



An investigation of leaders' motivation, intellectual leadership, and sustainability strategy in relation to Norwegian manufacturers' performance

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ABSTRACT

The objective of this paper is to study how leaders' motivation and leadership style relate to the adoption of sustainability efforts at the strategic level and to investigate some of the implications this has for firms. We investigate the relationships between leaders' personal motivation towards sustainability, their intellectual leadership for sustainability, and organizations' sustainability strategies. Further, we study perceived outcomes and objective measures of financial performance influenced by firms' incorporation of such strategies. Findings from a structural equation model of 352 Norwegian manufacturing firms showed that intellectual leadership partly mediated the relationship between leaders' personal motivation for sustainability and their firms' sustainability strategies, indicating that personal motivation influences firm strategy through executives' leadership behavior. We also find strong and significant paths from firms' sustainability strategies to perceived value creation and impact of initiatives at the organization level. Further we find small, but significant relationships between incorporation of sustainability efforts in firms' core business strategies and objective measures of their financial performance. We discuss possible implications of this study for managers and scholars.

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1. Introduction

The general population's attention towards the climate crisis is resulting in increased stakeholder pressure on manufacturing firms to become more sustainable in all aspects of their value chains (Gonzalez-Perez, 2013; Carter and Easton, 2011; Mani et al., 2014). Recent examples are the 'Thunberg-effect', where young and engaged people, such as Greta Thunberg are provoking and inspiring the general public to act in a more sustainable manner. In the EU-parliament election in May 2019, European voters called for more ambitious climate policies – a sign that politicians may follow up on the Paris Agreement with stricter environmental regulations for the manufacturing sector.

In this paper we understand corporate sustainability (CS) as the overall company activities to ensure sustainable development defined as “development that meets the needs of the present, without compromising the ability of future generations to meet

their needs” (WCED, 1987, p. 43). Recent studies have looked at various drivers of corporate sustainability (Lee et al., 2018; Papagiannakis and Lioukas, 2012; Rivera-Camino, 2012). One primary driver of corporate sustainability is firms' sustainability strategy (Etzion, 2007; Galpin and Lee Whittington, 2012; Lartey et al., 2019), and recent studies have shown that sustainability initiatives and outcomes of firms – and within them – can be predicted by individual differences in management, including motivation and leadership styles (Blome et al., 2017; González-Benito and González-Benito, 2006; Rivera-Camino, 2012; Wesselink et al., 2017).

Incorporating sustainability at the strategic level stands in contrast to firms which only engage in sustainability efforts due to institutional demands. In their review, Aguinis and Glavas (2012) found that when management commitment was absent from decisions related to sustainability practices it led to unsuccessful “decoupled” activities. In other words, to be able to build successful sustainability practices, leaders need to be involved at the level of individual motivation and behavior.

Even though the manufacturing sector is highly competitive and corporate sustainability has sometimes been framed as a zero-sum game, some scholars today argue that the climate challenge we

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currently face is one of the greatest business opportunities of our time (Porter and Kramer, 2006, 2011). They uphold that strategies that intricately incorporate sustainability have the potential to create increased value for firms, the environment, and society. Consequently, they believe that many firms are missing out on business opportunities that are created by new stakeholder concerns springing from an increased focus on sustainability. Following this line of reasoning, practitioners would benefit greatly from insight into how sustainability efforts could be developed and integrated into businesses' core strategies (Engert et al., 2016; Ghobadian et al., 2015).

Responding to calls to investigate the implementation and effects of strategic sustainability (Hart and Dowell, 2011; Waldman and Siegel, 2008), we focus on relationships between motivation, leadership style, and sustainability strategy. Furthermore, we investigate the link between sustainability strategy and firm-level performance as research still struggles with inconclusive results regarding this relationship (Goyal et al., 2013; Hussain et al., 2018). Specifically, we ask how leaders may influence firms' strategic sustainability efforts and the degree to which firms' sustainability strategies are associated with firm performance. By studying firms that incorporate sustainability efforts into the very heart of their core business strategies we may uncover the organizational implications of considering the three pillars of environmental, social and economic responsibility (Elkington, 1998).

We use an offshoot of a motivation type from self-determination theory called identified motivation. Identified motivation means that one behaves due to an identification with the value and importance of an activity (Ryan and Deci, 2000). Furthermore, we term leaders' identified motivation in relation to sustainability as *personal motivation for sustainability*. This type of motivation is linked with one's values for sustainability and is expressed when one wholly accepts the importance of sustainability (Graves and Sarkis, 2018; Sheldon et al., 2016).

In line with calls for leadership research to focus on more specific leadership styles – e.g. the components of transformational leadership rather than the broader concept of transformational leadership (Hughes et al., 2018; Van Knippenberg and Sitkin, 2013) – our study looks specifically at the leadership style of intellectual stimulation in relation to sustainability, which we specify as *intellectual leadership for sustainability*. This type of leadership means that management takes on a leadership style that is akin to intellectual stimulation, but with a sincere focus on sustainability. In other words, leaders who exemplify intellectual leadership are those that encourage others to reconsider assumptions, use different perspectives, and to look at issues of sustainability in new ways.

Below we will first outline the theoretical framework and develop eight hypotheses. Our hypothetical model is tested using structural equation modeling (SEM) on a representative sample of Norwegian manufacturers ($n = 352$) with data collected through an online questionnaire. The path model and results are presented before we discuss the findings, implications and limitations of our study.

2. Theoretical framework

2.1. Motivation, leadership, and sustainability strategy

Motivation guides behavior – it helps to determine *what* individuals do, and *how* they do it (Meyer et al., 2004). Self-determination theory is an established theory of motivation in psychology that posits that there are multiple types of motivation that are distinguished by their levels of autonomy and control. Higher levels of autonomous motivation are often preferred because they are associated with better performance for relatively

complex tasks (Deci et al., 2017). Ultimately, according to self-determination theory, behavior is not only dependent on the amount of motivation, but more importantly on the quality of motivation.

Autonomous forms of motivation drive individuals to act based on intrinsic interest inherent in an activity and through identification with the importance of an activity and its goals (Ryan and Deci, 2000). There are two primary types of autonomous motivation: intrinsic and identified motivation. Intrinsic motivation comes from enjoyment and interest inherent in an activity or behavior, while identified motivation is expressed when one identifies with the value of an activity or behavior (Ryan and Deci, 2000). Identified motivation has been found to positively associate with various outcomes such as individual performance (Burton, Lydon, D'Alessandro and Koestner, 2006), information seeking (Koestner et al., 1996), organizational commitment and conceptual understanding (Gagné and Deci, 2005), and behaviors such as civic virtue and altruism (Güntert, 2015), as well as innovative work behavior (Saether, 2019).

For some behaviors, identified motivation may be more fitting than intrinsic motivation, since not all activities necessarily lend themselves to enjoyment, but are rather more congruent with values-based motivation. Identified motivation in relation to sustainability – i.e., personal motivation for sustainability – is inherently linked with environmental values and is expressed when one internalizes the importance of sustainability (Graves and Sarkis, 2018; Sheldon et al., 2016). Recent studies have also supported an association between personal motivation for sustainability with pro-environmental behaviors (Graves and Sarkis, 2018; Graves et al., 2013; Kaplan and Madjar, 2015). Essentially, by having a personal motivation for sustainability that extends from one's own values, managers are likely to influence the greening of their own organizations (Papagiannakis and Lioukas, 2012; Rivera-Camino, 2012).

Since top managers create firm strategy (Carpenter et al., 2004; Hambrick and Mason, 1984), then those that personally value sustainability and express personal motivation for sustainability will likely include sustainability as an integrated part of firm strategy. Thus, leaders' personal motivation for sustainability should have a direct and positive effect on the likelihood of firms adopting a sustainability strategy.

H1: Leaders' personal motivation for sustainability will be positively associated with firms' propensity to adopt a sustainability strategy.

Above we argue that leaders' personal motivations for sustainability are of importance to the sustainability strategy of firms. However, to be able to incorporate sustainability strategies in firms, executives must communicate their values and lead others to put effort into the strategic practices regularly.

Strategy development is complex because it needs to consider the turbulence of industry and the changing needs of stakeholders over time. Transformational leadership has been linked to contexts of turmoil and to accelerating levels of change and crisis (Bass, 1985a; Bass and Riggio, 2006). Such situations necessitate development, and transformational leadership is a tool to provide a meaningful vision for the future and inspire employees to perform beyond even their own expectations. Currently, manufacturers are facing a future with unknown environmental regulation and consumer requirements; thus, these industries can be characterized as being in an uncertain environment.

Transformational leadership is possibly the most utilized perspective of leadership in management studies (Lord et al., 2017). It is composed of 1) *charisma/idealized influence* (leadership that energizes followers and gives them a sense of purpose), 2) *inspirational motivation* (providing followers with meaning and challenges to

achieve good for the collective group, firm or society), 3) *intellectual stimulation* (leadership that helps followers to question the common ways of solving problems and encourages novel improvements of methods and solutions to problems), and 4) *individualized consideration* (leadership that tries to understand the individual needs of others and helps them to realize their full potential) (Avolio et al., 1999; Bass, 1985a). Previous research has shown that leaders' environmentally oriented transformational leadership contributes to firms' green human resource practices (Jia et al., 2018) and green psychological climate (Zhou et al., 2018), and to employees' autonomous motivation for sustainability and pro-environmental behaviors (Graves et al., 2013; Graves and Sarkis, 2018).

Executives that adopt the transformational leadership style of intellectual stimulation, "may be less willing to accept the status quo and more likely to seek new ways of doing things while taking maximum advantage of opportunities" (Bass, 1985b, p. 38). Such leaders encourage their employees to question established assumptions, to look at problems in new ways, and to focus on developing creative solutions to challenges (Bass and Steidlmeier, 1999). Moreover, when leaders employ the leadership style of intellectual stimulation, they are scanning and evaluating the context in such a way that they are more inclined to discover opportunities to serve the firms' various stakeholders (Waldman et al., 2006; Du et al., 2013). As such, intellectual stimulation has been found to be a significant predictor of strategically oriented sustainability efforts (Waldman et al., 2006), in that it promotes creativity and whole new approaches to complex problems which may lead to developing untapped competitive environments. Therefore, intellectual stimulation may be the transformational leadership style that is most likely to result in improved, integrated, and effective sustainability strategies that are far-reaching and have a deep impact on their firms as opposed to more superficial or "greenwashing" sustainability strategies.

Motivation informs behavior, and leadership style is a form of behavior. Specifically, leaders' motivation precedes their leadership style (Kark and Van Dijk, 2007), which suggests a potential association between leaders' personal motivation for sustainability and the way they lead. Previous studies have investigated the relationship between personal motivation and leadership style and these studies revealed a positive link between autonomous motivation and transformational leadership (Barbuto Jr, 2005; Trépanier et al., 2012). Ultimately, leaders who identify with their work as being valuable and important (e.g., personal motivation for sustainability) are likely to exhibit transformational leadership behaviors (e.g., intellectual leadership) for sustainability. Considering the above, we propose the following hypotheses:

H2: Leaders' personal motivation for sustainability will be positively associated with intellectual leadership for sustainability.

H3: Intellectual leadership for sustainability will increase the propensity of firms adopting a sustainability strategy.

Based on the relationships proposed in the previous hypotheses, an indirect positive effect of personal motivation for sustainability on sustainability strategy is suggested through intellectual leadership. A manager's motivation may not be visible, but leadership style is – and so intellectual stimulation will act as a conduit for personal motivation for sustainability and sustainability strategy. Thus, we propose that intellectual leadership will mediate the relationship between personal motivation for sustainability and sustainability strategy.

H4: Intellectual leadership mediates the relationship between leaders' personal motivation and firms' sustainability strategy.

2.2. Sustainability strategy and firm outcomes

In balancing the three dimensions of corporate sustainability

connected to the business, natural environment, and societal aspects (Dyllick and Hockerts, 2002), there are bound to be conflicts of interest. It is unreasonable to assume that the manufacturing industry will go beyond regulatory demands and make radical and costly changes to their business models to benefit external stakeholders' sustainability concerns at the expense of shareholders. Manufacturing firms operate in highly competitive industries and if the adoption of sustainability strategies is perceived as yielding costs instead of economic benefits, as suggested by managers in Christman and Taylor's (2006) study, it is unlikely to be adopted broadly and rapidly. Hence, the question of the economic benefits and financial performance of sustainability strategies becomes pivotal.

Previous research on the relationship between sustainability and firm performance has been inconclusive (Goyal et al., 2013; Hussain et al., 2018). There might be several reasons for this. One of them is that it is methodologically difficult to study this relationship as it takes time for strategic innovations to provide positive economic impact (Hojnik and Russier, 2016) and relevant economic measures for sustainability are underdeveloped (Eliä et al., 2017). Therefore, we have chosen to address the second part of our research question related to the outcomes of sustainability strategies, by dividing it into two dimensions – managers' perceived outcome and the objective financial performance in terms of growth and profitability.

The argument that sustainability strategies could be driving costs is apparent (Waldman and Siegel, 2006). However, research and practice also suggest that in many cases there could be a good business opportunity in taking a sustainable approach, one that clearly outweighs the costs. In justifying sustainability strategies, Dyllick and Hockerts (2002) argue that "corporate sustainability implies a much broader interpretation of the concept capital than is used by either economists or ecologists" (p. 132). In approaching managers, Porter and van der Linde (1995) make a significant effort to build a business case for sustainability. They frame their argument from a competitive point of view and find that both firms and nations could benefit from being frontrunners in the development of making industries more sustainable. Hence, managers could be motivated to adopt sustainability strategies to keep them on the leading edge of an inevitable drive towards sustainability in the industry, to solve their industry's biggest sustainability challenges, and to mitigate business risk from stricter future environmental regulations. The natural-resource-based view (NRBV) (Hart, 1995), is an extension to the resource based view (RBV) and assumes that firms on their own also can achieve competitive advantages by "going green" (Berchicci and King, 2007). Through this theoretical perspective it is argued that RBV in its attempts to explain competitive advantage "ignored the interaction between an organization and its natural environment" (Hart and Dowell, 2011, p. 1465), and that "it is likely that strategy and competitive advantage in the coming years will be rooted in the capabilities that facilitate environmentally sustainable economic activity" (Hart, 1995, p. 991).

Research has since shown that sustainability strategies are more likely to create better economic performance and value for shareholders if sustainability is integrated with overall business strategy (Waldman et al., 2006; McWilliams and Siegel, 2001; Siegel and Vitaliano, 2007). Porter and Kramer (2006) argue that this is due to firms' increase in innovative capabilities and because it broadens firms' typical scope for innovation. This argument has been empirically supported in later studies. Bocquet, Le Bas, Mothe & Poussing (2013) and Haanaes et al. (2011) concluded that firms which adopt and integrate sustainability into their overall strategies are more likely to be more innovative in their product and service offerings.

Sustainable strategies' effects on value creation and the ability to solve industries' major challenges are difficult to measure objectively. Therefore, we approach these issues through managers' perceived impacts of the sustainability strategies.

H5: Firms' sustainability strategies will be positively associated with firms' perceived value creation.

H6: Firms' sustainability strategies will be positively associated with firms' perceived impact of initiatives (i.e. their focus on solving the biggest challenges in their industry).

Even though the relationship between sustainability efforts and financial performance is not conclusive in extant research (Goyal et al., 2013; Hussain et al., 2018), there are recent studies that suggest a positive relationship between sustainability and objective measures of firm performance (e.g. Lartey et al., 2019; Eccles et al., 2014; Reyes-Rodriguez, Ulhøi & Madsen, 2016). Eccles and Serafeim (2013) found that firms which strategically focus on sustainability efforts that are the most relevant, or "material" to shareholder value, can increase both financial performance and the positive effects of such sustainability practices.

There are many trajectories in which sustainability strategies might lead to objectively measured firm-level outcomes. When it comes to increased firm profit, the most obvious is increased profitability through improved efficiency relative to inputs. This strategy has a long history in manufacturing and is most often referred to as 'lean and green' (Florida, 1996). The concept refers to the logic that firms can increase sustainability, profitability, and operational excellence through incremental efficiency improvements in the use of input factors such as water, energy, and materials. Whether labelled 'lean and green' or not, this type of improvement program is something that most manufacturing firms implement to stay competitive (Netland and Aspelund, 2013), and it has been shown to increase firms' environmental performance (King and Lenox, 2001) and firm growth (Lartey et al., 2019). Although few studies exist that show the direct effects on profitability (Garza-Reyes, 2015), sustainability strategies that focus on resource efficiency are likely to influence profitability positively.

Regarding firm growth, the resource efficiency strategy will probably not have a great impact on growth of operational income unless it delivers significantly lower costs for consumers. This is because resource efficiency strategies are generally not transparent to consumers. Rather, sustainability strategies that drive growth are more likely to be strategies that entail transparent sustainability performance, such as green certifications and labeling, fair trade, use of sustainable materials, and recycling/reuse options embedded in products, which appeal to the growing market segment of environmentally concerned consumers. This market segment is already significant in size (US\$966 billion globally according to Unilever), and the Nielsen Global Sustainability Report (2015) shows that this segment is growing rapidly and that consumer brands with demonstrated commitment to sustainability grow four times faster than competitors globally. In addition, market research from McKinsey and Company (2012) shows that concerned customers are willing to pay a significant premium for products that fulfill their expectations about sustainability (McKinsey and Company, 2012). These general trends lead us to hypothesize:

H7: Firms' sustainability strategies will be positively associated with firms' financial performance, in the form of the growth rate of operational income.

H8: Firms' sustainability strategies will be positively associated with firms' financial performance, in the form of return on assets (profitability).

Fig. 1 below provides a visual presentation of the hypotheses in this study.

3. Method

3.1. Data

Some studies on the relationship between sustainability and firm performance are based on case studies with convenience sampling (Aspelund et al., 2015; Goyal et al., 2013), which makes it hard to establish external validity. To improve this aspect our study adopted a quantitative approach, targeting the whole population of Norwegian manufacturing firms.

The population was identified through the Brønnøysund Business Register that holds all public accounts of Norwegian businesses. The sample included companies listed with NACE codes in group C, *Manufacturing*, and thus consists of firms which manufacture a wide array of products, e.g. textiles, furniture, machinery, chemicals, metals, etc.

Firms which had less than five employees in 2015 were excluded, as were those without contact information registered in official registers. The total number of companies in NACE group C with registered contact information and 5 or more employees was 2466. The data collection took place during 2 months at the year end of 2015 and beginning of 2016. To ensure the questionnaire's validity, a pilot study with ten companies was performed prior to distribution. Then, firms were sent an online questionnaire with 110 questions related to their sustainability strategies and leadership. We received 352 fully complete responses resulting in a response rate of 14.3% and ended the data collection in February 2016. We performed a simple comparison between the sample and the population on the descriptive variables we had for all firms (firm size, age, industry code) and within the sample (early or late responder), and we found no significant differences, indicating that the sample was representative for the population.

Subsequently, we completed the dataset with three years of financial data from the year of censoring (2015, 2016, and 2017). This information was obtained from the business information service, Proff Forvalt (forvalt.no), which holds reliable financial accounts of all firms in the population.

The sample predominantly consists of SMEs, which is in line with the Norwegian industry profile. The responding firms had on average 80 employees and an annual turnover of approximately 33 million EUR. The survey was addressed to the CEO, or top-level leader and a cover letter noted that if the leader was unable to answer the questionnaire, it should be passed on to someone with responsibility for sustainability. In the final sample, more than 90 percent of valid responses were completed by the top-level leader.

3.2. Measures and control variables

The measures in the study are based on established and validated measures, but where we were unable to identify established measures, we instead developed them from theory related to the core concepts we were seeking to measure. All measures were tested with a reliability analysis (Cronbach's Alpha) and a Confirmatory Factor Analysis (CFA) with maximum likelihood information. All constructs were measured on a 7-point Likert scale ranging from 1 = *not at all* to 7 = *to a great extent*. Please see Table B1 in the Appendix for all survey items, reliabilities, and factor loadings.

Personal motivation for sustainability was measured using three items adapted from the identified motivation measure in the "Multidimensional Work Motivation Scale" developed by Gagné et al. (2015). These items captured the leaders' motivation to put effort into sustainability work, which extend from their values concerning sustainability.

The leadership style of *intellectual leadership for sustainability* was measured based on the intellectual stimulation scale in

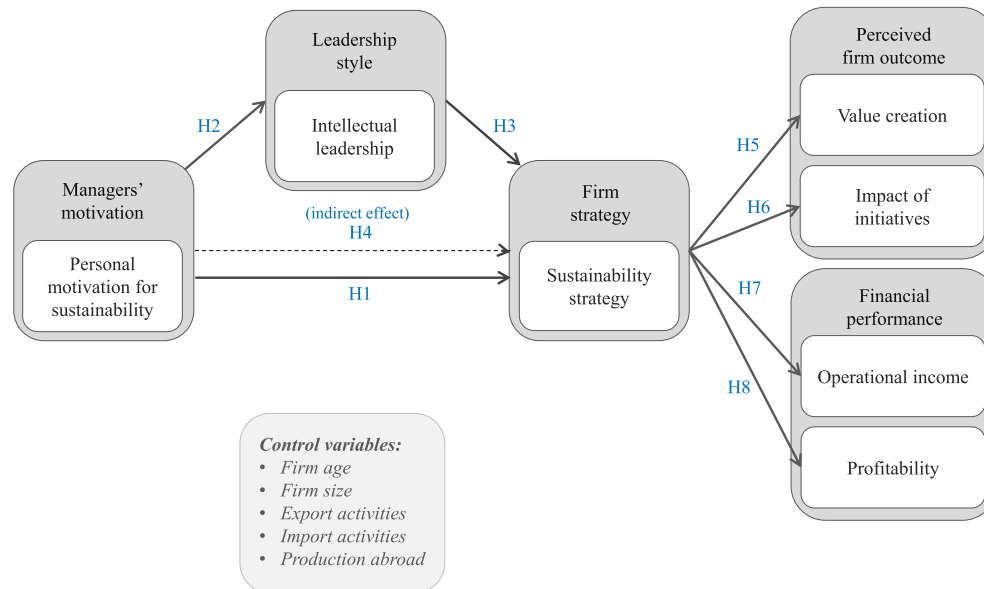


Fig. 1. The hypothesized model.

Waldman et al. (2006). It was adapted to specify the leadership style that the respondent and their management team use in relation to sustainability.

Questions relating to the dependent variable of *sustainability strategy* were based on theoretical contributions by Porter and Kramer (2006, 2011) and Willard (2012). This measure intended to capture the depth of firms' strategic foundations when it came to sustainability efforts.

The measure on perceived *value creation* was developed for the purpose of this study. The theoretical inspiration was taken from the seminal work of Dess and Davis (1984), which established that various strategies have various desired outcomes, such as increased sales, increased market premiums, or strategic market benefits.

The final variable on *Impacts of Initiatives* was also developed specifically for this study. Its objective was to measure the extent to which the sustainability strategies were aimed at solving the biggest challenges in their industry, and if these initiatives were perceived as effective in handling those challenges.

The variables *operational income growth rate* and *return on assets* were calculated as percentages based on the annual financial statements (see Appendix A for calculations). The growth rate of operational income was calculated as the percentage change in operational revenue from the accounting year of 2015 until 2017 – providing lagged financial data for the three years after the survey took place. Return on assets was calculated based on the sample-firms' financial statements for the year 2017. As the effects of firms' strategic measures are unlikely to show up on the financial statements immediately, lagging financial data enables us to capture the potential financial effects of firms' sustainability strategy over three years.

In addition, we included five control variables – firm age, firm size, and three measures of firms' international exposure. *Firm age* was calculated based on a single open-response item indicating the year of establishment of the firm. *Firm size* was measured by the number of employees in 2015. Firms' international exposure was measured with three dummy-variables relating to the firms' exporting, importing, and production activities.

3.3. Measurement model

To test the validity and structure of our constructs, we tested our

measurement model via CFA with maximum likelihood information. In Table 1, the factor loadings, standard deviations, and alphas of the measures are reported. We allowed no measurement error covariations within or across items or factors. All items loaded significantly onto their respective factors and exhibited loadings higher than 0.5. Cronbach's alphas (α) for all factors were well above 0.8. The average value extracted (AVE) for the measures was higher than 0.5, and higher than the respective squared factor correlations, signaling that our measures did not have problems with convergent or discriminant validity. To assess the goodness of fit of the measurement model we calculated the standardized root mean squared residual (SRMR) in addition to the root mean squared error of approximation (RMSEA). We also calculated two relative fit indexes, the comparative fit index (CFI) and the Tucker-Lewis index (TLI). The overall fit of the measurement model to our data was satisfactory, indicating that the model fits the data well (SRMR = 0.056; RMSEA = 0.063; CFI = 0.935; TLI = 0.925). Further information is found in Table 1 and B1.

3.4. Common method variance

Common method variance is variance in the collected data stemming from the method of measurement (Podsakoff et al., 2003). Even though common method variance can be limited by various procedural and statistical methods, it is often very difficult to avoid completely (Chang et al., 2010), especially when objective data sources are hard to obtain. This is the case for many sustainability measures of Norwegian firms, where there is a lack of reporting schemes concerning sustainability.

Survey data collected at a single time point may be subject to common method bias (CMB), although there are disagreements about the severity of it (Chang et al., 2010; Podsakoff et al., 2012). Nevertheless, we adopt a cautionary approach and explain how we limited its potential below.

To reduce the potential for CMB in the portion of the model based solely on self-report survey measures, we chose to rely on procedural and statistical remedies as outlined by Podsakoff et al. (2012). From a procedural standpoint, we used proximal separation between our predictor and criterion variables in our survey, which helps to eliminate common retrieval cues (Podsakoff et al., 2003). Furthermore, we assured respondents of their anonymity

Table 1
Factor means, standard deviations, average variance extracted and squared factor correlations.

Factor	Mean	SD	AVE	1	2	3	4	5
1. Personal motivation	4.974	0.074	0.885	1.000				
2. Sustainability leadership	4.242	0.079	0.743	0.455	1.000			
3. Sustainability strategy	4.291	0.087	0.771	0.404	0.561	1.000		
4. Value creation	4.314	0.070	0.582	0.214	0.323	0.256	1.000	
5. Impact of sustainability	4.161	0.085	0.896	0.284	0.436	0.369	0.178	1.000

and confidentiality, which can help limit this type of bias even when questions and their responses may be personally sensitive (Konrad and Linnehan, 1995). Also, when possible, we used validated scales, since they are generally less sensitive to CMB (Doty and Glick, 1998).

Statistically, our CFA demonstrated that our model gave good fit to the data, giving confidence that our model was not overtly suffering from CMB (Stam and Elfring, 2008). Seeking more assurance, we chose to specifically test for CMB in our data. We initially performed a Harman's one-factor test (Podsakoff and Organ, 1986) where the resulting single factor model showed an explained variance of 35.77%. Since this factor accounts for less than the majority of variance, it indicates that our data does not considerably suffer from CMB. Furthermore, we also conducted a latent common factor analysis (Podsakoff et al., 2003, 2012), which also revealed that CMB was not a major issue for our model. We found that three items in the value creation-construct may have been slightly affected by common method variance, since their respected loadings were moderately reduced when the common factor was included in the model – this could be a sign of social desirability where the survey-respondent tends to answer in accordance with what he or she believes the researcher is after (Carter and Easton, 2011). However, we did not deem this to be an issue that necessitated item removal, especially, since we felt it would be inappropriate from a construct validity standpoint.

3.5. Analytical approach

We used structural equation modelling (SEM) to test our hypotheses. The rationale for using this method is that it allows for several relationships to be tested simultaneously between constructs, and we can estimate both the direct and indirect effects while also accounting for potential measurement error in indicators. To be able to investigate the indirect relationships hypothesized, we adopted Baron and Kenny's (1986) approach to testing mediation and conducted a Sobel test. To analyze the data, we used Stata IC/15 and SPSS AMOS 26.

We followed a two-step approach described by Anderson and Gerbing (1988), in that we first estimated and studied the measurement model before we performed the full structural model. In the results and discussion-section we will first describe our findings before discussing the implications and limitations of our results. Lastly, we point to some avenues for future research.

4. Results

4.1. Structural model

After determining the validity and fit of our measurement model, we went on to test the hypotheses. We had hypothesized both direct and indirect relationships in our model (see Fig. 1 for an overview of the hypothesized relationships). To increase the ease of illustration the paths from control variables were not included in Fig. 1. However, control variables were included in the model specification where no residuals were allowed to covary. The path model was run with 352 firms with complete data. The structural

model showed satisfactory model fit indices (SRMR = 0.067; RMSEA = 0.072; CFI = 0.922; TLI = 0.905). After determining that the structural model adequately fit the data, the statistical significance, direction, and size of the path estimates were examined in order to assess support for the hypotheses. The hypothesized model results and standardized path estimates are illustrated in Fig. 2.

The results indicate that all hypothesized relationships in our model are significant and in line with our expectations. We see a significant and strong direct relationship between leaders' personal motivation for sustainability and firms' strategic sustainability practices. This means that the more a leader is consciously valuing and placing personal importance on sustainability activities and its goals, the more we see sustainability strategies at the firm level.

Intellectual leadership partly mediates the relationship between motivation and sustainability strategy, and the indirect effect linking motivation with sustainability strategy through leadership is stronger than the direct effect. The standardized path estimates from personal motivation to leadership, and from leadership to sustainability strategy both showed strong, positive, and statistically significant effects. To investigate mediation more closely we followed Baron and Kenny's (1986) characterization of mediation effects. All relationships were significant, as were the Sobel test, indicating that we have partial mediation (Baron and Kenny, 1986) or complementary mediation (Zhao et al., 2010). This indicates that motivation may impact strategy through leadership behavior, and in our dataset, the indirect effect through intellectual sustainability leadership is stronger than if the manager only exhibited personal motivation for sustainability.

Our findings show that leaders that have personal motivation for sustainability are more likely to lead firms with sustainability strategies. However, firms' strategic positioning on sustainability is not only influenced by their managers' personal motivation, but also on the managers' way of leading their employees. Our dataset shows that leaders' intellectual leadership for sustainability associates with firms that have developed a sustainability strategy.

We further uncover a significant, strong, and positive relationships between sustainability strategy and firms' perceived value creation, and between sustainability strategy and firms' impact of sustainability initiatives. These findings suggest that top managers perceive sustainability strategies to be associated with higher value creation and with solving the major challenges of their industry.

We also find that sustainability at the strategic level positively relates to the objective firm performance measures of operational growth and return on assets. The results of the objective measures are positive and significant, but weaker than the subjective ones. The results nevertheless indicate that there is a positive and significant relationship between having a sustainability strategy and realizing increased financial performance, but more so on growth than profitability. Table 2 shows the results of the model tests relative to the hypotheses.

Finally, there are multiple paths to estimate between the controls and the dependent variables in our hypothesized model, so we present the significant paths in Table 3 and provide an overview of all results in Appendix B, Table B2. Many of the significant paths from control variables showed very small standardized effects. The

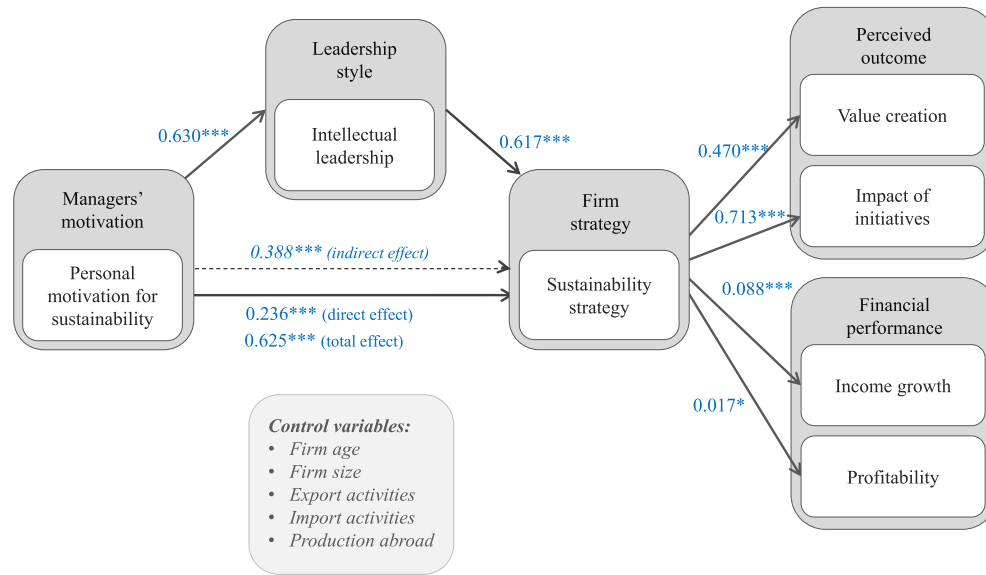


Fig. 2. Model results with standardized path coefficients.

export-dummy, on the other hand, showed a significant and moderately positive association with sustainability strategy and a strong negative relation to value creation. This indicates that firms that are engaged in international sales are more likely to have incorporated sustainable efforts at the strategic level, but that they perceive their value creation to be lower. Also, the effect of production abroad had a small, but significant negative effect on profitability, indicating that manufacturing outside of the domestic borders is related to lower return on assets.

Overall, the findings from our hypothesized model highlight the importance of managers' personal motivation and an intellectual leadership style for sustainability to be able to increase the incorporation of sustainability efforts at firms' strategic levels. Our results also show that executives' motivation impacts the sustainability strategies of firms through their leadership behaviors. The results further strengthen the argument that sustainability strategies are associated with higher value creation, higher impact of initiatives, and better financial performance in manufacturing firms.

5. Discussion

5.1. Firm performance associated with sustainability strategy

Scholars differ in their view on the direction of causality between sustainability and firm performance, as there are empirical arguments for both (Goyal et al., 2013). This study provides support to the research that indicates a positive path direction from sustainability strategies to firm performance (e.g. Eccles et al., 2014; Reyes-Rodriguez et al., 2016), both perceived and financial. We

observed a strong relationship between sustainability strategies and their perceived effects of firm value creation and ability to solve the greatest sustainability challenges in their industries. In other words, integration of sustainability efforts into the core strategies of firms will lead to more value creation and greater impact of firms' efforts at solving the major challenges of their industries, as perceived by managers.

These findings support the justification of the business case for corporate sustainability (Dyllick and Hockerts, 2002) and the practical shared value creation perspective as advocated by Porter and Kramer (2006, 2011) and suggest that being responsible is certainly not at odds with being competitive. Although, the finding for our value creation-construct needs to be interpreted with caution, due to the potential for social desirability, the path estimate between sustainability strategy and value creation was highly significant, and the effect was strong and in the expected positive direction. These are important findings in demonstrating the strength of the relationship – being sustainable in the areas that matter to the firm could also mean the firm is better able to create meaningful product solutions and value for stakeholders.

Firms with a sustainability strategy are also the ones that report the greatest ability to solve the major challenges of their industries (Porter and Kramer, 2011). Incorporating sustainability into the very essence of what firms are doing will, in other words, make them better at addressing the key challenges that their competitors also face. Sustainable solutions to these challenges could thereby involve competitive advantages (Hart, 1995).

In addition to perceived measures of firm performance our study also included the objective measures of operational income growth and profitability in the form of return on assets. The paths

Table 2
Test of hypotheses with standardized path coefficients.

H	Model parameters	Standardized estimate	Critical ratio	
H1	Direct effect Motivation → Strategy	0.236	4.46***	Supported
H2	Direct effect Motivation → Leadership	0.630	13.21***	Supported
H3	Direct effect Leadership → Strategy	0.617	9.65***	Supported
H4	Indirect effect Motivation → Leadership → Strategy	0.388	8.32***	Supported
H5	Direct effect Strategy → Value creation	0.470	9.59***	Supported
H6	Direct effect Strategy → Impact	0.713	11.39***	Supported
H7	Direct effect Strategy → Income growth	0.088	4.19***	Supported
H8	Direct effect Strategy → Profitability	0.017	2.40*	Supported

***p < 0.001, **p < 0.01, *p < 0.05.

Table 3
Control variables' significant paths to dependent variables.

Control variables, significant paths		Standardized estimate	Critical ratio
Control	Firm size → Strategy	0.001	2.37*
Control	Export → Strategy	0.209	2.05*
Control	Export → Value creation	-0.340	-3.13**
Control	Firm age → Income growth	-0.003	-1.97*
Control	Firm size → Income growth	-0.000	-1.99*
Control	Production abroad → ROA	-0.095	-2.88**

***p < 0.001, **p < 0.01, *p < 0.05.

from sustainability strategy to both variables measuring financial performance were small, but significant and in the expected direction. Having a sustainability strategy increases firms' probability of generating minor increases in both income growth and profitability. However, one can ask why the effects on financial data were so weak, and more specifically, why the effect on profitability was weaker than income growth.

There could be several reasons for this. Sustainability strategies that drive income growth are likely to involve transparent sustainability efforts to stakeholders, such as the use of sustainable and recyclable materials, fair trade, green labeling, and certifications. A growing number of customers have been shown to be willing to pay more for products which satisfy their sustainability expectations (McKinsey and Company, 2012; Nielsen Global Sustainability Report, 2015) therefore, this could be argued to be one of the first sustainable efforts firm take. Furthermore, when implementing sustainability strategies manufacturers may be initially focusing on preventing or reducing costs through efficiency improvements in the use of input factors (e.g. water, energy, and materials), and such effects do not immediately trickle down to the financial bottom line. Thus, the quicker effect is more likely to show up in the form of operational income growth.

Overall, it is methodologically challenging to study the effects of sustainability on firm performance, as it takes time for these types of strategic changes to provide positive economic impact (Hojnik and Ruzzier, 2016). In competitive industries, such as in manufacturing, sustainable technological improvements soon become the industry standard, providing only temporary competitive advantages for the first movers. This is also the reason why we have chosen to utilize both subjective (perceived measures) and objective (annual financial statements) constructs of firm performance in our study. Leaders have deep insight into their firms' operations and often realistic expectations for the performance of their firms, including the potential effects originating from strategic change. Acknowledging that the economic benefits from strategic efforts takes time to materialize, executives' subjective evaluations of the performance of their sustainability strategies could provide a more "correct" picture at a given point in the process.

5.2. Motivation and leadership associated with sustainability strategy

This study provides a novel perspective on the impact of leaders' motivation and leadership style on sustainability strategies among manufacturers. Transformational leadership is assumed to increase the motivation of employees (Bass, 1985a), and intellectual stimulation, specifically, is expected to increase the creativity of employees and inspire them to look at old challenges in new ways. In this paper we studied the motivation of leaders and found that their underlying values for sustainability were linked with leadership behaviors to create sustainable strategies at the firm-level. An intellectual leadership style seems beneficial in situations when the firm is facing complex challenges as it draws on the creative resources of the whole organization (Bass and Steidlmeier, 1999).

Expanding on previous studies that point to motivation and leadership as important elements in sustainability (Blome et al., 2017; González-Benito and González-Benito, 2006; Rivera-Camino, 2012; Waldman and Siegel, 2008; Wesselink et al., 2017) we contribute to the corporate sustainability literature by showing that executives' motivation and leadership style are associated with firms' inclusion of sustainable measures into their core business strategies. In accordance with Waldman et al. (2006) and Christensen et al. (2014) we found that executives' leadership style had a positive association with sustainability strategy. Extending Waldman and colleagues' research we also found that intellectual leadership partly mediated the relationship between personal motivation for sustainability and the firms' incorporation of sustainable strategies, thus providing an explanation for how managers' motivation can influence strategy. Our study supports the leadership literature in showing that a type of transformational leadership (intellectual leadership for sustainability) links to and acts as a mediator between motivation and sustainability strategy, but it also provides evidence that it may be prudent to focus on specific leadership styles, as advocated by Van Knippenberg and Sitkin (2013), rather than using the typical and broad approach of applying transformational leadership as a whole.

Furthermore, according to self-determination theory (Deci et al., 2017), higher levels of autonomous motivation lead to superior performance in complex tasks. Sustainability transition of the manufacturing industry is definitively a complex task. Therefore, more beneficial changes may come about through internal motivation rather than through controlled forms of motivation brought on by external forces like governmental regulation. This is also in line with Porter and van der Linde (1995) who argue that regulation should "create maximum opportunity for innovation by letting industries discover how to solve their own problems" (p. 129).

5.3. Implications

The question of how leaders in manufacturing firms should approach the sustainability challenge is highly pertinent and the current academic literature offers little coherent guidance in how to handle it effectively (Aguinis and Glavas, 2012; Engert et al., 2016; Waldman and Siegel, 2008). Given the inconclusive findings of previous research on the relationship between sustainability and firm performance, and the perceptions of sustainability as driving costs (Christman and Taylor, 2006), many managers have previously conceptualized sustainability efforts as a zero-sum game and regarded such practices as marketing campaigns.

This skeptical tradition that was created as a result of Friedman's (1970) arguments of sustainability could be one of the reasons why the business sector has not been able to adopt sustainable practices fast enough. The present study, however, suggests that it is not the case that sustainability strategies are purely cost drivers. Rather, the findings in this study show that top managements' motivation and leadership behaviors are significantly related to adopting sustainability strategies, and that the adoption of such strategies is not detrimental to firms' performance. Instead, we find the

incorporation of sustainability into firms' core business areas to be positively associated with financial performance, perceived value creation, and impact of problem solving initiatives.

This has important implications for managers – their personal motivation for sustainability can contribute to a deeper anchoring of sustainability efforts in firms. Furthermore, based on our study it can be argued that managers can do good, both for their firms and for the world, by following their own values and standards for sustainability. Such efforts speak to customers and other stakeholders through more meaningful product solutions, and by addressing key challenges in the firms' environments. Furthermore, sustainability strategies may be firms' best bet to guard themselves towards sudden policy changes driven by the rising awareness of the climate crisis as exemplified by the most recent EU-election where voters called for more green policies.

Finally, the initiation of sustainability strategies is both a top-down and a bottom-up process. A path to profitable sustainability may start with the motivation of top management, however, the content and the solutions embedded in the strategy may stem from employees. By utilizing intellectual leadership to challenge the employees to come up with novel and more meaningful solutions (e.g. through questioning the assumptions of the reigning industry logic), firms may create more sustainable opportunities for themselves.

5.4. Limitations and future research

Our findings open for some interesting avenues for future research. The present study is based on one dimension of leadership (i.e. intellectual leadership for sustainability) and one form of motivation (i.e. personal motivation for sustainability). More research could be done to provide a more nuanced picture of the role of top managers and to investigate the role of other specific types of leadership and motivation. In order to address these questions, we suggest more longitudinal studies to investigate how top managers influence sustainability strategies and practices over time. We also call for more research to investigate the sources of competitive advantages derived from sustainability in general.

Moreover, the present study has some limitations that should be considered. For one, the primary survey data is cross-sectional and based on self-report measures. Therefore, causality cannot be determined, and CMB may be present. To limit the potential for CMB we used objective financial measures for one part of our model; this does not resolve the potential for CMB in the rest of our model, but it does perhaps contribute to a more convincing argument for the influence of sustainability strategy on firms' financial performance. Furthermore, we performed various procedural and statistical remedies to reduce CMB, (outlined in the methods section).

interesting relationships dealing with organizational behavior. In our case, causal direction is suggested by theory, but our research design cannot exclude the possibility that directionality is reversed. Future studies could use longitudinal data to establish the directionality and causal ordering of the relationships. They could also use employee evaluations or peer ratings of managers' leadership styles in order to reduce the potential for social desirability of the responses and other common-method bias inherent in self-reports.

Future studies could also investigate other moderating and mediating variables as our study may suffer from omitted variable bias. This could, for example, help to explain the weak relationships between sustainability strategy and firms' financial performance.

Finally, this study is based on a representative sample of Norwegian manufacturers, but it remains to be seen whether the results transfer to other country settings. Unique characteristics of the Norwegian industry could mean that the results may transfer unsatisfactorily, especially to subsistence economies and countries with weak regulatory institutions. Further research is needed in order to establish whether the relationships between sustainability strategies and the perceived outcomes and financial performance can be generalized to other economies and contexts.

6. Conclusion

This paper aimed at investigating manufacturing firms' adoption of sustainability strategies and some of their potential outcomes. We studied the relationships between managers' personal motivation for sustainability, their intellectual leadership behaviors to promote sustainability, and firms' efforts to incorporate sustainability strategies into their core business areas. We found that leaders are important for firms' strategic sustainability efforts. The indirect effect in our results suggest that intellectual leadership partially mediates the relationship between motivation and sustainability strategy, providing an explanation for how executives' motivation impacts the propensity of manufacturers to adopt sustainable strategies. This study also observes a positive relationship between the adoption of sustainability strategies and firm performance. This positive relationship is found in four different dimensions, including leaders' perceptions of value creation and impact of initiatives, and to objective measures of income growth and profitability.

APPENDIX A

Calculation of average total capital:

$$\text{Average total capital} = \frac{\text{Total debt and equity (Jan. 1}^{\text{st}}) + \text{Total debt and equity (Dec. 31}^{\text{st}})}{2} \quad \text{Eq. (A.1)}$$

Ultimately, we agree with [Spector \(1994\)](#), who claimed that cross-sectional self-report studies are useful in uncovering

Calculation of return on assets:

$$\text{Return on assets} = \frac{\text{Ordinary profit before tax} + \text{Financial expenses}}{\text{Average total capital}} \quad \text{Eq. (A.2)}$$

APPENDIX B

Table B1
Factor loadings, standard deviations, and Cronbach's alpha

Factors and items	Loadings	SD
Personal motivation for sustainability ($\alpha = 0.9528$)		
Why do you put effort into work to promote sustainability in your company?	0.944	0.007
Because I personally consider it important to put effort into this work		
Because putting effort into this work is consistent with my values	0.979	0.005
Because putting effort into this work has personal significance to me	0.888	0.012
Sustainability leadership ($\alpha = 0.9183$)		
We regularly reconsider the assumptions our sustainability strategy is based upon	0.854	0.016
We seek to use different perspectives when we make decisions related to sustainability	0.883	0.014
We encourage employees to look at environmental and social challenges in new ways	0.877	0.015
We often suggest new ways of solving environmental and societal challenges	0.842	0.017
Sustainability strategy ($\alpha = 0.8975$)		
Sustainability is an inspiration to ongoing improvements in our production	0.804	0.020
Sustainability is integrated into our business strategy	0.916	0.013
Sustainability is a fundamental value for our business	0.893	0.014
Value creation ($\alpha = 0.9168$)		
How does the company's commitment to sustainability affect the company's:	0.828	0.019
Sales growth (increased volume)		
Perceived value for the customer (willingness to pay)	0.874	0.016
Customer loyalty	0.867	0.016
Ability to avoid direct competition	0.764	0.025
Ability to introduce new products and services	0.796	0.022
Political goodwill for allocations of social resources (regulations, licenses, permits)	0.504	0.042
Relation to company stakeholders	0.735	0.027
Position as an attractive partner	0.664	0.033
Impact of sustainability initiatives ($\alpha = 0.9531$)		
Our initiatives for sustainability are aimed at mitigating or solving the biggest challenges concerning sustainability we see in our industry	0.939	0.014
Our initiatives for sustainability are effective ways to mitigate or solve the major challenges of sustainability we see in our industry	0.952	0.014

Table B2
Control variables' paths to dependent variables

Paths from controls to dependent variables	Standardized estimate	Critical ratio	
Controls on leadership	Firm age → Leadership	-0.006	-1.67
	Firm size → Leadership	0.000	1.39
	Export → Leadership	0.103	0.91
	Import → Leadership	0.007	0.05
	Production abroad → Leadership	-0.135	-0.66
Controls on strategy	Firm age → Strategy	-0.0028	-0.82
	Firm size → Strategy	0.001	2.37*
	Export → Strategy	0.209	2.05*
	Import → Strategy	-0.126	-1.05
	Production abroad → Strategy	-0.150	-0.82
Controls on value creation	Firm age → Value creation	-0.001	-0.44
	Firm size → Value creation	0.000	-0.03
	Export → Value creation	-0.340	-3.13**
	Import → Value creation	0.173	1.37
Controls on impact of initiatives	Production abroad → Value creation	-0.083	-0.44
	Firm age → Initiatives	0.003	0.69
	Firm size → Initiatives	0.000	0.74
	Export → Initiatives	0.074	0.53
	Import → Initiatives	-0.191	-1.17
Controls on income growth	Production abroad → Initiatives	0.036	0.15
	Firm age → Income growth	-0.003	-1.97*
	Firm size → Income growth	-0.000	-1.99*
	Export → Income growth	-0.043	-0.82
	Import → Income growth	0.107	1.75
Controls on return on assets	Production abroad → Income growth	-0.130	-1.41
	Firm age → ROA	0.000	0.21
	Firm size → ROA	0.000	0.51
	Export → ROA	-0.035	-1.91
	Import → ROA	0.026	1.21
Production abroad → ROA	-0.095	-2.88**	

***p < 0.001, **p < 0.01, *p < 0.05.

References

- Aguinis, H., Glavas, A., 2012. What we know and don't know about corporate social responsibility: a review and research agenda. *J. Manag.* 38 (4), 932–968.
- Anderson, J.C., Gerbing, D.W., 1988. Structural equation modeling in practice: a review and recommended two-step approach. *Psychol. Bull.* 103 (3), 411.
- Aspelund, A., Fjell, L., Rødland, S.E., 2015. Doing good and doing well? - on the relationship between internationalization and social responsibility. *Int. J. Entrep.* 21 (2), 13–32.
- Avolio, B.J., Bass, B.M., Jung, D.I., 1999. Re-examining the components of transformational and transactional leadership using the Multifactor Leadership. *J. Occup. Organ. Psychol.* 72 (4), 441–462.
- Barbuto Jr., J.E., 2005. Motivation and transactional, charismatic, and transformational leadership: a test of antecedents. *J. Leadersh. Organ. Stud.* 11 (4), 26–40.
- Baron, R.M., Kenny, D.A., 1986. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Personal. Soc. Psychol.* 51 (6), 1173.
- Bass, B.M., 1985a. *Leadership and Performance beyond Expectations*. Free Press; Collier Macmillan.
- Bass, B.M., 1985b. *Leadership: good, better, best*. *Organ. Dyn.* 13 (3), 26–40.
- Bass, B.M., Riggio, R.E., 2006. *Transformational Leadership*. Lawrence Erlbaum Associates, Inc., New Jersey.
- Bass, B.M., Steidlmeier, P., 1999. Ethics, character, and authentic transformational leadership behavior. *Leadersh. Q.* 10 (2), 181–217.
- Berchicci, L., King, A., 2007. Postcards from the edge: A review of the business and environment literature. *Academy of Management Perspectives* 1, 1513–1547.
- Blome, C., Foerstl, K., Schleper, M.C., 2017. Antecedents of green supplier championing and greenwashing: an empirical study on leadership and ethical incentives. *J. Clean. Prod.* 152, 339–350.
- Bocquet, R., Le Bas, C., Mothe, C., Poussing, N., 2013. Are firms with different CSR profiles equally innovative? Empirical analysis with survey data. *Eur. Manag. J.* 31 (6), 642–654.
- Burton, K.D., Lydon, J.E., D'Alessandro, D.U., Koestner, R., 2006. The differential effects of intrinsic and identified motivation on well-being and performance: prospective, experimental, and implicit approaches to self-determination theory. *J. Personal. Soc. Psychol.* 91 (4), 750.
- Carpenter, M.A., Geletkanycz, M.A., Sanders, W.G., 2004. Upper echelons research revisited: antecedents, elements, and consequences of top management team composition. *J. Manag.* 30 (6), 749–778.
- Carter, C.R., Easton, P.L., 2011. Sustainable supply chain management: evolution and future directions. *Int. J. Phys. Distrib. Logist. Manag.* 41 (1), 46–62.
- Chang, S., van Witteloostuijn, A., Eden, L., 2010. From the Editors: common method variance in international business research. *J. Int. Bus. Stud.* 41 (2), 178–184.
- Christensen, L.J., Mackey, A., Whetten, D., 2014. Taking responsibility for corporate social responsibility: the role of leaders in creating, implementing, sustaining, or avoiding socially responsible firm behaviors. *Acad. Manag. Perspect.* 28 (2), 164–178.
- Christman, P., Taylor, G., 2006. Firm self-regulation through international certifiable standards: determinants of symbolic versus substantive implementation. *J. Int. Bus. Stud.* 37 (6), 863–878.
- Deci, E.L., Olafsen, A.H., Ryan, R.M., 2017. Self-determination theory in work organizations: the state of a science. *Annu. Rev. Organ. Psychol. Organ. Behav.* 4, 19–43.
- Dess, G.G., Davies, P.S., 1984. Porter's (1980) generic strategies as determinants of strategic group membership and organisational performance. *Acad. Manag. J.* 27, 467–488.
- Doty, D.H., Glick, W.H., 1998. Common methods bias: does common methods variance really bias results? *Organ. Res. Methods* 1 (4), 374–406.
- Du, S., Swaen, V., Lindgreen, A., Sen, S., 2013. The roles of leadership styles in corporate social responsibility. *J. Bus. Ethics* 114 (1), 155–169.
- Dyllick, T., Hockerts, K., 2002. Beyond the business case for corporate sustainability. *Bus. Strateg. Environ.* 11, 130–141.
- Eccles, R.G., Serafeim, G., 2013. The performance frontier: innovating for a sustainable strategy. *Harv. Bus. Rev.* 91 (5), 50–60.
- Eccles, R.G., Ioannou, I., Serafeim, G., 2014. The impact of corporate sustainability on organizational processes and performance. *Manag. Sci.* 60 (11), 2835–2857. <https://doi.org/10.1287/mnsc.2014.1984>.
- Elia, V., Gnoni, M.G., Tornese, F., 2017. Measuring circular economy strategies through index methods: a critical analysis. *J. Clean. Prod.* 142, 2741–2751.
- Elkington, J., 1998. *Cannibals with Forks: the Triple Bottom Line of the 21st Century Business*. Capstone, Oxford.
- Engert, S., Rauter, R., Baumgartner, R.J., 2016. Exploring the integration of corporate sustainability into strategic management: a literature review. *J. Clean. Prod.* 112, 2833–2850.
- Etzion, D., 2007. Research on organizations and the natural environment, 1992–present: a review. *J. Manag.* 33 (4), 637–664.
- Florida, R., 1996. Lean and green: the move to environmentally conscious manufacturing. *Calif. Manag. Rev.* 39 (1), 80–105.
- Friedman, M., 1970. The social responsibility of business to increase its profits. *N. Y. Times* 13, 122–126.
- Gagné, M., Deci, E.L., 2005. Self-determination theory and work motivation. *J. Organ. Behav.* 26 (4), 331–362.
- Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., van den Broeck, A., Aspel, A.K., Bellerose, J., Benabou, C., Chemolli, E., Güntert, S.T., Halvari, H., Indiyastuti, D.L., Johnson, P.A., Molstad, M.H., Naudin, M., Ndao, A., Olafsen, A.H., Roussel, P., Wang, Z., Westbye, C., 2015. Validation evidence in seven languages and nine countries. *Eur. J. Work Organ. Psychol.* 24 (2), 178–196.
- Galpin, T., Lee Whittington, J., 2012. Sustainability leadership: from strategy to results. *J. Bus. Strat.* 33 (4), 40–48.
- Garza-Reyes, J.A., 2015. Lean and green e a systematic review of the state of the art literature. *J. Clean. Prod.* 102, 18–29.
- Ghobadian, A., Money, K., Hillenbrand, C., 2015. Corporate responsibility research: past—present—future. *Group Organ. Manag.* 40 (3), 271–294.
- Gonzalez-Perez, M.-A., 2013. Corporate social responsibility and international business: a conceptual overview. *Adv. Sustain. Environ. Justice* 11, 1–35.
- González-Benito, J., González-Benito, O., 2006. A review of determinant factors of environmental proactivity. *Bus. Strateg. Environ.* 15 (2), 87–102.
- Goyal, P., Rahman, Z., Kazmi, A.A., 2013. Corporate sustainability performance and firm performance research: literature review and future research agenda. *Manag. Decis.* 51 (2), 361–379.
- Graves, L.M., Sarkis, J., 2018. The role of employees' leadership perceptions, values, and motivation in employees' proenvironmental behaviors. *J. Clean. Prod.* 196, 576–587.
- Graves, L.M., Sarkis, J., Zhu, Q., 2013. How transformational leadership and employee motivation combine to predict employee proenvironmental behaviors in China. *J. Environ. Psychol.* 35, 81–91.
- Güntert, S.T., 2015. The impact of work design, autonomy support, and strategy on employee outcomes: a differentiated perspective on self-determination at work. *Motiv. Emot.* 39 (1), 74–87.
- Haanaes, K., Arthur, D., Balagopal, B., Kong, M.T., Velken, I., Hopkins, M.S., 2011. First look: the second annual sustainability & innovation survey. *MIT Sloan Manag. Rev.* 52 (2), 77.
- Hambrick, D.C., Mason, P.A., 1984. Upper echelon: the organization as a reflection of its top managers. *Acad. Manag. Rev.* 9 (2), 193–206.
- Hart, S.L., 1995. A natural-resource-based view of the firm. *Acad. Manag. Rev.* 20 (4), 986–1014.
- Hart, S.L., Dowell, G., 2011. Invited editorial: a natural-resource-based view of the firm: fifteen years after. *J. Manag.* 37 (5), 1464–1479.
- Hojnik, J., Ruzzier, M., 2016. The driving forces of process eco-innovation and its impact on performance: insights from Slovenia. *J. Clean. Prod.* 133, 812–825.
- Hughes, D.J., Lee, A., Tian, A.W., Newman, A., Legood, A., 2018. Leadership, creativity, and innovation: a critical review and practical recommendations. *Leadersh. Q.* 29 (5), 549–569.
- Hussain, N., Rigoni, U., Cavezzali, E., 2018. Does it pay to be sustainable? Looking inside the black box of the relationship between sustainability performance and financial performance. *Corp. Soc. Responsib. Environ. Manag.* 25 (6), 1198–1211.
- Jia, J., Liu, H., Chin, T., Hu, D., 2018. The continuous mediating effects of GHRM on employees' green passion via transformational leadership and green creativity. *Sustainability* 10 (9), 3237.
- Kaplan, H., Madjar, N., 2015. Autonomous motivation and pro-environmental behaviours among Bedouin students in Israel: a self-determination theory perspective. *Aust. J. Environ. Educ.* 31 (2), 223–247.
- Kark, R., Van Dijk, D., 2007. Motivation to lead, motivation to follow: the role of the self-regulatory focus in leadership processes. *Acad. Manag. Rev.* 32 (2), 500–528.
- King, A.A., Lenox, M.J., 2001. Does it really pay to be green? An empirical study of firm environmental and financial performance. *J. Ind. Ecol.* 5 (1), 105–116.
- Koestner, R., Losier, G.F., Vallerand, R.J., Carducci, D., 1996. Identified and introjected forms of political internalization: extending self-determination theory. *J. Personal. Soc. Psychol.* 70 (5), 1025.
- Konrad, A.M., Linnehan, F., 1995. Formalized HRM structures: coordinating equal employment opportunity or concealing organizational practices? *Acad. Manag. J.* 38 (3), 787–820.
- Lartey, T., Yirenykyi, D.O., Adomako, S., Danso, A., Amankwah-Amoah, J., Alam, A., 2019. Going Green, Going Clean: Lean-green Sustainability Strategy and Firm Growth. *Business Strategy and the Environment*.
- Lee, J.W., Kim, Y.M., Kim, Y.E., 2018. Antecedents of adopting corporate environmental responsibility and green practices. *J. Bus. Ethics* 148 (2), 397–409.
- Lord, R.G., Day, D.V., Zaccaro, S.J., Avolio, B.J., Eagly, A.H., 2017. Leadership in applied psychology: three waves of theory and research. *J. Appl. Psychol.* 102 (3), 434.
- Mani, V., Agarwala, R., Sharma, V., 2014. Supplier selection using social sustainability: AHP based approach in India. *Int. Strateg. Manag. Rev.* 2, 98–112.
- McKinsey & Company, Miremadi, M., Musso, C., Weihe, U., 2012. How Much Will Consumers Pay to Go Green? *McKinsey Quarterly*, October 2012.
- McWilliams, A., Siegel, D., 2001. Corporate social responsibility: a theory of the firm perspective. *Acad. Manag. Rev.* 26 (1), 117–127.
- Meyer, J.P., Becker, T.E., Vandenberghe, C., 2004. Employee commitment and motivation: a conceptual analysis and integrative model. *J. Appl. Psychol.* 89 (6), 991.
- Netland, T.H., Aspelund, A., 2013. Company-specific production systems and competitive advantage: a resource-based view on the Volvo production system. *Int. J. Oper. Prod. Manag.* 33 (11/12), 1511–1531.
- Nielsen Global Sustainability Report, 2015. Consumer-goods' Brands that Demonstrate Commitment to Sustainability Outperform Those that Don't. Retrieved online. <https://www.nielsen.com/eu/en/press-releases/2015/consumer-goods-brands-that-demonstrate-commitment-to-sustainability-outperform/>. (Accessed 8 December 2019).
- Papagiannakis, G., Lioukas, S., 2012. Values, attitudes and perceptions of managers

- as predictors of corporate environmental responsiveness. *J. Environ. Manag.* 100, 41–51.
- Podsakoff, P.M., Organ, D.W., 1986. Self-reports in organizational research: problems and prospects. *J. Manag.* 12 (4), 531–544.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y., Podsakoff, N.P., 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88 (5), 879.
- Podsakoff, P.M., MacKenzie, S.B., Podsakoff, N.P., 2012. Sources of method bias in social science research and recommendations on how to control it. *Annu. Rev. Psychol.* 63 (1), 539–569. <https://doi.org/10.1146/annurev-psych-120710-100452>.
- Porter, M.E., Kramer, M.R., 2006. Strategy and society: the link between competitive advantage and corporate social responsibility. *Harv. Bus. Rev.* 89 (1/2), 62–77.
- Porter, M.E., Kramer, M.R., 2011. Creating shared value. *Harv. Bus. Rev.* 94 (1/2), 1–17.
- Porter, M.E., van der Linde, C., 1995. Toward a new conception of the environment-competitiveness relationship. *J. Econ. Perspect.* 9 (4), 97–118.
- Proffno, 2016. Retrieved from. www.proffno.no.
- Reyes-Rodríguez, J.F., Ullhøi, J.P., Madsen, H., 2016. Corporate environmental sustainability in Danish SMEs: a longitudinal study of motivators, initiatives, and strategic effects. *Corp. Soc. Responsib. Environ. Manag.* 23, 193–212.
- Rivera-Camino, J., 2012. Corporate environmental market responsiveness: a model of individual and organizational drivers. *J. Bus. Res.* 65 (3), 402–411.
- Ryan, R.M., Deci, E.L., 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am. Psychol.* 55 (1), 68–78.
- Saether, E.A., 2019. Motivational antecedents to high-tech R&D employees' innovative work behavior: self-determined motivation, person-organization fit, organization support of creativity, and pay justice. *J. High Technol. Manag. Res.* 100–350.
- Sheldon, K.M., Wineland, A., Venhoeven, L., Osin, E., 2016. Understanding the motivation of environmental activists: a comparison of self-determination theory and functional motives theory. *Ecopsychology* 8 (4), 228–238.
- Siegel, D.S., Vitaliano, D.F., 2007. An empirical analysis of the strategic use of corporate social responsibility. *J. Econ. Manag. Strategy* 16 (3), 773–792.
- Spector, P.E., 1994. Using self-report questionnaires in OB research: a comment on the use of a controversial method. *J. Organ. Behav.* 15 (5), 385–392.
- Stam, W., Elfring, T., 2008. Entrepreneurial orientation and new venture performance: the moderating role of intra- and extraindustry social capital. *Acad. Manag. J.* 51 (1), 97–111.
- Trépanier, S.-G., Fernet, C., Austin, S., 2012. Social and motivational antecedents of perceptions of transformational leadership: a self-determination theory perspective. *Can. J. Behav. Sci./Rev. Can. Sci. Comport.* 44 (4), 272.
- Van Knippenberg, D., Sitkin, S.B., 2013. A critical assessment of charismatic—transformational leadership research: back to the drawing board? *Acad. Manag. Ann.* 7 (1), 1–60.
- Waldman, D.A., Siegel, D., 2008. Defining the socially responsible leader. *Leadersh. Q.* 19 (1), 117–131.
- Waldman, D.A., Siegel, D.S., Javidan, M., 2006. Components of CEO transformational leadership and corporate social responsibility. *J. Manag. Stud.* 43 (8), 1703–1725.
- WCED eWorld Commission on Environment and Development, 1987. *Our Common Future*. Oxford University Press, Oxford (b).
- Wesselink, R., Blok, V., Ringersma, J., 2017. Pro-environmental behaviour in the workplace and the role of managers and organisation. *J. Clean. Prod.* 168, 1679–1687.
- Willard, B., 2012. *The New Sustainability Advantage: Seven Business Case Benefits of a Triple Bottom Line*. New Society Publishers, Gabriola Island.
- Zhao, X., Lynch, J.G., Chen, Q., 2010. Reconsidering Baron and Kenny: myths and truths about mediation analysis. *J. Consum. Res.* 37 (2), 197–206.
- Zhou, S., Zhang, D., Lyu, C., Zhang, H., 2018. Does seeing “mind acts upon mind” affect green psychological climate and green product development performance? The role of matching between green transformational leadership and individual green values. *Sustainability* 10 (9), 1–21, 3206.