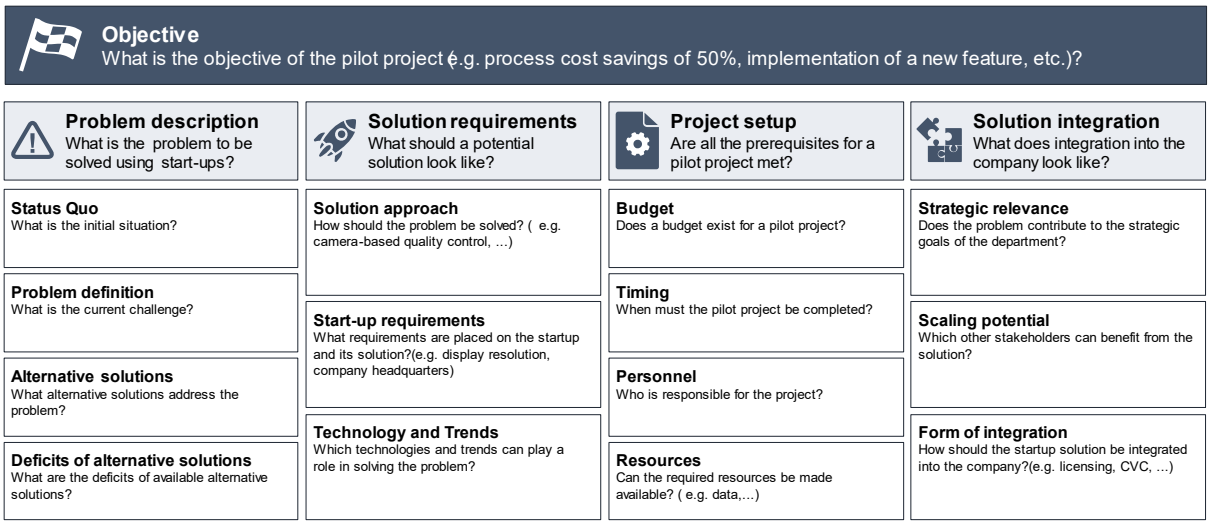

Figure 7: Problem Definition Canvas

which additional departments need to be included, or what technical resources are needed (e.g., test equipment or production resources). Additional market knowledge or help from the sales team or product management is helpful to define the required end date of the pilot project and the envisioned go-to-market. The integration of the solution into the operational business is planned in the fourth column. By defining the strategic relevance, potential to scale, and where or how to integrate it into a product, process, or business model, the future success can be determined as input for a business case.

4.2.4 Portfolio to (pre-) prioritize problem relevance

A problem prioritization portfolio (see Figure 8) was developed to support the VCLU in process steps 1.1.3 and 1.3.2.

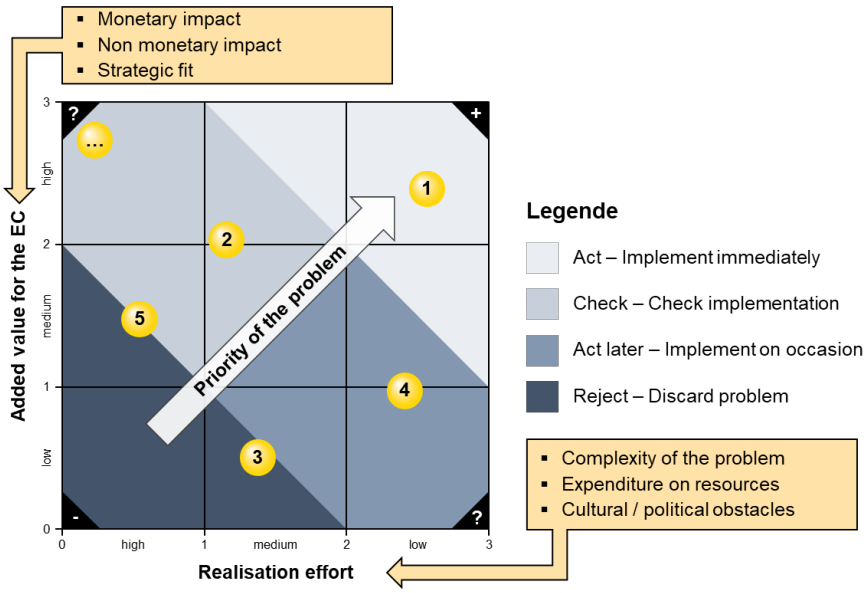

Figure 8: Problem Prioritization Portfolio

The portfolio consists of two axes, one describing the added value as an outcome of a successful adoption and the other describing the effort put into the realization of the pilot project and integration into operations. One challenge in the prioritization is that pilot projects may be evaluated using different metrics (e.g., monetary or non-monetary impact). Hence, a qualitative segmentation of the axis from high to low is chosen, and each problem needs to be categorized. In process step 1.1.3 (pre-prioritize problem relevance) the VCLU places the problem into the portfolio according to the qualitative information from the problem collection form and their expertise. Step 1.3.2 sees the final placement made from the effort identified in the problem collection form and the added value from the business case. The portfolio's four distinct areas help to decide on how to proceed with a problem. Only problems with a low realization effort and high value should be immediately acted upon. The ones that require high effort and only lead to a low result are to be rejected. The problems in between are put on hold to check their relevance at a later date or to implement it when resources get free.

5. Conclusion and implications

In this paper, we used the DSRM to develop a reference process for the request phase of the VCLM. The process is supported by methods and tools that were generated utilizing ADR. The aim was to unify existing processes described in the literature and enrich them with practical knowledge from companies applying the VCLM. The resulting process serves companies as a reference for setting up their own VCLM process or improving their existing one. The process focuses on the efficient identification and evaluation of problems integrating the different departments within ECs. The aim is not only to increase the number of collected problems but also to identify those that can generate the biggest impact for the company in the future. This should help to utilize the limited resources of a VCLU more efficiently and to increase the number of innovations integrated into products, processes, and business models through the VCLM at the same time. Although the process has already proven itself in practice, it should be noted that the process serves as a reference or best practice and may not be transferable directly to every company. The respective VCLUs have to adapt it to fit their organizational structures and decision-making processes.

A comparison of the VCLM process developed in this research with those from existing literature (chapter 2.2) reveals some similarities in process components. However, these differ significantly in their level of detail and support with venture clienting-specific methods. The process step "identify challenges" can be found in three literature sources, which is comparable to 1.1.1 a and b of our process (Corvello et al. 2023), (van der Meer, Selig, and Stettina 2021), (Faria et al. 2018). However, the literature does not differentiate between unknown and known problems, which differ greatly in terms of the level of innovation and their identification approaches. In addition, four literature sources describe that the identified problem needs to be detailed (Corvello et al. 2023), (Kurpjuweit and Wagner 2020), (Faria et al. 2018), (Haarmann et al. 2023). In this research, however, the detailing is divided into four process steps in sub-process 1.2 that derive specific requirements for the problem solution, as well as carrying out preliminary project- and integration planning. Only two sources describe an evaluation of the problem according to business impact or prioritization (van der Meer, Selig, and Stettina 2021), (Faria et al. 2018). In our research, prioritization is based not only on business impact but also on implementation costs, from which four decision fields are derived. This research adds a new level of detail to the request process in comparison to existing literature and establishes a standardized referencing process from both descriptive and prescriptive knowledge.

When looking at the literature, it is obvious that VCLM explicitly has been researched very little, although it is now widely used in industry. There is a need for further research at all levels, but above all further detailing of the entire reference process and derivation from adequate methods is needed. Due to the complexity of the process and the involvement of various stakeholders, it can also be helpful to use software to support the VCLU in the process. Furthermore, it is noticeable that different competences are required for the execution of the various process steps. This creates another need for additional research to examine the composition of a VCLU with different roles and skills of the employees.

Our research is subject to some limitations. First, this research builds on existing literature and the expertise of German companies that use VCLM. The limited state of the art and the restriction to German companies must be considered as limitations here. As with all qualitative and design research, we must also recognize the limitations regarding generalizability. Further analyses of company processes outside Germany may lead to additional detail and new methods. Nevertheless, the status described in this paper forms a good basis for practical application and for further research.

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