



# (Fr)Agile, Handle with Care! A Systematic Literature Review of the Nature and Limits of Agile Methods

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## Abstract:

**Purpose:** Agile methods are changing the traditional way of work, characterized by division of labor and authority, and challenging the tried-and-tested coordination and organization instrument of hierarchy. From a business research perspective, however, up to now there is no uniform description of their nature, conditions and limits of these methods. The present study addresses this lack of scientific substantiation by consolidating the current state of research on agile methods and critically assessing their contribution to an efficient and effective task fulfillment in firms.

**Design/Methodology/Approach:** A systematic literature review is conducted on the base of 30 studies published between 1975 and 2019 in scientific journals to identify and to describe coordination-relevant key dimensions of agile methods. Finally, the contribution of agile methods to task fulfillment regarding the criteria 'speed (efficiency)' and 'quality (effectiveness)' is discussed.

**Findings:** Five key dimensions of agile methods are identified based on the 30 studies. Only few of the contributions of the literature review are based on theories or empirically test the effectiveness/efficiency of agile methods; most are conceptual in nature. Given this, it is worth emphasizing that the critical evaluation of agile methods reveals certain conditions and limits of the (firm-wide) application of agile methods.

**Originality/Value:** This study provides a systematic description of agile methods and helps to clarify the nature and subject matter of agile methods. In contrast to the majority of publications in this research field, the present review does not only highlight the positive effects of agile methods, rather it also emphasizes the conditions and limits of agile methods, thereby enabling academics as well as practitioners to better assess the applicability and effects of agile methods.

**Keywords:** Agile Methods, Coordination, Organizational Agility, Literature Review

## 1. INTRODUCTION

For decades, hierarchy served both as mean to divide labor and as an efficient and functional coordination instrument as it is breaking down tasks into subtasks and processes in organizations (Halevy *et al.*, 2011). Due to the super ordination and subordination between organizational elements, an efficient and effective coordination and fulfillment of tasks should be ensured. In recent years, however, the dysfunctionalities of hierarchical structures have been repeatedly emphasized (Alavi *et al.*, 2014; Felipe *et al.*, 2016). The root cause of these reported dysfunctionalities lies in a changed environment that research and practice have been discussing for some time under the acronym VUCA (volatility, uncertainty, complexity, ambiguity) (Bennett and Lemoine, 2014). According to this view, firms today are increasingly confronted with rapid as well as complex (and perhaps interdependent) micro- and macroeconomic changes. Coordination via hierarchical structures is supposed to be unsuitable for the anticipation and/or adaptation to those changes as the associated decision-making processes are too slow and insufficiently purposeful (Teece *et al.*, 2016).

The question of how firms can quickly adapt to changing conditions in a VUCA-environment is becoming a determining issue for business research and practice. Opinion leaders (often from business practice), who believe that hierarchical structures are unsuitable today, argue that agile

methods are a viable alternative to hierarchies (e.g., Denning, 2015; Rigby, Sutherland *et al.*, 2016). They state that agile methods go along with a democratization of decision-making processes as well as increased levels of self-determination and participation of employees. This should lead to faster and better decisions, a more motivated workforce and thereby to a dismantling of hierarchies in the agile world of work. If we were to consider only articles from the popular business press (e.g., Boss, 2014; Brosseau *et al.*, 2019; Clark, 2012; Kastle, 2013; Pierce, 2019), we would come to the conclusion that the above mentioned opinion leaders are right. A growing number of firms rely, for example, on collaborative forms of work in ‘sprint teams’, develop new business models with the help of ‘design thinking processes’, and prescribe themselves more flexible forms of cooperation such as Scrum. The fact that 38 out of the 50 major European firms listed in the Euro Stoxx 50 index have mentioned the importance of agility and agile methods in their annual reports of 2020 as a critical factor underlines the relevance of agile methods (Source: Own analysis). Overall, one could be inclined to assume that agile methods are becoming increasingly important, while the importance of hierarchies in firms is declining.

Yet this conclusion is premature considering that there is no consolidated state of research on the nature, conditions, merits, and limits of agile methods to date. For example, there is still no cohesive theory or theoretical framework that can prove the benefit of agile methods. In general terms, ‘agility’ describes the ability of a firm “to adapt to unexpected changes in its environment” (Lehn, 2018, p. 66). While the term was first coined in the context of software development (Beck, 2000), it has found its way into management research and practice today. Besides other subcategories of agility (such as manufacturing agility), the call for organizational agility, i.e., the ability of firms to adapt and rapidly change their managerial processes and organization of work, is frequently voiced by management practitioners. Agile methods are closely linked to this call, as they are assumed to bring firms closer to the desired state of organizational agility. At the same time, it is difficult to give a precise definition of agile methods. Unlike for the case of traditional project management, for which broadly accepted definitions exist, there is no universal understanding of agile methods. Management practitioners would argue that methods are considered to be agile if they have an explicit or implicit reference to the ‘Agile Manifesto’. This understanding, however, reveals some arbitrariness, since various methodological approaches can be agile as long as they are based on flexible forms of collaboration. Unfortunately, business research does not offer further-reaching insights, as there are neither systematic literature analyses nor large-scale empirical findings (e.g., meta-analyses) that provide a better definition of what agile methods actually are. Considering the lack of scientific substantiation, it seems as if the calls for the application of agile methods (also as an alternative to hierarchical coordination) precede the actual state of empirical knowledge.

Against this backdrop, the present article pursues two contributions: First, it wants to consolidate the state of research on agile methods in an organizational and management context, as there is currently no uniform description or definition – from a scientific standpoint at least – regarding their nature. This includes, in particular, the identification, description, and abstraction of repeated findings on agile methods in the currently published body of scientific literature. The identification of such key dimensions of current writings could help to overcome the lack of scientific substantiation of the term. Second, based on the outcome of this literature review the respective findings will be discussed. As part of this discussion, special emphasis will be placed on the relevance of coordination via hierarchical structures: As long as the basic organizational principle of the division of labor still plays an important role, the second and corresponding organizational principle – coordination – must also be taken into account. We ask ourselves whether agile methods really have the potential to be a viable alternative to the hierarchy as a coordination tool in firms. Overall, the value added of the present study to theory lies in the creation of a uniform conceptual understanding of the ubiquitous agile methods. Their nature, conditions, merits, and limits are disclosed on the basis of the present state of research. This allows also for a critical examination of the extent to which the aspirations placed on agile methods correspond to the reality of the situation or whether they are rather – to put it provocatively – a fad in management based on a rather fragile theoretical and empirical foundation. The contribution to practice lies in an increased transparency regarding the actual effects of agile methods. Common beliefs, e.g., that agile methods can be used to enforce less hierarchical coordination in firms, could prove to be a fallacy.

## 2. DIVISION OF LABOR AND COORDINATION AS BASIC ORGANIZATIONAL PRINCIPLES IN FIRMS

In order to enhance their levels of efficiency and effectiveness in task fulfillment processes, firms traditionally rely on division of labor and specialization (see, e.g., already Smith, 1779 or Taylor, 1911). The need for a division of labor for complex overall problems as well as the necessity for the development of (isolated) partial solutions stem from the limited qualitative and quantitative capacity of organizational units. At the same time, the effort to achieve the overall objective as far as possible requires the alignment of all partial activities. Therefore, coordination as “the act of managing interdependencies between activities performed to achieve a goal” (Malone and Crowston, 1990, p. 361) is the second basic organizational principle besides the division of labor. As much as efficiency and effectiveness are the aim of the organizational sub-aspect ‘division of labor’, the sub-aspect ‘coordination’ must also meet the need for efficiency and effectiveness, considering the overall objective of each organization (i.e., purposeful task fulfillment). The resulting organizational problem is to find the form of coordination that enables the most efficient and effective handling of task-related interdependencies between the actors in a firm in order to achieve a given goal. The traditional and best known of these coordination mechanisms is hierarchy. Already Taylor (1911), Fayol (1916), and Weber (1922) emphasized the advantages of hierarchical organization, such as clear responsibilities, fast decision-making in complex situations, or efficient control. In a VUCA-environment, however, the dysfunctions of the hierarchy are often emphasized in recent years. Hierarchical coordination is often seen as too rigid and inert and – with respect to the ‘command-and-control’ principle – also as demotivating. By contrast, agile methods should serve as an answer to the complex challenges of today's world and change the traditional way of work with its precise division of labor and strict hierarchies. Nonetheless, the need for a purposeful task fulfillment must also hold true for agile methods. If agile methods are supposed to overcome the disadvantages of hierarchical coordination, these methods should enable the accomplishment of tasks at least as good as hierarchy has done so before.

In order to discuss the suitability of hierarchy or agile methods as coordination instruments, we should first consider, what firms require for the purposeful fulfillment of tasks. Above all, the defined goals need to be achieved, i.e., the effectiveness of task fulfillment has to be ensured (Drucker, 1977). “An effective organization is one that is able to achieve its purpose or aims” (Fairtlough, 2007, p. 13). Effectiveness is the measure of how the result achieved relates to the intended or expected result and can be considered as the quality of task fulfillment. However, the most effective firm can die of poor efficiency (Drucker, 1977). Thus, these goals should be achieved with a minimal use of resources, i.e., ensuring efficiency. Since agile methods are particularly concerned with fast adaptation to changing conditions (Nijssen and Paauwe, 2012), the resource ‘time’ plays a key role, which is why this input factor – in form of task fulfillment speed – is to be given special importance in the following. Speed describes the duration of the actual task fulfillment process and is determined by the duration of its individual steps, such as goal definition, task assignment, coordination processes between the employees, etc. So, purposeful task fulfillment can be broken down into the sub-aspects (1) speed (i.e., efficiency) and (2) quality (i.e., effectiveness). The criteria ‘speed of task fulfillment’ and ‘quality of task fulfillment’ should be met in order to ensure a purposeful task fulfillment. Based on these criteria, agile methods can be critically evaluated. Prior to an evaluation, however, we must identify the coordination-relevant dimensions of agile methods by means of a systematic literature analysis.

## 3. SYSTEMATIC LITERATURE REVIEW ON AGILE METHODS

### 3.1. Systematic Literature Review as a Research Method

In management research as well as in other social sciences, a literature analysis is considered to be an effective instrument in order to synthesize a number of primary studies with regard to a specific field of research (Cooper *et al.*, 2019; Rozas and Klein 2010; Snyder, 2019). It is a fundamental component of scientific work and constitutes a central part of the research process. A literature analysis often forms the basis for further phases of a research process (Seuring and Gold, 2012). Typically, it helps to identify a specific research gap as it measures a field of research, thereby justifying new research ideas. Hence, it can be of great assistance for the clarification of a research topic (Doyle, 2003; Rozas and Klein, 2010; Snyder, 2019). More importantly in the context of the present article, however, a literature analysis – in the form of a systematic literature review – can also be an independent research method that allows for a review of a certain body of literature.

This qualitative approach is based on text materials, which are systematically analyzed. It is conducted as a content analysis and provides a structured method for identifying, evaluating, integrating, and interpreting relevant contributions to a field of study, thus allowing a certain level of abstraction with regard to the investigation of a research question (Cooper *et al.*, 2019). A systematic literature review takes into consideration and integrates mixed research findings, which result from the different perspectives and observations of previous scholars (Rozas and Klein, 2010). More specifically, it includes the formulation of generalizing statements or the identification of conflicting research results. New chains of argumentation can be formed, which – in return – can be used to derive new research propositions for a certain topic (Doyle, 2003). Furthermore, connections between different research contributions, which have previously not yet been linked, can be explored and the existing literature within a field of research can be critically discussed (Fink, 2005; Tranfield *et al.*, 2003). This methodology has been adopted widely in previous articles (e.g., Banks *et al.*, 2016; Boyd *et al.*, 2005; Wechtler *et al.*, 2018; Seuring and Gold, 2012; Stahl and Tung, 2015).

### 3.2. Procedure for the Material Collection

Our procedure for the material collection consists of three methodological steps in a systematic and structured manner, which ensure the reliability of the analysis: (1) choice of journal database; (2) definition of search terms; (3) filter procedure.

The following description of the methodological procedure serves the reliability claim to the present study (in terms of procedural reliability). Furthermore, the identification of the relevant articles (and above all the revision of their content) was carried out by the authors of this article each independently. Through the independent and clearly defined revision of the contributions by each author, subjective influences of individual opinions are limited, and the validity of the results is safeguarded (due to investigator triangulation) (Flick, 2018). Furthermore, the detailed description of the methodological procedure allows other researchers to reproduce the literature review.

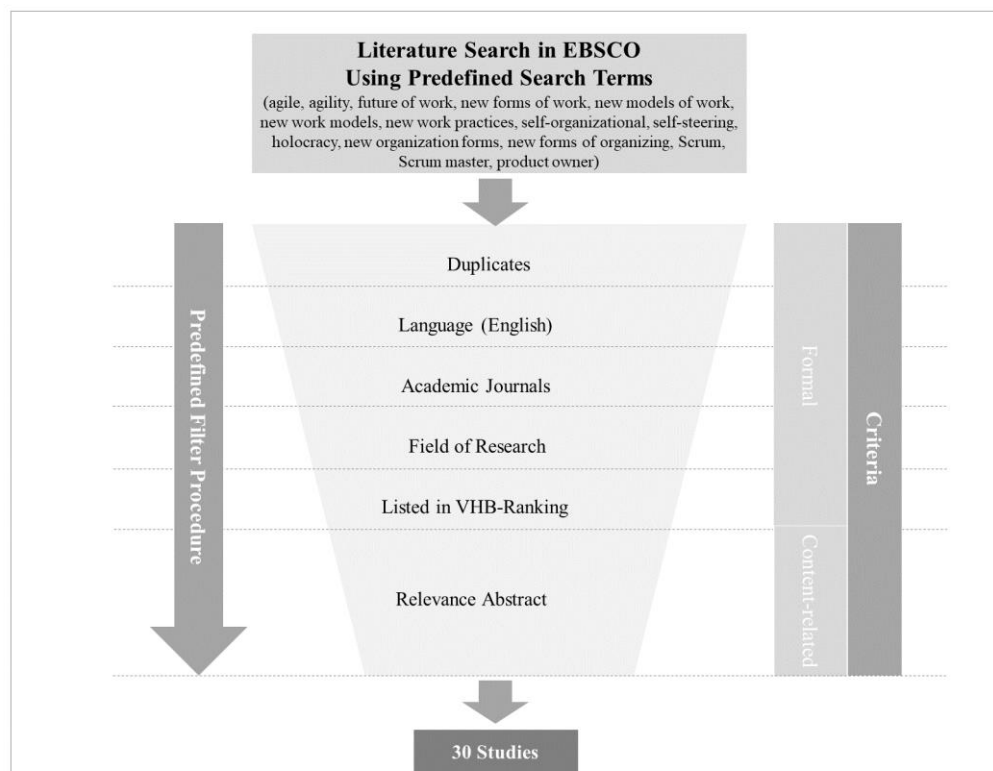


Figure1. Procedure for the Material Collection

For the material collection only articles published in peer-reviewed journals were selected (starting in 1975 – when the first was article published), thereby book chapters or unpublished works were excluded. Since journal articles usually undergo a review process with strict publication requirements, we can assume that the reviewed studies meet a certain level of conceptual and methodological rigor

(David and Han, 2004). We used the EBSCO host journal database. EBSCO host is suitable for our purposes as it allows a thorough screening for search terms in published articles as well as filter options in order to enhance the relevance of our collected material. Furthermore, it covers all fields of management research as well as other social sciences.

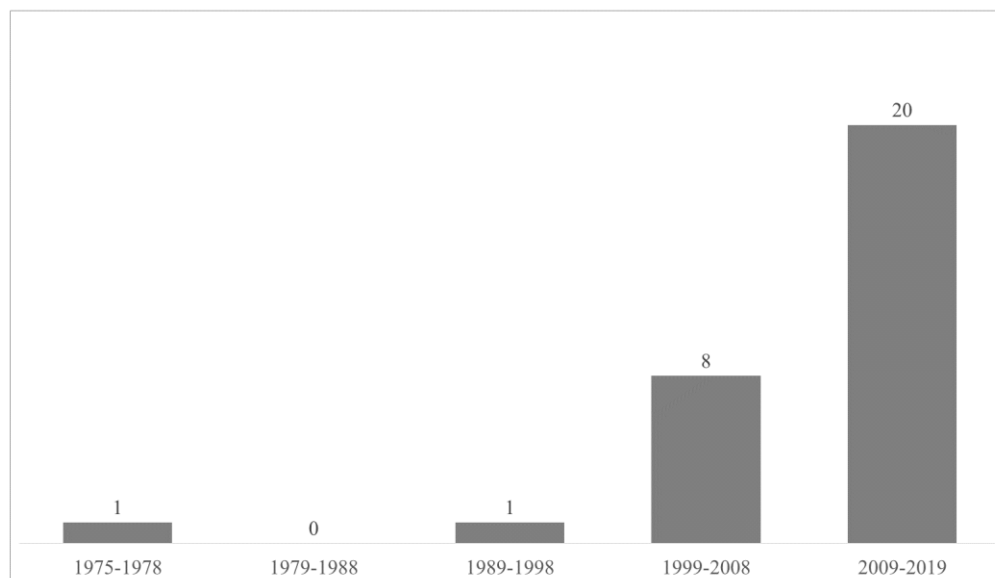
The definition of the search terms used to scan the database is of great importance, as it acts as an essential lever in the systematic literature review (Cooper *et al.*, 2019). For the present study we have chosen a number of keywords as search terms, which we often found in the popular business press in the context of agile methods. The following search terms were used in the present literature review: 'agile', 'agility', 'future of work', 'new forms of work', 'new models of work', 'new work models', 'new work practices', 'self-organizational', 'self-steering', 'holocracy' (i.e., a form of decentralized management), 'new organization forms', 'new forms of organizing', 'Scrum' (i.e., an agile process framework), 'Scrum master' (i.e., a position in the before mentioned process framework), 'product owner' (i.e., another position in the before mentioned process framework).

With the aim of condensing the obtained material to only the relevant articles, we have carried out a predefined filter procedure for the systematic literature review (see figure 1). Formal and content-related criteria were used. Formal criteria applied here are: (1) English language articles; (2) articles published in academic journals; (3) journals dealing with a field of research that suggests a study of organizational agility; (4) journals listed in the official ranking of the German Academic Association for Business Research (VHB) for global business research outlets. As a content-related criterion, we only considered articles that deal with matters of organizational agility. Contributions dealing with questions of agility beyond organizational research (e.g., agile manufacturing) were eliminated. We applied a two-step procedure in order to classify publications as relevant. If an article could not be classified as relevant (or not relevant) based on the content within the abstract directly in the first step, it was subjected to a further content analysis in a second step. The subsequent decision was then based not only on the abstract, but on the entire article. When in doubt or when we could not come to a joined conclusion with regard to the relevance of an article, we eliminated it from the database for our systematic literature review. In this regard, it is important to emphasize that the identification of relevant articles was not the result of the authors' personal preferences, but the result of the systematic approach described above. By applying this predefined filtering procedure, only 30 articles remained for the literature analysis.

### **3.3. Findings**

#### *3.3.1. Descriptive Analysis*

In the following, some aspects of the material that came to the fore during the review of the relevant contributions will be outlined. A total of 30 articles published in 21 journals between 1975 and 2019 were identified to be relevant for the present systematic literature review. With the exception of one article, which had dealt with the topic of 'new work structures' in 1975 (Walton, 1975), there are practically no research contributions on agile methods until the end of the 1990s. Since then, however, a continuous growth of relevant contributions can be observed. This growth can be linked to the emergence of publications on agile (software) development in informatics in the 1990s. As already stated in the introduction, agility (and the working methods associated with it) gained relevance in the sphere of software development earlier than in the context of organizational theory and management (Larman and Basili, 2003). To some extent, agile methods in informatics have contributed to the awareness of agility in business related contexts. The growing attention that is paid to agile methods in recent years in business research is illustrated by the distribution of respective contributions in Figure 2.



**Figure2.** Distribution of the studies over time

With regard to the distribution of the relevant articles across the subcategories of business studies, it can be noted that journals of general business studies have taken up the topic of agile methods in particular. Relevant publications can also be found in journals of personnel and organizational management as well as business informatics (Table 1). The latter can be attributed to the above outlined fact that the origin of agile methods lies in informatics (Larman and Basili, 2003). This is also reflected in the number of relevant publications in business informatics journals. The fact that a considerable part of the publications on agile methods can be found in journals covering the field of organizational and personnel management is not surprising if one considers that agile methods are supposed to offer solutions for organizational problems. It should also be noted that journals from some areas of business research, such as accounting, controlling or international management, are not represented in the collected material at all.

**Table1.** No. of studies per journal

Journal	VHB-Rank	Journal Subject	No. of Studies
Strategy & Leadership	C	GBS, SM	4
Human Resource Management	B	ORG, HR	3
Journal of Business Research	B	GBS	2
California Management Review	B	GBS	2
IEEE Software	C	BI	2
Organizational Dynamics	C	ORG, HR	2
Communications of the ACM	B	BI	1
Information Systems Journal	A	BI	1
International Journal of Information Technology & Decision Making	C	OR, TIE, WI	1
Project Management Journal	C	GBS	1
Management Decision	C	GBS	1
Journal of Business Strategy	C	GBS, SM	1
International Journal of the Economics of Business	C	GBS	1
International Journal of Human Resource Management	B	ORG, HR	1
International Journal of Production Research	B	OR, PROD	1
European Journal of Work and Organizational Psychology	B	ORG, HR	1
Organization Science	A+	ORG, HR	1
Organization Studies	A	GBS	1
M@n@gement	C	GBS	1
International Journal of Production Economics	B	LOG, OR, PROD	1
Journal of Management Studies	A	GBS	1

In order to investigate the geographical distribution of the relevant publications (Figure 3) for the descriptive analysis, we have looked at the origin of the authors. More than half of the contributions are written by US-American authors (16). 11 contributions are written by European authors and only three articles are published by authors from Asian countries. We will refrain from further-reaching hypotheses at this point. Nonetheless, our review may be an indication that the debate on agile methods is particularly taking place in the countries of the North Atlantic.

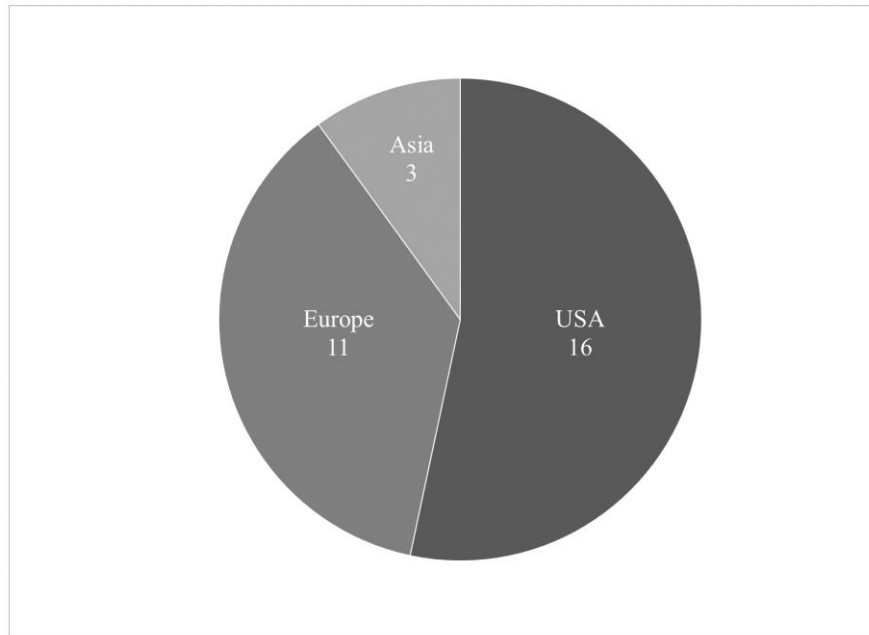


Figure3. Geographical distribution of the studies

In terms of the theoretical frameworks that underlie the publications on agile methods and which could serve as the theoretical basis of the coordination discussion (e.g., the transaction cost theory), we have not found a consistent and coherent background. A theory or theoretical framework in the sense of an "agility theory" or a comprehensive body of literature has not yet been established. It is therefore no surprise that there is also a lack of (at least theoretically well-founded) conclusions regarding the contribution of agile methods to coordination in the studies examined. Even more so, the majority of the relevant articles for the present literature review has no sound theoretical basis or solely cites fragments of theory. Only a small number of the articles refer to established theoretical frameworks (Table 2). In many cases, however, these are not clearly attributable to business studies, e.g., theory of complex adaptive systems or the theory of structuration (Augustine *et al.*, 2005; Brocklehurst, 2001). Theories from the field of business studies are scarce (exceptions are, e.g., Teece *et al.*, 2016; Nijssen and Pauwe, 2012).

Table2. Theories underlying studies on agile methods

Theory	Studies
Complex Adaptive Systems (CAS) Theory	Augustine <i>et al.</i> , 2005
Theory of Nature and Life	Saynisch, 2010
Enterprise Agility und Network Theory	Yang and Liu, 2012
Dynamic Capabilities	Teece <i>et al.</i> , 2016; Nijssen and Paauwe, 2012
AWS Model and Agility Framework	Winby and Worley, 2014
RBV, Social Exchange Theory	Alavi <i>et al.</i> , 2014
Organizational Theory und Modern Systems Theory	Schreyögg and Sydow, 2010
Theory of Structuration	Brocklehurst, 2001

Similarly, we can only find a thin basis with regard to the applied empiricism of the articles. Just half of the publications provide an empirical approach at all, the other half is of a conceptual, i.e., non-empirical nature (Table 3). In addition, the empirical articles also differ considerably in terms of their methodology: 10 Studies follow a qualitative-empirical approach, for which the authors tend to employ case studies. Five studies apply a quantitative-empirical research design. One follows a qualitative and quantitative approach. We hoped that the quantitative-empirical studies in particular would allow us to gain insights into the efficiency or effectiveness of agile methods, i.e., whether (as

described at the beginning) agile methods are able to administer organizational tasks better or at least equally well than traditional instruments, e.g., hierarchy. However, only two studies (Yang and Liu, 2012; Cegarra-Navarro *et al.*, 2016) can establish a slight positive connection between firm performance (which can be applied as a proxy for effectiveness) and organizational agility, whereas in one study agility is just a moderator variable. Against the background of this limited basis, there is only little empirical evidence for the efficiency or effectiveness of agile methods. In view of this, it is remarkable that the vast majority of the publications (23 out of 30) considers the use of agile methods (at least implicitly, by not making an explicit restriction, e.g., on specific project structures) for the entire (also multinational) firm/company and without limited timeframe (e.g., for the duration of the project).

**Table3.** *Empirical approaches of the studies*

Method	Studies
<b>Qualitative (10)</b>	
Case Study	Walton, 1975; Ruigrok and Achtenhagen, 1999; Brocklehurst, 2001; Shafer <i>et al.</i> , 2001; Augustine <i>et al.</i> , 2005; Khanna, New 2008; Drury-Grogan and O'Dwyer, 2013; Franken and Thomsett, 2013; Chan <i>et al.</i> , 2019
Cluster Analysis	Borzillo <i>et al.</i> , 2012
<b>Quantitative (5)</b>	
Regression Analysis	Felipe <i>et al.</i> , 2016
Structural Equation Modelling (SEM)	Yang and Li, 2012; Alavi <i>et al.</i> , 2014
Hypothesis Test	Longoni <i>et al.</i> , 2014; Cegarra-Navarro <i>et al.</i> , 2016
<b>Qualitative and Quantitative (1)</b>	
Interviews + Exploratory Factor Analyses	Charbonnier-Voirin, 2011
<b>Conceptual (14)</b>	
	Rockart, 1995; Boehm and Turner, 2005; Dyer and Ericksen, 2005; Schatz and Abdelshafi, 2005; Schreyögg and Sydow, 2010; Saynisch, 2010; Nijssen and Paauwe, 2012; Winby and Worley, 2014; Denning, 2015; Davidson and Klemme, 2016; Teece <i>et al.</i> , 2016; Denning, 2018; Lehn, 2018; Denning, 2019

In addition to the consideration of the theoretical and empirical foundations of the relevant publications, it is worth noting that no networks of researchers (or, to put it critically: citation cartels) for the study of agile methods have emerged so far. Such networks can sometimes be observed for different research areas (Price, 1965). As far as the study of agile methods is concerned, there are various authors with different professional backgrounds (e.g., practitioners, consultants in particular, and researchers). No concentration on a specific university or research institute can be discerned for the respective researchers.

### 3.3.2. Identification of Key Dimensions

Following the descriptive exploration, the data material needs to be subjected to a content analysis, which is the core element of a systematic literature review. For this qualitative analysis, different categories (or key dimensions) of the current body of literature are identified and relevant text passages are assigned to the categories (Seuring and Müller, 2007). The categories provide the structure for the identification, description, and abstraction of repeated findings of the data material. The aim of this procedure lies in the provision of a realistic representation of the collected research material without distortions caused by any a priori presumptions of the authors. This procedure meets the first contribution of the present study: the identification of key dimensions of agile methods based on the existing literature.

The identification of categories can be done either deductively or inductively. A deductive approach is less suitable for the present research context, as an already established comprehensive state of knowledge would be required for the analyzed field of research in order to define suitable categories (Mayring, 2014). As there is neither a uniform understanding of the term nor a consolidated state of research for the research area of agile methods, an inductive approach to the formation of categories is more promising.



We analyzed the collected material in the context of the coordination aspect and examined it for common, recurring aspects. We searched for repeated key terms, which were then used to derive the categories. In other words, we combined recurring arguments in the literature, thereby gradually clarifying the outlines of the categories. The 30 articles of our systematic literature review allowed for an identification of five categories. (1) We noticed that agile methods are often discussed in the context of agile teams that are interdisciplinary and self-organizational. (2) An open exchange of information is repeatedly emphasized as a critical element of agile methods. (3) Furthermore, we have observed that the need for less formalized structures and the importance of decentralized decision-making processes is often stressed. (4) We also noticed that there is a cultural dimension that goes along with the employment of agile methods. (5) Lastly, there are repeated arguments for the need of a changed understanding of leadership. Table 4 provides an overview of the category system, a brief description of the categories as well as associated anchor examples (i.e., concrete text passages describing the category prototypically).

**Table 4.** Overview of the category system

Category	Description	Anchor Example	Studies that referred to the category
Interdisciplinary and Self-Organized Teams	Shift in organizational management away from a central authority and turning towards various interconnected units	“Work is done by self-organizing teams, networks and ecosystems that mobilize the full talents of those doing the work.” (Davidson and Klemme, 2016, p. 36)	Walton, 1975; Rockart, 1998; Brocklehurst, 2001; Shafer <i>et al.</i> , 2001; Augustine <i>et al.</i> , 2005; Boehm and Turner, 2005; Schatz and Abdelshafi, 2005; Khanna and New, 2008; Schreyögg and Sydow, 2010; Saynisch, 2010; Charbonnier-Voirin, 2011; Borzillo <i>et al.</i> , 2012; Nijssen and Paauwe, 2012; Yang and Liu, 2012; Drury-Grogan and O'Dwyer, 2013; Franken and Thomsett, 2013; Longoni <i>et al.</i> , 2014; Winby and Worley, 2014; Denning, 2015; Davidson and Klemme, 2016; Teece <i>et al.</i> , 2016; Denning, 2018; Chan <i>et al.</i> , 2019; Denning, 2019
Open Exchange of Information	Effective management of knowledge and information based on an open information policy	“Today's organizational structures, however, demand extensive communication. They are facilitated, in fact made possible, by the vastly increased communication and co-ordination capability now available through information technology. Without information technology, it is highly doubtful that many of the organizational changes and experiments now underway could exist.” (Rockart, 1998, p. 418)	Rockart, 1998; Shafer <i>et al.</i> , 2001; Augustine <i>et al.</i> , 2005; Boehm and Turner, 2005; Dyer and Ericksen, 2005; Schatz and Abdelshafi, 2005; Khanna and New, 2008; Schreyögg and Sydow, 2010; Charbonnier-Voirin, 2011; Borzillo <i>et al.</i> , 2012; Nijssen and Paauwe, 2012; Yang and Liu, 2012; Alavi <i>et al.</i> , 2014; Winby and Worley, 2014; Cegarra-Navarro <i>et al.</i> , 2016; Felipe <i>et al.</i> , 2016; Teece <i>et al.</i> , 2016; Lehn, 2018; Denning, 2019
Low Degree of Formalization and Decentralized Decision-Making	Provision of local decision-making liberties, few restrictions by supervisors	“By having a minimal level of formalization, routinization and standardization, the organizational infrastructure becomes more adaptable.” (Nijssen and Paauwe, 2012, p. 3325) “A decentralized governance structure is	Rockart, 1998; Augustine <i>et al.</i> , 2005; Boehm and Turner, 2005; Dyer and Ericksen, 2005; Schreyögg and Sydow, 2010; Nijssen and Paauwe, 2012; Drury-Grogan and O'Dwyer, 2013; Franken and Thomsett, 2013; Alavi <i>et al.</i> , 2014; Longoni <i>et al.</i> , 2014; Winby and Worley, 2014; Denning, 2015; Davidson and Klemme, 2016; Felipe <i>et al.</i> , 2016; Teece <i>et al.</i> , 2016; Denning, 2018; Lehn, 2018; Chan <i>et al.</i> , 2019; Denning, 2019

		likely to promote agility and be especially advantageous during periods of rapid environmental change.” (Lehn, 2018, p. 67)	
Supportive Corporate Culture	Culture of self-responsibility, common understanding of agile principles as the basis for cooperation	“We have to create a common understanding of the current state of evolutionary, self-organizational, and complex principles. There needs to be a culture of trust. A ‘trusting’ culture welcomes outsiders, embraces new ideas, and promotes cooperation.” (Saynisch, 2010, p. 35)	Walton, 1975; Ruigrok and Achtenhagen, 1999; Brocklehurst, 2001; Shafer <i>et al.</i> , 2001; Augustine <i>et al.</i> , 2005; Boehm and Turner, 2005; Dyer and Ericksen, 2005; Schatz and Abdelshafi, 2005; Khanna and New, 2008; Saynisch, 2010; Charbonnier-Voirin, 2011; Nijssen and Paauwe, 2012; Yang and Liu, 2012; Franken and Thomsett, 2013; Alavi <i>et al.</i> , 2014; Denning, 2015; Cegarra-Navarro <i>et al.</i> , 2016; Davidson and Klemme, 2016; Felipe <i>et al.</i> , 2016; Teece <i>et al.</i> , 2016; Denning, 2018; Chan <i>et al.</i> , 2019; Denning, 2019
Adaptive Leadership style	Flexible design and adaptation of the management style to specific circumstances	“Leading a team by nurturing small organic teams, establishing a guiding vision, establishing simple rules, championing open information exchange, and managing with a light touch [...]” (Augustine <i>et al.</i> , 2005, p. 87)	Augustine <i>et al.</i> , 2005; Boehm and Turner, 2005; Dyer and Ericksen, 2005; Borzillo <i>et al.</i> , 2012; Nijssen and Paauwe, 2012; Drury-Grogan and O'Dwyer, 2013; Franken and Thomsett, 2013; Alavi <i>et al.</i> , 2014; Winby and Worley, 2014; Denning, 2015; Davidson and Klemme, 2016; Teece <i>et al.</i> , 2016; Denning, 2018; Chan <i>et al.</i> , Pan, 2019; Denning, 2019

### *Interdisciplinary and Self-Organized Teams*

The collected material shows that agile methods are applied by agile teams that become not only increasingly important but also constitute new forms of teamwork (Franken and Thomsett, 2013; Denning, 2015; Dyer and Ericksen, 2005). Although teamwork is nothing new in the work process (project teams and work groups have been common practice in firms for decades), a change can be observed. Conventional project teams are usually composed of a relatively large number of team members, who are involved in several projects at the same time. There is a clear hierarchy within such teams: the responsibility and authority to give instructions lies with the project manager. The co-workers are responsible for carrying out the tasks. Agile teams differ from classic project teams above all in their team design (i.e., team set-up) and working style (i.e., intra-team organization).

Agile teams are characterized by interdisciplinary set-ups. Several authors have argued the advantageousness of interdisciplinary teams (e.g., Borzillo *et al.*, 2012; Longoni *et al.*, 2014). For example, the bundling of the potentials of different competences has a positive effect on the development of new products. Bringing in different perspectives also increases the problem-solving competence, creativity and innovative strength of the workforce. Borzillo *et al.* (2012, p. 22) summarize that “[...] cross-functional teams allow for bringing together different sources of expertise that not only help improve current processes, but also create new capabilities to satisfy unfulfilled needs.” Furthermore, the fact that agile teams are often put together anew (depending on project topics) on an interdisciplinary basis contributes to the formation of agile networks within a firm across business units.

The team spanning work happens usually self-organizational (Borzillo *et al.*, 2012; Drury-Grogan and O'Dwyer, 2013; Shafer *et al.*, 2001). Self-organization refers to the development of structures and processes in which influencing, shaping and limiting factors emanate from the elements of the self-organizing system itself (Prehofer and Bettstetter, 2005). In less abstract terms, agile teams and networks are not subjected to an external regulatory structure. Instead they define their own regulatory regime. Shafer *et al.* (2001, p. 205) explain that such teams are self-managed and that they have “the

flexibility to assign and carry out tasks on their own volition". Drury-Grogan and O'Dwyer (2013, p. 1097) state that "agile teams are typically [...] collaborative and empowered to make decisions." Each team member contributes to the agile unit against the background of his or her expertise.

A classic example of an agile team is the Scrum team. A Scrum team consists of a Scrum master, a product owner and the members of the team. Scrum teams are characterized by interdisciplinarity: Members have all the skills needed to accomplish a task without depending on people outside the team. In addition, the team organizes itself completely independently: Targets and work steps are defined for each so-called sprint period in advance and are monitored thereafter. Decisions such as the distribution of tasks are made by the team members themselves.

#### *Open Exchange of Information*

Several studies of our systematic literature review emphasize that agile methods are characterized by an effective management of knowledge and information (e.g., Rockart, 1998; Boehm and Turner, 2005; Charbonnier-Voirin, 2011; Winby and Worley, 2014). Open access to and an exchange of information represent key dimensions of agile methods. Cegarra-Navarro et al. (2016, p. 1544) argue that "[...] organizational agility requires firms to quickly manage their knowledge when responding to a changing environment, and the market environment in particular." According to some studies of our review, certain aspects of agile methods facilitate the exchange of information. On the one hand, they are characterized by informal relationships in teams (Alavi et al., 2014), which arise impromptu, i.e., they are not intentional and therefore not reflected in the organizational structure of a firm. Communication via these informal channels is situational as well as variable and enables a quick exchange of information. On the other hand, the exchange of information is furthermore facilitated by instruments that allow simple forms of cooperation across different units. Dyer and Ericksen (2005, p. 186), for example, state that agile methods need workplaces that are "adaptable and expansive (tensile and modular or mobile buildings, movable panels instead of walls, open offices, nomadic workstations, plug-and-play technologies)" and that go hand in hand with "a variety of spaces for informal social interactions".

The facilitated exchange of information is best illustrated by so-called daily meetings that are often scheduled in agile teams. These meetings usually take no longer than 15 minutes and serve for the mutual coordination and exchange of information within a team. The team also uses the meeting to review the team-planning of the tasks and adjusts if necessary. In addition to daily meetings, other agile (and participative) meeting types, such as an Instant Open Space (i.e., an information exchange where there is no pre-defined agenda) or a Lean Coffee (i.e., a self-organized and informal meeting based on the idea that important conversations are always taking place during coffee breaks), also serve to promote the sharing of knowledge and to share information quickly and efficiently. Instruments like physical task boards are used to visualize the team's progress and performance.

#### *Low Degree of Formalization and Decentralized Decision-Making*

In the presentation of the first category 'Interdisciplinary and Self-Organized Teams' we have already indicated that agile methods often rely on collaboratively taken decisions. Overall, the studies underlying our review show that agile methods are characterized by a low degree of formalization as well as decentralized decision-making. Essentially, the degree of formalization describes the extent to which roles, authority, communication relationships, norms, sanctions, and procedures are fixed in writing by formal rules and laws such as organizational charts and job descriptions (Walsh and Dewar, 1987). (Organizational) agility does almost not require such formal rules and laws. This is why proponents of this new form of work argue that agile methods are not just another element in the toolbox of formalized management methods, but that they rather represent a completely different philosophy of work. This low level of formalization must also go hand in hand with greater decision-making decentralization, as employees must have the authority to perform non-formalized actions and to communicate with employees in other organizational units. Decentralization in this case means the distribution of decisions across the hierarchy, i.e., the transfer of decision-making powers to lower hierarchical levels and thus a reduction in the concentration of power at a central authority (Hill et al., 2000; Tata and Prasad, 2004). Some of the articles of our database highlight that decentralized decisions are beneficial for firms which find themselves in a complex and dynamic environment (e.g., Schreyögg and Sydow, 2010; Shafer et al., 2001). In corresponding situations, a decentralization of

decision-making power is advantageous, since firms can deal more effectively with problems of information reception and processing as decision paths become shorter, which in turn enables quick reactions to environmental changes.

For example, if we look at the set of rules of Scrum as one of the most widespread agile methods, we notice that it consists only of a few components. Scrum is neither defined as a formal process nor as a specific technique. It rather serves as a management framework that allows different processes and techniques to be applied without formal fixture. A decentralized decision-making process can also be observed in teams that apply Scrum. For example, certain decisions of a Scrum team lie with the employee with the role of the product owner and not necessarily with the hierarchically most senior team member (or a manager outside the team).

#### *Supportive Corporate Culture*

A number of studies of our systematic literature review show that corporate culture plays a key role for the successful employment of agile (Chan *et al.*, 2019; Khanna and New, 2008; Schatz and Abdelshafi, 2005; Walton, 1975). Agile methods require a corporate culture and – more specifically – a value system that differentiates itself from the regular (Rigby *et al.*, 2016). Firms that want to enforce the employment of these methods need to place a lot of value on the mutual trust of managers and employees on the one hand and establish a learning culture as well as a tolerance for mistakes on the other hand.

Managers must be able to trust that their employees make responsible, purposeful, and rational decisions within their own scope. Employees, in turn, must be ensured that they are not subjected to any sanctions by the firm management even in the event of wrong decisions and they must be able to openly voice ideas, suggestions and criticism. This requires a certain open-mindedness of the workforce and its management. Opinions and suggestions must be valued equally by everybody, and people should treat each other with mutual respect and trust. “There needs to be a culture of trust. A trusting culture welcomes outsiders, embraces new ideas, and promotes cooperation” (Saynisch, 2010, p. 35).

This goes along with a culturally anchored readiness to accept mistakes as learning opportunities and not as negative per se (Khanna and New, 2008; Ruigrok and Achtenhagen, 1999). Ruigrok and Achtenhagen (1999, p. 529) stated that culture in agile firms “allows mistakes to be made” and that “employees are encouraged to show initiative.” Agile methods require a corporate culture that gives learning a clearly recognizable, intentionally designated spot. “Managers should create an organizational learning culture [...] in their company to encourage agile behavior” (Alavi *et al.*, 2014, p. 6286). This is not only beneficial for the personal development of the employees. Also firms benefit from such a learning culture in the form of higher employee qualification levels as the basis for innovation, flexibility, and adaptability.

The corporate culture of firms enforcing agile methods can be exemplified by certain artifacts and symbols that are commonplace in respective businesses. Upon entering such a company, for example, one does not recognize a standard dress code. Employees wear the attire that they consider to be appropriate. In ‘playful’ team rooms there are communicative areas and meeting corners as well as quiet workplaces. Foosball tables, game consoles, and sofas are more the rule than the exception (albeit stereotypical). In addition, flipcharts, whiteboards and stickers dominate the image of the office. Just as every firm has its own internal language, businesses that enforce agile methods also have a multitude of specific terms (e.g., sprint, product backlog, product increment).

#### *Adaptive Leadership Style*

In the studies of our systematic literature review we found repeated arguments that agile methods also demand agile forms of leadership (Augustine *et al.*, 2005; Borzillo *et al.*, 2012; Drury-Grogan and O'Dwyer, 2013; Davidson and Klemme, 2016). The hitherto widespread Tayloristic leadership philosophy of ‘instruction and control’, in which both information and leadership are strictly hierarchical, is considered too inflexible in light of agile methods and their operational contexts (e.g., self-organized teams) (Davidson and Klemme, 2016; Teece *et al.*, 2016). Unlike traditional leadership styles, leadership in the context of agile methods is primarily about ensuring an agile unit's overall ability to function. This implies that the employment of agile methods requires some form of leadership that is less about specific instructions or work assignments and more about achieving an overall goal (Augustine *et al.*, 2005; Teece *et al.*, 2016).

The concept of adaptive leadership is supposed to provide answers to leadership challenges posed by agile forms of collaboration (Augustine *et al.*, 2005). According to this concept, the exercise of power plays a minor role in the managerial function and the enabling of a staff's self-organization becomes more important (Borzillo *et al.*, 2012; Denning, 2018; Drury-Grogan and O'Dwyer, 2013). This means that managers must accept the limits of their leadership position and that they need to have confidence in the problem-solving competencies of their workforce (Augustine *et al.*, 2005). The aim is to provide the basis for a successful delegation of tasks while otherwise relying on the inherent functional capacity of systems and staff. "In an agile team the project manager is not the accountable decision maker but more a facilitator or coordinator for the agile team" (Drury-Grogan and O'Dwyer, 2013, p. 1097).

For example, agile project approaches rely on strong, self-reliant teams (Davidson and Klemme, 2016). This is well exemplified by so called design thinking innovation sprints. Typically, design thinking teams are expected to find unorthodox and creative solutions to problems (e.g., new customer behavior). Managers primarily take on the role of the principal in this context, to whom the project work and results are presented during regular innovation board meetings. A traditional (or authoritarian) style of leadership would not be purposeful in this regard, as an all-too strong interference of the manager would limit the creative potential of this particular agile method. An adaptive leadership style, on the contrary, is more adequate, as it can be used to realize the potential of the design thinking method.

After the analysis of the 30 studies of our systematic literature review, we can consolidate the current state of research to some extent by putting together the findings that have been researched by previous authors. At least implicitly, the authors of the studies that we have reviewed address recurring and similar elements of agile methods. A consolidation of the state of research or in other words an identification, description and abstraction of the repeated findings can therefore be offered by us. We have identified five categories that reflect the repeated findings and thus represent the common denominator of studies dealing with agile methods. Altogether, it can be stated that agile methods are mainly practiced by interdisciplinary and self-organized teams in which information is exchanged openly. These agile units benefit from a low degree of formalization as well as a decentralized decision making authority. For this, a supportive corporate culture as well as an adaptive leadership style of the management are essential requirements.

#### 4. AGILE METHODS AND TASK FULFILLMENT

In a VUCA shaped environment, agile methods promise fast adaptability of firms, e.g., through decentralized decision-making, open exchanges of information, and self-organized teams. Whether agile methods can be the organizational concept of the future as a better alternative to – or perhaps even as a substitute for – hierarchy, has now to be evaluated critically. For this purpose, the previously introduced the criteria of purposeful task fulfilment – namely ‘speed (efficiency)’ and ‘quality (effectiveness)’ – are applied in the following.

Agile methods promise a fast adaptation to changing environmental conditions through internal flexibility, fast decision-making and corresponding actions, which are supposed to increase the speed of task fulfillment. This should be achieved for example via *interdisciplinary and self-organized teams*. Furthermore, a low degree of formalization of organizational structures should allow deviations from prescribed, rigid bureaucratic channels and thus make it possible to solve problems in faster, informal ways (Nijssen and Paauwe, 2012; Teece *et al.*, 2016). A decentralization of decision-making powers should lead to a shortening of the decision-making paths (Tata and Prasad, 2004). In theory this is promising, however, there are challenges and obstacles that can negatively influence the promised speed advantage of agile methods. This is especially true for the aspect of self-organization in the context of agile methods: For example, estimating the time and cost associated with tasks is difficult for employees, who have no far-reaching management information. Frequent structural changes (which can be conflict loaded) require time. A decision dictated ‘from above’, i.e., within the hierarchy, is possibly more likely to be accepted due to the recognized authority than a decision that is the result of negotiations or power struggles among fellow employees/peers (De Kwaadsteniet and van Dijk, 2010; Galinsky *et al.*, 2012; Halevy *et al.*, 2011).

Overall regarding the speed criterion of purposeful task fulfilment, we can state that task completion through self-organization can be faster than through hierarchy, especially when a hierarchy is multi-leveled as well as bureaucratic and associated with lengthy decision-making processes. Nevertheless, self-organization can be time-consuming and complicated, too, especially when the decision-making situation is dynamic and complex. Ironically, it is precisely in these dynamic and complex situations that agile methods should (supposedly) provide the greatest benefit.

In addition to the speed advantage, agile methods should also enable a higher quality of task fulfilment. An *open exchange of information*, for example, is clearly useful when it comes to the purposeful completion of tasks, which is a core mission of management. Employees can benefit from an extended scope of influence and may therefore find tasks more meaningful that are fulfilled with the help of agile methods (Sarros *et al.*, 2002). It is a logical conclusion that this contributes to motivation and creativity among the workforce (Alavi *et al.*, 2014; Englehardt and Simmons, 2002; Sarros *et al.*, 2002). However, it should be noted that the open exchange of information is limited by the fact that not all information in organizations is easily exchangeable. On the one hand, besides tangible knowledge, there is also implicit (tacit) knowledge that cannot simply be shared (Holste and Fields, 2010; Lee, 2001). On the other hand, there are many tasks that are confidential and protected by non-disclosure agreements. Yet, to be able to make adequate decisions, an appropriate information basis must be provided. Open access to information is thus closely linked to the *low degree of formalization and decentralized decision-making*. Autonomy and the opportunity of having a positive impact on the firm are often seen as motivators (Cordery *et al.*, 2010). However, it is assumed that all employees are willing and able to take on additional and more demanding tasks. But there are also employees who are not willing to take on more responsibility than needed and for whom work is only a ‘necessary evil’. Employees who are qualified but not willing to take decisions are not suitable for the application of agile methods. Vice versa, employees who are principally willing to work in a self-organized manner but do not have the necessary qualifications are also unsuitable. The lack of standard solutions can be seen as the biggest problem of self-organization on the level of clerks. In addition, the unknown freedom that comes with agile methods can trigger fears and a feeling of being overwhelmed. Getting recognition goes along with the risk of failure, and these failures cannot be blamed on ‘those up there’ (so called ‘external attribution’; Heider, 1958) once decisions have been decentralized. The more decisions can be made at one's own responsibility, the greater is the fear of making mistakes. Under time pressure and without adequate qualification, there's a high risk of being overworked. Another problem with regard to the motivational aspect is that the potential for conflict is fundamentally higher when there are no clear distribution and competence regulations and when employees/peers have to negotiate rules themselves. Coordination processes, e.g., the distribution of work packages, the assignment of tasks, the allocation of resources or of roles with special competencies (such as in the Scrum Team), the determination of work times etc. are critical because there are usually more or less attractive solutions. Besides the loss of time already described, such agile coordination processes can also lead to a loss of motivation through a deterioration of the organizational climate. The dynamic in agile teams results in higher requirements for managers who may face a dilemma: The further the employees' self-organization goes, the more difficult direct control becomes. In the case of complex tasks, the delegation of decisions makes particular sense in order to make use of employees' knowledge and skills. However, (according to the agency theory) the great information asymmetry between manager and employee in this case leads at the same time to the danger of a suboptimal decision by the decision maker, because the decision maker may follow his or her personal goals (Jensen and Meckling, 1976). An accurate control of the employee's decision-making process would overcompensate the relief intended with the delegation due to its enormous effort. In this situation, the manager must have more trust in the employee (and thus possibly change his or her view of human nature). Therefore, the *supportive corporate culture*, i.e., the trusting culture that we emphasized before, is an important condition. Without a tolerance for mistakes at all management levels, for example, it cannot be assumed that managers will share decision-making powers and the associated responsibility with their workforce. Turning away from the traditional form of management of ‘instruct and control’ also requires an affirmative, *adaptive leadership style*. This must not be just a phenomenon that is only found occasionally in a firm. Instead such a leadership style should be supported by the majority of the management. In other words, it must not be the exception, but rather the rule. Firms must also take this condition into account when they choose their managers. Looking at the high number of managers in large firms, it becomes clear how difficult it is

to meet this condition. It could take decades before such a leadership style has permeated all levels of the management team. Even if this can be achieved firm-wide, it has to be noted: At the latest when it comes to the question of liability for certain decisions, it becomes clear that one person in a firm must ultimately bear the responsibility. It is difficult to imagine that critical and/or risky decisions are made decentrally in agile teams and not by the liable person. Besides the challenges of the task fulfillment process, there is another challenge regarding the quality of the tasks that are to be completed with the help of agile methods. Agile methods are well suited, for example, for tasks that are difficult to routinize, that involve uncertainty, and that are associated with a certain degree of creative freedom for the employees in charge. This applies above all to tasks for which one can only assess cause-and-effect relationships retrospectively and for which ex-ante solutions are largely unknown. Many tasks in organizations have a rather operational or repetitive form and require therefore traditional personnel instruments in the sense of 'instruct and control'. Agile methods are less suitable for these tasks, as they often rely on a high motivation of the workforce.

Overall regarding the quality of task fulfillment, it can be stated that agile methods have fundamental advantages over hierarchy, especially through a higher motivation of the employees. In firms with strict hierarchies, employee motivation can suffer if employees are always required to perform assignments merely as the result of instructions. By contrast, it is beneficial for employee motivation if they can also express themselves about the tasks as well as the associated personal challenges. However, the motivation of the employees (and thus the quality of the task fulfillment) is bound to a variety of conditions, which are not met in every firm and which can, therefore, be seen as limits for the application of agile methods.

Besides these very concrete limits of agile methods for the purposeful fulfilment of tasks, further limits on a more abstract level are to be feared. For example, if we are assuming a firm-wide deployment of agile methods, it must be pointed out that there are different subsystems within a firm that are characterized by different cognitive and emotional orientations (Lawrence and Lorsch, 1967), which can lead to conflicts and may increase the need for coordination even more. Furthermore, it is unclear how agility can be handled in multinational firms that are involved in cross-border activities. Even if we would follow the assumption that a global, cosmopolitan, urban and educated workforce is predominant in multinational firms, the diversity of values represented by employees from different cultures is undeniable. Comparative cultural studies – on power distance or uncertainty avoidance, for example – have demonstrated this sufficiently (Hofstede 2001, Hofstede *et al.*, 2005). Against this background – and also in consideration of the geographical distribution of the publications of our systematic literature review (see also Section 3.3.1) – we ask ourselves whether the use of agile methods is not primarily an ethnocentric Western topic and whether there is a cultural limit to agility.

**Table 5.** Purposeful Task Fulfillment and Agile Methods

Category	Effectiveness	Efficiency
Interdisciplinary and Self-Organized Teams	<ul style="list-style-type: none"><li>• Higher motivation through empowerment of employees</li><li>• Interdisciplinarity expands problem-solving capabilities</li><li>• Higher conflict potential due to autonomous negotiation of rules</li><li>• Risk of suboptimal compromises</li></ul>	<ul style="list-style-type: none"><li>• Small teams with flexible resource allocation</li><li>• Risk of lengthy negotiation processes</li></ul>
Open Exchange of Information	<ul style="list-style-type: none"><li>• Enables a wide knowledge and information basis</li><li>• Not all information in organizations is easily exchangeable (tacit and confidential information)</li></ul>	<ul style="list-style-type: none"><li>• Fast sharing of information via informal ways</li></ul>
Low Degree of Formalization and Decentralized Decision-Making	<ul style="list-style-type: none"><li>• Higher motivation and creativity among the workforce</li><li>• Not every employee is willing and/or qualified to take on responsibilities</li><li>• Risk of employees' fears and a respective feeling of being overwhelmed</li></ul>	<ul style="list-style-type: none"><li>• Fast "time to market" due to fast decision-making</li><li>• Shortening of the decision-making paths</li><li>• Risk of power struggles</li></ul>

Supportive Corporate Culture	Two important conditions which need to be met for the application of agile methods. <ul style="list-style-type: none"><li>• Lengthy process of disseminating such a leadership style to all levels of the management team</li><li>• Culture must be shared by everyone in the firm, which can be a difficult and lengthy process</li></ul>
Adaptive Leadership Style	
<ul style="list-style-type: none"><li>• In general, the use of agile methods in the entire firm promises low chances to realize a higher effectiveness and/or efficiency because of different functional and cultural subunits within the firm. This becomes even more critical within the context of international business activities (especially via FDI), when different national cultures are also involved.</li></ul>	

## 5. CONCLUSION

In the introduction to our article, we emphasized that firms today are increasingly exposed to rapid micro and macro-economic changes. Faced with such a VUCA environment, the call for organizational agility (i.e., the ability of firms to adapt and rapidly change their managerial processes and organization of work) and agile methods, is getting louder. The fact that most of the Eurostoxx 50 firms mention agile methods in their annual reports as well as the coverage of this topic in numerous articles in the popular business press are indicative for the popularity of this new form of work. Quite surprisingly, however, there is up to now no uniform definition of agile methods. In the light of this lack of a common understanding of what agile methods are, our contribution lies in the delivery of a consolidated state of research. More specifically, we provide an identification, description and abstraction of repeated findings on agile methods with the help of a systematic literature review. Our study brings some clarification regarding the nature and subject matter of agile methods. On the basis of our literature review, we find that agile methods are primarily applied by interdisciplinary and self-organized teams. An open exchange of information, which is expressed in a variety of creative formats (e.g., lean coffee), is an essential element of these methods. Further characteristics are the low degree of formalization as well as a decentralized decision-making authority. At the same time, two important conditions need to be met for the effective application of agile methods. On the one hand, a supportive corporate culture should be prevalent. On the other hand, an adaptive leadership style needs to be backed affirmatively by a firm's management.

Does this mean that traditional coordination instruments and hierarchies in particular become less important because of agile methods and organizational agility? If we take the articles of the popular business press by their word, the dysfunctionalities of hierarchical structures prevail in a VUCA environment as they hinder firms from quick adaptations and changes. After the completion of our literature review, however, we are skeptical about this conclusion in two respects. First, we cannot find evidence in the existing literature that hierarchies are becoming less relevant because of the increasing importance of agile methods. Hierarchies have been proven to be an efficient and effective coordination instrument for decades. One could look far back in human history and find examples for the value of hierarchical structures (e.g., huge construction projects in Ancient Egypt, Roman legions). It still needs to be scientifically validated whether (and to what extent) agile methods as comparatively new management instruments are actually suitable to replace this established coordination instrument. Second, if hierarchical structures were to cease to exist, it is also unclear what should replace them. If the division of labor and the coordination of tasks are no longer enabled by the hierarchy of a firm, a new system of order is needed. Agile methods, however, are so manifold that they themselves cannot be considered as a fixed framework and therefore they also cannot provide such a system of order. Perhaps an agile organizational culture could provide this kind of system. A strong agile organizational culture could serve as a common basis of a workforce and as fundamental basis for coordination. However, this is not an aspect that was reflected in the collected material of our study (and therefore it was not discussed in our systematic literature review), but rather our proposition for further research. In this context, upcoming studies should also examine the dysfunctionalities of a strong organizational culture (e.g., strong conformity, lack of criticism of agile methods) and weigh them against the dysfunctionalities of hierarchical structures.

So, are agile methods and organizational agility just a fragile fad in management, as we provocatively asked in the introduction to this study? To answer this question, we must first point out – and this is a limitation of our study – that we (as well as most authors who have dealt with this subject matter before) have not conducted a quantitative-empirical investigation of the actual efficiency and effectiveness of agile methods. Nonetheless, we have found recurring and solid arguments for the



advantageousness of agile methods over the course of our analysis. The open exchange of information under agile methods allows, for example, faster and more efficient decisions making processes. Employees have the opportunity to shape tasks and their solutions more actively and may find their work more meaningful. The widespread popularity of agile methods in business practice is therefore clearly no inexplicable fad in management. Nevertheless, the question arises as to whether the term 'agile methods' is not simply old wine in new skins. Concerning the concept of agile methods there are, for example, some striking parallels to the idea of 'Adhocracy' (e.g., decentralized power, low formalization and small, market-oriented project teams), which is already half a century old (Bennis and Slater, 1968; Mintzberg, 1979; Toffler, 1970). At so far we could assume that now under the conditions of VUCA the time of adhocracy or agile methods has come; however, we have also to conclude that (in the present) agile methods are associated with certain conditions and limitations. Agile methods are neither suitable for every task nor for everyone and are therefore also not suitable for entire, especially big firms. They are thus no panacea for the solution of organizational problems.

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