



Managerial overconfidence: promoter of or obstacle to organizational resilience?

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Abstract

Organizational resilience provides firms with the capability to face adverse circumstances successfully. Therefore, it constitutes an indispensable capability for each company. As indicated by Upper Echelon Theory, particularly executives and their personal traits exert a major impact on organizational capabilities, decision-making as well as action taking. Thus, they also should play an important role in promoting organizational resilience. However, so far literature lacks a comprehensive understanding regarding these relations. Accordingly, the present paper strives to add to such a comprehensive understanding with a particular focus on managerial overconfidence, one of the most widely and controversially discussed personality trait of executives. To pursue this goal, we develop a model comprising the relevant components of organizational resilience in terms of important resources, conduct a systematic literature review to identify the major corporate areas that are affected by managerial overconfidence and draw conclusions for the identified findings on the relation between organizational resilience and overconfidence. The analysis indicates a positive impact on social resources, a rather negative impact on procedural resources and a mixed impact on financial resources, where e.g. the effect on takeover activities is negative while the impact on financing preferences is at least partly positive. Moreover, the identified literature in large parts provides evidence regarding material resources, while social and procedural resources are covered to a lesser extent, indicating a need for further research.

Keywords Managerial overconfidence · Resilience · Empirical evidence

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1 Introduction

External shocks like the financial crisis of 2007, fast changes of environmental protection regulations, political crises or the Corona pandemic, as discussed in Kraus et al. (2020b), demonstrate the importance for companies to be resilient in order to face such adverse circumstances successfully. When analyzing this resilience, scholars usually focus on organizations as a whole, their processes and their resources (e.g., Buliga et al. 2016; Gittell 2006; Lenknick-Hall and Beck 2005; Lengnick-Hall et al. 2011). But as Hambrick (2007, p. 334) emphasises: “If we want to understand why organizations do the things they do, or why they perform the way they do, we must consider the biases and dispositions of their most powerful actors—their top executives” (Hambrick 2007, p. 334). This quote reflecting the view of the Upper Echelon Theory illustrates the great importance that top-managers’ personality traits exert on companies’ success. Thus, if we want to understand how to foster organizational resilience, we have to learn more about the role that major decision-makers’ personality characteristics play to build a resilient organization.

Self-confidence constitutes one such characteristic, because a certain degree of it helps to run a company successfully (Johnson and Fowler 2011). However, if it switches to overconfidence, the danger of making the wrong decisions increases (Johnson and Fowler 2011), as one’s own abilities are overestimated and risks are underestimated (Johnson and Fowler 2011). This results in corporate crises, scandals, and poor performance (e.g., Ho et al. 2016). Thus, Plous (1993, p. 217) emphasizes in a frequently quoted sentence (e.g. Moore and Healy 2008): “No problem in judgment and decision making is more prevalent and more potentially catastrophic than overconfidence”.

However, one has to distinguish between misjudgments due to a *lack of knowledge or ability* and a *fundamental personality trait*. The former also is referred to in literature as overconfidence (Griffin and Varey 1996). Yet, it describes a condition that can be easily remedied, since knowledge deficits can be eliminated and prognostic abilities can be developed. In contrast, overconfidence as a personality trait is anchored in the self-image and thus in the decision-maker’s behavioral patterns. Therefore, it hardly changes and affects many decisions.

The great influence of this personality trait on successful corporate management is reflected in an extensive body of research that deals with self-confidence, its exaggerated manifestations and its consequences (e.g., Billett and Qian 2008; Malmendier and Tate 2015; Dowling et al. 2021). This literature is very broad, divided into different areas, and provides mixed evidence regarding the effects of overconfidence (e.g., Aghazadeh et al. 2018). Moreover, research is not only found in the business context but also in psychology (e.g., Moore and Healy 2008).

While large parts of literature stress the negative impact of managerial overconfidence, other scholars provide a more differentiated perspective. Based on Owen and Davidson (2009), Paulhus and Williams (2002), as well as Taylor and Brown (1988), Tourish (2020) argues that overconfidence also has a beneficial facet. Its relation to a positive perception of own abilities and of the firm’s capabilities provides a path to resilience, as “‘positive illusions’ help people cope with adversity, develop resilience in the face of setbacks and show more creativity” (Tourish 2020, p. 91). Thus, deeper

insights into the relation between overconfidence and organizational resilience promise paths for a better understanding of both the development of organizational resilience and the effects of managerial overconfidence in companies.

However, due to the research's fragmentation and the rare explicit discussion between managerial overconfidence and organizational resilience in existing studies, so far literature lacks a comprehensive understanding on the relation between managerial overconfidence and relevant building blocks of organizational resilience. While some researchers identify links between managerial overconfidence and isolated corporate areas, e.g., innovativeness like Galasso and Simcoe (2011), Hirshleifer et al. (2012), Tang et al. (2015a) and Wang et al. (2018), that are important for organizational resilience, literature lacks a study that summarizes the different areas affected by managerial overconfidence and provides a broad perspective on the impact of this personality trait on organizational resilience. Moreover, existing empirical evidence on the effect of managerial overconfidence on different corporate areas rather *implicitly* contains insights regarding its impact on factors related to organizational resilience. In the present paper, we strive to make these insights more *explicit*, compile them to a broader perspective and elaborate on relevant paths for future research. To achieve this goal, we first derive a model containing the core resources to foster organizational resilience based on extant literature. Next, we perform a systematic literature review to identify a broad range of empirical evidence regarding the impact of managerial overconfidence in the corporate context. We focus on *empirical* studies investigating the impact of *managers'* overconfidence. Based on this, we analyze the relation between the identified consequences of overconfidence and the derived components of organizational resilience. Finally, we discuss future research paths.

The study provides the following insights: First, we offer a state-of-the-art review on empirical research on managerial overconfidence with a clear focus on studies dealing with managers. Thereby, we advance theory-building in this area. Second, we provide evidence of the resilience-enhancing effects of managerial overconfidence and thereby put this personality trait into another perspective. Third, we combine research on managerial overconfidence and on organizational resilience, two theory streams which have been separated so far but contain a high potential for a mutual enrichment. Fourth, this comprehensive review of managerial overconfidence as a personality trait contributes to the Upper Echelon Theory (Hambrick and Mason 1984; Hambrick 2007; Shen 2019).

Overall, findings indicate a potentially positive impact of overconfidence on firms' adaptability through risk-taking, innovation activities and the capability to build social resources, if the overconfident manager is monitored by a strong controlling committee and conservative accounting procedures. Yet, as overconfident managers tend to make inefficient investment decisions and cause negative investor reactions, if they are not limited by controlling instances, they also reduce the material resources and thereby weaken the basis to build up resilience. Additionally, they exert detrimental effects on procedural resources. Finally, the identified literature in large parts provides evidence regarding material resources, while social and procedural resources are covered to a lesser extent, indicating a need for further research.

2 Theoretical background

2.1 Core elements of organizational resilience

As stressed by recent literature resilience research has evolved into various fields with different definitions (Hillmann 2020; Linnenluecke 2017). Thus, to discuss the effects of the relations between managerial overconfidence and corporate areas, which are identified in the following literature review, on organizational resilience, we have to clarify our understanding of organizational resilience and identify components relevant to establish it.

Resilience has one of its origins in ecology: Holling (1973, p. 14) defined it as “a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables”. This view also represents the core of resilience in an organizational context. In general, “[t]he term ‘resilience’ has been used at the organizational level to describe the inherent characteristics of those organizations that are able to respond more quickly, recover faster or develop more unusual ways of doing business under duress than others” (Linnenluecke 2017, p. 4). Accordingly, Gittell et al. (2006) emphasize three aspects: Resilient organizations are able to adapt in a positive sense under difficult circumstances, they can recover from unforeseen events, and they remain functional in difficult situations. Some authors condense these capabilities to the two characteristics *robustness* and *adaptability*, where the earlier is related to “vulnerability attenuation, stress endurance, and recovery” (Buliga et al. 2016, p. 653) and the latter refers to learning and the derivation of opportunities from difficult situations (Buliga et al. 2016). To develop and maintain these capabilities, organizations need to have a set of resources at their disposal. Literature provides a very broad range of perspectives on these resources and their peculiarities. For our research focus, we strive to condense this variety to a parsimonious number of resources capturing the main characteristics. To this end we identified three main categories of resources in the literature, which are related to each other.

The first main category comprises *social resources* which evolve from interactions between organizational members. Gittell et al. (2006), for example, highlight (positive) collegial relationships to provide moral, social, and emotional support. Lengnick-Hall et al. (2011) discuss aspects like group identity, shared values, sense-making, social capital, and networks designed for resource sharing. These resources foster adaptability on the organizational level by promoting a basic, positive disposition on the individual level to deal with challenges through corresponding values and by guiding behavior in situations that require searching for opportunities. They also can support robustness by providing organizational networks that enable a better use of resources and thus keep the organization functional even in times of strain.

Material resources, the second main category, are related to financial resources to acquire them when needed and a viable business model to ensure a sustainable supply with the needed financial resources (Gittell et al. 2006). Yet, to understand their impact on organizational resilience, a closer look to a related literature stream dedicated to slack resources, i.e., the availability of material resources beyond what is necessary, is warranted. This literature provides mixed evidence regarding the positive effect

of slack resources on innovative and adaptive processes, as slack offers resources to invest in innovation but can also lead to inertia (Nohria and Gulati 1996; Voss et al. 2008). Therefore, the usefulness of material resources in fostering adaptability has to be judged individually. In contrast, literature indicates that the availability of material resources allows an organization to function even under difficult circumstances, thus promoting robustness. Meyer (1982, p. 530) calls these resources “organizational shock absorbers“, which can cushion impacts. Moreover, excess financial resources can save social resources by rather investing them than laying off staff and thereby destroying valuable social networks and value systems (Meyer 1982).

To reasonably apply the two previously mentioned types of resources, literature indicates that organizations have to develop adequate *procedural* resources, e.g., Lengnick-Hall et al. (2011) mention useful routine actions as important basis for resilience. Lengnick-Hall and Beck (2005) point to a relation between adaptability and robustness on the one hand and different kinds of routines and processes to deal with complexity on the other hand. Based on Boisot and Child (1999), the authors distinguish routines that reduce complexity and those that absorb complexity. The latter enable flexible action taking through broadly based plans to recognize unexpected events early on and to ensure flexible decision-making behavior. These routines are thus related to adaptability. In contrast, complexity-reducing routines maintain stability, regulate interactions and reduce the coordination effort. Although the authors position them in the context of an “adaptive fit” between organization and environment, these routines are less helpful to achieve a high degree of adaptability but aim at keeping the organization functional even in difficult situations, strengthening robustness (Kunz and Mur, in press). In both cases, effective routines save material resources, as they increase efficiency and help to guide social relationships by setting frames for social interaction. Figure 1 illustrates the discussed relations.

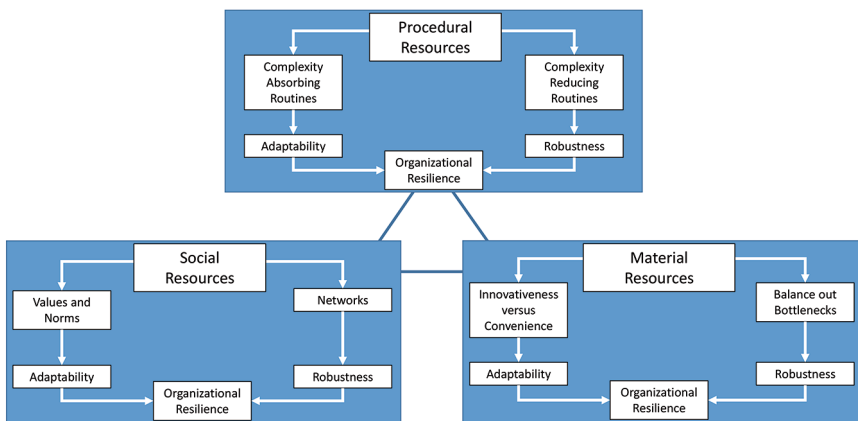


Fig. 1 Relevant components of organizational resilience

2.2 Overconfidence as a personality trait

To delimit the area of the following literature review, we clearly have to define managerial overconfidence, which is of particular importance since literature provides two different views on it. First, overconfidence refers to a cognitive bias, i.e., “the overestimation of one’s knowledge (more generally, the overestimation of the validity of one’s judgment) when there is no personally favored hypothesis or outcome” (Griffin and Varey 1996, p. 228). In this sense overconfidence represents a valuation error, which leads to individuals overestimating the accuracy of their assessments and thus positively deviating their judgments from reality (Schaefer et al. 2004). It is tested by asking subjects to indicate how certain they are about a particular answer (Klayman et al. 1999). Second, overconfidence is defined in a much broader sense as a personality trait that leads one to see oneself as superior to others (e.g., Palmer et al. 2019). Accordingly, Hirshleifer et al. (2012, p. 1459) define overconfidence as “the tendency of individuals to think that they are better than they really are in terms of characteristics such as ability, judgment, or prospects for successful life outcomes (the last issue is sometimes called “optimism”)”. This interpretation is about the positive evaluation of events because one thinks one can influence them in the desired direction due to ones’ superior abilities compared to others.

Moore and Healy (2008) further differentiate the following three perspectives, the first and last of which can be assigned to cognitive bias and the second to personality traits: The overestimation of correct answers in a test procedure (*overestimation*), the believe to have abilities superior compared to the whole population (better-than-average effect, *overplacement*) and the excessive certainty regarding one’s own accuracy in estimating certain facts (*overprecision*).

Griffin and Varey (1996) emphasize that overconfidence as a personality trait has both cognitive and motivational components. Thus, it fundamentally affects the outcomes of many corporate decision-making processes related to organizational resilience leading to more comprehensive behavioral effects than a mere estimation error. Therefore, in the present study, we focus on overconfidence as a personality trait. However, the two views are not always used by authors in a selective manner. For example, Puetz and Ruenzi (2011, p. 685) state: “Overconfident individuals tend to overestimate their abilities (see Frank 1935) and the precision of their knowledge (see Fischhoff et al. 1977)”. The former points to the personality trait and the latter to the cognitive bias. Stotz and von Nitzsch (2005, p. 122) also point out that “[i]t is not always possible to differentiate between overconfidence in one’s own knowledge and overconfidence in one’s own abilities.” This fact must be taken into account when selecting the relevant articles and it must be carefully examined in each article which of the two perspectives is in the foreground.

In addition, it should be noted that, introduced by Roll (1986) in the context of takeovers, the term hubris was adopted by many authors as a synonym for overconfidence (e.g., Hayward and Hambrick 1997; Tang et al. 2015a, Tang et al. 2015b; Tang et al. 2018).

Since the present paper focuses on the importance of overconfidence in the corporate context, which according to the Upper Echelon Theory is mainly affected by the behavior of key decision-makers, the following discussion focuses on empirical

studies that deal with *managerial* overconfidence and that investigate the behavior of managers and not, for example, of students as surrogate test subjects.

3 Method and selection procedure

Literature reviews can pursue different goals. The present study focuses on the identification of studies in the field of managerial overconfidence with relevance to organizational resilience. It is not intended to provide a complete overview of the research on managerial overconfidence, but to identify a sample of papers which allows to derive a perspective on this relation. Thus, following the differentiation by Breslin and Gatrell (2020), the present study can be located on the prospector side, i.e., it seeks to broaden the perspective of research on managerial overconfidence by making more explicit the insights which this field provides for research on organizational resilience and which so far have not yet been discussed explicitly in the analyzed studies. In this sense, the present literature review also can be categorized as qualitative, as we do not apply statistical methods to condense the empirical findings, and as integrative as defined by Dwertmann and van Knippenberg (2021). Also, Elsbach and van Knippenberg (2020, p. 2) state that “integrative reviews result in novel takeaways, such as a new conceptual framework or theory that defines the field reviewed”. Exactly this is the aim of the present study. However, in some sense we have to deviate from the core idea of integrated reviews as discussed by these authors: They state that integrative reviews should not be guided by “authors’ a priori perspectives” (Elsbach and van Knippenberg 2020, p. 3). As we aim to identify results regarding managerial overconfidence which can be related to organizational resilience, but which have not yet been discussed explicitly, we have to predefine our perspective on organizational resilience and thereby provide some guidance. However, the results obtained from the literature of managerial overconfidence in relation to organizational resilience form novel takeaways.

The search comprised a database-supported and a backward search (Aromataris and Riitano 2014; Brunton et al. 2017; Dundar and Fleeman 2017). To conduct the main search as comprehensive as possible while keeping it manageable, we first executed a preliminary search phase, in which we identified the relevant keywords and databases. As previously discussed, overconfidence can be defined at least in two ways, where we focus on the personality trait. As indicated in Sect. 2.2, terms related to this trait are overconfidence, better-than-average, overplacement and hubris. Therefore, these terms were applied as keywords and introduced in the search as follows: `overconfi*`, `better-than-average`, `overplace*` and `hubris`. During the preliminary search it became apparent that a narrowing down to the field of management was necessary to obtain a manageable amount of hits. Thus, in the main search we combined these keywords with `manage*` and `CEO`, leading to the following search string: `((overconfi* OR overplace* OR better-than-average OR hubris) AND (ceo OR manage*))`. We applied this search string to the title and the abstract. While overconfidence as such is a field of research which crosses disciplinary boundaries, we focus on the business context. Therefore, we only used business-related databases. During the preliminary search phase, we checked Business Source Premier, EconLit,

ABI/INFORM Complete and EconBiz. For the main search we dropped EconBiz, as in the preliminary search it did not provide further relevant articles beyond the three other databases. Search date, number of hits and duplicates are indicated in Table 1. It has to be mentioned that we did not use Scopus, as we did not have access to it. During this identification phase we used the following non-content-related inclusion and exclusion criteria (Hiebl 2021): The papers should be written in English. Moreover, following the recommendation by Kraus et al. (2020a, p. 1034) we concentrated on peer-reviewed journal articles “to ensure the highest standards of transparency”.

In addition to this database-based search, we performed a search in Google Scholar applying the keywords in the title indicated in Table 2, to cross check, whether we overlooked parts of the literature by concentrating on the mentioned databases. As this search in the end provided us with only four further articles, which met all our criteria for inclusion in the final sample, we are confident that the identified body of research is comprehensive.

The articles identified via this search process were analyzed in the screening phase regarding their fit to the present research topic based on the following six content-related inclusion and exclusion criteria (Hiebl 2021): As previously mentioned, we focus on (1) *empirical research* that (2) *uses managers as test subjects* and that focuses (3) *on overconfidence as personality trait*. Moreover, we concentrate on the (4) *effect of managerial overconfidence on different corporate areas*, but we are not interested in the development of managerial overconfidence dependent on antecedents, like learning processes and experience. Additionally, (5) the *journal ratings* of VHB-JOURQUAL 3 and Academic Journal Guide 2018 were used to assess journal quality. Articles were included that were either classified at least C in the first ranking

Table 1 Overview of search results in databases

Date	Database	Results
10/15/2021	ABI/Inform Complete	481
10/17/2021	Business Source Premier and EconLit via EBSCO	547
	<u>Total</u>	1.028
	<u>Duplicates</u>	352
	<u>Total number of literature sources</u>	676

Table 2 Overview of search results in Google Scholar (search date: 10/21/2021)

Keyword	Number of hits
CEO overconfidence	100*
Manager overconfidence	42
Overconfident CEO	17
Overconfident CEOs	67
Overconfident manager	2
CEO hubris	59
CEOs hubris	8
Manager hubris	1
Managers hubris	3

* Only the first 100 hits were checked, as the following hits did not yield suitable articles

or/and at least 2 in the second ranking. Thus, we excluded articles indicated in the databases as peer-reviewed that are published in journals with a mainly business-practical focus. Finally, to cover the complete research (6) *we did not set any time frame*. Applying these criteria, we were able to identify 106 articles. These articles were subject to a backward search, applying the same inclusion/exclusion criteria, that yielded further 10 articles. Thus, in total we identified 116 articles.

4 Results

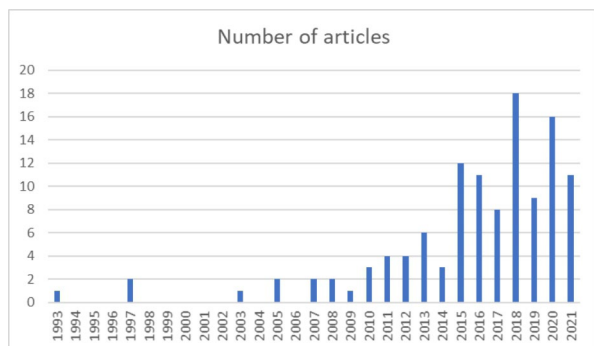
4.1 Description of the sample

Figure 2 illustrates the development of the identified research on managerial overconfidence over time. To allow for a structured discussion of this research we developed a concept matrix following Webster and Watson (2002), which assigns the main topics of the identified articles to the categories as indicated in Table 3.

During the process of designing this matrix, we first identified the major corporate areas in which overconfidence has been empirically investigated so far and realized that we could relate the findings within these areas to the three types of resources related to organizational resilience. This resulted in the following categories: First, we found results related to the generation and application of material resources. Within this category, called *managerial overconfidence and material resources*, we further differentiate between insights related to (1) *mergers and acquisitions*, (2) *investment behavior and share buybacks*, (3) *financing preferences and dividend payments*, (4) *tax policy*, (5) *reactions of investors, analysts and lenders* and (6) *financial performance*. Second, some scholars provide findings regarding the effect of managerial overconfidence on *social resources* by investigating its impact on the *interaction with stakeholders*. Third, several articles contain observations related to the impact of managerial overconfidence on *procedural resources*, particularly in the context of (1) *accounting*, (2) *auditing* and (3) *innovation processes*.

Additionally, several articles address issues that are prior to the analyses of specific corporate areas, as they investigate decision behavior in a more general way. These articles can be further differentiated into two categories. The category *impact*

Fig. 2 Frequency distribution of studies by publication year



on *decision-making processes* contains insights regarding the effect of managerial overconfidence on *risk-taking*, *error handling* and *strategic decisions*. The category CSR deals with literature covering the relation between managerial overconfidence and corporate social responsibility (CSR), i.e., a fundamental attitude of companies regarding responsible action taking. Finally, several studies indicate *moderators* on the investigated relations which form an additional category.

Table 4 contains an overview of the research questions, the sampling and the measurement of managerial overconfidence within the identified studies. The two most commonly used measures are media-based and option-based. The media-based measurement is related to the evaluation of press articles (e.g., Hayward and Hambrick 1997; Malmendier and Tate 2008). Statements of the managers and reports on them are analyzed for text passages that indicate overconfidence. The option-based method uses the holding period of options as a proxy for overconfidence, assuming that holding periods longer than rational ones indicate overconfidence, i.e., the belief in one's own ability to change even difficult situations (e.g., Malmendier and Tate 2005). If other measures are used in the studies, they are briefly explained in the table. In addition, there are a few studies in which it is not clear from the measurement of overconfidence and the indicated research purpose whether the scope of the analyzed overconfidence is related to the personality trait or the cognitive bias. This is indicated in the table.

In the following sections, the insights on the relation between managerial overconfidence and the identified areas are discussed. In Sect. 5, based on this discussion core insights regarding organizational resilience are derived which are integrated into a framework, placed in relation to each other, and further research needs will be derived from this.

4.2 Managerial overconfidence and material resources

4.2.1 Mergers and acquisitions

The identified literature points to a *positive relation between overconfidence and takeover activities* (Brown and Sarma 2007; Ferris et al. 2013), where CEOs' dominance has an additional reinforcing effect, especially in the case of diversifying acquisitions (Brown and Sarma 2007). Regarding *the extent of takeovers*, the identified literature shows a complex picture: While Lu et al. (2015) observe a positive relation, Rovenpor (1993) finds both a positive and a negative relation between overconfidence (self-confidence) and acquisitions, depending on the measure used for overconfidence: When it is measured by analyzing speeches, the relation is positive, whereas it is negative for a questionnaire-based measurement using items related to the locus of control. Chai et al. (2016) confirm a positive relation between overconfidence and takeover activity, but also observe an influence of the deviation from the planned debt structure on this relation: They show that a high deviation from the planned debt structure can regulate CEOs' increased value-destroying takeover activity. With respect to *the quality of takeovers*, the picture is clearly negative (e.g., Doukas and Petmezas, 2007; Croci et al., 2010). Already Hayward and Hambrick (1997) find a positive relation between overconfidence (hubris) and the premiums paid during an

Table 3 Concept Matrix

	Managerial overconfidence and material resources					Managerial overconfidence	Managerial overconfidence and procedural resources			Decision making processes	CSR	Moderators
	Investment behavior and	Financial	Tax policy	Reactions of investors, and	Financial performance		Accounting	Auditing	Innovation processes			
		X							X			
			X							X		
				X		X					X	
			X									
Almeida et al.								X				
Alqatamin et al.					X							
Andreou et al.			X									
Andreou et al.	X											
Andriospoulos et al.	X											
Andriospoulos et al.		X										
										X	X	
Banerjee et al.		X									X	
Banerjee et al.						X					X	

Table 3 (continued)

	Managerial overconfidence and material resources					Managerial overconfidence	Managerial overconfidence and procedural resources			Decision making processes	CSR	Moderators
	Investment behavior and	Financial	Tax policy	Reactions of investors, and	Financial performance		Accounting	Auditing	Innovation processes			
Beavers and Bou-Bou						X						
Bou-Bou	X						X				X	X
Bukalska		X	X									X
Chai et al.	X					X						
Chen and Lu				X								
Chen et al.								X				
Chen et al.									X			X
Chen et al.			X									
Choi et al.	X											
Chu et al.							X					
Chyz et al.			X				X					X
Croci et al.	X						X					X
Dick et al.			X								X	
Doukas and Petmezas	X											
Du-								X				

Table 3 (continued)

	Managerial overconfidence and material resources					Managerial overconfidence	Managerial overconfidence and procedural resources			Decision making processes	CSR	Moderators
	Investment behavior and	Fi-	Tax policy	Re- actions of in- vestors, an-	Fi- nancial per- for-		Ac-	Au- dit- ing	In- no- va- tion pro- cess- es			
Eichholtz and	X				X							
Ferris et al.	X							X				X
Galasso and Simcoe								X				X
Gul et al.											X	
Guo and Ding								X				
Hayward and Hambrick	X				X							X
Ho et al.					X			X	X			X
Hsu et al.			X				X					X
Hsu et al.				X								
Hur et al.	X											
Iyer et al.	X	X										
Ji and Lee				X				X				X

Table 3 (continued)

	Managerial overconfidence and material resources					Managerial overconfidence	Managerial overconfidence and procedural resources			Decision making processes	CSR	Moderators
	Investment behavior and	Financial	Tax policy	Reactions of investors, and	Financial performance		Accounting	Innovation processes				
Kaplan et al.					X							
Kim	X			X								
Kim and Kim		X			X							
Kim et al.				X								X
Kim et al.									X			X
Kim et al.					X							
Ko-lasinski and Li					X							X
Koo and Yang	X											
Kubick and Lai et al.			X					X				
Lai et al.										X		X
Lai et al.	X											
Lee							X					
Lee											X	
Leng et al.					X							
Li and Sullivan										X		X
Li and Tang										X		X
Lin et al.	X											

Table 3 (continued)

	Managerial overconfidence and material resources					Managerial overconfidence	Managerial overconfidence and procedural resources			Decision making processes	CSR	Moderators
	Investment behavior and	Financial	Tax policy	Reactions of investors, and	Financial performance		Accounting	Innovation processes				
Lin et al.		X										
Lin et al.				X								X
Lin et al.		X										
Liu and Lei				X								
Liu and Loureiro et al.					X							
Lu et al.	X											
Mal-Mal-McManus	X			X				X				
Mitra et al.		X							X			X
Park and Park and Kim	X				X							X
Park et al.		X			X							X
Phua et al.	X					X						
Pierck								X				
Rov-enpor	X			X								

Table 3 (continued)

	Managerial overconfidence and material resources					Man- age- rial over- confi-	Managerial over- confidence and procedural resources			Decision mak- ing pro- cess- es	CSR	Mod- era- tors
	In- vest- ment be- hav- ior and	Fi-	Tax policy	Re- ac- tions of in- ves- tors, an-	Fi- nan- cial per- for-		Ac-	Au- dit- ing	In- nova- tion pro- cess- es			
Sau- er- wald and Su										X	X	
						X						
									X			
Seo and Shar- ma									X			
Seo et al.		X										
								X				
Tan		X										
Tang et al.								X			X	
Tang et al.										X	X	
Tang et al.										X		
Te- bour- bi et al.								X				
Ting et al.		X									X	
Viv- ian and Xu		X										
	X							X				
			X								X	
Yang	X							X				
										X		

acquisition, which in turn is negative for the shareholders of the acquiring company. A similar result is observed by Pavićvić and Keil (2021), who also show that this relation can be attenuated by slowing down the predeal process. Malmendier and

Table 4 Concept Matrix

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Adam et al. (2015)	Relation between managerial overconfidence and risk management using derivative financial instruments of companies	Period: 1989–1999, sample: 92 gold mining companies from North America	Managerial overconfidence is expressed by means of the self-attribution bias, i.e. managers increasingly apply speculative hedging strategies using derivative financial instruments, recognizable by a higher hedge ratio, provided that they have been able to achieve successes (positive cash-flows) in the past
Adam et al. (2020)	Relation between managerial overconfidence and the use of performance pricing provisions in loan contracts (performance-sensitive debt)	Period: 1992–2010, sample: 1,199 unique CEOs	Option-based
Aghazadeh et al. (2018)	Relation between managerial overconfidence and the cost of equity	Period: 1996–2012, sample: 13,535 firm-year observations	Three option-based measured variables are combined into one variable by means of factor analysis
Ahmad et al. (2021)	Impact of managerial overconfidence on entrepreneurial strategic decision making	Sample: 169 questionnaires of entrepreneurs operating in the manufacturing sector (SMEs), located within the twin cities Rawalpindi-Islamabad in Pakistan, with employment size up to 250 employees	Measurement scale based on Mouna and Jarboui (2015) and ul Abdin et al. (2017)
Ahmed and Duellman (2013)	Relation between managerial overconfidence and conservative accounting	Period: 1993–2009, sample: companies of the S&P 1500 Index, 14,641 firm-year observations	Four measures: an option-based measure, a net buyer measure similar to Malmendier and Tate (2005), and two measures that capture overinvestment due to overconfidence
Aliani et al. (2016)	Consequences of managerial overconfidence for the tax policy of Tunisian companies	Period: 2002–2011, sample: 28 companies listed on the Tunisian stock exchange	Measurement by questionnaire
Aktas et al. (2019)	Relation between managerial overconfidence and the value that the stock market attributes to cash	Period: 1993–2013, sample: exclusion of financial and utility companies, 12,105 firm-year observations	Option-based and for robustness testing also media-based as well as use of gender
Almeida et al. (2021)	Moderating effect of managerial overconfidence on the relation between a sudden cash inflow and innovativeness	Period: 2002–2003, 2005–2006, 2000–2007 (depending on the analysis), sample: 37 firms in the control group and 317 firms in the treatment group	Option-based

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Alqatamin et al. (2017)	Relation between managerial overconfidence and the level of forward-looking information disclosure	Period: 2008–2013, sample: 1,206 firm-year observations of Jordanian firms listed on the ASE	Three measures. (1) option-based, (2) investment decisions according to Campbell et al. (2011) and Ahmed and Duellman (2013), 3) leverage ratio
Andreou et al. (2018)	Relation between managerial overconfidence and reactions to announcements of share buybacks	Period: 1992–2009, sample: U.S. companies, 16,025 buyback announcements	Three measures: (1) media-based, (2) option-based, (3) gender-based
Andreou et al. (2019)	Relation between managerial overconfidence and diversification	Period: 1993–2010, sample: 1,360 companies and 8,262 firm-year observations for stock-based measurement of overconfidence, 1,860 companies and 10,843 firm-year observations for media-based measurement of overconfidence	Two measures: (1) measure based on purchases of shares of the own company, (2) media-based
Andriospoulos et al. (2013)	Influence of managerial overconfidence on the buyback of shares	Period: 1997–2006, sample: 400 share buyback announcements by companies mainly listed in the UK, 13,378 buyback transactions	Option-based
Andriospoulos et al. (2020)	Influence of managerial overconfidence on overpayment	Period: 82,425 firm-year observations comprised of 11,504 unique U.S. industrial firms, sample: 1975–2011	Option-based
Arena et al. (2018)	Importance of CEO hybrid for environmentally friendly innovations	Period: 2010–2012, sample: 338 firm-year observations, 134 companies	A measure was generated by factor analysis from the following three measures: (1) media-based, (2) relative compensation, (3) photo
Ataullah et al. (2018)	Relation between managerial overconfidence and the maturity of debt instruments	Period: 2000–2010, sample: 865 firm-year observations, 192 British listed companies	Two measures: (1) based on computer-assisted voice and sound analyses of management board statements, (2) based on the acquisition ratio of company shares
Banerjee et al. (2015)	Influence of an independent board on managerial overconfidence, investigated using the Sarbanes-Oxley Act and changes in the NYSE/NASDAQ listing rules (SOX)	Period: 1992–2012, about 22,000 firm-year observations	Option-based, for robustness testing also media-based, measurement based on options in relation to income and other measures

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Banerjee et al. (2018)	Relation between managerial overconfidence and shareholder class actions	Period: 1996–2012, sample: depending on the model, between 174 and 194 observations from a sample of over 22,000 firm-year observations with 1,375 claims	Option-based, to test the robustness of the results measurement by means of media-based and share-based measures according to Kolasinski & Li (2013)
Beaver and Mobb (2020)	Relation between managerial overconfidence and the CEOs' activities related to the work at board	Period: 1996–2011, sample: 114,052 independent director-year observations for 20,527 firm-years	Following Malmendier and Tate (2005, 2008): Two option-based measures and one measure based on the fact that overconfidence is expressed by CEOs buying more shares in a company despite existing shareholdings
Bouwman et al. (2014)	Relation between CEO optimism and earnings management	Period: 1984–1994, sample: companies listed in the USA, which were listed in the Forbes 500 list at least 4 times during the period, 477 companies, the sample is based on the sample in Malmendier and Tate (2005, 2008)	Three option-based measures
Bouzouitina et al. (2021)	Relation between managerial overconfidence and corporate social responsibility	Period: 2010–2017, sample: 2,360 UK firms listed on the FTSE 400 Index	Two measures: (1) Media-based, (2) net share purchase ratio following Malmendier and Tate (2005)
Brown and Sarma (2007)	Relation between managerial overconfidence and acquisition activity	Period: 1994–2003, sample: 65 companies from the S&P/ASX 50 Index	Media-based
Bukalska (2020)	Relation between managerial overconfidence and investment-cash flow sensitivity as well as financial constraints	Period: 2010–2016, sample: 145 surveys from non-listed enterprises based in Poland with non-overconfident managers (78 companies and 546 firm-year observations) and overconfident managers (67 companies and 469 firm-year observations)	Survey based on Wrońska-Bukalska (2016)
Campbell et al. (2011)	Relation between CEO optimism and CEO dismissal	Period: 1992–2005, sample: 12,334 CEO-firm year observations, 3,352 CEO-firm combinations, 294 forced changes	Three measures: (1) option-based, (2) based on the purchase of company shares according to Malmendier and Tate (2005), (3) based on the investment level
Chai et al. (2016)	Influence of managerial overconfidence on company takeovers, taking into account the deviation from the target capital structure	Period: 1993–2011, sample: exclusion of financial and utility companies, 1,432 announced and implemented company takeovers	Option-based

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Chen and Lu (2015)	Relation between managerial overconfidence and share buyback costs	Period: 2001–2013, sample: exclusion of financial companies, companies listed in Taiwan that carried out open market repurchases (ORMs) in the period mentioned, 2,749 ORMs	Four measures according to Schrand and Zechman (2012): (1) industry-adjusted investment level, (2) measurement based on acquisition activity, (3) measurement based on debt-to-equity ratio, (4) measurement based on the issue of convertible bonds and preference shares
Chen et al. (2014)	Impact of R&D investments as a result of managerial overconfidence on business performance	Period: 1980–1994, sample: 477 listed U.S. companies	Option-based
Chen et al. (2015)	Effect of managerial overconfidence on dealing with wrong decisions	Period: 1994–2008, sample: 576 forecasts from 217 CEOs of U.S. listed companies who are making profit forecasts for the first time in their profession	Three different measures: (1) media-based, (2) option-based, (3) successes achieved in the past analogous to Hayward & Hambrick (1997)
Chen et al. (2020)	Effect of managerial overconfidence on firms' cash holdings	Period: 1992–2016, sample: 17,942 firm-year observations of 1967 U.S. firms	Option-based
Choi et al. (2018)	Relation between managerial overconfidence and investment cash flow sensitivity	Period: 1992–2012, sample: exclusion of financial and utility companies, 15,446 firm-year observations of companies in the S&P 1500	Two option-based measures
Chu et al. (2019)	Impact of managerial overconfidence on earnings management	Period: 1985–2010, sample: 392 AAER firm-year observations, 43,939 non-AAER firm-year observations	Option-based
Chung and Hribar (2021)	Impact of managerial overconfidence on likelihood and timeliness of goodwill impairments	Period: 2003–2012, sample: varies depending on variables, total number of firm-quarter observations equals 23,295	Two option-based measures and one measure based on forecasts following Hribar and Yang (2016) among others. It should be noted that the last measure can measure both a personality trait and a cognitive bias.
Chyz et al. (2019)	Relation between managerial overconfidence and tax avoidance	Period: 1990–2007, sample: the sample of companies with a change of CEO between 1990 and 2007 is based on Fee et al. (2013), 1,090–1,220 firm-year observations (depending on the tax avoidance variable used)	Option-based and eight additional measures to test the robustness

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Cormier et al. (2016)	Relation between CEO hubris and misinformation	Period: 1995–2009, sample: 16 Canadian companies whose CEOs are accused of misconduct or who disclose such conduct and are subject to formal allegations by regulators that resulted in a financial or administrative penalty	Three dimensions are considered: (1) “relation with the world”: (the prerequisite for the emergence of CEO hubris is power, in that CEOs or their families hold more than 5% of the shares or the CEO founded the company), (2) “relations with the self”: certain corporate structures and business models, (3) “relations with others”: CEO awards, press reports and buy recommendations from stock analysts
Croci et al. (2010)	Relation between managerial overconfidence and the success of company takeovers in phases of high and low market valuation	Period: 1990–2005, sample: buyers are British companies, 848 takeovers	Option-based
Deshmukh et al. (2013)	Relation between managerial overconfidence and dividend payments	Period: 1984–1994, sample: the initial sample is identical to the sample of Malmendier and Tate (2005, 2008) and Malmendier et al. (2011), of which 2,778 firm-year observations were taken from 244 companies	Two measures: (1) option-based, (2) media-based
Dick et al. (2021)	Relation between managerial overconfidence and CSR engagement in family firms versus other firms	Period: 2014, sample: 343 Polish companies (mainly medium-sized and nearly all non-listed)	Measures capturing the positive deviation between managers’ subjective evaluation of the firms’ situation and the firms’ objective economic condition. It should be noted that these measures partly can measure both a personality trait and a cognitive bias.
Doukas and Petmezas (2007)	Relation between self-attribution bias, managerial overconfidence and returns on private acquisitions	Period: 1980–2005, sample: exclusion of financial and utility companies, 5,334 successfully completed acquisitions (all private companies) of British listed companies	Overconfidence is determined by the increased takeover activity of managers over a period of three years, overconfidence on the part of managers exists if up to five or more company takeovers have taken place within this period

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Duellman et al. (2015)	Relation between managerial overconfidence and audit fees	Period: 2000–2010, sample: exclusion of financial and insurance companies, 7,661 firm years	Three measures: (1) option-based, (2) investment-based according to Ahmed and Duellman (2013), (3) investment-based according to Biddle et al. (2009)
Eichholtz and Yönder (2015)	Impact of managerial overconfidence on the investment activity of U.S. real estate investment companies	Period: 2003–2010, sample: 146 U.S. real estate investment companies	A net buyer measure similar to Malmendier and Tate (2005) is applied to the purchase and sale of real estate, CEOs are judged to be overconfident if they buy more real estate than they sell over the entire sample period
Engelen et al. (2015)	Relation between managerial overconfidence and entrepreneurial orientation in companies	Period: 2005–2007, sample: 142 observations for 61 companies	Option-based according to Campbell et al. (2011)
Ferris et al. (2013)	Relation between managerial overconfidence and company takeovers	Period: 2000–2006, sample: exclusion of financial and state-owned enterprises, companies from the global ranking of Fortune magazine, global sample of U.S., Japanese, English, French and German companies	Media-based
Galasso and Simcoe (2011)	Impact of managerial overconfidence on innovation policy	Period: 1980–1994, sample: exclusion of financial, insurance and real estate companies, 290 companies, 627 managing directors, 3,648 firm-year observations	Option-based
Gul et al. (2020)	Impact of managerial overconfidence on the relation between CSR engagement and empire building	Period: 1996–2015, sample: 16,635 firm-year observations of U.S. firms	Option-based
Guo and Ding (2020)	Moderating effect of managerial overconfidence on the relation between performance discrepancy and a firm's patent application rhythm	Period: financial data: 2011–2015, sample: 6,814 firm-year observations of 1,730 listed companies	Measurement based on prediction errors in managers' earnings forecasts. It should be noted that this measure can measure both a personality trait and a cognitive bias.
Gupta et al. (1997)	Effect of changed conditions (in the wake of the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989) on acquisition activity driven by Hubris	Period: 1979–1992, sample: 138 merger offers (78 pre-act, 60 post-act) from buyers of solvent savings banks whose offers were approved by the Federal Home Loan Bank Board (FHLBB) or the Office of Thrift Supervision (OTS) in the period 1979–1992	Hubris is defined according to Roll (1986) and measured as follows: Hubris should result in a non-positive correlation between the gains of the target firm and of the buyer, at least for the subsample with positive total wealth gains.

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Hayward and Hambrick (1997)	Influence of managerial hubris on premiums paid for company takeovers and the moderating effect of the board structure on this	Period: 1989–1992, sample: pairs of publicly traded companies involved in a takeover between 1989 and 1992 with payments in excess of \$100 million, 106 acquisitions	Three measures: (1) company performance, (2) media praise for the CEO, (3) self-importance measured by relative compensation
Hirshleifer et al. (2012)	Relation between managerial overconfidence and pioneering and innovative behavior	Period: 1993–2003, sample: exclusion of financial institutions and utilities, 2,477 CEOs, 9,807 firm-year observations	Two measures: (1) option-based, (2) media-based
Ho et al. (2016)	Impact of managerial overconfidence on lending and leverage in the banking sector before and after the financial crisis	Period: 1994–2009, sample: 1,643 banking-year observations	Option-based
Hsieh et al. (2014)	Relation between managerial overconfidence and earnings management	Period: 1991–2009, sample: exclusion of, among others, financial firms and regulated firms, sample size varied between 3,748 and 5,499 observations depending on the model	Option-based
Hsieh et al. (2018)	Relation between managerial overconfidence and tax avoidance	Period: 2004–2014, sample: 1,848 or 1,962 firm-year observations depending on the model	Measure on the basis of purchasing behavior with regard to the shares of the own company following Zheng (2012)
Hsu et al. (2017)	Relation between managerial overconfidence and conservative or prudent accounting	Period: 1992–2011, sample: 19,386 CEO-year observations	Option-based
Hsu et al. (2021)	Moderating effect of managerial overconfidence on the relation between book-tax differences and loan contracting	Period: 2001–2017, sample: 6,531 facility-years	Option-based
Huang et al. (2011)	Relation between managerial overconfidence and cash-flow sensitivity	Period: 2002–2005; sample: exclusion of young enterprises and financial companies, 2,234 firm-year observations of Chinese companies	Two measures: (1) Measurement using the difference between predicted and actual success rates according to Lin et al. (2005). It should be noted that this measure can target both a personality trait and a cognitive bias. (2) Relative compensation according to Hayward and Hambrick (1997)
Huang et al. (2016)	Effect of managerial overconfidence on the maturity of financial liabilities	Period: 2006–2012, sample: exclusion of financial companies, 944 listed U.S. companies, 4,309 firm-year observations	Option-based

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Huang-Meier et al. (2016)	Relation between managerial overconfidence and cash	Period: 1992–2010, sample: exclusion of financial companies and utilities, 1,001 firm-year observations in the optimism sample and 4,902 firm-year observations in the non-optimism sample	Option-based and for testing the robustness also measurement based on the investment level
Hur et al. (2019)	Relation between managerial overconfidence and R&D expenditures	Period: 2011–2017, sample: 6,280 business-years of firms listed on the e Korea Stock Exchange (KSE) and the Korea Securities Dealers Automated Quotation (KOSDAQ)	Measurement based on capital expenditures
Iyer et al. (2017)	Relation between managerial overconfidence and reactions to a change of CEO	Period: 1994–2011, sample: 470 observations for the liabilities side, 1,626 observations for the equity side	Option-based
Ji and Lee (2015)	Relation between managerial overconfidence and audit reports with GCO	Period: 2001–2011, sample: 2,742 firm-year observations of 192 FGCO firms and 2,550 CLEAN opinion firms	Measurement based on company characteristics analogous to Schrand and Zechman (2012)
Kaplan et al. (2012)	Impact of managerial overconfidence on performance in a buyout and venture capitalist context	Period: 2000–2006, sample: 316 candidates considered for CEO positions in firms involved in private equity transactions	Measurement through factor analysis applied to 30 characteristics
Kim (2013)	Relation between managerial overconfidence and, inter alia, market reactions to takeover announcements	Several sources, including 6,931 interviews of CEOs on CNBC television in the period 1997–2006, CEO change information in the period 1993–2008	Overconfidence is expressed in the form of self-attribution bias, based on how often CEOs refer to themselves in TV interviews on CNBC or attribute failures to industry or the general economic situation
Kim and Kim (2019)	Effect of managerial overconfidence on dividend payouts of high performing firms	Period: 1993–2015, sample: 8,801 firm-year observations	Option-based
Kim et al. (2016)	Relation between managerial overconfidence and a fall in share price	Period: 1992–2010, sample: companies of the S&P 1500 Index, 17,568 year observations (in the case of the second and third measures of overconfidence 16,229 year observations)	Three measures: (1) option-based, (2) investment behavior at company level (according to Schrand and Zechman, 2012), (3) investment behavior at CEO level (according to Campbell et al., 2011)
Kim et al. (2018)	Relation between manager hubris and overinvestment	Period: 1993–2007, sample: 1,914 firm-year observations, 469 companies	Computer-aided text mining of corporate press releases in conjunction with secondary data

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Kim et al. (2021)	Relation between managerial overconfidence on the one hand and firm growth and profitability in the restaurant industry on the other hand	Period: 1993–2016, sample: 148 firm-level panel observations for 27 publicly traded restaurant firms in the United States	Option-based
Kolasinski and Li (2013)	Impact of strong, independent board members on the takeover activities of overconfident CEOs, learning effects	Period 1988–2006, sample: all mergers and acquisitions carried out in this period based on the acquisition of a majority shareholding, completed and recalled, with a U.S. listed company as acquirer, 15,204 firm-year observations	CEOs are considered overconfident if they buy shares of their company in the secondary market and the shares generate a negative abnormal return within the following 180 days
Koo and Yang (2018)	Influence of managerial overconfidence on the cash-flow sensitivity of corporate investments	Period: 2007–2013, sample: exclusion of financial and utility companies, 796 firm-year observations with companies within the Korean capital market	Three of the four measures relate to forecast errors, the deviation between forecast and actual earnings (partly based on Lin et al., 2005), while the last measure measures self-attribution bias, triggered by recent corporate success
Kouaib and Jarboui (2016)	Relation between managerial overconfidence (among others) and R&D expenditures	Period: 2000–2014, sample: 454 CEOs, 182 firms, 2,730 firm-year observations	Score based on Schrand and Zechman (2012) and related to firms' investing and financing activities
Kubick and Lockhart (2017)	Relationship between managerial overconfidence and tax policy	Period: 1994–2011, sample: exclusion of financial and utility companies, S&P 1500 companies	Published information on CEO awards through various media channels
Lai et al. (2017)	Relation between managerial overconfidence and the development of foreign markets	Period: 2001–2004, sample: 1,251 market entries by 782 U.S. companies	Two measures: (1) option-based, (2) media-based
Lai et al. (2021)	Relation between managerial overconfidence and labor investment efficiency	Period: 1996–2017, sample: 16,766 firm-years	Four measures: three option-based measures, one measure based on excess investment
Lee (2016)	Relation between managerial overconfidence and weaknesses in internal control mechanisms in financial reporting	Period 2004–2011, sample: companies that disclose weaknesses in their control systems according to the Sarbanes-Oxley Act (SOX), 8,933 firm-year observations, thereof 495 on companies that disclose their weaknesses in the corresponding Section 404 of SOX	Measurement based on company characteristics analogous to Schrand and Zechman (2012)

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Lee (2021)	Relation between managerial overconfidence and voluntary disclosure of greenhouse gas emissions and a moderating role of diversity and industry-level competition on the relation between managerial overconfidence and firm performance	Period: firms in the Korea Stock Exchange (KSE) and the Korea Securities Dealers Automated Quotation (KOSDAQ) listed as of as of 31 December 2019, sample: 13,334 firm-year observations	Measurement by residuals obtained from an estimation of capital expenditure
Leng et al. (2021)	Relation between managerial overconfidence and the probability of corporate failure	Period: 1999–2017, sample: 1,891 firms, 235 cases of failures	Three measures: (1) share-based measure following Kolasinski and Li (2013), (2) option-based, (3) media-based
Li and Tang (2010)	Impact of hubris on the risk attitude of Chinese managers	Period: August–October 2000, Sample: questionnaire survey, manufacturing industry with a final sample size of 2,790 enterprises	Difference between the subjective assessment of CEOs (questionnaire survey) and the actual company performance (return on sales). A larger difference in z-scores implies a higher degree of CEO hubris. It should be noted that this measure can target both a personality trait and a cognitive bias.
Li and Sullivan (2020)	Relation between managerial overconfidence and strategic foresight	Period: first study in 2011 comprising data for 2006–2010, second study in 2012 comprising data from participants of the first study for the year 2011, sample: 498 Chinese firms	Measurement following Li and Tang (2010)
Lin et al. (2005)	Relations between managerial overconfidence and investments	Period: companies listed on the Taiwan Stock Exchange between 1985 and 2002, sample: exclusion of financial companies, 8,711 forecasts from 386 CEOs in 869 different companies	Measurement based on prediction errors in managers' earnings forecasts adjusted for specific reasons for prediction errors. It should be noted that this measure can measure both a personality trait and a cognitive bias.

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Lin et al. (2008)	Relation between managerial overconfidence and investments	Period: companies listed on the Taiwan Stock Exchange and over-the-counter market between 1989 and 2004 and found in the Taiwan Economic Journal Database, sample: 1,931 forecasts by 591 CEOs in 511 different companies	Measurement based on prediction errors in managers' earnings forecasts adjusted for specific reasons for prediction errors (cf. Lin et al., 2005), another measure is based on share ownership. It should be noted here that the first variable can measure both a personality trait and a cognitive bias.
Lin et al. (2019)	Influence of managerial overconfidence on the recommendation of analysts to investors (selling side), the time taken by analysts to review such stocks and the effect of recommendations on investors depending on managerial overconfidence	Period: 1994–2014, sample: 58,776 revisions of analysts' recommendations, 37,505 of which are observations on CEO overconfidence	Option-based
Lin et al. (2020)	Relation between managerial overconfidence and loan spreads	Period: 1993–2015, sample: 16,703 loan contracts of 2,104 publicly listed U.S. firms	Option-based
Liu and Nguyen (2020)	Impact of managerial overconfidence on CEO letter style	Period: 2014–2016, sample: 1,150 firm-year observations in the unbalanced sample and 1,071 in the balanced sample	Option-based
Liu and Lei (2021)	Impact of managerial overconfidence on the relation between managerial abilities and stock price crashes	Period: 1994–2018, sample: 24,289 firm-years	Option-based
Loureiro et al. (2020)	Moderating impact of managerial overconfidence on the relation between CEO \$ compensation on the one hand and firm performance and total CEO pay on the other hand	Period: 1992–2013, sample: 80 CEOs	Option-based
Lu et al. (2015)	Relation between REIT managers' overconfidence and acquisitions	Period: 1983–2007, sample: 1,887 REIT acquisition announcements, 393 acquiring REITs and 1,204 non-acquiring REITs	Measurement based on the buying of shares following Malmendier and Tate (2005)

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Malmendier and Tate (2005)	Impact of managerial overconfidence on corporate investments	Period: 1980–1994, sample: 477 listed U.S. companies	Two option-based measures and one measure based on the fact that overconfidence is expressed by CEOs buying more shares in a company despite existing shareholdings
Malmendier and Tate (2008)	Managerial overconfidence in company takeovers, consequences and reactions of the market	Period: 1980–1994, sample: 394 listed U.S. companies	Two option-based measured variables and one media-based measured variable
Malmendier et al. (2011)	Impact of managerial overconfidence on financing policy	Period: 1980–1994, sample: exclusion of financial and utility companies, 477 U.S. listed companies, additional information on birth cohort and military service	Two measures: (1) option-based, (2) media-based
McManus (2018)	Relation between managerial hubris and profit manipulation	Period: 01.07.2002–30.09.2002, sample: matched-pair structure, including use of the U.S. General Accounting Office's (GAO) financial restatement database, 142 balance sheet adjustments	Measurement based on media interest, self-importance and pride
Mitra et al. (2019)	Relation between managerial overconfidence and the cost of auditing the consolidated financial statements, taking into account the impact of the competence of managers and the characteristics of the Board of Directors and the Audit Committee	Period: 2003–2011 (a post-SOX period was deliberately chosen), sample: exclusion of, among others, financial companies and foreign companies (probably non-U.S. companies), 12,942 observations of 2,515 companies with data on audit fees	Three measures, two of which are based on capital expenditure, the third is option-based
Mueller and Brettel (2012)	Relation between managerial overconfidence, company performance and stock market developments over the business cycle	Period: 1999–2008, sample: 33 listed German companies that rank among the 100 best German companies (World Magazine Ranking), 332 CEO-years of 67 CEOs from 35 companies	Option-based
Park and Chung (2017)	Possibility of limiting managerial overconfidence by institutional investors	Period: 1992–2010, sample: exclusion of financial and utility companies, companies listed on the New York Stock Exchange, AMEX and NASDAQ, 17,051 firm-year observations	Option-based

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Park and Kim (2009)	Relation between managerial overconfidence and the indebtedness of Korean companies	Period: 1985–2007, sample: exclusion of financial companies, 10,848 yearly observations of 516 listed Korean companies	Based on a questionnaire survey in which managers give their assessment of the current and expected economic situation, the Central Bank of South Korea compiles an index whose average value over the last 12 months is used as an indicator of overconfidence
Park et al. (2018)	Relation between CEO hubris, corporate performance and corporate structures	Period: 2001–2008, sample: 654 firm-year observations, 164 large Korean companies	Three measures: (1) based on press articles, (2) number of CEO certifications or awards, (3) based on letters from CEOs to shareholders
Pavićić and Keil (2021)	Relation between managerial overconfidence and level of acquisition premiums	Period: 2001–2018, sample: 349 acquisitions	Option-based
Phua et al. (2018)	Relation between managerial overconfidence and the encouragement of stakeholders, employees and suppliers to be more engaged and to make more effort	Period: 1993–2011, sample: exclusion of financial and utility companies, 1,921 companies, 14,754 firm-year observations	Three measures: (1) option-based, (2) CEO's share purchases based on insider information analogous to Kolasinski and Li (2013), (3) based on the number of press comments describing CEOs as self-confident analogous to Banerjee et al. (2015)
Pierk (2021)	Relation between managerial overconfidence and write-offs following CEO turnover	Period: 1993–2012, sample: 1,175 CEO changes, 11,642 firm-year observations	Three measures: One option-based measure and two investment-based measures following Ahmed and Duellman (2013)
Reyes et al. (2020)	Moderating impact of the business cycle on the positive relation between managerial overconfidence and firm performance	Period: 1992–2015, sample: 220 industries, 1,712 companies, 15,217 firm-year observations	Option-based
Rovenpor (1993)	Importance of CEO self-confidence (in the sense of overconfidence) and other personality traits for corporate takeover activities	Sample: The target group were CEOs of the 350 top companies according to the 1988 Fortune 500 list of the largest industrial companies and the CEOs of the 150 top companies according to the 1988 Fortune 500 list of the largest service companies. The final sample included CEOs of 269 of these companies.	Self-confidence was measured by content analysis in CEO speeches and in a questionnaire using two items from Rotter's Locus of Control Scale (1966)

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Sauerwald and Su (2019)	Relation between managerial overconfidence and the difference between what companies communicate in terms of CSR and what they actually implement	Period: 2006–2014, sample: S&P 500 companies, 1,003 observations	Option-based
Schrand and Zechman (2012)	Influence of managerial overconfidence on misstatements in financial reporting	Period: January 1996–2003, 49 court-ordered audits due to misrepresentations in financial reporting, and for further analysis, use of a sample from the high-tech industry and a sample covering different industries	Several measures of overconfidence are used, including aspects of remuneration, start-up experience and expertise
Schumacher et al. (2020)	Impact of managerial overconfidence on the relation between performance feedback and risk-taking	Period: 1992–2014, sample: 5,482 firm-year observations for 824 distinct firms	Two measures: (1) option-based, (2) media-based
Seo and Sharma (2018)	Relation between share-based compensation and risk appetite in the U.S. restaurant industry, with managerial overconfidence as a moderator	Period: 1992–2013, sample: 659 firm-year observations from 45 U.S. restaurant companies	Option-based
Seo et al. (2017)	Relation between managerial overconfidence and the maturity of liabilities	Period: 1992–2015, sample: U.S. listed restaurant companies, 791 firm-year observations, 45 restaurant companies	Option-based
Simon and Houghton (2003)	Relation between managerial overconfidence and groundbreaking product launches at smaller companies in the computer industry	Sample: 135 companies in Georgia which introduced a new product shortly before the survey	Overconfidence refers to the managers' conviction that the new product will be successful. For this purpose, interviews were conducted in which the managers were asked to explicitly state which success factors are important for their products. The statements of the managers were then coded according to their choice of words and compared with the findings of the questionnaire survey 18 months after the product launch and a measure was calculated from this.
Tan (2017)	Relation between managerial overconfidence and financing preferences in U.S. real estate investment companies	Period: 1992–2014, sample: issue of 100 debt instruments and 189 shares of 62 real estate investment companies	Option-based

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Tang et al. (2015a)	Relation between CEO hubris and the innovation policy of companies	1st study: cross-sectional data on CEOs of 2,820 Chinese manufacturing companies, data from a questionnaire survey conducted in 2000; 2nd study: longitudinal data on U.S. listed high-tech companies, period: 1995–2005, 3,285 firm-year observations	1st study: Difference between the subjective assessment of CEOs (questionnaire survey) and the actual company performance (return on sales), 2nd study: CEO hubris measure based on forecast errors. It should be noted that the variables can measure both a personality trait and a cognitive bias.
Tang et al. (2015b)	Relation between manager hubris and CSR	Period: 2001–2010, sample: 1,925 firm-year observations, 464 CEOs, 397 companies from the S&P 1500 companies	Media-based
Tang et al. (2018)	Different relations between CEO hubris versus CEO narcissism and CSR activities	Period: 2003–2010, sample: 266 CEOs, 235 U.S. companies listed in the S&P 1500, 769 firm-year observations	Media-based
Tebourbi et al. (2020)	Relation between managerial overconfidence and R&D investments	Period: 2007–2016, sample: 2,051 firm-year observations of Vietnamese firms	Measurement based on residuals of the regression of investment, i.e. the sum of capital expenditures, R&D expense, and acquisitions minus sale proceeds of property, plant, and equipment divided by lagged total assets, on lagged change in sales
Ting et al. (2016)	Relation between managerial overconfidence and financing preferences	Sample: 1,404 firm-year observations of 793 companies listed on the Malaysian stock exchange as of 30.09.2012	Six measures: (1) size of the CEO photo in the annual report, (2) educational background, (3) wealth of experience, (4) gender, (5) network, (6) performance
Vivian and Xu (2018)	Managerial overconfidence and the “pecking order”	Period: 1994–2011, sample: 2,283 observation points, 459 British companies	Three measures: (1) a computer-based linguistic analysis of the statements of the decision-makers analyzed, whether they are written in an optimistic tone, (2) an industry-adjusted investment based measure (similar to Campbell et al., 2011), (3) how CEOs and CFOs deal with their shareholdings

Table 4 (continued)

Author(s) (year)	Focus of investigation	Sample	Measurement of managerial overconfidence
Wang et al. (2016)	Relation between inflation uncertainty, managerial overconfidence and investment behavior	Period: 2003–2012, sample: exclusion of financial companies, 2,332 Chinese companies	Measurement using the difference between predicted and actual success figures according to Lin et al. (2005). It should be noted that this measure can target both a personality trait and a cognitive bias.
Wang et al. (2018)	Relation between political relations, the level of investment in R&D and managerial overconfidence	Period: 2010–2014, sample: 1,293 Chinese companies listed on the Shanghai or Shenzhen stock exchange	A comparative analysis of the investment flows of the sample companies regarding the highs and lows of the Chinese business cycle and the investment behavior of peer group companies allows to determine overconfidence, since the investment behavior of the self-confident managers deviates from an optimal behavioral pattern closely related to the business cycle.
Wong and Wang (2018)	Effect of managerial overconfidence on the valuation of investments in TV commercials by the stock market and the impact of family ownership on it	Period: 2007–2011, sample: 1,658 announcements of new TV spots by 78 companies listed on the Taiwanese stock exchange	Media-based
Yang (2015)	Relation between manager hubris in mergers and cost remanence	Period: 1995–2011, sample: 303 mergers, 1,786 control companies	CEO hubris on the bidder side is determined via an interaction variable consisting of the dummy variable BidderHubris, which takes the value one if the company is a merged company, and the variable Optimism, which captures the deviation of the manager's sales forecast from the actual sales figures
Zavertina et al. (2018)	Influence of managerial overconfidence on innovation activity of the company, investment in R&D, its output and impact on goodwill	Period: 2008–2013, sample: transnational sample of 766 listed European companies	Three measures: (1) CEOs named in press reports, (2) their age, (3) their experience
Zhang et al. 2020	Impact of managerial overconfidence on firm pollution	Period: 2015–2017, sample: 319 observations for 236 firms	Three measures: two media-based measures and one salary-based measure

Tate (2008) show that overconfidence tends to lead to poor quality takeovers when

the buyer has many internal resources available. Finally, Yang (2015) shows a connection between overconfidence (hubris) in acquisition activities and cost remanence due to overestimated synergy potentials. *In terms of financing*, results are also clear: Chai et al. (2016) and Ferris et al. (2013) observe a preference for cash to realize company takeovers by very confident CEOs. Finally, Gupta et al. (1997) analyze the effect of changed conditions (specifically in the wake of the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989) on acquisitions driven by overconfidence (hubris), but cannot identify any effect, which suggests a *robustness of the observed influence* of overconfidence in the context of takeovers independently of regulation.

4.2.2 Investment behavior and share buybacks

The identified articles provide evidence of a robust effect in terms of *overinvestment* (Huang-Meier et al. 2016; Park and Chung 2017). In addition, a number of studies indicate that overconfidence leads to *cash-flow sensitivity of investment activity* that deviates from rational behavior: Malmendier and Tate (2005) show that overconfidence increases the cash-flow sensitivity of investments in relation to existing funds and that this is particularly strong in companies that are dependent on equity financing. The starting point for their explanation of this observation is the tension between CEOs' and market assumptions on company value (Malmendier and Tate 2005, especially p. 2662): Since very confident decision-makers overestimate the value of their investments, they tend to overinvest if they have sufficient internal resources. If these internal resources are not available, however, they are not willing to raise equity because they perceive the company as undervalued by the market. Several scholars confirm these findings in various contexts (Bukalska, 2020; Huang et al. 2011; Kim 2013; Koo and Yang 2018; Lin et al. 2005). In addition, Choi et al. (2018) show that when cash-flows fall, investment activity of very confident managers does not decrease linearly but less than would be rational. For the real estate sector, Eichholtz and Yönder (2015) also note that, if sufficient funds are available, overconfidence favors the acquisition of real estate but impairs its sale, resulting in lower net operating income and lower profits from property sales. The findings of Wang et al. (2016) additionally suggest that lower inflation uncertainty is associated with overinvestment and that overconfidence increases this.

According to Andreou et al. (2019), overconfidence promotes *value-destroying diversification strategies* and leads to a preference for diversifying investments, especially when internal financial resources are available. In addition, very confident CEOs tend to implement restructuring measures after diversification has taken place, i.e., they have to invest further resources to make the diversification work. Lai et al. (2021) provide another aspect regarding investment behavior, as they observe a negative relation between managerial overconfidence and *labor investment efficiency*. Finally, Andriopoulos et al. (2013) find a positive relation between overconfidence and the *implementation of announced share buybacks*, i.e., a less value creating investment behavior.

4.2.3 Financing preferences and dividend payments

Regarding the *preferred funding source* literature provides contradictory results: Vivian and Xu (2018) find that overconfidence is a key driver of the “reverse pecking order”, i.e., contrary to the rational approach, equity is not used as a last resort to finance projects, which is pronounced in smaller companies. Ting et al. (2016) demonstrate a negative relation between overconfidence and corporate debt. In contrast, Park and Kim (2009) reveal a positive relation between overconfidence and the indebtedness of Korean companies. Lin et al. (2008), Malmendier et al. (2011) and Tan (2017) come to a similar conclusion in other contexts. Moreover, according to Malmendier et al. (2011) overconfidence implies a preference for internal financing, i.e., overconfident CEOs finance more investments with debt than equity compared to rationally acting CEOs, but their overall debt levels are at a moderate level. There is also no agreement on the *maturity of debt instruments*: According to Huang et al. (2016) overconfidence leads to a preference for short-term debt instruments. In contrast, Ataullah et al. (2018) find evidence that overconfidence extends the maturity of debt instruments. Seo et al. (2017) also show that companies with CEOs affected by overconfidence tend to use long-term debt if they have greater growth opportunities. This effect is also stronger for companies with low cash-flows. Additionally, several scholars observe a propensity of overconfident managers to hold high *cash deposits* and their *reluctance to pay dividends* (Andriosopoulos et al. 2020; Chen et al. 2020; Deshmukh et al. 2013; Huang-Meier et al. 2016; Kim and Kim 2019). Bukalska’s (2020) results also indicate less *financial constraints* in companies led by overconfident managers. Finally, scholars observe particularities regarding *lending*. Adam et al. (2020) provide evidence that overconfident managers use performance-sensitive debt (PSD) differently than more rational managers. The former apply PSDs with steeper performance-pricing schedules than the later. To explain this observation, the authors draw on an explication linked to the overconfident managers’ more favorable expectation regarding the firms’ performance. Moreover, the authors find that firms perform worse in the post-issuing phase when led by an overconfident manager. According to Lin et al. (2020) a high degree of managerial overconfidence leads to lower loan spreads on the borrower side, which is related to collateral and covenants, i.e., higher risk for the borrower.

4.2.4 Tax policy

According to Kubick and Lockhart (2017) as well as Chyz et al. (2019), overconfident CEOs’ tend to avoid tax to a greater extent than rational CEOs. Additionally, Hsieh et al. (2018) show that companies with very self-confident CEOs and CFOs are more likely to avoid taxes than companies with other combinations of characteristics between CEO and CFO. Aliani et al. (2016) also find that overconfidence significantly reduces the tax level of Tunisian companies. Yet, it should be noted that this study is based only on 28 companies and, as the authors note, the observed effect is due both to an overestimation of the returns on tax policy decisions and an underestimation of the non-tax relevant costs incurred in this context.

4.2.5 Reactions of investors, analysts, and lenders

Large parts of the literature point to adverse effects of overconfidence on interactions with investors, analysts, and lenders: Hsu et al. (2021) observe a relation between the difference between reported book income and taxable income on the one hand and unfavorable *loan contracting*, e.g., shorter maturity, for the borrower on the other hand. They further find that if the borrower is led by an overconfident CEO, this relation is strengthened. According to Malmendier and Tate (2008) *market participants* show negative reactions, when very confident CEOs announce a merger. Kim (2013) adds to this result by observing that investors react positively to the announcement of overconfident CEOs to make a takeover, if there is only a moderate degree of overconfidence. Results by Kim et al. (2016) indicate a positive relation between overconfidence and plunging stock prices. Similarly, Liu and Lei (2021) observe a moderating impact of managerial overconfidence on the relation between managerial abilities and stock price crashes, in the sense that these abilities exert a positive impact on these crashes only if overconfidence is high. Wong and Wang (2018) show that CEO overconfidence leads investors to evaluate a new TV advertising campaign adversely reflected in negative reactions on the stock market. In addition, Andreou et al. (2018) can show that the stock market reacts differently to share buyback announcements by very self-confident CEOs compared to rational CEOs. The long-term increases in market value induced by the announcement are lower. Chen and Lu (2015) also point out that overconfidence has a negative effect in the context of share buybacks by increasing buyback costs. Iyer et al. (2017) note a rather positive reaction of shareholders and creditors to the change of a very self-confident compared to a rational CEO. Aghazadeh et al. (2018) show a relationship between overconfidence and the cost of equity: a moderate degree of overconfidence has a negative effect on it, while a high degree of overconfidence shows a positive relation with it. Aktas et al. (2019) find that in companies with scarce financial resources and growth opportunities, a positive valuation of cash by the stock market can be observed in the presence of a very confident CEO, while a negative valuation can be observed in companies without financial constraints. Finally, Lin et al. (2019) provide evidence that *analysts* are reluctant to make positive recommendations for stocks of companies led by very confident CEOs and that analyst recommendations for companies with very self-confident CEOs are given a high weight by investors.

4.2.6 Financial performance

Several scholars point to a detrimental effect of overconfidence on financial performance: Hayward and Hambrick (1997) and Kolasinski and Li (2013) find evidence that the acquisitions of very self-confident CEOs (referred to as *hubris* in Hayward and Hambrick 1997) are more value-destroying than those of not very self-confident CEOs. The study by Ho et al. (2016) confirms a negative relation between overconfidence and corporate success, which is induced by the risk behavior promoted by overconfidence: The risks taken by very self-confident decision-makers to increase returns in boom phases lead to greater defaults at banks in crisis phases. Also, Eichholtz and Yönder (2015) as well as Park et al. (2018) observe a negative relation

between overconfidence and business success. Loureiro et al. (2020) show a moderating effect of CEO overconfidence on the relation between the application of 1\$ CEO salaries on the one hand and firm performance and CEO total pay on the other hand. It increases the negative impact of this extreme compensation strategy on firm performance and its positive effect on total CEO pay. Thus, in sum, it has a detrimental effect.

Yet, the results of Hsu et al. (2017) point in a slightly different direction: They find that companies that are managed by a very confident CEO and therefore tend to carry out risky but promising projects, but that also have conservative accounting practices that quickly disclose problems with these projects and prompt the CEO to solve them, show better corporate performance. According to this study, this effect is reinforced in highly dynamic environments. Mueller and Brettel (2012) also paint a rather mixed picture of the relation between overconfidence and corporate success. They point out that high investments by overconfident CEOs have a negative impact on corporate profitability and stock market performance during recessions, but a positive impact during ups and downs. Accordingly, the investment behavior favored by overconfidence has different effects on corporate success depending on the market phase. Reyes et al. (2020) find similar evidence, as they observe that the business cycle has a moderating effect on the positive relation between managerial overconfidence and firm performance, in the sense that in expansion years this relation is strengthened and in recession years it is attenuated. Moreover, Kim and Kim (2019) provide evidence for a positive effect on firm performance: While overconfident CEOs of high-profitability firms are reluctant to pay dividends, these firms exhibit higher future performance than all other firms. Kaplan et al. (2012) investigate the relation between overconfidence, which they relate to resoluteness and performance. They differ from other studies in the way, how they measure overconfidence. They use a data set of 30 characteristics that were collected in a recruiting process and applied a factor analysis to deduce factors, of which one is related to overconfidence. The authors find a positive relation between this factor and CEO success, defined as the CEOs' company receiving "positive press regarding its operations or additional financing at higher valuations" (Kaplan et al. 2012, p. 982).

Kim et al. (2021) and Leng et al. (2021) put these results in a broader perspective by providing more nuanced insights: The results by Kim et al. (2021) indicate a positive effect of managerial overconfidence on firm growth in the restaurant industry which is negatively moderated by franchising. In contrast, they could not statistically significantly confirm the hypothesized negative impact of managerial overconfidence on firm profitability. However, the latter relation is significantly moderated by franchising as follows: In case of franchising profitability is higher for firms led by overconfident CEOs than for firms led by non-overconfident CEOs. In case of no franchising, the opposite holds. The authors conclude from these combined results an offsetting effect of franchising on the negative effect of overconfidence. Leng et al. (2021) find a positive relation between managerial overconfidence and the probability of corporate failure in innovative environments but not in non-innovative environments. Moreover, conservative accounting seems to moderate the relation between overconfidence and the probability of failure, as this relation only is significant in case of low conservatism. Also, overconfidence only exerts a positive impact on the

probability of bankruptcy in case of small boards of directors. Similar results can be observed for less independent boards and less diverse boards.

Finally, according to Liu and Nguyen (2020) CEO overconfidence affects the writing style of CEO letters and thus the presentation of firm performance. Overconfident CEOs use more positive words.

4.3 Managerial overconfidence and social resources

As stressed in Sect. 2.1, social resources are one further important building block to establish organizational resilience. However, so far, literature only provides scarce evidence regarding the impact of overconfidence on this type of resources. Phua et al. (2018) find that overconfidence is helpful in *building supplier networks* and leads to lower *employee turnover*. The authors argue that overconfident managers achieve this by leading in a very dedicated way. They are optimistic regarding the growth opportunities of the firm and therefore work hard, which in turn is observed by stakeholders in a positive manner. Particularly, overconfident managers increase the number of dependent suppliers and thus are according to the authors capable to establish “bilateral relationships with suppliers” (Phua et al. 2018, p. 520). They further induce these suppliers to make higher investments, which underlines their capability to establish longer-lasting relationships. Campbell et al. (2011) observe a non-linear relationship between optimism (operationalized as overconfidence) and *dismissals*: Moderately confident CEOs are less likely to be dismissed early than very confident or not at all confident CEOs. This observation points to a possible non-linear relation between overconfidence and these managers’ capability to establish stable relationships which protect them from early dismissal. Alqatamin et al. (2017) observe that managerial overconfidence fosters *forward-looking information disclosures*, an important way of communicating with investors. Beavers and Mobbs (2020) find evidence that managerial overconfidence has a positive relation with CEOs’ attendance of board meetings, serving on the nominating or the compensation committee, independent directorships, and attendance rates on boards. Moreover, “[b]oards with overconfident directors are more likely to appoint a better prepared and more reputable CEO following a turnover” (Beavers and Mobbs, 2020, p. 389). Thus, overconfident managers are highly engaged in these activities and thereby can build *networks*.

4.4 Managerial overconfidence and procedural resources

4.4.1 Accounting

Accounting processes constitute one important part of organizational routines to document corporate activities and thereby help to prepare decision-making in firms. In this context, overconfidence leads to adverse developments as it fosters *misconduct*: Schrand and Zechman (2012) find a positive relation between overconfidence and misreporting. In addition, Cormier et al. (2016) show that CEO hubris (operationalized as overconfidence) is present in companies accused of false reporting. The results are consistent with McManus (2018), who focuses on profit manipulation and demonstrates a positive relation between CEO hubris (operationalized as overconfidence)

and profit manipulation. Banerjee et al. (2018) show a positive relation between overconfidence and shareholder class actions. According to Bouwman et al. (2014), manager optimism (operationalized as overconfidence) leads CEOs to *smooth earnings* and to less frequently make surprising adjustments to them. The authors explain this observation by the fact that all CEOs smooth out earnings figures, but very confident decision-makers do so more strongly, especially in bad times, because they overestimate the possibility of making enough profits in the future to compensate for this. Findings by Hsieh et al. (2014) confirm such a relation between overconfidence and earnings management. According to Kouaib and Jarboui (2016) managerial overconfidence moderates the relation between earnings thresholds and real earnings management based on R&D expenditures. Moreover, Ahmed and Duellman (2013) find a negative relation between overconfidence and *conservative accounting*. The authors attribute this observation to the fact that very self-confident decision-makers overestimate the profitability of their investments and are therefore only prepared to take potential losses into account after a delay. Chung and Hribar (2021) observe evidence that managerial overconfidence decreases the likelihood of impairment in any firm-quarter and increases the time to impair goodwill. Pierk (2021) argues that new CEOs engage in large write-offs, a form of conservative accounting, as they observe poor projects which have been overlooked by their predecessor. The author observes that overconfident, new CEOs are less willing to do large write-offs than less overconfident, new CEOs. Finally, Lee (2016) shows that overconfidence favors the occurrence of weaknesses in the *internal control and monitoring processes*, e.g., staff shortages in accounting.

However, these negative findings are put into another perspective by Chu et al. (2019). In their sample, propensity-score matching eliminates a significant impact of CEO's overconfidence on earnings manipulation when comparing manipulating firms to the whole population. The authors conclude that either their "overconfidence proxy contains noise or that overconfidence is not an important determinant of manipulation after controlling for firm characteristics" (Chu et al. 2019, p. 1969).

4.4.2 Auditing

Similarly to accounting, auditing comprises an important set of organizational procedures. Overall, findings regarding the impact of managerial overconfidence on auditing are mixed: Mitra et al. (2019) find more intensive auditing in the presence of overconfidence among decision-makers in the company. Yet, the exact background of how overconfidence leads to a more intensive examination, e.g., due to increased earnings management, is not apparent here. The study shows, however, that higher capabilities of the decision-makers to generate reliable accounting information mitigate this effect. Duellman et al. (2015), on the other hand, observe a negative relation between overconfidence and audit fees in companies with a weak audit committee. The authors attribute this to the conviction of the very self-confident decision-maker that the auditor is not a useful corrective in the course of accounting. A strong audit committee reduces this relation. Ji and Lee (2015) demonstrate a positive relation between overconfidence and audit reports with GCO. The extent to which overconfidence leads to this in detail, however, is not investigated.

4.4.3 Innovation processes

Regarding innovation processes, one further bundle of procedures which are discussed in the context of managerial overconfidence, literature provides a complex picture. Overconfidence seems to foster *innovation activities as such*: Galasso and Simcoe (2011) demonstrate a positive relation between overconfidence and innovation (measured by citation-weighted count of U.S. patents). The authors explain this observation with the fact that very self-confident decision-makers underestimate the probability of failure and are therefore more willing to innovate in order to present themselves as particularly capable. Hirshleifer et al. (2012), Tang et al. (2015a), Wang et al. (2018) and Tebourbi et al. (2020) show a similar relation between overconfidence (referred to as hubris in Tang et al. 2015a) and innovation or spending on innovation. Furthermore, Kim et al. (2018) find a relation between hubris (operationalized as overconfidence) and a reduced focus on advertising spending compared to R&D investment, moderated by a number of factors. Finally, based on the Upper Echelon Theory Engelen et al. (2015) show a positive effect of CEOs' overconfidence on the entrepreneurial orientation in their companies.

However, in terms of *financial innovation success*, overconfident CEOs perform poorly: Simon and Houghton (2003) show that overconfidence favors the introduction of pioneering, high-risk products, which are likely to be less successful. Chen et al. (2014) focus on the long-term effect of high R&D investments due to overconfidence on market reactions and find higher returns in companies without very self-confident CEOs than in companies with very self-confident CEOs. Also, Zavertiaeva et al. (2018) show that overconfident managers do not invest efficiently in R&D and are therefore detrimental to firm value. Hur et al. (2019) come to a similar conclusion by observing that overconfident CEOs are less willing to reduce R&D expenditures in case of decreasing sales. Moreover, Almeida et al. (2021) find a detrimental moderating effect of overconfidence on the relation between a sudden cash inflow and innovativeness, i.e., in case of overconfident CEOs the analyzed firms produce less valuable patents. The authors conclude from this that they may invest more in risky innovation projects and thereby are more likely to destroy value.

Finally, Guo and Ding (2020) observe a *relation between a firm's performance discrepancy, i.e., the difference between actual performance and aspirations, a firm's patent application rhythm and overconfidence*. If the aspiration level is lower than the actual performance, CEOs tend to change this rhythm because they try to recalibrate R&D to increase innovativeness and thereby performance. Thus, a less rhythmic patenting pattern can be observed. In contrast, if performance is higher than the aspiration level, the current patenting pattern remains the same, as it serves the firm. CEOs overconfidence attenuates this relation. In case of high performance, such CEOs are trying to surpass their previous performance, while in the opposite case, they are not willing to admit the problems and to change processes.

4.5 Decision-making processes

In addition to studies dealing with specific corporate areas, there are also authors who analyze the influence of managerial overconfidence on general aspects in connection with decision-making processes.

First, literature suggests a positive relation between *risk-taking* and overconfidence: According to Lai et al. (2017), who apply behavioral decision theory, CEOs' overconfidence encourages the acquisition of a *full* stake in a foreign company to gain a foothold in foreign markets. The authors consider this approach to be very risky, as these investments are cost-intensive and susceptible to negative consequences of environmental changes. They explain the willingness of decision-makers affected by overconfidence to take these risks by the fact that they (unjustifiably) trust themselves to master these imponderables. Such a higher propensity to take risks of overconfident managers also is observed by Li and Tang (2010), Hirshleifer et al. (2012), Adam et al. (2015), and Seo and Sharma (2018).

However, Schumacher et al. (2020) provide a finding that is not fully in line with these observations. Based on a sample of U.S. manufacturing firms they find that overconfident CEOs are less willing to increase risk-taking if they are confronted with negative performance feedback, because they perceive the situation as less critical as more rational decision-makers. Moreover, these CEOs are willing to decrease risk-taking if they receive positive feedback. This effect is reversed, if the CEO is not in an aspiration situation but gets into a situation of survival. In this case, the overconfident CEO prefers a riskier strategy in case of negative feedback than a rational decision-maker. The authors interpret the reaction of an overconfident CEO in an aspiration situation as unfavorable because negative performance feedback should foster problematic search related to increasing risk-taking. Also, the reaction in a survival situation is interpreted as unfavorable by the authors.

One further article deals with the *handling of errors* by overconfident managers. Chen et al. (2015) observe a significantly negative relation between the willingness to correct predictions and overconfidence.

Finally, based on a sample of entrepreneurs Ahmad et al. (2021) find a detrimental effect of overconfidence on *strategic decision-making*. Similarly, Li and Sullivan (2020) observe a negative relation between hubris (operationalized as overconfidence) and strategic foresight, i.e. "individual or collective ability to assess and predict emerging future events and subsequently allocate strategic resources necessary for achieving favorable outcomes" (Li and Sullivan, 2020, p. 1).

4.6 CSR

In the context of CSR activities existing studies present mixed results. Tang et al. (2015b) demonstrate both a negative relation of hubris (operationalized as overconfidence) with involvement in CSR activities, and a positive relation with the implementation of activities that are contrary to CSR. Sauerwald and Su (2019) find indications that overconfidence contributes to a divergence between communicated and actual CSR commitment. The authors compare the optimistic tone adopted in the company's own CSR reporting with the corporate social performance measured by

Table 5 Moderating effects

Authors (year)	The connection between overconfidence and...	Moderator	Amplification of adverse effects	Amplification of beneficial effects	Mitigation of adverse effects	Mitigation of beneficial effects	Moderation of neutral relations
<i>Dynamics, uncertainty, complexity and advantageousness of the environment</i>							
Ji and Lee (2015)	Critical assessment by the auditor	High uncertainty	X				
Lai et al. (2017)	Acquisition of a <i>full</i> participation in a foreign company	High uncertainty	X				
Hsu et al. (2017)	Corporate success (with conservative accounting)	High uncertainty		X			
Arena et al. (2018)	Environmentally friendly innovations	High uncertainty				X	
Tang et al. (2015b)	Low awareness of socially responsible activities	High uncertainty			X		
Tang et al. (2015b)	High perception of socially irresponsible activities	High uncertainty			X		
Chung and Hribar (2021)	Timeliness of goodwill impairments	Uncertainty about firm performance	X				
Li and Tang (2010)	Risk behavior	Great market complexity	X				
Tang et al. (2015a)	Company innovations	Great environmental complexity				X	
Engelen et al. (2015)	Entrepreneur orientation	High market dynamics		X			
Tang et al. (2015a)	Company innovations	A more favorable environment				X	
Li and Tang (2010)	Risk behavior	Positive market conditions	X				
Galasso and Simcoe (2011)	Innovation	Strong competition		X			

Table 5 (continued)

Authors (year)	The connection between overconfidence and...	Moderator	Amplification of adverse effects	Amplification of beneficial effects	Mitigation of adverse effects	Mitigation of beneficial effects	Moderation of neutral relations
Tang et al. (2015b)	High perception of socially irresponsible activities	Strong competition			X		
Li and Sullivan (2020)	Strategic foresight	Industry concentration			X		
Hirshleifer et al. (2012)	R&D expenditure	Innovativeness of the industry		X			
Hirshleifer et al. (2012)	Patent applications	Innovativeness of the industry		X			
Hirshleifer et al. (2012)	Patent citations	Innovativeness of the industry		X			
Lai et al. (2017)	Acquisition of a <i>full</i> participation in a foreign company	Information asymmetry	X				
Lai et al. (2017)	Acquisition of a <i>full</i> participation in a foreign company	Cultural distance	X				
Lai et al. (2017)	Acquisition of a <i>full</i> participation in a foreign company	Institutional distance	X				
Hsu et al. (2017)	Corporate success (with conservative accounting)	Less restrictive financing conditions		X			
Ownership							
Wong and Wang (2018)	Adverse evaluation of a new TV advertising campaign by investors	Family participation	X				
Ting et al. (2016)	Financial decision	State participation					X
Li and Tang (2010)	Risk behavior	State participation			X		
Supervisory bodies and accounting							
Lai et al. (2017)	Acquisition of a <i>full</i> participation in a foreign company	Strong board			X		

Table 5 (continued)

Authors (year)	The connection between overconfidence and...	Moderator	Amplification of adverse effects	Amplification of beneficial effects	Mitigation of adverse effects	Mitigation of beneficial effects	Moderation of neutral relations
Kolasinski and Li (2013)	Value-destroying takeover activity	Strong board			X		
Brown and Sarma (2007)	Value-destroying takeover activity	Strong board			X		
Park et al. (2018)	Lower business success	Strong board			X		
Mitra et al. (2019)	Audit costs	Strong board	X				
Chung and Hibrar (2021)	Timeliness of goodwill impairments	Strong board			X		
Bou-zouitina et al. (2021)	CSR activities	Corporate governance effectiveness		X			
Hayward and Hambrick (1997)	Acquisition premium	CEO also chairman of the board	X				
Li and Tang (2010)	Risk behavior	Board membership of the CEO	X				
Hayward and Hambrick (1997)	Acquisition premium	High number of internal board members	X				
Sauerwald and Su (2019)	Decoupling between communicated and actual CSR commitment	Expertise of external board members			X		
Sauerwald and Su (2019)	Decoupling between communicated and actual CSR commitment	Shares of external board members in the company			X		

Table 5 (continued)

Authors (year)	The connection between overconfidence and...	Moderator	Amplification of adverse effects	Amplification of beneficial effects	Mitigation of adverse effects	Mitigation of beneficial effects	Moderation of neutral relations
Ahmed and Duellman (2013)	Conservative accounting	External monitoring (<i>no effect</i>)			x		
Chen and Lu (2015)	Low success of share buybacks	Corporate governance			X		
Cormier et al. (2016)	Misconduct	Corporate governance (<i>no effect</i>)			x		
Kim et al. (2016)	Share price falls	CEO dominance	X				
Kim et al. (2016)	Share price falls	Disagreeing investors	X				
Kim et al. (2016)	Share price falls	Conservative accounting			X		
Park and Chung (2017)	Tendency to overinvestment	Monitoring by institutional, long-term investors			X		
Mitra et al. (2019)	Audit costs	Managerial skills			X		
Mitra et al. (2019)	Audit costs	Effectiveness of the auditor	X				
Introduction of SOX							
Banerjee et al. (2015)	Risk behavior	SOX			X		
Banerjee et al. (2015)	Low dividend payments	SOX			X		
Banerjee et al. (2015)	Little success with company takeovers	SOX			X		
Banerjee et al. (2015)	Low business success	SOX			X		
Banerjee et al. (2018)	Shareholder class actions	SOX			X		
Hsieh et al. (2014)	Earnings management	SOX (<i>little effect</i>)			x		

the KLD Rating. Gul et al. (2020) observe an attenuating effect of overconfidence on the negative relation between CSR engagement and empire building. Thus, while more rational managers decrease their empire building, if they are also engaged in CSR, for overconfident decision-makers this propensity is less pronounced. According to the authors, this finding indicates that overconfident managers apply CSR as social hedge, i.e., they use CSR to mask the negative impacts of their empire building. Tang et al. (2018) additionally show that the negative relation between hubris (operationalized as overconfidence) and CSR engagement is reinforced when affiliated companies invest less in CSR than the focal CEO. Zhang et al. (2020) draw from their analysis the conclusion that CEO overconfidence results in more firm pollution. However, Theissen and Theissen (2020) question this conclusion by raining doubts about the interpretation of the regression results. Overall, the authors concerns seem to be warranted, therefore, we do not draw on this conclusion in the further discussion.

Yet, in contrast to these detrimental effects, for mainly mid-sized, unlisted, founder-controlled family firms in Poland Dick et al. (2021) observe a positive effect of managerial overconfidence on these firms' CSR activities. Moreover, according to Bouzouitina et al. (2021) managerial overconfidence exerts a positive effect on British firms' CSR and Lee (2021) finds a positive relation between managerial overconfidence and the voluntary disclosure of greenhouse gas. Finally, Arena et al. (2018) show that hubris (operationalized as overconfidence) is positively associated with environmentally friendly innovations.

4.7 Moderators

In this section, the most important moderators found in the previously mentioned studies are discussed (see also Table 5). Based on the argumentation in the articles their impact is categorized as strengthening or weakening the positive or negative effects. In addition, there are a few moderated relations that cannot be classified as positive or negative for the company and are therefore noted separately in the last column.

Dynamic, uncertainty, complexity, and the advantageousness of the environment play a particular role. A high level of uncertainty has both a strengthening impact on negative effects (Chung and Hribar 2021; Ji and Lee 2015; Lai et al. 2017) and a weakening impact on them (Tang et al. 2015b). In addition, it can also strengthen positive relations (Hsu et al. 2017) or weaken them (Arena et al. 2018). High market complexity is unfavorable, as it reinforces negative effects (Li and Tang 2010) or weakens positive effects (Tang et al. 2015a).

In addition, *ownership structures*, e.g., state shareholdings or family ownership, show a moderating effect in various articles. For example, the relation between overconfidence and financing decisions is moderated by the extent of state participation (Ting et al. 2016).

The moderating effects of *supervisory bodies* and *accounting* are of particular interest, as these, in contrast to the moderators mentioned above, can be influenced by the company. For example, Hayward and Hambrick (1997) find a positive relation between hubris (operationalized as overconfidence) and the amount of premiums

paid during an acquisition. If the CEO is also the chairman of the board and there are more internal members, i.e., there is less external control, the relation is strengthened. Kolasinski and Li (2013) show that a strong board as a supervisory body can mitigate the effect of overconfidence on value-destroying takeover activities. Chung and Hribar (2021) find that the number of financial experts on the board attenuates the unfavorable impact of managerial overconfidence on the timeliness of goodwill impairments. However, literature also provides evidence that control bodies are ineffective in mitigating the negative effects of overconfidence. For example, Ahmed and Duellman (2013) find that the negative relation they observe between overconfidence and conservative accounting cannot be reduced by external monitoring. Cormier et al. (2016) also observe that hubris (operationalized as overconfidence) is present in companies accused of misconduct and that here corporate governance mechanisms prove ineffective. The relation between overconfidence and audit costs identified by Mitra et al. (2019) is weakened by managerial skills and strengthened by board and auditor effectiveness. Although the latter is initially a negative effect for the company, as it increases costs, it also points to increased control. Taking into account the various moderating effects of control bodies, as shown in Table 5, it seems that a reducing effect of controls on negative effects of overconfidence prevails.

The moderating *effect of SOX* is ambiguous: Banerjee et al. (2015) observe a positive effect of SOX, since after its introduction overconfident CEOs traded less risky, increased dividends, led companies to more success after takeovers as well as reported better business performance. The positive relation between overconfidence and shareholder class actions, as demonstrated by Banerjee et al. (2018), is reduced by SOX. In contrast, Hsieh et al. (2014) show that SOX is less effective in regulating overconfident CEOs' earnings management.

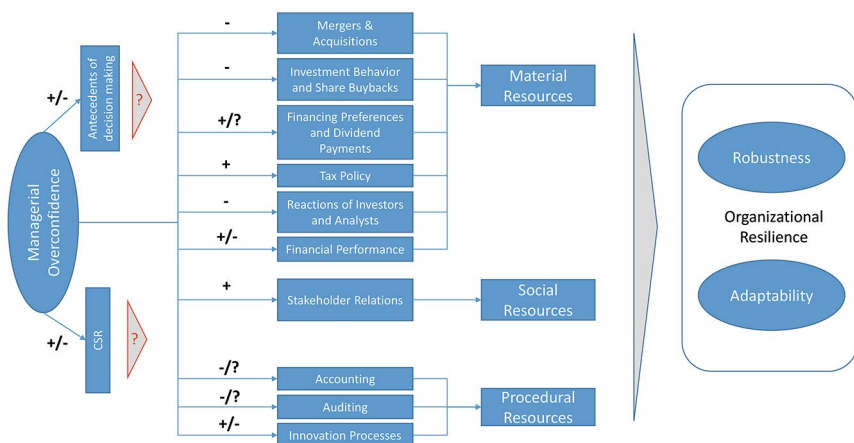


Fig. 3 Framework

5 Discussion

In the present section we organize the insights gained from the identified literature into a framework, illustrated in Fig. 3, to pinpoint the major takeaways and to discuss promising paths for future research.

As indicated in Fig. 3 by the signs on the arrows from overconfidence to the examined corporate areas we can condense the previous discussion in many cases to an overall positive or negative relation, which in turn exerts a positive or negative effect, respectively, on material, social or procedural resources, which in turn build organizational resilience. From these insights we can derive the following core takeaways.

Managerial overconfidence exerts a *detrimental effect on material resources* particularly through an unfavorable effect on the following areas: On a broad basis, the identified literature indicates that overconfident CEOs' *takeover activities* consume a company's material resources in an imprudent way (e.g., Hayward and Hambrick 1997; Malmendier and Tate 2008), as they are less successful than those of rational decision-makers, while at the same time overconfidence fosters their realization. Additionally, research mainly indicates that managerial overconfidence results in overinvestment and cash-flow sensitive *investment behavior* (e.g., Bukalska 2020; Huang et al. 2011; Malmendier and Tate 2005), which deviates from rational decision-making and thereby consumes resources in an ineffective way which deprives companies of important material resources for building resilient structures. Moreover, managerial overconfidence exerts a negative effect on *investors' allocation decisions* (e.g., Kim et al. 2016), i.e., investors are, in general, more reluctant to invest their money in companies led by overconfident managers, which reduces their financial leeway and has a negative impact on material resources and thus organizational resilience. A similar negative effect can be observed with *creditors* (Iyer et al., 2017). Yet, in other corporate areas managerial overconfidence results in the *strengthening of material resources*: As discussed in Sect. 4.2.3 no clear results can be derived from the literature regarding the relation between overconfidence and *financing preferences*. Some studies tend to indicate a preference for short-term debt, which entails a liquidity risk, while others point to long-term debt. The fundamental preference for equity versus debt is also not clearly documented. However, a preference for cash deposits can be observed. This last finding indicates a positive effect of overconfidence on organizational resilience through the deployment of material resources: Holding this kind of financial resources (as part of material resources), which can be accessed at short notice in times of crises, strengthens organizational resilience. Additionally, overconfident CEOs' tendency to follow an aggressive *tax policy* can be interpreted as trying to retain as much financial resources in the short run within the company as possible, which in turn positively affects the availability of relevant material resources. Thus, contrary to what is often noted in the literature, managerial overconfidence not only has negative effects, but in some areas has a positive impact on material resources. Accordingly, the question is whether it is possible to harness these positive effects while mitigating negative impacts. As the discussion in Sect. 4.7 shows, there is indeed evidence that control instances, particularly strong boards that are independent from the overconfident CEO, can attenuate detrimental

takeover activities and unfavorable investment behavior. Thus, the insights gained from the identified literature lead to the following proposition:

Proposition 1 *Very confident CEOs can have a positive effect on organizational resilience through the deployment of material resources, if they are under the control of a strong, independent board.*

The identified findings indicate a positive impact of managerial overconfidence on social resources. Particularly, Phua et al. (2018) observe a positive effect of managerial overconfidence on the establishment of supplier networks and employee commitment. Supplier networks are related to organizational robustness, as stable supplier relationships can cushion the imponderables in a difficult business environment, as they help to secure the supply of relevant raw materials even in difficult market situations. The reduction of employee turnover by overconfident managers indicates on the one hand, that they are able to retain employees even in difficult situations and thus stabilize the organization. On the other hand, this increased employee commitment also indicates the willingness of employees to support organizational transformation and thereby fosters adaptability. This observation is put into a broader perspective by Campbell et al. (2011). They do not focus on the same relationships as Phua et al. (2018), but they show that a medium degree of overconfidence results in the lowest probability of early dismissals, which indicates that a medium level of overconfidence seems to be optimal in the context of relationships, as moderately overconfident managers have the highest ability to win others over. Overall, these findings can be condensed to the following proposition:

Proposition 2 *Very confident CEOs are capable to strengthen important social relations and thereby to enhance social resources which promotes organizational resilience.*

In terms of accounting and auditing, two important procedural resources, managerial overconfidence exerts in large parts negative effects. Except for Chu et al. (2019), findings indicate that overconfidence seems to increase the propensity for misconduct in the context of corporate reporting. This behavior weakens the effectiveness of these organizational procedures to foster organizational resilience. On the one hand, the denial or manipulation of information results in a decreasing capability to adapt to a changing environment as the situation cannot be judged in a realistic manner. On the other hand, the acceptance of manipulations weakens the perception of the reporting as an objective and as accurate as possible information system and thus also the company's belief in the correctness of the information provided. This can mitigate robustness as reporting is not accepted as a stabilizing procedure, which provides correct information to keep the company going also in difficult situations. However, it has to be mentioned that the study by Chu et al. (2019) shows that it has not yet been conclusively clarified whether these negative effects of managerial overconfidence are so pronounced.

Further detrimental effects can be observed in terms of auditing. These processes are designed to uncover mistakes and fraudulent behavior to prevent decision-mak-

ers from concealing undesirable developments and thereby causing organizations to react too slowly to adverse changes. Thus, processes which hinder these procedures to reach their full potential are detrimental to organizational resilience. So far, literature to judge the impact of managerial overconfidence on these procedures is limited. However, as discussed in Sect. 4.4.2 existing research indicates of a negative influence. Thus, the identified literature mainly points to a detrimental effect as follows:

Proposition 3 *Very confident CEOs hinder affective accounting and auditing processes which weakens organizational resilience.*

Moreover, literature provides evidence regarding a positive impact of overconfidence on innovation processes, one further building block of procedural resources, although not always in an efficient way. This observation also holds for innovations related to environmental-friendly investments, as discussed in Sect. 4.6. Overconfident managers are more optimistic than more rational ones and, thus, are also willing to start very risky, but potentially very valuable innovation projects. Yet, this risk also comes at the price of severe failures. All in all, overconfidence has the potential to increase firms' adaptability through innovation policy and thereby also their resilience. However, as pointed out by Guo and Ding (2020), overconfidence can exert a detrimental effect on the implementation of an optimal patent application rhythm, which potentially mitigates a firms' adaptability. Thus, literature indicates a potential for positive effects on adaptability through innovation, but this observation does not apply without restriction. As indicated in Table 5, industry characteristics, particularly competition and industry innovativeness, can foster the beneficial aspects of overconfidence on innovations. This observation indicates that the beneficial impact of overconfidence on innovations depends on the type of industry in which a company led by an overconfident CEO operates. Those companies which operate in an environment in which innovations are of high importance due to the pressure of competitors can benefit from overconfident CEOs' behavior. This leads to the following proposition:

Proposition 4 *Very confident CEOs exert a positive impact on innovation processes in competitive and highly innovative market environments fostering organizational resilience.*

Besides articles which deal with one of the three core resources, several scholars provide insights regarding the impact of managerial overconfidence on topics related more generally with decision processes. As elaborated further when discussing future research paths, literature on risk-taking induced by overconfidence so far does not provide insights which can be condensed to one proposition. While this literature criticizes the risk-taking behavior by overconfident managers, until today, the relation between this risk-taking and the decision processes observed in the different corporate areas are unclear. For example, a propensity to take risks might induce aggressive tax policies, ambitious innovation processes but also inadequate takeover activities.

One further article deals with the handling of errors by overconfident managers. Chen et al. (2015) observe a significantly negative relation between the willingness

to correct predictions and overconfidence. While the literature on this topic still is limited to one article, one can already note, that this characteristic is detrimental to organizational resilience, as it avoids necessary decisions and reduces adaptability. As top-managers exert a major impact on organizational culture, this unwillingness to face up to mistakes also can establish itself in the organization and thus endanger adaptability in the long term resulting in Proposition 5:

Proposition 5 *Very confident CEOs exert a negative impact on organizational resilience through inadequate error handling strategies.*

Also, literature indicates detrimental effects of overconfidence on strategic decision-making, which in turn can reduce companies' adaptability and thus organizational resilience: Strategic planning allows companies to adapt to changing circumstances and make provisions to respond flexibly to unpredictable events. Thus, we can derive the following proposition:

Proposition 6 *Very confident CEOs have a lower capability for strategic decision-making which exerts a negative effect on organizational resilience.*

The pursuit of CSR goals has become an important strategic issue in recent years, as both customers and regulation are increasingly demanding sustainable business practices. The successful implementation of these goals also makes sense for companies themselves, as they secure their economic basis in the long term through the sustainable use of natural resources and sustainable interaction with all stakeholders. This allows companies to adapt to changing circumstances and make provisions to respond flexibly to unpredictable events. The identified literature provides mixed evidence regarding the impact of managerial overconfidence on CSR. Particularly, overconfident managers tend to overemphasize CSR performance in their communication and they are unlikely to show real commitment. This discrepancy can disturb the basis of trust with stakeholders and thereby can exert a negative impact on social resources. However, more recent publications indicate a positive effect of managerial overconfidence on CSR activities (Bouzoutina et al. 2021; Dick et al. 2021; Lee 2021). Moreover, as indicated by Arena et al. (2018), managerial overconfidence might foster environmentally innovations, which in turn positively affect material resources through e.g., generating earnings. Therefore, extant literature points to both positive and negative relations with CSR, which in turn affect several resources related to resilience. Consequently, so far, no clear proposition can be derived based on the identified literature.

Beside these propositions, also several paths for future research emerge from the previous discussion. First, as indicated above, evidence regarding the impact of managerial overconfidence on financial performance is mixed. This observation might result from the fact, that a company's performance is only partly affected by the outcomes of single decision areas, like takeovers or investment decisions. Only a mixture of these single influences finally leads to the observed financial performance. Consequently, to understand the impact of managerial overconfidence on material resources via its impact on firm performance, aspects like takeover activities and

investment decisions have to be considered as mediators. Yet, while single relations are already empirically analyzed, literature lacks a more comprehensive perspective, which investigates the combined effects of managerial overconfidence on firm performance mediated by these areas. This combined perspective is important because the impact of managerial overconfidence varies across areas and therefore it cannot be determined *ex ante* what the overall effect will be. Thus, one promising avenue for future research is the structured identification of mediating internal factors, like investment behavior, takeover activities, leadership, etc., and external factors, like environmental dynamics, uncertainty, and complexity, between managerial overconfidence and financial performance and the investigation of their joint impact. Thereby, future research can shed more light on the impact of managerial overconfidence on one of the most important building blocks to generate material resources needed to establish organizational resilience.

Second, as mentioned above, with respect to social resources, empirical results suggest a positive effect of managerial overconfidence. However, the existing literature is limited containing only four sources, which points to a considerable need for further research in this area, including a more in-depth analysis of the relationships addressed by Phua et al. (2018) and Campbell et al. (2011). Particularly, future research should analyze in more depth which mechanisms lead to these positive effects of overconfidence. Through this, certain behavioral characteristics can be worked out, which can also be conveyed to non-overconfident managers. This would make it possible to combine the more rational decision-making behavior of non-overconfident managers with positive behavioral patterns of overconfident managers in terms of building up social resources.

Third, with respect to accounting and auditing procedures scholars provide mainly detrimental effects of managerial overconfidence. Yet, with respect to manipulating activities in accounting, it has not yet been conclusively clarified whether there really is an impact of overconfidence, as indicated by the insights provided by Chu et al. (2019), who control for other firm characteristics. This raises the question of whether these firm characteristics or managerial overconfidence have a stronger impact on the manipulating activities and of whether both aspects could lead to joint detrimental effects. Further insights into these issues could provide angles to curb these manipulations on a broader basis by disentangling complex interactions. Furthermore, as indicated by Cormier et al. (2016) even corporate governance cannot mitigate the identified possible negative effects of managerial overconfidence on misreporting. This points to further research needs to better understand the mechanisms underlying the failure of these mechanisms to mitigate detrimental effects. Also, in case of auditing the identified literature is limited, and further investigations are needed to clarify in detail possible relations between managerial overconfidence and the establishment of effective auditing procedures. For example, it still is unclear, how managerial overconfidence in detail exerts an impact on certain auditing activities.

Fourth, as discussed previously, managerial overconfidence seems to increase the willingness to initiate innovations. However, this process is not carried out optimally, particularly in environments characterized by less competition and innovativeness, which can lead to negative consequences for the company's performance. As innovation is a key process for companies to remain competitive in the long run, for com-

panies it would be reasonable to try to curb the negative side-effects of managerial overconfidence while keeping its undeniable positive aspects. However, as indicated in Table 5, so far literature only provides moderators, like the environmental context, which cannot be influenced by companies. Therefore, one important path for future research lies in the more detailed investigation of moderating factors which are internal to a company and therefore can be deliberately applied to mitigate the negative effects of overconfidence on innovations while keeping the positive ones. As indicated by their effect on the relation between overconfidence and other corporate areas, strong boards and accounting measures might be promising candidates for such moderators.

Fifth, literature evaluates the largely positive relation between managerial overconfidence and risk-taking as unfavorable. Yet, as the propensity to take risks influences any decision process, and thus also decisions related to the previously discussed corporate areas, a deeper understanding of the relation between risk-taking induced by managerial overconfidence and these areas is warranted. So far, only few scholars dealing with certain corporate areas mention risk-taking (Simon and Houghton 2003; Ho et al. 2016). Therefore, our knowledge regarding the causal chain from managerial overconfidence via risk-taking to corporate areas is incomplete. Additionally, as highlighted by e.g., Brown and Sarma (2007) and Kolasinski and Li (2013), strong boards can curb overconfident managers' excessive risk-taking behavior. This raises the question of whether this way positive effects of the elevated risk propensity, e.g., regarding innovativeness, can be maintained while the negative consequences can be mitigated by adequate control instances. Thus, based on these mentioned insights further research is warranted dedicated to each of the corporate areas to understand the mediating role of risk-taking and moderating factors to mitigate its negative effects.

Sixth, one paper deals with the impact of overconfidence on error handling and indicates a negative impact on the willingness to correct wrong predictions. Similarly to risk-taking, also error handling is a prerequisite to ensure effective decision processes. Accordingly, the question rises whether this observed negative effect in a particular context also applies to other decision contexts in which mistakes have to be corrected, e.g., in accounting or in the course of investment decisions, pointing to one further path for future research.

Seventh, literature indicates a mixed effect of overconfidence on CSR activities. On the one hand, several scholars show detrimental effects. As CSR activities enhance the relations to core stakeholders, like suppliers, employees and customers, these detrimental effects indicate a weakening of social resources. Moreover, a loss of customer trust due to severe violations of CSR principles can also have a negative impact on material resources. However, more recent publications point to a positive effect of managerial overconfidence in this context, which in turn would strengthen social and material resources. Moreover, Arena et al. (2018) find a positive effect on ecological innovations, which further underlines the at least partially positive effect on companies' innovation activities, and thus procedural resources, already discussed above. Overall, so far literature does not investigate these relations in detail but remains at a level where the focus is on the fundamental connection between managerial overconfidence and CSR, pointing to further need for research to disentangle the complex relations with the three resource types. In this context emphasis also

should be placed on the identification of moderators to reduce negative effects. So far, literature provides only few insights here, e.g., as observed by Sauerwald and Su (2019) the expertise of external board members can mitigate the decoupling between communication and actual CSR activities.

Eighth, the identified literature focuses on a broad set of areas. However, further research is needed to gain deeper insights of whether these areas are the only and the most important ones to understand the major impacts of managerial overconfidence on organizational resilience in the corporate context.

Ninth, so far, the identified literature deals with the relation between managerial overconfidence and corporate areas in a way that allows to derive insights only about one core resource type, mainly material resources. In contrast, so far it is mute about the impact of managerial overconfidence on different core resources via the same corporate area. As only the joint deployment of these core resources leads to a resilient organization, a deeper understanding of joint impacts is of high relevance to theory building and business practice.

Finally, while large parts of research provide insights regarding corporate areas mainly related to material resources, social and procedural resources are covered to a lesser extent. This observation may result from the fact that the field of overconfidence in the business context is strongly shaped by scholars from the area of behavioral finance, who typically concentrate on a financial perspective, like investment behavior and takeover frequency, which in turn is related to material resources. However, the identified research related to social and procedural resources shows a strong impact of overconfidence which indicates that research in these areas is worthwhile and should be intensified. One possible way to achieve this broader perspective is to pick up those corporate areas which are mainly linked to material resources and to further elaborate on the question of whether and how managerial overconfidence additionally affects changes of social and procedural resources in this context. For example, one should further investigate whether mergers conducted by overconfident managers are less successful to deploy social networks across the merged firms and thus fail to extract benefits from the merger to strengthen organizational resilience. Another possible research question considers the question of which effect has an aggressive tax policy on the general willingness to take responsibility for all stakeholders and thereby build stable networks and norms that contribute to a resilient organization.

6 Methodological issues

Beside the mentioned outcomes with respect to the relation between managerial overconfidence and organizational resilience, we observed several *methodological peculiarities*. An evaluation of Table 4 shows that almost all authors perform an indirect measurement of overconfidence, especially option-based and media-based. This type of measurement is certainly preferred, since a direct measurement of overconfidence using validated scales via questionnaires is difficult to implement in the target group of subjects. However, these indirect measures are also influenced by other personality traits. In the option-based measurement, there exists a potential connection with

risk preferences, as it assesses the behavior of a decision-maker in a risky situation. Media-based measures could be influenced by characteristics such as extraversion. It is therefore advisable to develop other measuring instruments in the future, that relate more precisely to overconfidence as a personality trait and are psychometrically validated (Hinkin, 1998), and to carry out comparative analyses to check whether the relations identified are robust. In addition, there are hardly any experimental studies. This makes it difficult to identify causal relations. The restriction to publicly accessible data, which is found in many studies on managerial overconfidence, is due to the difficult access to the target group, i.e. managers in higher positions. Nevertheless, it would be desirable for future research to strive for greater access to this target group in order to be able to derive actual causal relations. This would also make it possible to examine the connection with other related personality traits, e.g., self-efficacy expectations (Bandura 1977; Judge et al. 2002) or self-esteem, neuroticisms, and locus of control (Judge et al. 2002), and to obtain a more comprehensive picture of the effect of the interplay of different traits.

7 Conclusion and limitations

The preceding discussion has revealed a differentiated picture regarding the relation between managerial overconfidence and organizational resilience. However, the study has several limitations. The focus on English literature narrows the perspective, as research published in other languages might contain further insights, particularly with a certain cultural background.

Furthermore, the analysis focuses on articles that define overconfidence as a personality trait. This does not allow a comparison with studies that consider overconfidence as a cognitive bias. However, this limitation seems reasonable since personality traits influence behavior much more fundamentally than cognitive distortions and are more difficult to influence.

Additionally, the present study focuses on contributions in which findings were obtained on the basis of managers. In this way, experiments were largely ruled out, since the experiments found in the literature were conducted with other subjects, especially students, and, thus, do not provide insights into the behavior of managers. It must also be taken into account here that although experimental research on overconfidence is very broad, it tends to focus on general contexts and situations outside business practice. Accordingly, a transfer to the business context, as it is the focus here, seems unwarranted. In contrast, experimental research has the advantage of deriving causalities. This is not fully possible in the studies considered.

Finally, the literature review focuses on articles published in journals with review procedures. Doctoral theses were excluded as a result. We have decided to take this step because the evaluation of a dissertation cannot be viewed by external parties and we would therefore be forced to make a subjective assessment of its quality. We wanted to avoid this in the context of this study. It is to be asked whether a future overview should also include this literature.

Overall, despite the limitations mentioned above, the previous analysis presents a broad picture of current research on managerial overconfidence, provides a number

of paths for further research and highlights the findings that are relevant to business practice. It thus makes an important contribution to an improved understanding of the influences of managerial characteristics on business processes demanded by Upper Echelon Theory.

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