

The Collaborative Iron Triangle: A New Tool for Supporting a Project-Culture-Aware Management in Interorganizational R&D Projects

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Abstract

Since project managers still face problems in managing interorganizational R&D projects, it is a promising approach to manage these projects project-culturally-aware. However, an important prerequisite for a project-culture-aware management is that the involved individual organizations pursue a collaborative strategy. Therefore, our article provides a conceptual approach including a new tool, the Collaborative Iron Triangle, which supports both project sponsors and managers in different phases of the collaboration process to pursue a collaborative strategy in interorganizational R&D projects.

Keywords: open innovation, project management, collaborative design, management tool, collaborative iron triangle

1. Introduction

Knowledge as an entrepreneurial resource became an important success factor for firms in the 21. century (Korge and Schnabel 2009). Thus, firms engage in open innovation activities to use internal as well as external knowledge for advancing their technology (Chesbrough 2006). When externalizing internal and integrating external knowledge by working in partnerships with complementary organizations, firms engage in coupled open innovation processes (Gassmann and Enkel 2004). Firms seem to prefer these processes when faced with complex problems in their design processes. The concrete form of the partnership depends on the locatability of the required external knowledge. When the knowledge source is locatable, firms form nonequity partnerships with the respective complementary organizations (Bagherzadeh et al. 2019). Thus, on project-level, the involved partners collaborate via nonequity partnerships in interorganizational R&D projects. Hence, these projects are temporary organizations which cross organizational boundaries (Sydow and Braun 2018).

Since the various partners of an interorganizational R&D project shape their collaboration through contractual agreements without any equity ownership, they do not need massive equity investments, can reduce development costs and lead times and enable communication, knowledge and capability sharing among each other (Bagherzadeh et al. 2019; Culpan 2002). However, their collaboration is highly complex since these projects turn away like networks from the hierarchical as well as the market logic (Sydow and Braun 2018; Thoma 2018). Thus, there are high set-up and transaction costs, as the various partners require highly complicated contracts to prevent opportunism and high coordination efforts (Bagherzadeh et al. 2019). This impedes project members in their mode of operation and thus the project success.

For collaborative R&D projects, a meta-analysis of vom Brocke and Lippe 2015 indicate two well-researched research streams concerning the management tasks and processes as well as tools,

techniques, and specific guidelines. However, a study of [Sydow and Braun 2018](#) shows, that the interorganizational dimension for projects is still under-researched. There are for example open research questions concerning interorganizational practices and routines as well as project governance ([Sydow and Braun 2018](#)). Moreover, existing management tools and methods do not support managers properly in dealing with the projects' particularities ([Barnes et al. 2006](#); [Calamel et al. 2012](#); [König et al. 2013](#); [vom Brocke and Lippe 2015](#)). Project particularities are for example a high partner heterogeneity concerning stakeholder expectations or different occupational cultures as well as limited project management authority due to governance structures and partner autonomy. Thus, project managers still face management problems ([vom Brocke and Lippe 2015](#)).

A project-culture-aware management could support project managers in dealing with these project particularities as it involves interorganizational project members in a continuous closed-loop to develop a project culture that supports a successful project completion. This demands commitment from each individual project team member ([Dieterich et al. 2021](#); [Dieterich and Ohlhausen 2022](#)). However, an important prerequisite for a project-culture-aware management in interorganizational R&D projects is that the individual organizations pursue a collaborative strategy. Therefore, our research work aims at answering the following research question: "How to support a project-culture-aware management in interorganizational R&D projects?"

The structure of this paper is as follows. In chapter two, theoretical background regarding a collaborative strategy in interorganizational R&D project is given. Then, in chapter three, a new tool, the Collaborative Iron Triangle is introduced. In chapter four, a conceptual approach with the tool in different phases of the collaboration process is shown. Lastly, in chapter five, a conclusion, limitations, and implications for future research are given.

2. A collaborative strategy in interorganizational R&D projects

Due to their characteristics interorganizational R&D projects are embedded in a complex, multi-layered environment with many stakeholders. From this environment, as in intraorganizational projects, various goals result. These can be narrowed to three basic goals, which are interdependent and represent basic project success criteria ([Leyh et al. 2014](#); [Pollack et al. 2018](#)). The concept of the 'Iron Triangle', which is fundamental for understanding and measuring project success, illustrates these three basic success criteria on its vertices ([Pollack et al. 2018](#)). While project management research shows consensus regarding time and cost as two of the vertices, there is a controversy discussion concerning quality, scope, requirements or performance as the third vertex ([Pollack et al. 2018](#)).

A study of [Pollack et al. 2018](#), which explores the concepts of the Iron Triangle and their changes in 45 years of project management research, shows that the links of time, cost and quality are significantly stronger than the links to the alternatives. However, [Pollack et al. 2018](#) also showed two different perspectives on the Iron Triangle. At the first perspective the Iron Triangle is "*a representation of the status of the most important project success criteria*" ([Pollack et al. 2018](#), p.544), at the second one it is "*a didactic device*" ([Pollack et al. 2018](#), p.544). Neither at the first nor at the second perspective quality as third vertex is crucial. At the first perspective [Pollack et al. 2018](#) argue, that the success criteria depend on the context and that the only persistent criterion is the satisfaction of the clients and contractors with the impacts and outcomes of a project. At the second perspective [Pollack et al. 2018](#) argue, that quality can even be used interchangeably with the alternatives. Both perspectives are considered in this research work. However, since the tool should serve as a didactic device, the third vertex of the Iron Triangle can be scope (see Figure 1). The advantage of scope is its broadness as it includes the project vision and goals as well as the extent, quality, functionality, comfort, service levels etc. of the deliverables ([Kuster et al. 2019](#)).

Hence, the three vertices of the Iron Triangle are scope, time, and cost. In this context, 'scope' encompasses the desired results from a project, 'time' addresses the desired timeframe for achieving the agreed project goals and 'cost' shows the maximum costs including work effort and resources which can be used for the project ([Kuster et al. 2019](#)). These three basic goals can only be achieved when the involved actors work all together with a clear delegation of responsibilities and an operational and organizational structure, which is adapted to the respective project ([Leyh et al. 2014](#)). Thus, organization and communication link the basic goals and can therefore, as [Dechange 2020](#) show, be placed within the

Iron Triangle (see Figure 1). Hence, to sum up, a project is successful when the three basic goals scope, time and cost are rated positively overall and when the involved actors are satisfied (Lechler 1997).

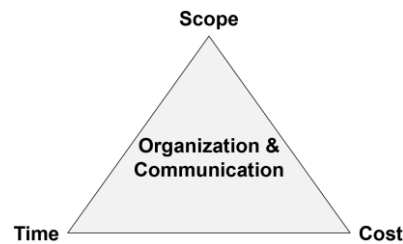


Figure 1. Iron Triangle, following Dechange 2020; Kuster et al. 2019, translated.

For the involved actors of an interorganizational R&D project to collaborate productively, i.e., for a project culture to develop that is conducive to achieve a successful project completion, pursuing a collaborative strategy becomes important. According to Lewicki and Hiam 2006, a collaborative strategy involves a high importance of outcome and relationship. This means, that the involved organizations put effort in maximizing their outcomes while preserving or enhancing their relationships with the other organizations within an interorganizational R&D project (see Lewicki and Hiam 2006). To pursue a collaborative strategy, Lewicki and Hiam 2006 show a four-step process for carrying out collaborations. In the first step the problem is identified. Thereby, it is important that the individual collaborators find a common view of the problem and define it as a common goal of the collaboration. In the second step, the focus lies on the understanding of the problem. Here, it is important to identify the underlying needs and interests of the single collaborators. Since interests show what the individual collaborators care about more broadly, multiple ways can be found to solve conflicts of competing interests. Thus, collaborators should reconsider their interests from time to time and be encouraged by the other collaborators to communicate a probable shift (Lewicki and Hiam 2006). When the problem and interests are understood, in step three the collaborators generate alternative solutions. Alternative solutions can be found on the one hand by redefining the problem and on the other hand by generating a list of possible solutions for the problem as defined. In the latter approach, a general formulation of the problem is important so that individual collaborators are not favoured over others. In this way, each collaborator engages in finding suitable solutions, also for the other side. Moreover, another key in this step is not to evaluate the solutions or to decide on their use. Only at the end of this step the potential solutions are prioritized to reduce the selection of possible solutions. In this context, it is important that the individual collaborators are firm about achieving their interests, but flexible in the way they are achieved (Lewicki and Hiam 2006). In the last step, a solution is selected. For this, the prioritized list is reduced again, e.g., by considering the first priorities of all collaborators. Positive suggestions should be considered, and negative ones should be changed into positive ones. The solutions are then evaluated, preferably with objective criteria, on the basis on their acceptability and quality. Within this process the opinions of all collaborators need to be considered, so that no collaborator is required to justify its preferences. Moreover, fairness becomes essential within the evaluation process which is either in terms of equality, contributed resources or legitimate claims. At the end of this four-step process, a collaboration agreement results which considers the interests of all collaborators (Lewicki and Hiam 2006). Thus, the two dimensions 'outcome' and 'relationship' are inseparably linked. This is also evident in beneficial collaborations since these are characterized by a coherence in strategies, complementarity in competencies, resources and working areas and the possibility to generate win-win-constellations (Gerybadze 2005). Therefore, these elements can be seen as the central building blocks for successful collaborations and hence form the 'essence of collaboration'. This 'essence of collaboration' becomes also visible when looking at different success factors of interorganizational R&D projects. A frequently cited study from Barnes et al. 2006 shows a framework and a practical management tool for effective project management of collaborative R&D projects. Barnes et al. 2006 identified in a literature review and a case study work industry-industry as well as university-industry success factors, which form the basis of the 'good practice model' for university-industry collaborations (Barnes et al. 2006). These success factors depend on the collaboration phases 'initiation', 'execution' and 'outputs' (Barnes et al. 2000).

Kalkowski and Mickler 2015 excluded some specific factors for university-industry-collaborations in the category 'outcomes', so that the model gets generally applicable. Moreover, since the focus for the development of the tool is on the success factors, the academia-industry 'cultural gap' issues showed by Barnes et al. 2006 are excluded. Figure 2 shows the success factors in the individual collaboration phases.

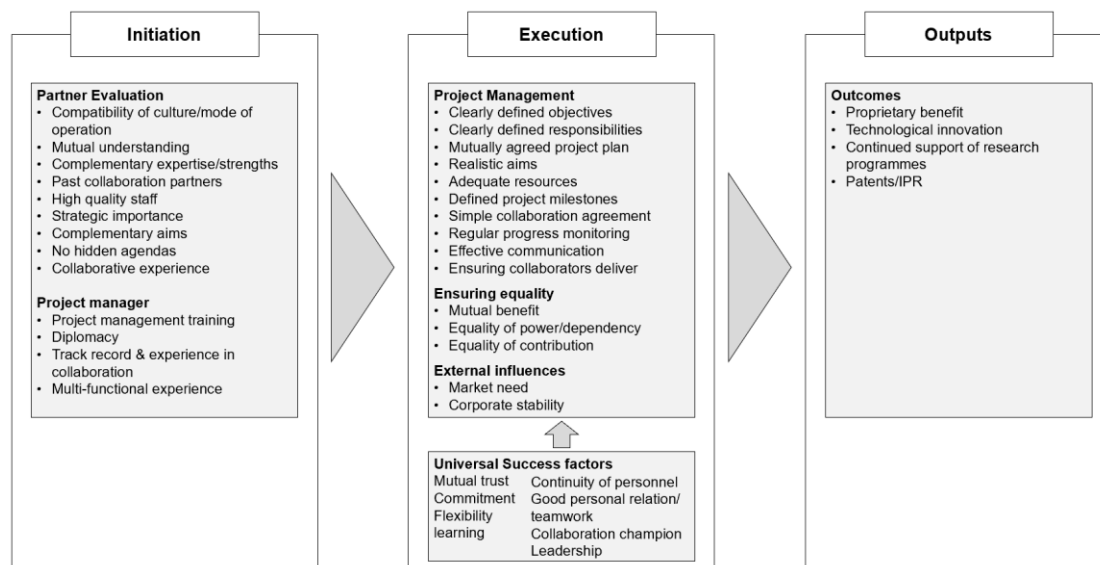


Figure 2. Success factors in the individual collaboration phases, following Barnes et al. 2000; Barnes et al. 2006; Kalkowski and Mickler 2015.

3. The Collaborative Iron Triangle

For the development of the Collaborative Iron Triangle the success factors in the individual collaboration phases (see Figure 2) are assigned to the success criteria from the Iron Triangle (see Figure 1) and to the 'essence of collaboration'. By assigning the success factors to the success criteria 'scope', 'time' and 'cost' (see Table 1), the importance of the 'outcome' dimension becomes visible. Hence, it is not surprising, that these criteria can be confirmed for interorganizational R&D projects. Thus, these criteria provide a framework within a project-culture-aware management operates to support a successful project completion. However, most of the success factors could be assigned to the success criterion 'organization & communication' extended by 'coordination' (see Table 1), as coordination manages dependencies among activities and integrates as well as harmonizes individual working contributions of the involved partners in the sense of the overarching common goal (Ohlhausen 2002). This shows, the importance of the 'relationship' dimension and thus of a project-culture-aware management in interorganizational R&D projects. Hence, when the framework of project scope, cost and time is defined, a project-culture-aware management can operate to support a successful project completion. Moreover, the assignment of the success factors to the success criteria also confirms that both the outcome and relationship dimension are addressed by the 'essence of collaboration' (see Table 1). Thus, a coherent time, a complementary scope which includes a win-win project outcome and complementary cost of the individual organizations as well as a coherent organization, communication, and coordination of the individual organizations and in interorganizational R&D projects are important.

Hence, it becomes evident, that for interorganizational R&D projects, it is not sufficient to focus only on one Iron Triangle. Rather, there needs to be an Iron Triangle for each individual organization which clarifies and documents its interests and resources. With aligning these individual Iron Triangles, project scope, cost and time of an interorganizational R&D project results. This sets a framework within which the development of a project culture is essential which is conducive to achieve project scope in time and cost. A project-culture-aware management puts project culture and thus the relationships among interorganizational project members into focus which is an important and promising approach for managing interorganizational R&D projects (see Dieterich et al. 2021; Dieterich and Ohlhausen 2022). Hence, it is important to support this kind of management with a conceptual approach including a new tool, the Collaborative Iron Triangle.

Table 1. Success criteria for interorganizational R&D projects

Focus on	Success criteria	Assigned Success Factors per Collaboration Phase		
		Initiation	Execution	Outputs
Outcome dimension	Project-Scope	Complementary aims	Clearly defined objectives, realistic aims, market need	Technological innovation
	Project-Time	<i>no assigned success factors</i>	Defined project milestones	<i>no assigned success factors</i>
	Project-Cost	High quality staff	Adequate resources	<i>no assigned success factors</i>
Relationship dimension	Project Organization, Communication & Coordination (OCCp)	High quality staff, no hidden agendas, collaborative experience, past collaboration partners, mutual understanding, strategic importance	Clearly defined responsibilities, regular progress monitoring, mutually agreed project plan, simple collaboration agreement, effective communication, mutual trust, flexibility, learning, continuity of personnel, good personal relation/teamwork, collaboration champion, leadership, ensuring collaborators deliver, corporate stability, commitment	Patents/IPR, continued support of research programmes
Outcome & Relationship dimension	Essence of collaboration	compatibility of culture/mode of operation, complementary expertise/strengths, complementary aims	Mutual benefit, equality of power/dependency, equality of contribution	Proprietary benefit

The Collaborative Iron Triangle (see Figure 3) focuses on a successful project completion and visualizes the connections between the single success criteria 'scope', 'time', 'cost', 'organization, communication, and coordination' and the 'essence of collaboration'. Visualization is essential to manage and simplify the high complexity of interorganizational R&D projects, as it supports people to share their information nonverbally (Fathi 2019). Moreover, it is adaptable to every project which prevents project managers from establishing a new tool for each project and from following the 'learning by doing' principle, which has been the case so far (vom Brocke and Lippe 2015). The Collaborative Iron Triangle supports project sponsors and managers in following a collaborative strategy which is essential for a project-culture-aware management of interorganizational R&D projects.

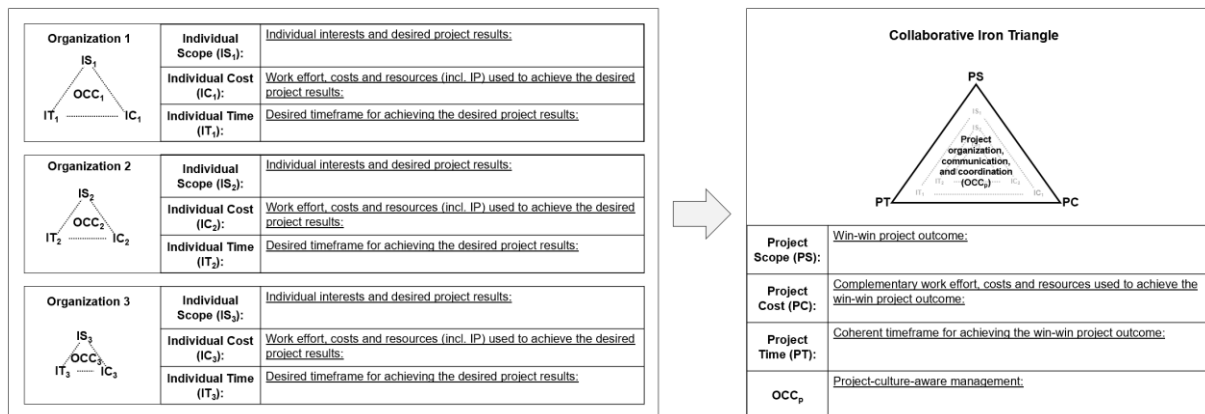


Figure 3. Template: Collaborative Iron Triangle

The given template above (see Figure 3) shows on the left side exemplarily three organizations which collaborate in a specific interorganizational R&D project. Each of these organizations has an individual 'organization, communication, and coordination' (OCC), e.g., regarding its organizational culture or modes of operation and pursues individual interests with the collaboration in the interorganizational R&D project and thus has individual desired project results. To achieve the individual desired project results, each organization contributes different resources, including intellectual property (IP) and work effort as well as has a desired timeframe to achieve its desired project results. On the right side, the template shows the Collaborative Iron Triangle. This is the Iron Triangle which is valid for the interorganizational R&D project. Project scope, time and cost result from the scopes, costs, and times of the individual organizations. By illustrating the individual interests and to be contributed resources these become transparent. In this way, the individual organizations can align their scopes to find a win-win constellation, their costs to complement each other and their time to have coherent timeframes. These can be illustrated with a new tool, the Collaborative Iron Triangle. Moreover, during the negotiation meetings, they can find out whether their 'organization, communication, and coordination' fits each

other. Furthermore, 'organization, communication, and coordination' (OCC) of the individual organizations needs to be addressed by project organization, communication, and coordination (OCCp) so that interorganizational project members can collaborate productively. Therefore, it is important to develop a project culture which is conducive to achieve a successful project completion by a project-culture-aware management (see [Dieterich et al. 2021](#); [Dieterich and Ohlhausen 2022](#)).

4. A conceptual approach with the Collaborative Iron Triangle

The Collaborative Iron Triangle supports both project sponsors and managers in different phases of a collaboration process to pursue a collaborative strategy. In the initiation stage, the Collaborative Iron Triangle mainly supports project sponsors of different organizations in finding suitable collaboration partners and enter into a fix collaboration agreement in four steps (see Figure 4).

In the first step, project sponsors have similarities with entrepreneurs who start a venture. When starting a venture, entrepreneurs can follow either a cyclic process ('effectuation') or a linear-causal ('causation') one ([Faschingbauer 2017](#); [Sarvasvathy 2008](#)). Effectuation is useful when the environment is driven by human actions, goals are unclear, and the future is unpredictable ([Sarvasvathy 2008](#)). Causation is useful when the environment is independent of human actions, goals are clear, and the future is predictable ([Sarvasvathy 2008](#)). An effectual entrepreneur starts with a given set of means and determines potential achievements with these means (vague goals) as well as the affordable loss ([Dew et al. 2009](#); [Grichnik et al. 2018](#); [Sarvasvathy 2008](#)). Transferred to project management, this means that, as in an agile approach (see [Kuster et al. 2019](#)), with effectuation time and cost (means) are fixed and scope is flexible. For partner-finding, an effectual entrepreneur scouts out at an early stage, who can and wants to contribute means to a joint project. Hence, partnership's direction and goals are negotiated, long time before an entrepreneurial goal is set. Potential partners choose themselves via their willingness of contribution. With those partners, who want to contribute, effectual entrepreneurs enter into fix agreements ([Faschingbauer 2017](#)). Instead, a causal entrepreneur sets a concrete goal, determines the expected return as well as the necessary means for achieving the goal ([Dew et al. 2009](#); [Sarvasvathy 2008](#)). Transferred to project management, this means that, as in a classic approach (see [Kuster et al. 2019](#)), with causation time and cost (means) are flexible and scope is fixed. For partner-finding, a causal entrepreneur defines at first a purpose of collaboration and decides then which roles partners could take. Precise interfaces are created and rules concerning partner expectations and communication processes are defined. Then, a causal entrepreneur scouts out those partners, who fit right to the defined interfaces ([Faschingbauer 2017](#)).

Hence, in the first step, project sponsors could either follow an effectuation or a causation approach (see Figure 4). By following an effectuation approach they start with the problem they want to solve and contact those partners they already know. In contrast to that, a project sponsor who follows a causation approach starts with a defined project scope and contacts those partners that contribute the 'right' resources to achieve the project scope. Then, in the second step, independently on the approach chosen before, project sponsor and potential partners fill in their individual interests, desired project results as well as the resources to be contributed and desired timeframes (see Figure 4). Thereby, the interests are transparent to all potential collaboration partners which is a key in a collaborative process (see chapter 2). After that, in step three the potential collaboration partners find suitable solutions (see Figure 4). When following an effectuation approach, the project sponsors from the individual organizations focus on an extension of project scope. This could work, as the collaborative process of [Lewicki and Hiam 2006](#) shows, by redefining the problem so that all individual interests are addressed by the project scope. In this way the project scope includes a win-win project outcome. When following a causation approach, the project sponsors of the individual organizations focus on a separation of the previously defined project scope. This separation needs to be aligned with the individual scopes. This could work, as the collaboration process of [Lewicki and Hiam 2006](#) shows, by generating a list of potential solutions and then prioritizing them. In this way, the project scope also includes a win-win project outcome. Independently of following an effectuation or causation approach, project sponsors discuss the degree of complementarity for resources to be contributed. The resources that complement are included in project cost. Thus, project cost is extended so that a complementary resource base results for an interorganizational R&D project. In the same way, project sponsors discuss the desired timeframes given for the project so that they can align them with each other. Thereby, project time is levelled so that a

coherent timeframe results for an interorganizational R&D project. Hence, in step four, the win-win project outcome as well as the complementary resources and the coherent timeframe for achieving this win-win project outcome can be documented (see Figure 4).

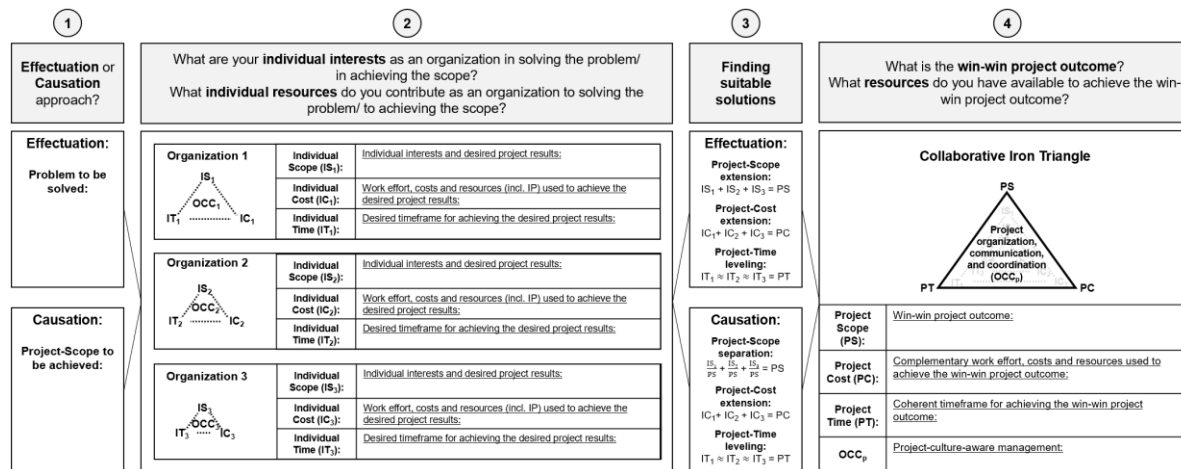


Figure 4. A four-step process for finding suitable collaboration partners with the Collaborative Iron Triangle

In this way, the Collaborative Iron Triangle shows at a glance the targeted win-win project outcome, the available complementary resources that are needed to achieve this outcome and the coherent timeframe to achieve it. In addition, the Collaborative Iron Triangle could work as collaboration agreement since it illustrates at a glance the defined project scope, cost and time and the individual Iron Triangles with the individual scopes, costs and times that are included there. Thereby, it is possible to generate a fair output separation since it documents which organization contributes which resources and work effort. Moreover, interorganizational project managers can use this tool to support their project-culture-aware management. Since the values to be defined of a project culture must be aligned with achieving project scope in cost and time (Dieterich and Ohlhausen 2022), a continuous review of this collaboration agreement is necessary. Therefore, the resulting defined project scope, cost and time from the four-step partner-finding process (see Figure 5, left side) must be continuously reviewed regarding the individual Iron Triangles that are included there (see Figure 5, right side). For this, regular meetings with project sponsors, managers and interorganizational project team must take place to see whether the individual interests and thus the win-win project outcome are still up to date. Thereby, they can continuously review whether the interests of each individual organization are consistently reflected in the win-win project outcome. Furthermore, they can see at an early stage if changes occur. By this, the resulting project culture can be conducive to achieve project scope in cost and time and thus to a successful project completion.

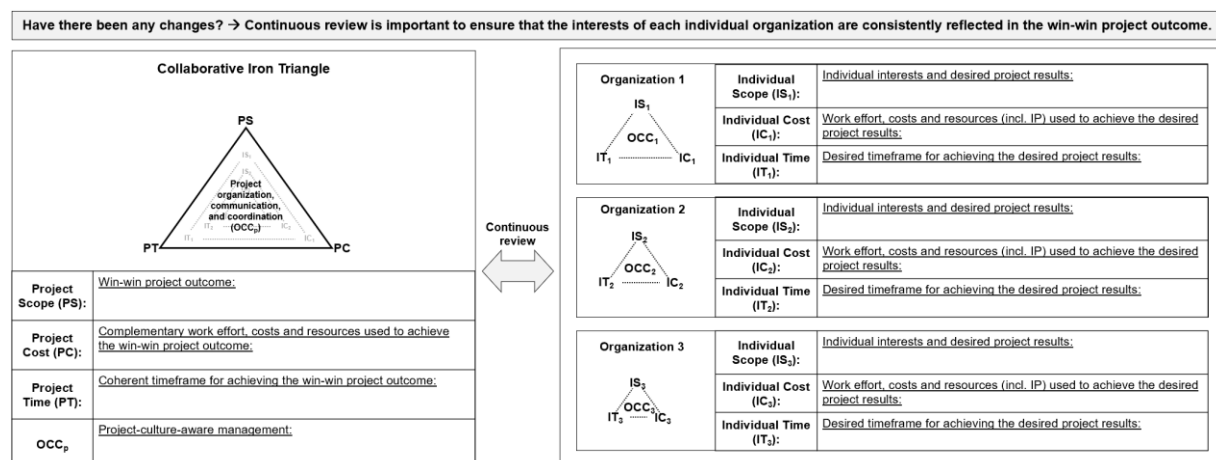


Figure 5. Continuous review of a collaboration agreement with the Collaborative Iron Triangle

5. Conclusion, limitations, and future research questions

This paper aims at answering the research question: "How to support a project-culture-aware management in interorganizational R&D projects?" As a result, a conceptual approach for supporting project-culture-aware management was shown with a new supporting tool, the Collaborative Iron Triangle. The Collaborative Iron Triangle supports both project sponsors and managers in different phases of the collaboration process to pursue a collaborative strategy in interorganizational R&D projects, especially in those with nonequity partnerships. At the initiation phase, the Collaborative Iron Triangle supports a collaborative partner-finding process either with an effectuation or a causation approach. Moreover, the individual interests and desired project results as well as the individual resources which are contributed by the individual organizations are illustrated. Based on these, different solutions can be found so that with both an effectuation and a causation approach an interorganizational R&D project results, which has a win-win project outcome, complementary resources, and a coherent timeframe. Moreover, with the Collaborative Iron Triangle, a collaboration agreement results which documents and shows at a glance beside the defined win-win project outcome, complementary resources and coherent timeframe, also the individual interests, desired project results and contributed resources. Thus, a fair output separation based on the contributed resources and work effort is possible. Moreover, the Collaborative Iron Triangle supports a project-culture-aware management of interorganizational R&D projects. Interorganizational project managers, project sponsors as well as interorganizational project teams can review in regularly meetings whether the individual interests are reflected in the project win-win outcome. Since the values of a supportive project culture must be align with the project scope in cost and time (Dieterich and Ohlhausen 2022), this is important for managing interorganizational projects project-culturally-aware. Thus, the Collaborative Iron Triangle used in combination with a project-culture-aware management addresses the two dimensions 'outcome' and 'relationship' of a collaborative strategy (see Lewicki and Hiam 2006).

This research work contributes to research on interorganizational R&D projects in several ways. The Collaborative Iron Triangle shows the importance of the outcome and relationship dimension in interorganizational R&D projects and how to support a project-culture-aware management there. While more and more studies emphasize the networking of organizations at firm-level (e.g., Fraunhofer Group for Innovation Research 2018) the Collaborative Iron Triangle, however, shows that at project-level complementary chains among these organizations result which need a coherent, inclusive management. Moreover, the Collaborative Iron Triangle offers a new approach in handling critical issues in interorganizational projects, as for example a fair output separation or dealing with intellectual property (IP). Since the contributed resources are illustrated, a collaboration agreement with the Collaborative Iron Triangle documents from the beginning who contributes which resources, including IP.

However, there are as well some limitations to consider. The concept of the Iron Triangle or 'triple constraints' is challenged. In current project management literature there is an evolution from 'triple constraints' to 'competing constraints' which includes beside the primary constraints scope, cost and time also further constraints such as value, quality, image/reputation and risk (Kerzner 2017). This is mainly to involve project stakeholders and thus a business viewpoint in project management (Project Management Institute 2017). The focus of this research work was mainly how a collaborative strategy can be pursued in an interorganizational R&D project to support a project-culture-aware management. For this, the primary constraints were necessary which are addressed by the Iron Triangle concept. Moreover, by applying the tool in a collaborative partner-finding process and by incorporating continuous reviews of the individual interests and desired project results, project sponsors are involved and thus a business viewpoint can be found in the win-win project outcome. However, it would be interesting to extend the Collaborative Iron Triangle with further constraints such as value or image and reputation (see Kerzner 2017). Furthermore, since the Collaborative Iron Triangle was not evaluated yet, future research could apply this tool in different interorganizational settings for getting empirical evidence on its benefits in different collaboration phases. Especially the evaluation of resulting complementary chains could be interesting for identifying how interorganizational project success depends on these chains and what role plays a project-culture-aware management. In this

context an interesting research question for future research could be: “How can organizationally cultural differences within an interorganizational R&D project be minimized by following a project-culture-aware management approach using the Collaborative Iron Triangle?” Moreover, examining how the Collaborative Iron Triangle could remove legal hurdles, especially concerning the intellectual property could be beneficial, as this would prevent interorganizational project managers from high set-up and transaction costs. Hence, interesting research questions for future research could be: “How can legal hurdles be removed by using the Collaborative Iron Triangle?” and “How can the Collaborative Iron Triangle be used to minimize set-up and transaction costs?” Besides, the current COVID-19 pandemic shows the importance of organizational resilience. This is as well for interorganizational R&D projects as temporary organizations the case. Thus, future research could answer the following research question: “How can the Collaborative Iron Triangle support project-culture-aware managers in building resilient networks within interorganizational R&D projects?”

Even though the Collaborative Iron Triangle was developed for interorganizational R&D projects with nonequity partnerships, in general it is applicable, when different organizations or organizational units collaborate in projects. Thus, future research could focus on the application of the Collaborative Iron Triangle in other settings, as for example for supporting other open innovation modes (see [Bagherzadeh et al. 2019](#)) or collaboration among different departments within organizations.

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