

Environmental certifications and customer satisfaction: Evidence from kindergartens

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Abstract

Purpose

The purpose of this paper is to study whether environmental certifications increase customer satisfaction in kindergartens, and whether this relationship is influenced by kindergarten size or ownership type.

Design/methodology/approach

Data from a parental satisfaction survey in Norwegian kindergartens is combined with data on environmental certifications (n=2033-3270 kindergartens over 7 years, approximately 11% certified). Regression models with extensive controls are used to test the relationships.

Findings

The main pooled cross-sectional regression and all panel data regression models show no significant relationships between environmental certification and customer satisfaction. Organizational size or ownership type (for profit/non-profit) does not moderate the relationship.

Practical implications

Environmental certifications have little or no impact on customer satisfaction in this sample of kindergartens.

Originality/value

The study contributes by examining the effects of environmental certifications on customer satisfaction in kindergartens, a little studied topic and a sector, and by using a large sample, secondary data and panel data methods, avoiding some limitations in earlier research.

Keywords: Environmental certification, customer satisfaction, organizational size, signalling, kindergartens, Norway

1 Introduction

Environmental certifications are confirmations by third parties that a product, service, or organization fulfils certain environmental standards. Certifications are often used when the underlying quality cannot be easily observed, as is typically the case regarding environmental performance (Jahn et al., 2005). Previous research have found that environmental certifications increase consumers' quality perceptions and trust, increase the probability of consumers choosing the firm or product, and increase consumers' willingness to pay (Atkinson & Rosenthal, 2014; Darnall et al., 2018; Delmas & Lessem, 2017; Harris, 2007).

Do environmental certifications also influence how satisfied customers are with a product or service after purchase and use? Customer satisfaction is defined as the "overall evaluation based on the total purchase and consumption experience with a good or service over time" (Anderson et al., 1994), and is important for firms, as it is positively related to customer loyalty, firm reputation and firm performance (Luo & Bhattacharya, 2006; O'Sullivan & McCallig, 2012). Several factors point to a positive relationship between certifications and customer satisfaction. Some customers care about the environment, and may be more satisfied with products and services that are environmentally friendly (Luo & Bhattacharya, 2006). Social and environmental credentials may be interpreted by consumers as quality signals, going beyond the social and environmental dimensions of the product or service (Chernev & Blair, 2015). Existing studies have generally found a positive relationship between perceived social and environmental performance and customer satisfaction (Loureiro et al., 2012; Luo & Bhattacharya, 2006; Sun & Price, 2016; Walsh & Bartikowski, 2013).

On the other hand, there exist reasons to question the effect of certifications on satisfaction in a real market setting. Customer satisfaction is an overall evaluation over time, and the environmental certification is only one of many influences on satisfaction. Will the potential positive effect of certification be strong enough to influence customer satisfaction in an empirically meaningful way? Further, satisfaction is typically perceived to be a result of the delivered experience compared to the customer's expectations (Johnson & Fornell, 1991). If environmental certifications also increase expectations, they may have no or even negative effects on satisfaction, depending on how the organization fulfils the expectations. Also, while certifications may be important when environmental performance is hard to assess, such signals may not be as important where customers have good insight in the environmental performance of the provider.

The main purpose of this study is to therefore to examine whether environmental certifications influence customer satisfaction in a real market setting. In addition, the purpose is to test the potential explanation of the certification functioning as a quality signal or as a signal of pro-social motives. If the quality explanation is correct, I suggest that the effect of certification should be larger for larger organizations, where it is arguably more difficult to observe and assess the true environmental performance. If the social motives explanation is correct, I suggest that the effect of certification should be bigger for for-profit (vs non-profit or public) organizations.

To examine these relationships, the study uses data from an annual customer satisfaction survey among parents with children in Norwegian kindergartens (n=2033-3270 kindergartens, over 7 years). The data about customer satisfaction is combined with data on kindergartens' environmental certifications, about 11% of the sample holds an environmental

certification, and rich background data about the kindergartens. Cross-sectional and panel data models are then used to examine the relationships.

This study makes several contributions. It is among the first direct tests of the relationship between environmental certifications and customer satisfaction. It studies the relationship in a real market setting, kindergartens, where service quality and prices are largely fixed and the effects of certification should be possible to isolate. Compared to previous research, this study uses a larger sample, and with data over several years, panel data techniques can be used to estimate the effects of certification. This reduces concerns about omitted variable bias, which can often be a problem in cross-sectional studies. Further, this study combines data from different existing sources, reducing the problem of common method bias frequently found in studies where all variables are collected in the same questionnaire (Podsakoff et al., 2003), as well as social desirability bias sometimes found in research on environmental behaviours (Vesely & Klöckner, 2020).

2 Background and theory

2.1 Environmental certifications

Environmental certifications are certifications by third-parties confirming that an organization adheres to a specific minimum standard regarding environmental policies, efforts or results (Jahn et al., 2005). While firms may engage in different types of pro-environmental actions and communication, either on an individual basis or in an industry initiative, certifications by third parties secure that the firm has satisfied some type of criteria regarding its processes or performance (Dranove & Jin, 2010).

Certifications are useful for firms when information asymmetry between the firm and the outsider exists, and quality is difficult to assess. Without information asymmetry, there would be no clear need for the certification since outsiders would have full information about the firm's environmental performance. However, the environmental performance of a firm or product is often difficult to assess for outsiders, since it often is a result of hidden and internal processes, a result of diffuse emissions through the supply chain, and cannot be observed directly from the product (Jahn, Schramm, & Spiller, 2005). The certification may work as a costly signal, separating good performers from not as good performers (Spence, 1973). For this to happen it must be profitable for firms with good environmental performance and unprofitable for firms with poor performance to achieve the certification. Outsiders, including buyers, may then infer the level of environmental performance from the certification.

Previous research has found that environmental certifications influence consumer responses. At the product and service level, products with environmental certifications are often perceived to be of better quality, taste better, be healthier and better for you (Sörqvist et al., 2015). Overall, customers are willing to pay more for products with such certifications (Fanasch & Frick, 2020; Tully & Winer, 2014). Some research shows that environmental certifications are related to or improve firm performance (Cañón-de-Francia & Garcés-Ayerbe, 2009; Wen & Lee, 2020), although this may only apply to all types of firms (Granly & Welo, 2014; Heras-Saizarbitoria et al., 2011).

2.2 Environmental certifications and customer satisfaction

Customer satisfaction has been defined as an "overall evaluation based on the total purchase and consumption experience with a good or service over time" (Anderson et al., 1994). Firms invest in achieving high levels of customer satisfaction, as customer satisfaction is positively correlated to willingness to pay, customer loyalty, firm reputation and firm

performance (Homburg et al., 2005; O'Sullivan & McCallig, 2012). Public sector entities are also increasingly interested in customer satisfaction, and frequently use customer or user satisfaction as objectives (Andreassen, 1994; Ferrari & Manzi, 2014).

A large body of research has examined the causes and consequences of customer satisfaction (Otto et al., 2020; Szymanski & Henard, 2001). While several theoretical frameworks have been used, much of research has focused on the effects of expectations, disconfirmation of expectations and performance on satisfaction (Johnson & Fornell, 1991). Expectations are thought to influence satisfaction directly. If outcomes are lower or higher than expected, this leads to negative or positive disconfirmation. Performance is thought to influence satisfaction positively, as the ability of the offering to satisfy needs, wants and desires increases, compared to the cost (Szymanski & Henard, 2001). A meta-analysis of these relationships generally found support for this theory (Szymanski & Henard, 2001).

Several theoretical reasons for why environmental efforts or performance should influence customer satisfaction positively exist. Firstly, customers also care about other aspects than the "narrow" or technical quality of their product or service (Luo & Bhattacharya, 2006). An environmental certification shows that everything else equal, the environmental performance of the firm and the product/service is better than without the certification. This should lead customers to be more satisfied with the company, as the total performance increases. For this effect to happen, it is enough that a non-trivial segment is concerned with this dimension.

Secondly, sustainability efforts have been found to have a "halo"-effect, where consumers perceive sustainable products to be of better quality (Chernev & Blair, 2015). This is a result of sustainability efforts being interpreted by consumers as a sign of altruistic moral values. This applies also in situations when consumers can observe and experience the product. An environmental certification can potentially give the same "halo"-effect, where the environmental efforts signal altruism and therefore is interpreted as better quality, overall. Since performance or quality is an important antecedent of customer satisfaction (Carrillat et al., 2009), this should lead to higher customer satisfaction.

It is possible that an environmental certification also increases the expectations of a product or service. According to the expectation-disconfirmation framework, this can increase satisfaction, as consumers are at least partly thought to adjust their assessments to their expectations. On the other hand, if the product or service outcome is lower than expected, for instance because the customer is not impressed with the environmental performance despite the certification, this can lead to negative disconfirmation and lower customer satisfaction. A meta-analysis found that disconfirmation is a stronger correlate with customer satisfaction than expectations (Szymanski & Henard, 2001).

Few studies examine the relationship between environmental certifications and customer satisfaction directly. An exception is Peiró-Signes et al. (2014), who find that environmentally certified hotels in Spain get higher customer ratings. Others have found that environmental certifications increase intention to book but has no influence on financial performance. Hotels can change this by communicating more strategically about their green certification (Chi et al., 2022).

A larger body of related research have looked more generally at how different types of environmental or sustainability-related efforts relates to customer satisfaction. Higher perceived levels of sustainability or environmental responsibility are, in general, positively associated with customer satisfaction (Loureiro et al., 2012; Luo & Bhattacharya, 2006; Sun & Price, 2016; Walsh & Bartikowski, 2013). In the retail sector, commitment to corporate social responsibility is positively correlated with satisfaction in different sectors and in

different countries including South Korea, Portugal, Germany and the US (Loureiro et al., 2012; Park et al., 2017; Walsh & Bartikowski, 2013). In the manufacturing sector, a positive relationship was found between an ISO14001-certification and perceived customer satisfaction (Ann et al., 2006). Studying manufacturing firms in China and Vietnam, Xie et al. (2017) find that customer satisfaction mediates the relationship between CSR and financial performance. Also, perceived corporate social responsibility among large US corporations is positively related to customer satisfaction, which again is positively related to market value (Luo & Bhattacharya, 2006).

In the service and hospitality sectors, a positive relationship between CSR perceptions and customer satisfaction has also been found. There was a positive relationship between CSR perceptions and customer satisfaction among bank customers in Spain (Pérez & Rodríguez del Bosque, 2015). Restaurants' sustainable practices are positively related to customer satisfaction (Chaturvedi et al., 2022). In a sample of Italian hotel customers a positive relationship between perceived green practices and customer satisfaction was found (Merli et al., 2019).

Overall, theoretical reasons suggest a positive relationship between environmental certifications and customer satisfaction, and the related empirical studies give support. The first hypothesis is therefore the following:

H1: An environmental certification improves customer satisfaction.

2.3 Environmental certifications and organizational size

If certifications provide outsiders with relevant information about performance, certifications should be more relied upon when performance is more difficult to assess. One factor that may influence how hard it is to assess environmental performance is organizational size. For large organizations, the internal processes are typically more complex and less transparent, and it may be more difficult for outsiders to assess the procedures and results across the whole organization. In a small organization, the customer can observe the full operations, more easily receive representative information and more easily build an impression of environmental efforts and performance. The information asymmetry may therefore be larger in larger organizations. As a result, outsiders may rely more on signals, such as certifications, to evaluate the environmental performance of larger organizations.

Supporting this perspective, a range of empirical studies have found that size is an predictor of whether and how much the firm communicates about their CSR and sustainability processes and results (Brammer & Millington, 2008; Brammer & Pavelin, 2004; Fifka, 2011). While several reasons can explain this (large organizations are more under scrutiny, and they may benefit more from a positive environmental image), the findings are also consistent with outsiders having more problems assessing performance, and the organization thus communicating and signalling more. The second hypothesis is therefore:

H2: An environmental certification improves customer satisfaction more for larger kindergartens.

2.3 Environmental certifications and type of ownership

An environmental certification may not only tell something about the environmental performance of an organization, but also about the underlying values and motivations for the organization. Firm motivations are important for consumer evaluations (Becker-Olsen et al., 2006; Chen & Petersen, 2022). When consumers believe that the firm motivation is benevolent/altruistic (vs. self-interested), they perceive product quality as higher when the

firm is involved in corporate social responsibility activities (Chernev & Blair, 2015). Consumers who attribute sustainability activities to intrinsic firm motivation (vs extrinsic) perceive product prices to be fairer (Habel et al., 2016).

The kindergarten sector in many countries, including Norway, consists of public, non-profit and for-profit kindergartens. The type of ownership likely influences the customers' perceived motivations of the kindergartens. I hypothesize that private for-profit kindergartens have the most positive effect of certification, since an environmental certification can signal that the kindergarten is not only concerned with profits, but also care about the well-being of society. An environmental certification will not have the same impact for public or non-profit kindergartens, where the profit-motive does not interfere. The third hypothesis is therefore:

H3: An environmental certification improves customer satisfaction more for for-profit than for non-profit (including public) kindergartens.

3 Methodology and data

The hypotheses are tested using data about environmental certifications and customer satisfaction in a panel of Norwegian kindergartens. The Norwegian kindergarten sector is a suitable setting for testing the relationships. Children aged 1 to 5 have the right to attend a kindergarten, and more than 92% of children in Norway attend one of approximately 5800 kindergartens. Around half the kindergartens are privately owned or operated (either non-profit or by for-profit chains) and half publicly owned and operated. All kindergartens are funded by a combination of transfers from the local municipality and parental fees. Kindergarten operations are regulated in detail, with requirements regarding curriculum, minimum staffing levels, physical space available per child and employee education levels. Prices are standardized, with a maximum price per month (3 230 NOK in 2021). While the application procedures vary between municipalities, parents apply to their prioritized local kindergartens and are given a place depending on availability.

Data about customer satisfaction in this study come from a survey of parents' satisfaction with their kindergarten (The parents' satisfaction survey). The survey is organized annually by the Norwegian Directorate for Education and Training and carried out in collaboration with the participating kindergartens. Participation in the survey is free and voluntary for the kindergartens. 36-63% of Norwegian kindergartens have chosen to participate in the survey in the period of this study (n=2033-3270, in 2016-2022). Private kindergartens and kindergartens in Oslo are overrepresented among the participants in the survey, apart from this few systematic differences exist (Opinion, 2018). The purpose of the survey is to provide information about satisfaction to be used by kindergartens in their operations. The customer satisfaction data are also published in an easily accessible format on a website aimed at parents choosing kindergartens. The survey is distributed electronically by email to the parents with children in the participating kindergartens in November every year. The survey contains questions about satisfaction with the child's development, well-being, information, and physical facilities, as well as total satisfaction with the kindergarten. The response rate is between 60-70%, varying across kindergartens and years. In total, 86 000 parents participated in the survey in 2016, growing to 125 000 in 2018-2021, and falling to 110 000 in 2022 (Norwegian Directorate of Education and Training, 2020).

For data about environmental certifications I use data from Eco-Lighthouse (Eco-Lighthouse, 2021b). The Eco-Lighthouse is a Norwegian certification program for firms and organizations wanting to document their environmental efforts and performance. To be certified, the organization must satisfy common and industry-specific criteria. Common criteria that organizations regardless of sector must fulfil include requirements about policies, procedures

and resources related to the environment. Organizations must have an environmental policy, environmental objectives, clear responsibilities, a plan, risk assessment, reporting procedures internally and externally, and policies regarding purchasing, transportation, and waste. Industry-specific requirements for kindergartens include inclusion of environmental topics in the pedagogy, use of organic foods, and a safe and environmentally friendly outdoor area (Eco-Lighthouse, 2021a). The Eco-lighthouse is the only certification program used in Norwegian kindergartens, and previous research has examined various aspects of the program (Granly & Welø, 2014; Monkerud & Ytterhus, 2013; Utgård, 2018).

Background data about the kindergarten come from the Norwegian Directorate for Education and Training, who maintains records of characteristics of the children, the staff, and the physical facilities of each kindergarten (Norwegian Directorate for Education and Training, 2020).

3.1 Main variables in the study

Customer satisfaction (the dependent variable) is measured as the mean response (in each kindergarten) to the question “In total, how satisfied or dissatisfied are you with your kindergarten?” (1-5, Very dissatisfied, dissatisfied, neither satisfied nor dissatisfied, satisfied, very satisfied).

Environmental certification is a binary variable indicating whether the kindergarten held the Environmental lighthouse certification at the time of the survey.

Kindergarten size. Kindergarten size is measured as the number of children in the kindergarten.

Ownership form. Kindergartens are either publicly or privately owned and operated. Privately owned kindergartens are either non-profit (typically owned and run by NGOs, local associations, or parental groups) or for-profit (run by one of several large chains). I distinguish between these different ownership forms using two dummies indicating private (1) or public (0) kindergarten, and for-profit (1) vs no-profit (0) kindergarten.

3.2 Control variables

Children/staff ratio. The minimum number of employees per child is regulated by law, but kindergartens may have more employees than the minimum, possibly indicating more resources available. To adjust for this, I include the children/staff ration, calculated as the number of children in the kindergarten, divided by the number of full-time equivalent positions.

% of staff with relevant education. Education levels vary across kindergartens, possibly due to more resources available. I therefore include a variable for the % of staff with relevant education, calculated as the percentage of full-time equivalent positions held by staff trained as kindergarten teachers or have a certificate of apprenticeship or equivalent in kindergarten subjects, divided by the total number of staffs.

Share of male employees. Kindergartens in the sample have around 90% female staff. Kindergartens with environmentally and socially concerned management or owners may influence both certification and the share of male employees. I therefore control for the share of male employees.

Opening hours. Kindergarten opening hours may be correlated with the resources available as well as satisfaction. I control for the number of hours per day that each kindergarten is open.

Physical space available per child. Physical space may be correlated with the resources available as well as satisfaction. I therefore control for the number of square meters available per child.

Public inspection. Municipalities are responsible for securing the quality level in the kindergartens and carry out inspections in kindergartens as part of this responsibility. I control for this by including a dummy set to 1 if the kindergarten is inspected in a given year.

Cost of lunch. Kindergartens have fixed prices but can charge parents for lunch. As a result, prices and quality of the lunch offering varies. I therefore control for the cost of lunch.

Impression of the child's wellbeing is the parents' mean response (in each kindergarten) to questions about friendships, happiness and play. See appendix A for the items.

Impression of the child's development is the parents' mean response (in each kindergarten) to questions about the social development, language development and learning. See appendix A for the items.

Satisfaction with Information from the kindergarten is the parents' mean satisfaction (in each kindergarten) with information from the kindergarten. See appendix A for the items.

Satisfaction with the physical facilities in the kindergarten is the parents' mean satisfaction (in each kindergarten) with the indoor and outdoor facilities and resources. See appendix A for the items.

Municipality. Several types of geographical differences can be expected. Parents and children are different across geographies and may have different expectations, quality judgements and environmental preferences (Drange & Telle, 2020). Municipalities vary in their economic situation and capacity to govern kindergartens. Depending on location, kindergartens have different competitive situations and ability to attract skilled employees. To control for unobserved factors common to each municipality, I therefore include municipality dummies (city borough dummies for the capital Oslo).

Year. To control for time-varying events that potentially influence satisfaction with all kindergartens (such as the Corona-epidemic, which influenced kindergarten operations) I include year dummies.

3.2 Descriptive statistics

Table 1 shows descriptive statistics for the sample by certification status. Around 11% of kindergartens in the sample held the Environmental Lighthouse certification. Differences between certified and non-certified kindergartens are small, but certified kindergartens are larger and more likely to be publicly owned. Average satisfaction with kindergartens is high – around 4.5 on the 1-5 scale. We see no obvious effect of certification before adjustments for other factors, parents are slightly more satisfied with the non-certified kindergartens.

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Table 2 shows the correlation matrix for the continuous variables. Customer satisfaction has low correlations with the different kindergarten characteristics and as expected high correlations with the other dimensions in the customer satisfaction survey (parents' impression of their child's development and well-being, and their satisfaction with the information from and physical environment in the kindergarten).

---INSERT TABLE 2 ABOUT HERE---

4 Analysis and results

4.1 Pooled regression models

The first empirical strategy is to use pooled regression models with customer satisfaction as the dependent variable, environmental certification and kindergarten size as the independent variable, and a set of control variables. The idea is to compare kindergartens with environmental certifications to kindergartens without environmental certification who are similar in all other observed dimensions, using control variables (Angrist & Pischke, 2014). I estimate four models. Model 1 includes the kindergarten characteristics as controls, model 2 includes the parental satisfaction with different dimensions of the kindergarten as controls, and model 3 includes both sets of control variables. Models 4 and 5 tests the interactions with kindergarten size and ownership (public or private), using the complete set of control variables.

The dependent variable is the mean satisfaction measure from the responses in each kindergarten, thus representing the satisfaction of very different number of parents. The smallest kindergarten in the sample had only 3 children, and the largest 363. To account for potential heteroscedasticity I therefore use weighted least squares estimation with number of children in the kindergarten as the weight (Wooldridge, 2013). To further account for potential heteroscedasticity, I estimate heteroscedasticity-robust standard errors clustered at the kindergarten and year level. The models are estimated using R (R Core Team, 2021) using the “fixest” package for fixed effects estimation (Berge et al., 2023) and the “sandwich” package for robust standard errors (Berger et al., 2017; Zeileis, 2004). Table 3 presents the results of the pooled regression models.

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Model 1 with only the kindergarten characteristics as controls shows a small and positive but not statistically significant relationship between certification and customer satisfaction. Model 2, controlling for parents’ satisfaction with various aspects of the kindergarten, finds a significant and positive relationship. In model 3, with all control variables, the relationship is again not significant. Models 4 tests the hypothesized interaction between certification and kindergarten size (H2). The variable has a small positive coefficient but is not statistically significant. Model 5 tests the hypothesized interaction between certification and for-profit ownership. The variable has a negative coefficient, the opposite of hypothesized, but is not significant.

Overall, these results give little support to the theorized positive relationship between environmental certifications and customer satisfaction. When controlling for a range of other factors a positive relationship exists. However, the effect is small and not statistically significant I find no interaction with kindergarten size or type of ownership

4.2 Panel data analysis with fixed effects

While the pooled regression models include an extensive set of control variables, a bias due to omitted variables is still a concern. It is unlikely that the models have controlled for all relevant factors that are correlated with the environmental certification and customer satisfaction. Such unobserved variables can for instance be management skills or parental preferences. I therefore estimate panel data models as a next step. In these models, the change of certification status in a kindergarten is used to estimate the effect in the change of customer satisfaction. We therefore do not have to be concerned with potentially omitted

variables, as long as they are constant over time (Wooldridge, 2013). In total, 492 kindergartens in the sample get certified or lose their certification or let the certification expire in the period.

I estimate similar models as in the pooled regression models in table 3, with the exception that ownership form and chain membership is removed as almost no kindergartens change ownership or chain membership in the period. To estimate fixed effects models the municipality dummy is replaced with a kindergarten dummy. Table 4 shows the results:

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As can be seen from in table 4, the estimates for environmental certification in the panel data analysis are very similar to the pooled regression models. Environmental certification has a positive effect on customer satisfaction. However, the estimates are not significantly different from zero, and H1 is rejected. Again, the interactions with kindergarten size and type of ownership are insignificant, and H2 and H3 are also rejected.

4.3 Robustness checks

I estimate additional models to check the findings' robustness. In the previous panel models the assumption is that the difference between getting certified and losing the certification is the same. This is the assumption of symmetric effects in panel data analysis (Allison, 2019), and may be unrealistic. Parents and kindergartens may react differently to getting and losing the certification. For instance, kindergartens may publicly celebrate when they achieve the certification, while keeping more silent about its expiration. In the sample, 195 kindergartens got certified and 297 kindergartens let the certification expire in the period. I therefore estimate a set of fixed effects panel models distinguishing between becoming certified and losing the certification. This is done by creating two variables, one dummy for getting the certification taking the value of 1 in the year the kindergarten is certified, and one dummy for losing the certification, taking the value of 1 in the year the certification is lost or expired (Allison, 2019). Since no chain kindergartens got a certification in the period, this interaction cannot be estimated. Appendix B shows the results for the main variables. The coefficients are again not significantly different from zero.

I also estimate a set of models with the parental impression or satisfaction with the different aspects of the kindergarten (child's development, child's wellbeing, satisfaction with information and satisfaction with physical facilities) as dependent variables. If environmental certification influences one of these variables directly, controlling for it in the previous models could have introduced selection bias (Elwert & Winship, 2014). While this cannot be ruled out, the results in appendix C show that environmental certification does not have a significant impact on the impression of or satisfaction with the other aspects or domains of the kindergarten.

5 Conclusion and discussion

This research has examined whether environmental certifications improve customer satisfaction in a sample of Norwegian kindergartens. An environmental certification shows that the kindergarten has principles and procedures regarding environmental issues, and I hypothesized that this would increase customer satisfaction. I further hypothesized that an environmental certification would improve customer satisfaction more in larger kindergartens, where quality may be more difficult to observe for customers, and who then will rely more on the certification, and for for-profit kindergartens, since a certification potentially signals care for the society.

Testing these relationships in a large dataset of kindergartens over a 7-year period, I found a small positive relationship between certifications and customer satisfaction, which was not significantly different from 0 in most models. In my preferred model, a fixed effects panel data model, environmental certifications had no significant relationship with customer satisfaction. The study found no moderating effect of kindergarten size or for-profit status.

5.1 Theoretical and managerial implications

While previous studies have found a positive relationship between environmental efforts and customer satisfaction (Loureiro et al., 2012; Xie et al., 2017), this study finds no such relationship in the most extensive models. Theoretically, the results cast some doubt on the generalizability of the positive relationship between environmental efforts and customer satisfaction identified in previous studies. The findings cannot rule out a small positive effect of environmental certifications on customer satisfaction also in the current context but suggest that there are other, unidentified factors that influence the strength of the relationship between environmental efforts and customer satisfaction.

One such factor can for instance be the information content and awareness of the certification. It may be that the environmental certification studied gives little useful information to the parents about the environmental performance of the kindergarten. While the Environmental Lighthouse is a common certification in Norway, the details may not be known to the parents.. This may partly be a result of a lack of communication from the kindergartens, previous research show that a large percentage of certified firms do not actually communicate actively about their environmental certification (Heras-Saizarbitoria et al., 2020). Alternatively, it may be that kindergarten customers already have detailed knowledge about the environmental performance of their kindergartens since they visit the kindergartens twice per day, and that the environmental certification does not give extra information.

Industry or geographic characteristics may also influence the effects of certification. Previous research has found positive relationships between sustainability efforts and customer satisfaction in among others the hospitality and manufacturing sectors. It may be that kindergartens are different, and that parents are less concerned about the environmental policies and performance compared to the well-being and development of their child in the kindergarten. Also, this study is done in Norway, where public authorities in general are expected to take a large responsibility for environmental welfare (Gjølberg, 2010). Further, the kindergarten sector is heavily regulated, and it may be that parents have few expectations towards kindergartens' additional environmental efforts. For managers, the findings indicate that while environmental certifications may be useful for other purposes, such as attracting customers or increasing willingness to pay, they do little for customer satisfaction, at least for this service offering and market. The findings cannot rule out a small positive effect of environmental certifications on customer satisfaction, but managers who are interested in improving customer satisfaction will typically find that other initiatives have a more certain effect.. Alternatively, it may be that the kindergartens do not communicate well enough that they are environmentally certified or what this means (Heras-Saizarbitoria et al., 2020). If this is the case, they do not get the potential positive effects of the certification. A clear implication for managers would then be to improve their communication strategy.

5.2 Limitations and future research

This study has some limitations. Firstly, the study only had access to the mean responses from each kindergarten, and not the individual answers from the parents. The individual answers would have made it possible to control for individual characteristics of parents and

children, both reducing the potential problem of differences in the composition of children and parents between kindergartens and getting more precise estimates. Secondly, better measures for the dependent and some of the independent variables would have been desirable. The dependent variable is measured with one item only, and some of the independent variables are formative measures. Further, while the panel data models control for omitted variables that are constant over time, time-variant omitted variables are still a potential concern. Finally, like several other studies in the area this study is done in a single industry. It is difficult to know how much we can generalize to other industries or types of products or services.

To alleviate these weaknesses as well as build on the findings in this study, future research may want to combine survey research with background data about environmental certifications and performance. A possibility is for instance to survey customers before or after the introduction of an environmental certification and including questions measuring the awareness of the certification and the perception of environmental performance, as well as satisfaction. An interesting avenue for future research is also to study how managers decide how much and how to communicate about the certifications, and customers awareness and perceptions about the certifications. Both qualitative and quantitative research could be useful here. Future research should also test the effect of environmental certifications for other types of services and sectors and in other countries.

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Table 1: Descriptive statistics by certification status

| Variable | Not certified | | | Certified | | |
|--|---------------|------|------|-----------|-------|------|
| | N | Mean | SD | N | Mean | SD |
| Customer satisfaction | 17611 | 4.5 | 0.27 | 1993 | 4.5 | 0.25 |
| Number of children | 17585 | 58 | 31 | 1991 | 69 | 36 |
| Children per employee | 17263 | 5.8 | 0.53 | 1991 | 5.9 | 0.48 |
| % of staff with relevant education | 17588 | 70 | 17 | 1991 | 70 | 15 |
| %male employees | 17588 | 9.9 | 11 | 1991 | 11 | 11 |
| Private kindergarten = 1 | 17611 | 0.54 | 0.5 | 1993 | 0.31 | 0.46 |
| Chain kindergarten = 1 | 17611 | 0.16 | 0.37 | 1993 | 0.014 | 0.12 |
| Opening hours | 17534 | 9.7 | 0.47 | 1988 | 9.7 | 0.41 |
| Space per child | 17218 | 5.9 | 2.1 | 1988 | 5.5 | 1.5 |
| Public inspection in same year = 1 | 17536 | 0.4 | 0.49 | 1988 | 0.52 | 0.5 |
| Cost of lunch | 17520 | 316 | 120 | 1988 | 263 | 122 |
| Impression of child's development | 17606 | 4.6 | 0.19 | 1993 | 4.6 | 0.18 |
| Impression of child's wellbeing | 17606 | 4.8 | 0.14 | 1993 | 4.7 | 0.14 |
| Satisfaction with information | 17602 | 4.3 | 0.32 | 1993 | 4.3 | 0.29 |
| Satisfaction with physical environment | 17605 | 4.2 | 0.29 | 1993 | 4.1 | 0.26 |

Source: Author's own research

Table 2: Correlation matrix

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|--|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|
| (1) Customer satisfaction | 1.00 | | | | | | | | | | | |
| (2) Kindergarten size | -0.12 | 1.00 | | | | | | | | | | |
| (3) Children per employee | -0.02 | 0.29 | 1.00 | | | | | | | | | |
| (4) % staff with relevant education | 0.02 | 0.01 | -0.07 | 1.00 | | | | | | | | |
| (5) % male employees | 0.04 | 0.14 | 0.07 | -0.15 | 1.00 | | | | | | | |
| (6) Opening hours | -0.03 | 0.27 | 0.19 | 0.07 | -0.05 | 1.00 | | | | | | |
| (7) Space per child | 0.00 | -0.23 | -0.39 | 0.11 | -0.12 | -0.07 | 1.00 | | | | | |
| (8) Cost of lunch | 0.12 | 0.08 | 0.04 | -0.03 | 0.05 | 0.17 | -0.02 | 1.00 | | | | |
| (9) Impression of child's development | 0.78 | -0.15 | -0.06 | 0.07 | -0.03 | 0.00 | 0.04 | 0.09 | 1.00 | | | |
| (10) Impression of child's well-being | 0.74 | -0.13 | -0.04 | 0.06 | 0.00 | 0.02 | 0.03 | 0.11 | 0.79 | 1.00 | | |
| (11) Satisfaction with information | 0.70 | -0.15 | -0.04 | -0.06 | 0.05 | -0.07 | -0.02 | 0.07 | 0.74 | 0.62 | 1.00 | |
| (12) Satisfaction with physical facilities | 0.76 | -0.07 | -0.05 | 0.03 | 0.05 | 0.05 | 0.07 | 0.27 | 0.63 | 0.61 | 0.55 | 1.00 |

Note: Correlations larger than 0.02 are significant at the 1% level. Source: Author's own research

Table 3: Results from pooled regression models

| | (1) | (2) | (3) | (4) | (5) |
|---|----------------------|---------------------|---------------------|---------------------|---------------------|
| Environmental certification (H1) | 0.012 (0.009) | 0.010* (0.004) | 0.006 (0.004) | -0.001 (0.009) | 0.006 (0.005) |
| Environmental certification x kindergarten size (H2) | | | | 0.000 (0.000) | |
| Environmental certification x chain kindergarten (H3) | | | | | -0.007 (0.037) |
| Kindergarten size | 0.000 (0.000) | | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Children per FTE | -0.015 (0.008) | | 0.002 (0.004) | 0.002 (0.004) | 0.002 (0.004) |
| % Staff with relevant education | 0.001*** (0.000) | | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| % Male staff | 0.001 (0.000) | | 0.000* (0.000) | 0.000* (0.000) | 0.000* (0.000) |
| Private kindergarten | 0.194*** (0.011) | | -0.002 (0.005) | -0.003 (0.005) | -0.002 (0.005) |
| Chain kindergarten | -0.070*** (0.011) | | -0.024** (0.004) | -0.023** (0.004) | -0.023** (0.005) |
| Opening hours | -0.046** (0.010) | | -0.015* (0.004) | -0.015* (0.004) | -0.015* (0.004) |
| Space per child | 0.001 (0.002) | | -0.005** (0.001) | -0.005** (0.001) | -0.005** (0.001) |
| Public inspection in same year | -0.016** (0.003) | | -0.003 (0.002) | -0.003 (0.002) | -0.003 (0.002) |
| Cost of lunch | 0.000 (0.000) | | 0.000*** (0.000) | 0.000*** (0.000) | 0.000*** (0.000) |
| Parental impression of child's development | | 0.392*** (0.013) | 0.373*** (0.011) | 0.373*** (0.011) | 0.373*** (0.011) |
| Parental impression of child's wellbeing | | 0.401*** (0.020) | 0.396*** (0.022) | 0.396*** (0.022) | 0.396*** (0.022) |
| Parental satisfaction with information | | 0.143*** (0.009) | 0.146*** (0.007) | 0.146*** (0.007) | 0.145*** (0.007) |
| Parental satisfaction with physical environment | | 0.349*** (0.040) | 0.373*** (0.041) | 0.373*** (0.041) | 0.373*** (0.042) |
| Num.Obs. | 19185 | 19565 | 19180 | 19180 | 19180 |
| R2 | 0.212 | 0.778 | 0.783 | 0.784 | 0.783 |
| Year dummies | X | X | X | X | X |
| Municipality dummies | X | X | X | X | X |

* p < 0.05, ** p < 0.01, *** p < 0.001. Standard errors clustered at the kindergarten and year level. Source: Author's own research

Table 4: Results from fixed effects regression models

| | (6) | (7) | (8) | (9) | (10) |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|
| Environmental certification (H1) | 0.016 (0.009) | 0.004 (0.008) | 0.004 (0.008) | 0.013 (0.013) | 0.004 (0.008) |
| Environmental certification x kindergarten size (H2) | | | | 0.000 (0.000) | |
| Environmental certification x chain kindergarten (H3) | | | | | -0.009 (0.039) |
| Kindergarten size | 0.000 (0.000) | | 0.000* (0.000) | 0.000* (0.000) | 0.000* (0.000) |
| Children per FTE | -0.011 (0.004) | | 0.003 (0.004) | 0.003 (0.004) | 0.003 (0.004) |
| % Staff with relevant education | 0.001* (0.000) | | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| % Male staff | 0.000 (0.000) | | 0.001* (0.000) | 0.001* (0.000) | 0.001* (0.000) |
| Opening hours | 0.013 (0.019) | | 0.007 (0.009) | 0.007 (0.009) | 0.007 (0.009) |
| Space per child | 0.018** (0.004) | | 0.000 (0.003) | 0.000 (0.003) | 0.000 (0.003) |
| Public inspection in same year | -0.011** (0.002) | | -0.002 (0.002) | -0.002 (0.002) | -0.002 (0.002) |
| Cost of lunch | 0.000** (0.000) | | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| Parental impression of child's development | | 0.351*** (0.012) | 0.346*** (0.013) | 0.346*** (0.013) | 0.346*** (0.013) |
| Parental impression of child's wellbeing | | 0.317*** (0.018) | 0.318*** (0.018) | 0.318*** (0.018) | 0.318*** (0.018) |
| Parental satisfaction with information | | 0.161*** (0.006) | 0.162*** (0.007) | 0.161*** (0.007) | 0.162*** (0.007) |
| Parental satisfaction with physical environment | | 0.362*** (0.030) | 0.366*** (0.031) | 0.366*** (0.031) | 0.366*** (0.030) |
| Num.Obs. | 19185 | 19565 | 19180 | 19180 | 19180 |
| R2 | 0.642 | 0.852 | 0.853 | 0.853 | 0.853 |
| Year dummies | X | X | X | X | X |
| Kindergarten dummies | X | X | X | X | X |

* p < 0.05, ** p < 0.01, *** p < 0.001. Standard errors clustered at the kindergarten and year level.
Source: Author's own research

Appendix A: Questions from the parental satisfaction survey

| Construct/theme | Response scale |
|---|---|
| Satisfaction with physical environment | |
| How satisfied or dissatisfied are you with: | 5. Very satisfied, 4. Pretty satisfied, 3. Neither satisfied nor dissatisfied, 2. Pretty dissatisfied, 1. Very dissatisfied, 0. Do not know |
| 1. The kindergarten's outdoor areas? | |
| 2. The kindergarten's indoor premises? | |
| 3. The kindergarten's toys and equipment? | |
| 4. The kindergarten's hygiene? | |
| 5. The kindergarten's food offering? | |
| 6. How the kindergarten safeguards the children's' safety | |
| Impression of child's well-being | |

To which extent do you agree or disagree with the following statements:

1. I have the impression that my child is happy in the kindergarten
2. I have the impression that my child has friends in the kindergarten
3. I have the impression that the kindergarten facilitates different types of play and activities

5. Completely agree, 4. Partly agree, 3. Neither agree nor disagree, 2. Partly disagree, 1. Completely disagree, 0. Do not know

Satisfaction with information

To which extent do you agree or disagree with the following statements:

1. I receive good information about how my child is doing in the kindergarten
2. I receive good information about the content in the kindergarten day
3. The kindergarten is good at informing about changes in staff

5. Completely agree, 4. Partly agree, 3. Neither agree nor disagree, 2. Partly disagree, 1. Completely disagree, 0. Do not know

Impression of child's development

To which extent do you agree or disagree with the following statements:

1. I have a good dialogue with the kindergarten about my child's development
2. I have the impression that the kindergarten contributes to my child's social development (friendship, empathy, consideration)
3. I have the impression that the staff in the kindergarten encourages my child's curiosity and desire to learn
4. I have the impression that the kindergarten facilitates my child's language development

5. Completely agree, 4. Partly agree, 3. Neither agree nor disagree, 2. Partly disagree, 1. Completely disagree, 0. Do not know

Total satisfaction

In total, how satisfied or dissatisfied are you with your kindergarten?

5. Very satisfied, 4. Pretty satisfied, 3. Neither satisfied nor dissatisfied, 2. Pretty dissatisfied, 1. Very dissatisfied, 0. I do not know

Source: Norwegian Directorate for Education and Training (2020), author's own translation.

Appendix B: Results from asymmetric fixed effects models

| | (11) | (12) | (13) | (14) | (15) |
|--|-------------------|------------------|------------------|------------------|-------------------|
| Got certified (H1) | 0.030 (0.020) | 0.007 (0.012) | 0.007 (0.012) | 0.008 (0.016) | 0.007 (0.012) |
| Lost certification (H1) | -0.005 (0.010) | 0.007 (0.015) | 0.007 (0.015) | 0.003 (0.022) | 0.009 (0.016) |
| Got certified × Kindergarten size (H2) | | | | 0.000 (0.000) | |
| Lost certification × Kindergarten size (H2) | | | | 0.000 (0.000) | |
| Lost certification × Chain kindergarten (H3) | | | | | -0.051 (0.041) |
| Num.Obs. | 19185 | 19565 | 19180 | 19180 | 19180 |
| R2 | 0.642 | 0.852 | 0.853 | 0.853 | 0.853 |
| Kindergarten characteristics controls | X | | X | X | X |
| Satisfaction with domains controls | | X | X | X | X |
| Year dummies | X | X | X | X | X |

| | (11) | (12) | (13) | (14) | (15) |
|----------------------|------|------|------|------|------|
| Kindergarten dummies | X | X | X | X | X |

* p < 0.05, ** p < 0.01, *** p < 0.001. Standard errors clustered at the kindergarten and year level. Source: Author's own research.

Appendix C: Other dependent variables

| | (16) | (17) | (18) | (19) |
|---------------------------------------|--|---|--|---|
| | DV: Parental impression of child's development | DV: Parental impression of child's well-being | DV: Parental satisfaction with information | DV: Parental satisfaction with physical environment |
| Environmental certification | 0.003 (0.003) | 0.003 (0.003) | -0.013 (0.007) | 0.012 (0.007) |
| Num.Obs. | 19180 | 19180 | 19180 | 19180 |
| R2 | 0.852 | 0.786 | 0.821 | 0.846 |
| Kindergarten characteristics controls | X | X | X | X |
| Satisfaction with domains controls | X | X | X | X |
| Year dummies | X | X | X | X |
| Kindergarten dummies | X | X | X | X |

* p < 0.05, ** p < 0.01, *** p < 0.001. Standard errors clustered at the kindergarten and year level. Source: Author's own research.