Available online at www.sciencedirect.com

ScienceDirect

Procedia CIRP 109 (2022) 155–160

www.elsevier.com/locate/procedia

32nd CIRP Design Conference

The EDiT method guideline - enabling distributed teams through situation-adequate method application

Albert Albers[a], Katharina Duehr*[a], Katharina Zech[a], Simon Rapp[a]

[a]Karlsruhe Institute of Technology (KIT), IPEK – Institute of Product Engineering, Kaiserstr. 10, 76131 Karlsruhe, Germany

* Corresponding author. Tel.: +49-721-608-43953; fax: +49-721-608-46051. E-mail address: Katharina.Duehr@kit.edu

Abstract

To counteract individual losses in distributed product development, the EDiT method (Enabling Distributed Teams) enables product development teams to continuously improve their distributed collaboration based on the characteristics of distributed product development. The EDiT method is the result of research into supporting distributed product development teams and is continuously being developed. For the successful transfer of the method into practice, a guideline for the situation-adequate adaptation and user-centered application of the EDiT method is designed. Therefore, a comprehensive understanding of the requirements for the EDiT method is compiled. An online guideline provides access and situation-adequate selection, adaptation, and application of the suitable method variant. A reference process model serves as orientation support for the situation-adequate application.

Keywords: distributed development; distributed collaboration; collaborative design; design methods; problem-solving; improvement process; guideline, situation-adequate method application

1. Introduction

The ongoing connectivity of so-called advanced systems is creating new, dynamic system networks, which lead to increasing requirements regarding new product generations [1]. For the development of advanced systems different competencies and a range of disciplines are required, which are currently often only present at different locations [1,2]. However, distributed product development teams face several new challenges in collaboration that can lead to losses in the effectiveness and efficiency of their work [3,4]. Accordingly, the individual causes of possible losses must be methodically identified and addressed by appropriate measures to finally improve distributed collaboration. Methods for improving collaboration of product development teams are already available in the literature [5–9]. Still, these are usually not tailored to the characteristics of distributed development teams [10,11]. Furthermore, Birkhofer, Jänsch, and Kloberdanz emphasize the importance of adapting methods to the individual development situation with the first of their 10 principles for successful method transfer - "Meet the Design Situation!" [12]. To enable improvement of distributed collaboration of product development teams and thus to counteract the possible losses, a method is needed which addresses the characteristics of distributed teams in the improvement process. The EDiT - Enabling Distributed Teams method developed by Duehr et al. aims at this goal [13]. However, it still lacks support for the situation-adequate adaptation and user-centered application of the EDiT method.

2. State of research

2.1 Distributed product development teams

Building on existing literature [14–16], distributed product development is used in this contribution as follows: “Distributed product development describes the form of product development in which collaboration in the activities is characterized by at least one individual being spatially separated from other individuals. The geographical separation

2212-8271
10.1016/j.procir.2022.05.229

can be extended to organizational and temporal separation. Information and communication technologies (ICT) have to be used for collaboration. Collaboration can take place both synchronously and asynchronously."

However, with distributed collaboration, product development teams face diverse challenges, such as communication problems due to e.g. physical distance, organizational difficulties [2,17]. In addition, distributed teams seem to discuss less and communicate less intensively and spontaneously, which can cause, among other things, information loss, delayed exchange of information, and slowly working processes [2,17,18]. Overall, the various, individual challenges lead to losses in the efficiency and effectiveness of product development activities [3,4]. Building on the challenges in the different product development activities, Duehr et al. derived criticality factors providing information about the criticality of a distributed product development activity [19]. Thus, the criticality factors represent indicators of challenges in distributed product development activities [19]. To be able to systematically address the individual challenges in the various product development activities, Duehr et al. further identified fields of action [20], which summarize the success-relevant influencing factors of distributed product development and act as levers to counteract the losses in effectiveness and efficiency [21].

2.2 Improvement processes in distributed collaboration

Several methods can be found in the literature that supports improving teamwork in product development [5], e.g. SCRUM, Kanban, Continuous Improvement Process, or Design Thinking [6–9]. However, it can be observed that these do not consider the characteristics of distributed development teams [10,11]. The structure of the EDiT method of Duehr et al. is based on the SPALTEN problem-solving process [22] and additionally uses the criticality factors and fields of action of distributed product development as a basic concept to specifically address the characteristics of distributed product development. The method consists of the following four generic phases: Potential-Analysis, Measure Definition, Measure Implementation, and Measure Evaluation. [13] For the successful transfer of the method into practice, the requirements of all three evaluation categories of the DRM (requirements for support, applicability, and success) must be met as best as possible [23]. Thus, 16 requirements were identified for the EDiT method, and are grouped into three categories as shown in Table 1 [13].

Table 1. Requirements for the support (**U**), application (**A**), and success (**E**) evaluation of the EDiT method according to Duehr et al. [13].

ID	The method should …
U1	support the understanding of the factors influencing distributed product development.
U2	support the identification of critical activities of distributed product development.
U3	support the analysis of improvement potentials of the collaboration of distributed product development teams.
U4	support the definition of measures for the development of improvement potentials of the collaboration of distributed product development teams.
U5	support the implementation of defined measures to improve collaboration among distributed product development teams.
U6	support the evaluation of implemented measures to improve the collaboration of distributed product development teams.
A1	have a reasonable ratio of effort and benefit.
A2	be easy to use for the development team.
A3	be divided into meaningful steps.
A4	have an appropriate level of detail.
A5	be able to be integrated into existing processes.
A6	be applicable in different development teams.
E1	support the improvement of distributed collaboration within product development teams.
E2	positively influence the effort-benefit ratio of the process for improving distributed collaboration.
E3	improve the efficiency of the distributed product development team.
E4	improve the effectiveness of the distributed product development team.

For the early validation and thus additional support of the successful transfer of the method into practice, some applications with early maturity of the method have already been carried out [3,20,24,25], which form a further basis for this contribution.

3. Aim of research and methodology

The literature shows that various methods for improving collaboration in product development teams already exist. However, these are currently not tailored to the characteristics of distributed product development. The concepts of criticality factors and fields of action provide this perspective. In addition, the methods' contribution to success can only be fully exploited if a method can be suitably adapted to the prevailing, individual development situation [12,26,27]. This is repeatedly criticized when developing methods. As presented in section 2, the initial concept and components for initial method applications in the system of objects and 16 requirements for the EDiT method in the system of objectives are already defined. However, a single overview of the various components and suitable support for user-centered and situation-adequate method application by the development teams are not yet available. For the successful transfer of the method into practice, the requirements of all three presented categories (requirements for support, application, and success) must be satisfied and require detailed consideration [13]. Consequently, there is a need to fulfill the requirements for the EDiT method leading in a situation-adequate and user-centered application support for distributed product development teams to improve their individual distributed collaboration. This will be supported by integrating the criticality factors and fields of action of distributed product development to enable a consideration of the characteristics of distributed product development.

Accordingly, the goal of this contribution is the development of a guideline for the situation-adequate adaptation and user-centered application of the EDiT method. In addition, the development of a reference process model of the EDiT method is aimed at, which addresses the criticality factors as well as the fields of action of distributed product development leading to successful support of the individual

application of the method. Therefore, three research questions will be answered:

- How can existing requirements for the EDiT method be interpreted and operationalized into measures and elements focusing on the integration of the characteristics of distributed product development?
- How is a guideline to be designed to support the situation-adequate adaptation and user-centered application of the EDiT method?
- What does a reference process model of the EDiT method look like?

A comprehensive analysis of the existing components of the EDiT method in relation to the requirements for the method which were extracted from a study with 125 product developers has been carried out [13]. Compiling the analysis results into the framework of Gericke et al. regarding the elements of a method and their relationship, the existing components, and their contribution to the fulfillment of the requirements was evaluated [27]. The results were then summarized and completed with implementation measures to fully meet the requirements. To enable a situation-adequate and user-centered application, an online guideline based on the defined measures was developed. In the guideline, four variants for the method application are presented, indicating the various application possibilities for individual design situations. Finally, a reference process model was developed to give orientation support based on initial method applications.

4. Analysis of the theoretical background and existing components of the EDiT method

Providing an in-depth understanding of the EDiT method, the findings from the analysis of the theoretical background are summarized in the description of the method based on the five aspects from the framework by Gericke et al (cf. Fig. 1). The results of the analysis are structured according to the system triple of product engineering (system of objectives, operation system, system of objects) [28,29].

As outlined in section 3, the focus of this contribution is on supporting the fulfillment of the requirements for situation-adequate adaptation and user-centered application of the EDiT method and thus on the **system of objectives**. Accordingly, in the first step, all 16 requirements for the EDiT method are analyzed. Based on the initial findings on the operationalization of the requirements for the EDiT method by Duehr et al. [13], the following findings can be drawn.

For the **requirements for support** (ID = U1-U6), it appears that the primary condition for all six requirements is the consideration as well as the appropriate integration of certain activities from the four phases of the EDiT method to support the fulfillment of the respective requirement. In addition, tools must be provided so that the execution of the respective activities can be supported and ensured. The analysis of U1 and U3 shows that explicit consideration must be given to the implementation of the fields of action of distributed product development. Moreover, for requirement U2, the criticality factors are assumed to be a necessary aid. However, in addition to these explicitly required supporting instruments, adequate support for the execution of the activities must be provided for all requirements, which are then to be identified as part of the implementation process.

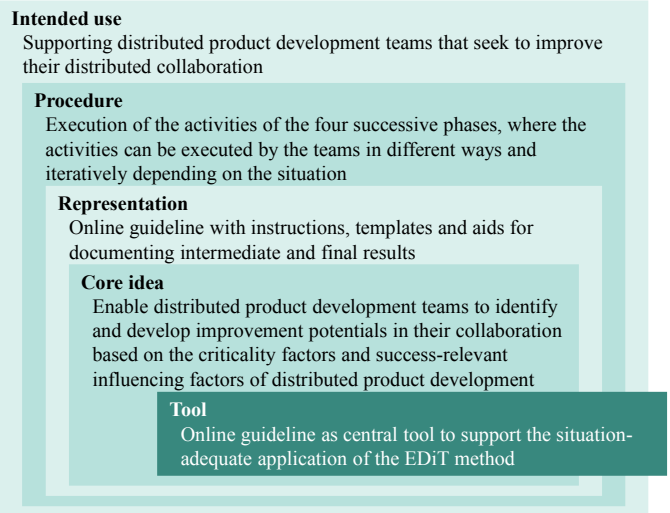

Fig. 1. The elements of a method and their relation to the implementation in a tool according to Gericke, Eckert und Stacey [27] applied to the EDiT method based on Duehr et al. [13].

From the analysis of the **requirements for the applicability** (ID = A1-A6) of the EDiT method, the following conditions are derived:

- A1 & A4: Different variants of the EDiT method depending on the individual challenges of the team and the prevailing development context can be applied.
- A2: Product development teams can apply the EDiT method in a situation-adequate and autonomous manner without an expert specifically trained to apply the method.
- A3: Starting from the structure of the EDiT method in four successive phases, further subdivisions can be made.
- A5: Product development teams can execute single activities of the EDiT method in different ways individually.
- A6: The EDiT method can be applied across multiple teams as the phases of the method are designed generically, but individual activities can be adapted to specific development contexts through different ways of execution.

Lastly, the analysis of the **requirements for the contribution to success** (ID = E1-E4) of the EDiT method leads to the finding that the basis for meeting these requirements is already given by the structure and basic concept of the method.

The detailed examination of the requirements reveals that not all requirements, in particular those relating to the applicability, are sufficiently fulfilled. This should be considered for the tool – the online guideline – being developed. As the guideline will represent a component of the object system of the EDiT method, it should support the fulfillment of all requirements for the EDiT method.

The **operation system** of the EDiT method consists of the team as a key resource [20,25]. It is intended that the method can be applied autonomously by product development teams, which is why the development of the method and its components focuses on individual contexts and the teams [13].

The operation system is of implicit importance for the design of the guideline by considering the individuality of product development teams as a central aspect.

From the analysis of the **system of objects** of the EDiT method, the four phases and their associated activities as well as the collection of aids for the execution of the activities that originate from the development of the basic concept and the initial applications of the EDiT method can be identified [13]. The implementation of these tools in the guideline and individual examples will be covered in the next section.

5. Approach to support the situation-adequate adaptation and user-centered application of the EDiT method

5.1 Measures to be implemented in the EDiT method guideline

To support the situation-adequate and user-centered application of the EDiT method, the requirements based on the three validation criteria support, application, and success after Blessing and Chakrabarti described in the previous section are specified through measures that are to be implemented in the guideline [23]. To contribute to the fulfillment of the EDiT method requirements, the measures listed in Table 2 are implemented in the guideline.

Table 2. Measures to be implemented in the guideline to satisfy the support (**U**), application (**A**), and success (**E**) evaluation requirements.

ID	Measures to be implemented in the guideline
U1	Provision of the 10 fields of action for distributed product development based on the success-relevant influencing factors in the activity block *Identification of critical activities* and / or *Identification of improvement potentials*.
U2	Provision of the criticality factors and the detailed description with criteria in the activity block *Identification of critical activities* and / or *Identification of improvement potentials.*
U3	Provision of the 10 fields of action of the distributed product development based on the success-relevant influencing factors for the derivation of the improvement potentials in the activity block *Identification of improvement potentials.*
U4	Provision of implementation aids, tools, and different variants with focus on sufficient description of measures with content, responsibility as well as deadlines for implementation and support for the selection of measures with a suitable cost-benefit ratio in the activity block *Definition of measures*.
U5	Provision of six success factors for the implementation of measures in the activity block *Implementation of the measures*.
U6	Provision of implementation aids and tools for the identification, selection, and survey of potentially measurable variables and disturbance variables in the activity block *Preparation and execution of the evaluation of the initial state* as well as for the measurement of the new state and the evaluation in the activity block *Evaluation of the improvement through the specific measures.*
A1	Provision of different variants of the method conduction for a situation-adequate application of the EDiT method illustrated using guiding examples. (Note: A distinction is made between standardized and flexible activities).
A2	Provision of a step-by-step guide for self-responsible execution by the product development team.
A3	Subdivision of the phases of the EDiT method into individual activities summarized in activity blocks, which can be executed step by step.
A4	Provision of different variants of the method conduction for a situation-adequate application of the EDiT method illustrated using guiding examples. (Note: A distinction is made between standardized and flexible activities).
A5	Provision of information as well as tools to support the selection, adaptation, and application of the various options for executing the single activities as well as recommendations for which activities adaptations or changes regarding the application variant are possible and reasonable.
A6	Presentation of the generic phases of EDiT forms the basis for cross-industry application of the method. Access to application variants enables flexible and situation-specific applicability. Activities can be repeated in the same way or with a different application variant flexibly.
E1	Structure of the method based on SPALTEN problem-solving process and use of the concepts of criticality factors and fields of action of distributed product development.
E2	Support the selection of the measures with the best cost-benefit ratio in the activity *Definition of measures.* Additionally, in the activity *Evaluation of the improvement through the specific measures*, the effort is evaluated against the benefit of the method.
E3	Use of the concept of criticality factors, which describes factors that influence the efficiency and effectiveness of distributed product development.
E4	Use of the concept of criticality factors, which describes factors that influence the efficiency and effectiveness of distributed product development.

5.2 Implementation of the defined measures in the guideline

A short introduction is integrated before the start of phase 1, which contains, for example, basics on how to work with Miro (an online platform for collaborative whiteboards) used for the guideline. By following the corresponding arrows, links, and instructions in the guideline, it is possible to carry out all activities with appropriate adaptations to the individual prevailing situation. The selection of the most suitable path is guided by discussion and answering guiding questions by the team. In addition, the guideline gives access to additional material that provides information on the four integrated application variants based on experience. This is, for example, information on available tools and possible procedures for all activities. Overall, the guideline provides access to the following application variants: *Game Team Space, Workshops, Retrospective, Individual Tools*.

In the following, the four phases of the EDiT method as they are implemented in the guideline to meet the presented requirements are described (e.g. Fig. 1). Elements from the different application variants are introduced in each phase.

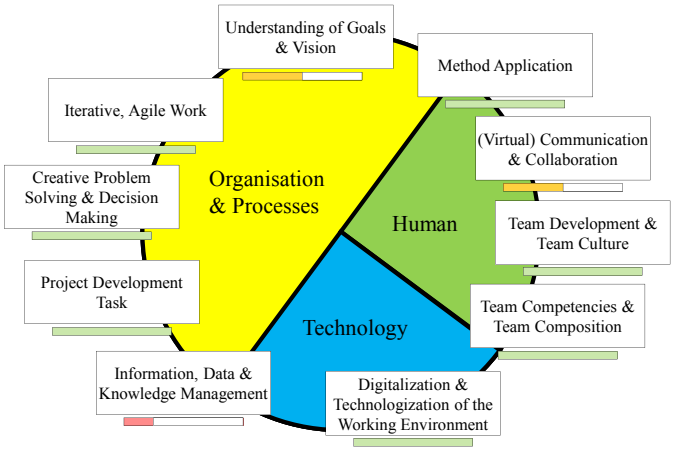

Fig. 2. Excerpt from activity block 3 of the guideline – Potential in the fields of action according to Duehr et al. [20].

The objective of the **first phase** of the EDiT method is to identify potentially critical activities and to identify potential for improvement in the fields of action of distributed product

development (cf. Fig. 2). For this purpose, the team analyzes existing and potentially occurring efficiency and effectiveness losses in the development process along with the criticality factors of distributed product development to narrow down the problem causes. The evaluation of the current state of the fields of action provides information about which fields of action have the highest potential to address the possible causes of the problem. One or more fields of action can be selected as input for the next phase.

The objective of the **second phase** is to conduct an in-depth analysis of the potential for improvement based on the problem causes identified in the criticality factors and the most promising fields of action. This includes the definition, analysis, and selection of appropriate measures for implementation. It is important to integrate the entire team to derive measures that are accepted throughout the team. In addition, the definition of measures can be deductive or creativity-based. The second activity block of the phase is the preparation and execution of the evaluation of the initial state before the implementation of the measures, to carry out the final evaluation of the implementation of measures in the fourth phase of the method. For this purpose, based on the existing process model for the validation of the EDiT method, qualitative and quantitative, subjective and objective variables for measuring the benefit, the effort as well as the implementation of the EDiT method are exemplified and supported by examples (cf. Fig. 3). As an example of subjective and quantitative data, the assessments of the fields of action as well as the criticality factors from phase 1 can be used. Finally, the data of the selected variables for the definition of the initial state must be collected and documented before the implementation of measures.

Benefit	Effort	Implementation
👍	Quantitative	Qualitative
Objective	e.g. duration of activities	e.g. eye tracking data
Subjective	e.g. assessment of criticality factors and fields of action	e.g. interview statements

Fig. 3. Excerpt from activity block 6 of the guideline – Areas for identifying measurable variables according to Duehr et al. [25].

The objective of the **third phase** is the individual implementation of measures to tap the identified and selected improvement potentials. It is important that the team is jointly involved in the implementation of measures and that all efforts and additional activities required for the implementation of measures are documented. This is supported in the guideline by providing success factors of measure implementation.

The objective of the **fourth phase** is the evaluation of the improvement measures as well as the application of the method, including a recapitulate and learn. Therefore, the current status is collected and evaluated based on the variables defined in phase 2. The realized benefit has to be compared to the incurred effort for the implementation of the measures. A simple evaluation without large additional effort indicates the re-evaluation of the criticality factors and fields of action from phase 1 based on which one can achieve direct statements about the success of the measure implementation and thus also the method application. Furthermore, the team reflects on the application of the method. In addition, the 16 requirements for the EDiT method are evaluated to make further statements about possible improvement potentials for the method.

5.3 Reference process model of the EDiT method

Based on the initial reference model of Duehr et al., Fig. 4 represents the refined reference process model of the EDiT method [13]. The process model was derived out of different applications of the EDiT method in the field and serves as a reference process model for further applications. In addition, the measures for implementing the requirements were incorporated into the reference process model. The reference process also serves as orientation support for the application of the EDiT method based on the activity blocks in the guideline.

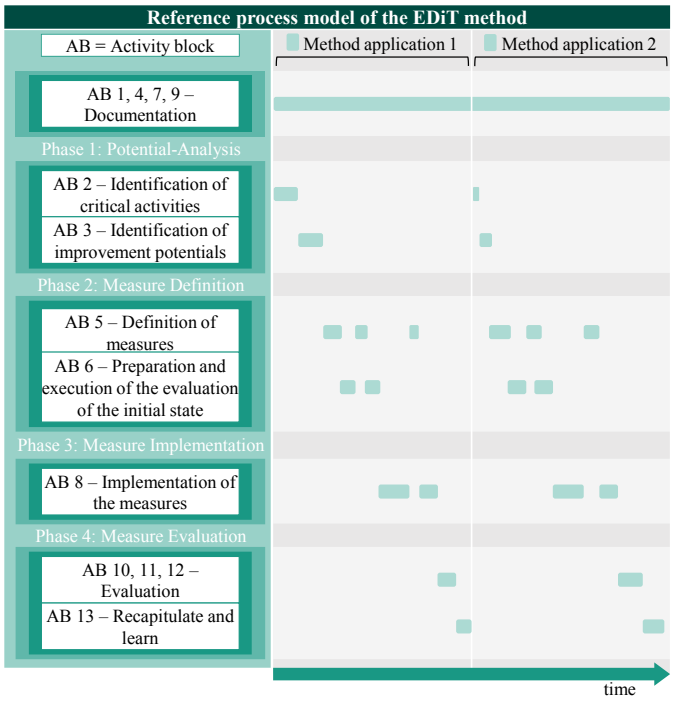

Fig. 4. The reference process model of the EDiT method.

Based on the initial studies conducted, it was observed that a first initial method application is usually followed by a second more in-depth method application based on the results of the first application. This was also modeled in the reference process.

6. Summary and discussion

This contribution has aimed at identifying and implementing measures for the fulfillment of existing requirements for the situation-adequate and user-centered application of the EDiT method based on the criticality factors and fields of action of the distributed product development. First, based on an initial analysis of the theoretical background of the EDiT method, measures to address the existing requirements have been developed. Second, an online guideline to support the situation-adequate and user-centered method application based on the developed measures has been

introduced. Third, a reference process model of the EDiT method derived out of six different applications of the EDiT method in the field has been presented.

Several limitations must be quoted. The focus of this contribution was on the development of a guideline. Due to infinite variants of the application possibilities, of which four have been made explicit in the guideline, no validation of the guideline has yet been carried out. In addition, a decision had to be made on a tool for implementing the guideline. The focus was on using a tool that is accessible to many people, and the decision was made in favor of Miro. Nevertheless, it must be said that Miro is a valid basis, but it does not offer all the desired possibilities. Some practical implications can be stated. The method is developed to be applied by distributed development teams regardless of the industry context or the product development phase leading to a need for situation-adequate adaption. Although the online guideline is structured in a way that all information and support materials are accessible to everyone, it is recommended to have a dedicated method coach who is responsible for the selection of the application variant as well as the implementation together with the team. Recent method applications have shown that incorporating the method into existing agile meetings (such as the retrospective) positively supports the method's success.

This study focused on the situation-adequate and user-centered support of the EDiT method. Based on the measures implemented to meet the requirements for the EDiT method, comprehensive validation studies need to take place in various development contexts. To validate the situation-adequate and user-centered application of the EDiT method, the guideline will be used within various development teams leading to the application of different variants of the EDiT method. In addition, the added value of the EDiT method compared to existing methods for improving collaboration, in general, must be analyzed.

References

[1] Dumitrescu R, Albers A, Riedel O, Stark R, Gausemeier J (2021) *Engineering in Deutschland – Status quo in Wirtschaft und Wissenschaft, Ein Beitrag zum Advanced Systems Engineering*, Paderborn.

[2] Gaul H-D (2001) Verteilte Produktentwicklung - Perspektiven und Modell zur Optimierung. Dissertation, München, Technische Universität München.

[3] Duehr K, Hirsch M, Albers A, Bursac N (2020) A Methodology to Identify and Address Improvement Potentials in Communication processes of distributed product development - an initial approach. In: *Proceedings of the Design Society: DESIGN Conference*, pp. 541–550. DOI: 10.1017/pds.2021.568.

[4] Boucher M (2020) *What's the Cost of Poor Engineering Collaboration?*

[5] Zanker W (1999) Situative Anpassung und Neukombination von Entwicklungsmethoden. Dissertation, München, Technische Universität München.

[6] Atzberger A, Nicklas SJ, Schrof J, Weiss S, Paetzold K (2020) *Agile Entwicklung physischer Produkte*. Universität der Bundeswehr München. DOI: 10.18726/2020_5.

[7] Schnegas H (2019) Alles im Fluss. Kanban und Scrum als Innovationswerkzeuge im Design Thinking für die agile Produktentwicklung. In: *17. Gemeinsames Kolloquium Konstruktionstechnik. Agile Entwicklung physischer Produkte.*, pp. 212–223. DOI: 10.18154/RWTH-2019-08298.

[8] Grots A, Pratschke M (2009) Design Thinking — Kreativität als Methode. *Marketing Review St. Gallen* 26(2):18–23. DOI: 10.1007/s11621-009-0027-4.

[9] Schwaber K, Sutherland J (2020) *The Scrum Guide: The Definitive Guide to Scrum: The Rules of the Game.*

[10] Grieb J (2008) Auswahl von Werkzeugen und Methoden für verteilte Produktentwicklungsprozesse. Dissertation, München, Technische Universität München.

[11] Wieland S, Anke J, Fichte A, Helbig J (2017) Adaption von SCRUM für verteilte Teams in Teilzeitarbeit. *Informatik Spektrum* 40(5):445–54. DOI: 10.1007/s00287-016-1003-4.

[12] Birkhofer H, Jänsch J, Kloberdanz H (2005) An extensive and detailed view of the application of design methods and methodology in industry. In: *Proceedings of International Conference on Engineering Design ICED 05*.

[13] Duehr K, Schiele A, Mueller H, Kopp D, Albers A (2021) EDiT - Requirements of Enabling Distributed Collaboration in Product Development Teams. In: *The ISPIM Innovation Conference – Innovating Our Common Future*. DOI: 10.5445/IR/1000136773.

[14] Gierhardt H (2001) Global verteilte Produktentwicklungsprojekte: Ein Vorgehensmodell auf der operativen Ebene. Dissertation, München, Technische Universität München.

[15] Kern E-M (2016) Verteilte Produktentwicklung. In: Lindemann U, (Ed.). In: *Handbuch Produktentwicklung*. Carl Hanser Verlag GmbH Co KG, pp. 455–481.

[16] Lipnack J, Stamps J (2000) *Virtual teams: People working across boundaries with technology.* 2nd ed. John Wiley & Sons, New York.

[17] Ahuja J (2017) Modelling the Success Factors of Virtual Team. *INDJST* 9(48):1–9. DOI: 10.17485/ijst/2016/v9i48/105874.

[18] Larsson A, Törlind P, Karlsson L, Mabogunje A, Leifer L, Larsson T, Elfström B-O (2003) Distributed team innovation. In: *Proceedings of International Conference on Engineering Design ICED 03*.

[19] Duehr K, Hettel V, Nix B, Dernbach F, Heimicke J, Albers A (2021) Evaluation of the Effect of Distributed Collaboration on the Effectiveness and Efficiency of Design Activities. *Journal of Design Research.* (handed in).

[20] Duehr K, Hofelich M, Beck L, Albers A (2021) A validation environment for a method to enable distributed agile product development teams. In: *R&D Management Conference 2021 - Innovation in an Era of Disruption*.

[21] Albers A, Weissenberger-Eibl MA, Duehr K, Zech K, Seus F (2020) Literature-based identification of success-relevant influencing factors of distributed product development. In: *30th CIRP Design Conference*, pp. 415–420. DOI: 10.1016/j.procir.2019.11.007.

[22] Albers A, Burkardt N, Meboldt M, Saak M (2005) SPALTEN problem solving methodology in the product development. In: *Proceedings of International Conference on Engineering Design ICED 05*.

[23] Blessing LT, Chakrabarti A (2009) *DRM, a Design Research Methodology*. Springer London, London. DOI: 10.1007/978-1-84882-587-1.

[24] Duehr K, Efremov P, Heimicke J, Teitz EM, Ort F, Weissenberger-Eibl M, Albers A (2021) The Positive Impact of Agile Retrospectives on the Collaboration of Distributed Development Teams – A Practical Approach on the Example of Bosch Engineering GmbH. In: *Proceedings of the International Conference on Engineering Design (ICED21)*, pp. 3071–3080.

[25] Duehr K, Grimminger J, Albers A, Bursac N (2022) Enabling Distributed Teams - A Process Model for Method Validation in Agile Development Practice. In: *International Design Conference - Design 2022.* (handed in).

[26] Duehr K, Kopp D, Walter B, Spadinger M, Albers A (2019) Einflussfaktoren in der standortverteilten Produktgenerationsentwicklung – Eine literaturbasierte Momentaufnahme. In: Stelzer RH, Krzywinski J, (Eds.). In: *Proceedings of Entwerfen - Entwickeln - Erleben. Produktentwicklung und Design 2019*, 2nd ed. TUDpress. Dresden, pp. 309–326.

[27] Gericke K, Eckert C, Stacey M (2017) What do we need to say about a design method? In: *Proceedings of the 21st International Conference on Engineering Design (ICED17)*, pp. 101–110.

[28] Albers A, Reiss N, Bursac N, Richter T (2016) iPeM – Integrated Product Engineering Model in Context of Product Generation Engineering. In: *26th CIRP Design Conference*, pp. 100–105. DOI: 10.1016/j.procir.2016.04.168.

[29] Ropohl G (1975) Einleitung in die Systemtechnik. In: Ropohl G, (Ed.). In: *Systemtechnik–Grundlagen und Anwendung*. München Wien: Carl Hanser, pp. 1–77.