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B2B value co-creation influence on engagement: Twitter analysis at international trade show organizer

Co-creation
influence on
engagement

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Abstract

Purpose – This paper studies, based on the theory of service-dominant logic, the effect of value co-creation practices (linking and materializing) on engagement dimensions (popularity, commitment and virality). The main objective is to analyze the influence of value co-creation practices on engagement at international trade shows organizer association on Twitter.

Design/methodology/approach – This paper studies the usage of Twitter by the Specialty Food Association, which organizes one of the top five foods and beverage international trade show in the United States. To achieve the research objective, the authors have analyzed 1,608 posts on Twitter from the Twitter account @Specialty_Food. A content analysis was performed using Krippendorff's (2004) recommendations, and the data were analyzed using regression analysis with optimal scaling and Kruskal–Wallis Test.

Findings – According to the results, some materializing practices influence popularity, commitment, virality and global engagement on Twitter. While the usage of some linking practices influences respectively commitment and popularity.

Originality – These results provide valuable information for business-to-business (B2B) contexts and answer a research gap reported in previous literature, which affirms that more research is needed about the relationship between service systems and engagement. From a general view, to generate more engagement on social media in B2B contexts, it is recommended to prioritize posts that incorporate live and online events based on collaborative and dynamic human interactions, following by business ideas and business cases.

Keywords Business-to-business (B2B), Value co-creation, Service-dominant logic, Engagement, International trade shows, Social network, Twitter

Paper type Research paper

1. Introduction

Trade shows represent, nowadays, recurrent business events that facilitate diverse forms of commercial and social exchanges among key stakeholders of an industry (Tafesse and Skallerud, 2017). They present an opportunity to sell, reinforce contacts, maintain the brand image and access new markets (Godar and O'Connor, 2001). In this regard, for many business-to-business (B2B) firms, trade show participation is a key element of their marketing mix, often second only to the cost of the salesforce (Gopalakrishna *et al.*, 2022). As Sarmiento and Simões (2018) point out, international trade shows (ITS) can provide great opportunities for



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businesses to build business positions in the international market. If visitors get engaged with a trade show, the organizer and exhibitors get benefits as well (Gopalakrishna *et al.*, 2019).

Recently, literature has recognized the usefulness of social media in promoting trade shows (Lapoule and Rowell, 2016) because improves the trade show's performance (Singh *et al.*, 2017). Even more, social media contributes to B2B engagement, an essential issue in research about social media (Brodie *et al.*, 2013; Hollebeek, 2019).

On the other hand, the study about the relationship between value co-creation practices and engagement is relevant for many reasons. First, because engagement predicts key variables for markets as purchase intention, help intention and feedback intention (Hsieh and Chang, 2016). Second, value co-creation practices are an emerging issue; consequently, more research is needed about it. Third, there are yet few studies about the relationship between co-create value practices and engagement in social media.

Despite the relevance of the trade shows, and according to Lilien (2016), more studies on B2B are needed and especially using analytics to reach significant conclusions (Lilien, 2016). In that direction, our work focuses on studying analytics about B2B communications in social media.

Considering the abovementioned, the aim of this research is to analyze the influence of value co-creation practices on engagement at ITS organizer association on Twitter. According to Frow *et al.* (2016), more research about the impact of co-creation practices on relationships within a specific context is needed.

In general, first, this study responds to a recent call for research on the value co-creation process (Frow *et al.*, 2016). The results may help to understand the co-creation process and its influence on relationships (Frow *et al.*, 2016; Kohtamäki and Rajala, 2016). Second, the present research focuses on a single case study that offers unique opportunities to understand the micro-practices of co-creation and the process of value co-creation (Kohtamäki and Rajala, 2016). Third, there are yet few studies about the relationship between co-create value practices and engagement in social media (Fernandes and Remelhe, 2016). And fourth, our work applies statistical methods to find nonlinear relationships (Kohtamäki and Rajala, 2016).

In sum, this research contributes to the conceptualization of co-creation practices in trade shows, the understanding of the value co-creation process in B2B contexts, and the measure of co-creation practices (because it is proposed as an adaptation of a previous methodology for applying in Twitter). Additionally, there are practical implications in our work. More specifically, this research proposes actions in the usage of value co-creation practices by B2B actors on social media because, in general, its results demonstrate the usefulness of the value co-creation practices for the market, generating engagement with brands in B2B contexts. From a general view, the study suggests prioritizing posts that incorporate live and online events based on collaborative and dynamic human interactions, followed by business ideas and business cases on Twitter. In sum, its findings can help to improve the trade show performance and, consequently, exhibitors' results (Gopalakrishna *et al.*, 2019) and open the doors to further research (i.e. the study of the influence of other variables on engagement in B2B contexts, or the analysis of other variables that can influence the co-creation practices or it can be studied the usage of co-creation practice in other ITS).

2. Theoretical framework and research hypotheses

2.1 Conceptualization of co-create value and theoretical approaches

Value co-creation started to be studied as early as the 1970s in the field of marketing (Grönroos, 2012; Terblanche, 2014). According to Terblanche (2014), value co-creation was called customer participation at the beginning, and it was mentioned for the first time in a

paper by Lovelock and Young (1979). Nevertheless, the term known as value co-creation has become a researched construct since Vargo and Lusch (2004) identified that marketing was turned more service-centered (Merz *et al.*, 2018). According to Saha *et al.* (2020), this concept has its origin in the proposition that consumers are ‘co-creators of value’ and that companies cannot offer value by themselves.

In marketing literature, researchers have variously conceptualized value co-creation, and their definitions refer to many aspects (Kohtamäki and Rajala, 2016). Table 1 shows that researchers have called value co-creation in different ways (i.e. co-production, co-design) (Payne *et al.*, 2008; Kohtamäki and Rajala, 2016). However, it is most common the term value co-creation. Together with its conceptualization, value co-creation can be studied from many

Year	Concept	Definition	Authors
2004	Co-creation of value	The process of involving the actions of both a provider and a consumer through which experience is created	Prahalad and Ramaswamy (2004)
2011	Co-creation, a practice-theory	“... we thus conceive of practices as background coping skills that simultaneously limit and enable interactions between provider and customer” (p. 355)	Echeverri and Skålén (2011)
2012	Value co-creation	“... value co-creation behavior as a multidimensional concept consisting of two higher-order factors, each made up of multiple dimensions. These two factors are customer participation behavior and customer citizenship behavior” (p. 5)	Yi and Gong (2013)
2015	Co-created service experience practices	“... our conceptualization that service experiences are experiential, relational activities and interactions developed with the customer and potentially other actors ...” (p. 271)	McColl-Kennedy <i>et al.</i> (2015)
2016	Value creation	“... value creation has been studied at least on four levels: at firm-level, within dyadic relationships, as well as in networks and ecosystems (Frow <i>et al.</i> , 2014)” (p. 9)	Kohtamäki and Rajala (2016)
2016	Co-creation practices	Activities classified into three dimensions Linking Materializing Institutionalizing	Marcos-Cuevas <i>et al.</i> (2016)
2016	Co-creation activities	In theoretical terms, this research study contributes by studying the ways in which companies might foster the co-creation process by raising customer resource levels	Alves <i>et al.</i> (2016)
2018	Value co-creation	“... all-round involvement of consumers in the entire corporate processes (CEB) and a high sense of belonging to the firm supplier (commitment) encourage value co-creation” (p. 151)	Botti <i>et al.</i> (2018)
2018	Co-creation value (CCV)	“... we define CCV as the actors’ appraisal of the meaningfulness of a service by assessing what is contributed and what is realized through collaboration” (p. 72)	Busser and Shulga (2018)
2022	Value co-creation-	“Following previous studies, we consider value co-creation as a multidimensional concept that includes linking and materializing activities to be analyzed in international B2B contexts in its relationship with ‘virtual’ engagement”	The authors

Source(s): Own elaborated

Table 1.
Conceptualization of
value co-creation

perspectives and theoretical approaches (Saha *et al.*, 2020). Nonetheless, this paper has focused on experience logic, a perspective that comes from service-dominant logic (S-D logic). This approach focuses on skills and knowledge (operant resources) instead of tangible resources such as raw materials and machinery (operand resources) for creating a competitive advantage for the firm (Saha *et al.*, 2020). This election is based on diverse motives, as explained below.

Overall, value co-creation is a keystone of the service perspective in marketing (Grönroos, 2012). In this context and according to literature, the S-D logic can be considered as an umbrella for the comprehension of service-based value co-creation (Kohtamäki and Rajala, 2016). For example, recent studies (i.e. Brambilla *et al.*, 2022; Klafke and de Oliveira, 2022) propose the use of this approach in the building of value co-creation in diverse industries. With it, there is an approach that comes from the S-D logic and considers engagement platforms even more relevant for value creation. This approach has been proposed by Ramaswamy (2011), and it is called an alternate logic of value creation.

According to Ramaswamy (2011), the alternate logic considers that every interaction between firms and consumers on social media creates an experience, and consequently creates value; a value that it is based on collaborative, dynamic, contextual and generative human interactions.

In this sense, contemporary researchers consider value co-creation as an interaction among actors, and the quantity of studies about this construct reveals that value co-creation is a significant area for current and future research (Kohtamäki and Rajala, 2016). Following the proposal of Marcos-Cuevas *et al.* (2016), value co-creation is formed by three dimensions:

- (1) *Linking* is defined as “mobilizing social connections and networks”, and it is operationalizing as practices of (1) co-diagnosis (collecting and organizing information for collaborative use), (2) co-ideation (generating and suggesting ideas, communicating and sharing, engaging) and (3) co-evaluation (commenting and selecting ideas) (p.100).
- (2) *Materializing* is conceptualized as “operational practices related to the production of a value co-creating offering”, and it is operationalizing as practices of (1) co-design (developing concepts and knowledge), (2) co-testing (prototyping and improving the offering, giving feedback) and (3) co-launching (creating and managing information, advertising, marketing and diffusing information) (p.100).
- (3) *Institutionalizing* is defined as “organizational practices related to the design of institutions and structures to capture and retain value created”, and it is operationalizing as practices of embedding, that can be measured by the development of rules, norms and standards (p.100).

These three dimensions are useful for the development of the present research because (1) the authors propose a theoretically-grounded and empirically-informed classification of value co-creating practices, and (2) they focus on defining value co-creation practices in B2B contexts.

According to the literature, practices of linking and materializing are related to engagement (Marcos-Cuevas *et al.*, 2016). However, there was no found evidence of a relationship between institutionalizing practices and engagement, maybe because social media messages are not related to rules, norms and standards. Consequently, the present investigation will focus on an analysis of linking and materializing practices.

2.2 Effects of value co-creation: the engagement (commitment, virality and popularity)

According to the literature review, value co-creation has beneficial effects on companies (loyalty, engagement, satisfaction among others). Considering the context of our work,

engagement was selected as a variable of interest because it is a central outcome to study in social media contexts (Brodie *et al.*, 2013). In this sense, literature has proved that co-creation practices have some effects on B2B contexts.

In social sciences literature, engagement has been widely studied by educators, psychologists, sociologists and recently by marketers (Brodie *et al.*, 2011). As Hollebeek *et al.* (2022) state, this concept has changed into a major performance metric because has been proved to create a superior firm performance. If we consider engagement in virtual contexts, the concept is more recent. Brodie *et al.* (2013) define engagement as follows.

Consumer engagement in a virtual brand community involves specific interactive experiences between consumers and the brand, and/or other members of the community. Consumer engagement is a context-dependent, psychological state characterized by fluctuating intensity levels that occur within dynamic, iterative engagement processes ... (p. 107)

From a general view, engagement is formed by three components: the cognitive, emotional and behavioral components (Hollebeek *et al.*, 2014; Harrigan *et al.*, 2017) that can be translated to the virtual context under other denominations as (1) commitment, (2) virality and (3) popularity (Bonsón and Ratkai, 2013). In this sense, this paper follows the proposal by Bonsón *et al.* (2016) and Bronson and Ratkai (2013) because their research method has been successfully used on social networks such Twitter, Facebook and YouTube. Additionally, content analysis studies, such as those of Ponte *et al.* (2015), Bonsón *et al.* (2016), Haro-de-Rosario *et al.* (2018) and Villamediana-Pedrosa *et al.* (2019), confirm that it is flexible and easy to adapt in new contexts of study such as Facebook and Twitter.

2.3 The relationship between value co-creation dimensions and engagement

According to Grisseemann and Stokburger-Sauer (2012), there is a research gap in the relationship between the actions that stimulate or support the co-creation of value and the response in customers. As AbdelAziz *et al.* (2021) state, most of the current studies focused on the value co-creation behavior and output but it is limited the research that focus on what contributes to the customers' engagement for value co-creation intention.

The term engagement by involving customers in value co-creation has received special attention from scientists (Vargo and Lusch, 2008) and have special interest for trade show contexts because, at trade show, the organizer and the exhibitors have been benefited when visitors engage with the fair in a completely comprehensive way (Gopalakrishna *et al.*, 2019).

According to Roberts *et al.* (2014), the motivation to engage in value co-creation is related to the co-creation activities; specifically, different co-creation activities produce a variation in motivations to engage with value co-creation. Literature shows evidence of the influence of value co-creation practices on engagement or any of its dimensions (for example, Carpenter and Krutka, 2015; Fernandes and Remelhe, 2016; Haro-de-Rosario *et al.*, 2018; Hsieh and Chang, 2016; Roberts *et al.*, 2014; Rodesiler, 2015; Xing and Gao, 2018).

According to Ramaswamy (2011), the market should be defined in a new way, as a forum where people outside the companies are part of the value co-creation process of brands. In this scenario, social networks have allowed consumers to exchange experiences that shape the value of co-creation experiences (Alves *et al.*, 2016). As individuals and brands interact and engage, their experiences become the new basis of value co-creation, and this process is facilitated by social networks because they have empowered the people outside the firms (Ramaswamy, 2011). Gummesson and Mele (2010) affirmed that the co-creation of value comes from interactions and the integration of resources. From this point of view, consumers are pleased with social media and desire to interact with brands and, consequently, co-create value (Hsieh and Chang, 2016). In this context, Twitter can be classified as an engagement platform (Fernandes and Remelhe, 2016).

Additionally, social media also offer a perfect environment for the development of engagement (Brodie *et al.*, 2013). In general, customers' interactions on social media can be a source of co-creation and engagement co-creation at the same time (Fernandes and Remelhe, 2016). In this context, co-creation and engagement became in close and related concepts (Chathoth *et al.*, 2016).

In sum and based on previous literature, we hypothesize that co-creation practices (linking and materializing practices) influence engagement (popularity, commitment and virality).

H. Value co-creation practices (linking and materializing) positively influence on engagement (popularity, commitment, virality and global engagement).

Literature suggests that there is a relationship between actions that can be classified as linking and materializing practices and engagement (Füller, 2006; Wu *et al.*, 2007; Brodie *et al.*, 2013).

First, *regarding linking*, Roberts *et al.* (2014), Fernandes and Remelhe (2016) or Hsieh and Chang (2016) found that firms' activities related to linking practices (co-diagnosis, co-ideation and co-evaluation) work as motivators of engagement. For example, Hsieh and Chang (2016) conducted a study with 300 university students enrolled in a marketing competition in Taiwan, and found that value co-creation tasks/practices affect engagement. These authors explained that some activities (related to linking practices) work as motivators of engagement. In the same way, Haro-de-Rosario *et al.* (2018) and Xing and Gao (2018) found that actions that can be classified as linking practices (co-diagnosis, co-ideation and co-evaluation) influence commitment (an engagement's dimension) and engagement. In addition, other authors found that social interactivity drives engagement (Cheng *et al.*, 2019).

Based on these findings, the following hypothesis is proposed:

H1. The usage of linking practices positively influences engagement.

More specifically:

H1.1. Co-diagnosis positively influences (a) popularity, (b) commitment, (c) virality and (d) global engagement on Twitter.

H1.2. Co-ideations positively influence (a) popularity, (b) commitment, (c) virality and (d) global engagement on Twitter.

H1.3. Co-evaluation positively influences (a) popularity, (b) commitment, (c) virality and (d) global engagement on Twitter.

Second, the literature supports that *materializing practices* can also influence engagement. For example, Roberts *et al.* (2014), Haro-de-Rosario *et al.* (2018) or Xing and Gao (2018) found that firms' activities that can be classified as materializing practices (co-design, co-testing and co-launching) could work as motivators of the engagement. Xing and Gao (2018), in a study with more than 600,000 tweets from development professional and learning communities, found that actions that can be classified as materializing practices (co-design, co-testing and co-launching) influence commitment (or engagement); however, materializing influence more than linking practices. According to these authors, users of these learning communities value principally tweets that focused on actions related to co-design and co-testing practices. In the same line, Carpenter and Krutka (2015) and Rodesiler (2015) state that materializing practices on Twitter engage users of learning communities. In addition, knowledge-based factors positively influenced the implementation of value co-creation practices in companies operating within collaborative steel networks (Fang *et al.*, 2021). Considering the conclusions of the previous research, the following specific hypothesis is proposed:

H2. The usage of materializing practices positively influences engagement.

More specifically:

- H2.1. *Co-design* positively influences (a) popularity, (b) commitment, (c) virality and (d) global engagement on Twitter.
- H2.2. *Co-testing* positively influences (a) popularity, (b) commitment, (c) virality, and (d) global engagement on Twitter.
- H2.3. *Co-launching* positively influences (a) popularity, (b) commitment, (c) virality and (d) global engagement on Twitter.

Additionally, researchers support that some practices are more related to engagement than others. For example, according to Hsieh and Chang (2016), linking is more influential on engagement; but following Xing and Gao (2018), materializing is more influential. This is consistent with the findings of Roberts *et al.* (2014) who think that engagement varies according to the different co-creation practices. Based on these works, the following specific hypothesis is proposed:

- H3. There are *differences* between the *linking* (co-diagnosis, co-ideation and co-evaluation) and the *materializing* practices (co-design, co-testing and co-launching) regarding the production of engagement.

In sum, as Table 5 shows, there are three main hypotheses with 28 specific sub-hypotheses.

3. Method

The present study proposes nonexperimental and ex-post-facto research because variables have already occurred before the researchers have started with the observation (Kerlinger, 1973).

3.1 Data collection, procedure and classification

As stated before, this paper focuses on the relationship between co-creation practices and engagement at international trade show organizer on Twitter. In this sense, data of interest has been collected from the Twitter account @Specialty_Food of the Specialty Food Association (<https://www.specialtyfood.com/>), owner of the Fancy Food Shows (summer and winter versions), which are ranked as the top five Food and Beverage International Trade Show in the United States (<https://www.exponents.com/our-blog/top-15-food-beverage-industry-trade-shows-in-usa/>).

Twitter was selected as social media platform because: (1) it is public, (2) it is possible to investigate each tweet, (3) tweets can be taken simultaneously and (4) it provides enough data for thorough analysis (Leek *et al.*, 2019).

Considering the nature of data and research purpose, content analysis is used, following Krippendorff's (2004) recommendations, dividing our analysis into six stages: design, unitizing, sampling, coding, drawing inferences and validation.

Data were collected through keyhole.co, an accessible freeware in its basic version (Del Vecchio *et al.*, 2018). Additionally, we used the Twitter Premium API through a third-party application named <https://www.followersanalysis.com/>. Finally, all tweets posted in 2019 (in total 1,608) were extracted from the account @Specialty_Food on 28th January 2020.

Every tweet was classified by hashtags into coded categories according to the co-creation practices typologies proposed by Marcos-Cuevas *et al.* (2016) that also have been employed by other authors (Fang *et al.*, 2021). The use of hashtags on Twitter is considered a powerful and helpful source of data (Wang *et al.*, 2016). Considering the mentioned above, the hashtags were used for the tweet classification in the present research (Costa *et al.*, 2013).

To classify data into coded categories, a codebook was created. The codebook included the hashtags selected for each practice. The categorization was carried out mostly using hashtags and according to the description of each practice defined in the literature (Marcos-Cuevas *et al.*, 2016). Linking practices were measured through the presence of content, mostly using hashtags, on tweets related to co-ideation and co-evaluation practices. Materializing practices were measured through the presence of content, mostly using hashtags, on tweets related to co-testing, co-design and co-launching practices. Regarding institutionalizing practices, no tweets were found about this kind of practice.

This codebook was tested and considered suitable for the analysis (Cohen's kappa = 0.99, 95% confidence interval). It is used to measure the degree of agreement between two observers. According to the results for Cohen's kappa, there was an almost perfect agreement for the codebook (Landis and Koch, 1977).

The final number of tweets included in the study was 1,608, which were classified into the co-creation practices categories proposed by Marcos-Cuevas *et al.* (2016).

3.2 Variables

3.2.1 Independent variables. As stated before, the co-creation practices were measured using an adaptation of Marcos-Cuevas *et al.* (2016) who proposed to measure three dimensions: linking practices (three items), materializing practices (three items) and institutionalizing practices (one item). This proposal was applied in B2B contexts (Fang *et al.*, 2021; Marcos-Cuevas *et al.*, 2016). As stated before, the codebook included the hashtags selected for each practice.

Linking: was measured *through the presence of content* (mostly using hashtags) on tweets related to co-ideation and co-evaluation practices:

- (1) *Co-ideation practices* (those practices that *generate and suggest ideas*, communicate, share and engage). Thus, in our study, the tweets classified into this category were related principally to *business cases*, the principal label was #12under35.
- (2) *Co-evaluation practices* (those practices that *comment and select ideas*). Thus, the tweets classified into this category were associated with any tweet that include comments about *business ideas*.

Materializing was measured through the presence of content, (mostly using hashtags) on tweets related to co-testing, co-design and co-launching practices.

- (1) *Co-design practices* (those practices that *develop concepts and knowledge*). The tweets classified into this category were related principally to *live and online events*. The principal labels were #FancyFoodShow and #SFABizSummit. In the trade show context, it is carried out the summit of business called SFA Biz Summit, in this event the companies can join the industry experts.
- (2) *Co-testing practices* (those practices that prototype and improve the offering, giving feedback). The tweets classified into this category were related principally to *talent*. The principal labels were #SofiAward and #SFALeadershipAwards.
- (3) *Co-launching practices* (those practices that *create and manage information*, advertising, marketing and diffusing information). The tweets classified into this category were related principally to *information*. The principal label was #SFANews.
- (4) *Co-diagnosis practices* (collecting and organizing information for collaborative use). In our study, *there were no tweets* associated with co-diagnosis (a linking dimension).

- (5) *Co-ideation practices* (generating and suggesting ideas, communicating and sharing and engaging). The tweets classified into this category were related principally to business cases, *tweets that included #12under35*.
- (6) *Co-evaluation practices* (commenting and selecting ideas). The tweets classified into this category were associated with any hashtags, but with content related to ideas, comments and sharing of information.

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If the tweet contained more than one hashtag or no hashtags, the main topic of the tweet was considered.

3.2.2 Dependent variables. This study follows the digital stakeholder engagement measure proposed by Viglia *et al.* (2018), through two dimensions, the number of favorites and the number of comments in a post. In addition, the study adds one dimension to measure engagement, the number of retweets in a post (Bonsón *et al.*, 2016; Haro-de-Rosario *et al.*, 2018). Thus, the engagement was measured using the proposal of Viglia *et al.* (2018) and using an adaptation of the metrics proposed by Bonsón *et al.* (2016) because it measures engagement on social media and it has been used previously in Twitter's data analyses (Bonsón *et al.*, 2016; Haro-de-Rosario *et al.*, 2018). In this sense, engagement was associated with three dimensions (Table 2):

- (1) *Virality*: the number of retweets on posts
- (2) *Popularity*: the number of favorites on tweets.
- (3) *Commitment*: the number of comments on tweets.

4. Analysis and discussion

After collecting the data, the 1,608 tweets were classified into the dimensions of co-creation practices (Table 3) and analyzed as explained in Section 3.

Figure 1 represents the frequencies of the co-creation practices found in the 1,608 tweets. As can be seen, co-launching is the most used practice, followed by co-designed; while co-ideation is the less used practice. If we group the practices into both categories (linking and materializing), it could be affirmed that materializing practices are the most used.

Engagement			
Popularity	P1	Number of favorites	Total number of favorite reactions on Twitter's post
	P2	$(P1/\text{Number of fans on publication month}) \times 1,000$	Average number of favorites per one thousand fans
Commitment	C1	Number of comments	Total number of comments on Twitter's post
	C2	$(C1/\text{Number of fans on publication month}) \times 1,000$	Average number comments per one thousand fans
Virality	V1	Number of retweets	Total number of retweets on Twitter's post
	V2	$(V1/\text{Number of fans on publication month}) \times 1,000$	Average number of retweets per one thousand fans
Global Engagement	GE	$P2 + C2 + V2$	Global Engagement Index
Note(s): Own development			

Table 2.
Adaptation of metrics
presented by Bonsón
et al. (2016) for the
measurement of
engagement on tweets

Table 3.
Descriptive statistics

[illegible]

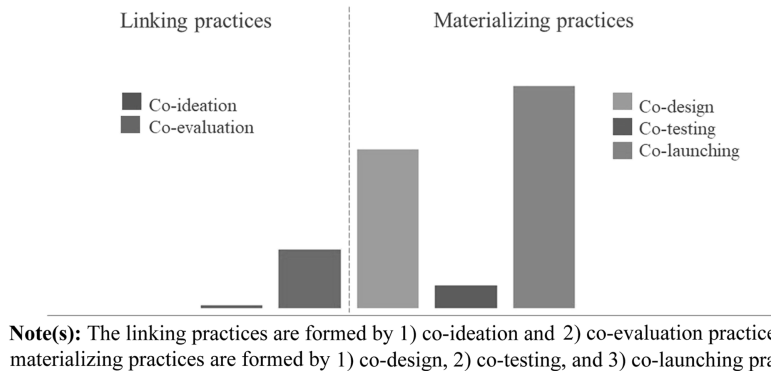


Figure 1.
Frequencies of
co-creation practices

Descriptive analyses of the data indicate that the global engagement average is around 0.0989 per thousand fans. Popularity is much higher ($\bar{x} = 0.0746$) than virality ($\bar{x} = 0.0221$) and commitment ($\bar{x} = 0.0022$). Additionally, popularity is the dimension that contributes most to global engagement, followed by virality. These results are in accordance with, for example, Villamediana *et al.* (2019).

Then, an exploratory data analysis was run to check the data distribution. Therefore, the results of the Kolmogorov–Smirnov test show that the p -values are less than 0.01 for engagement and its dimensions. Consequently, the data are not normally distributed. The nonnormality of the data conditioned the rest of the analysis. For this reason, regression analysis with optimal scaling was selected to evaluate the relationships between the predictor variables and the dependent variables. Categorical regression (CATREG) allows that data are not normally distributed (Hartmann *et al.*, 2009).

After the descriptive analysis, we tested the three main hypotheses and their 28 specific sub-hypotheses with a statistical significance level of p -value < 0.05 (α) and a 95% confidence interval. Following previous works (Lee *et al.*, 2010; Villamediana-Pedrosa *et al.*, 2019), regression analyses with optimal scaling (CATREG) were run to test the rest of the specific hypotheses. In total, four regression models were constructed, one for each dependent variable (global engagement and its dimensions: popularity, commitment and virality). Results were statistically significant in every regression (considering p -value < 0.05) (Table 4).

In the first model, related to *popularity*, the results reveal a highly significant and moderate correlation ($R = 0.286$) between popularity and the co-creation practices (the linking practices formed by co-ideation and co-evaluation; and the materializing practices formed by co-design, co-testing and co-launching). In the model, approximately 8% of the variance in popularity is

Dependent variable	R	R^2	Group comparison		F	β	Coefficients		
			R Adjusted	p . Error			e	df	F
Popularity	0.286	0.082	0.080	0.918	35.807**	0.286	0.023	4	152.583**
Commitment	0.087	0.008	0.005	0.992	3.046*	0.087	0.024	4	13.163**
Virality	0.147	0.022	0.019	0.978	8.846**	0.147	0.025	4	33.548**
Global Engagement	0.269	0.072	0.070	0.928	31.167**	0.269	0.024	4	123.714**

Note(s): ** p -value < 0.01 ; * p -value < 0.05 ; predictor variable: co-creation practices

Table 4.
Regression analyses
with optimal scaling

Table 5.
Hypotheses tests

Hypotheses	(a) Popularity	(b) Commitment	(c) Virality	(d) Global engagement
<i>Linking influences H1</i>				
(1) Co-ideation	H1.1.a) Rejected	H1.1.b) <i>Accepted</i>	H1.1.c) Rejected	H1.1.d) Rejected
(2) Co-diagnosis	H1.2.a) Rejected	H1.2.b) Rejected	H1.2.c) Rejected	H1.2.d) Rejected
(3) Co-evaluation	H1.3.a) <i>Accepted</i>	H1.3.b) Rejected	H1.3.c) <i>Accepted</i>	H1.3.d) <i>Accepted</i>
<i>Materializing influences H2</i>				
(1) Co-design	H2.1.a) <i>Accepted</i>	H2.1.b) <i>Accepted</i>	H2.1.c) <i>Accepted</i>	H2.1.d) <i>Accepted</i>
(2) Co-testing	H2.2.a) Rejected	H2.2.b) Rejected	H2.2.c) Rejected	H2.2.d) Rejected
(3) Co-launching	H2.3.a) Rejected	H2.3.b) Rejected	H2.3.c) Rejected	H2.3.d) Rejected
<i>Differences H3</i>				
	H3.a) <i>Accepted</i>	H3.b) <i>Accepted</i>	H3.c) <i>Accepted</i>	H3.d) <i>Accepted</i>

explained by the co-creation practices: R^2 adjusted = 0.080, $F(0.918) = 35.807$, p -value < 0.01. According to these results, the co-creation practices explain the popularity of Twitter.

In the second model, related to *commitment*, the outcomes show a significant and low correlation ($R = 0.087$) between commitment and the co-creation practices (the linking practices formed by co-ideation and co-evaluation; and the materializing practices formed by co-design, co-testing and co-launching). In the model, approximately 0.5% of the variance in commitment is explained by the co-creation practices: R^2 adjusted = 0.005, $F(0.992) = 3.046$, p -value < 0.05. According to these results, the co-creation practices explain the commitment on Twitter.

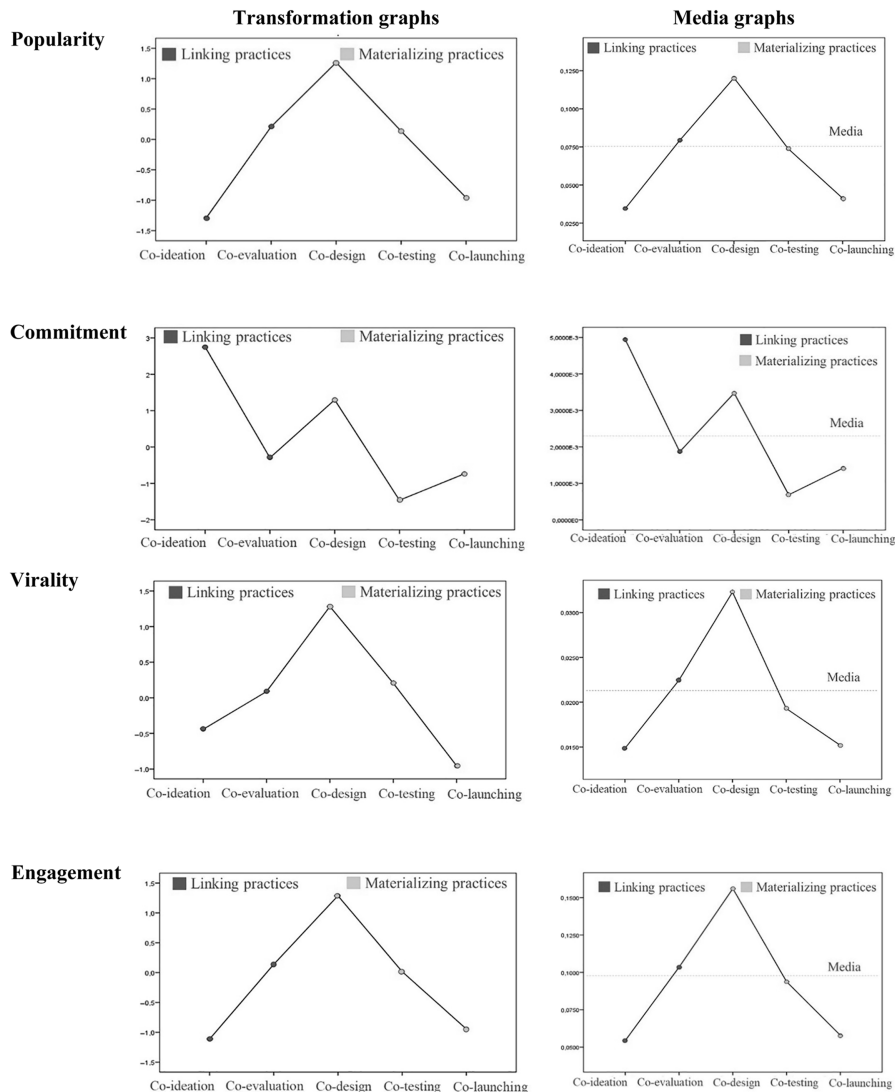
In the third model, related to *virality*, there is a highly significant and low correlation ($R = 0.147$) between virality and the co-creation practices (the linking practices formed by co-ideation and co-evaluation; and the materializing practices formed by co-design, co-testing and co-launching). In the model, approximately 1.9% of the variance in virality is explained by the co-creation practices: R^2 adjusted = 0.019, $F(0.978) = 8.846$, p -value < 0.01. According to these outcomes, the co-creation practices explain the virality on Twitter.

In the last model, related to *global engagement*, the outcomes reveal a highly significant and moderate correlation ($R = 0.269$) between engagement and the co-creation practices (the linking practices formed by co-ideation and co-evaluation; and the materializing practices formed by co-design, co-testing and co-launching). In the model, approximately 7% of the variance in engagement is explained by the co-creation practices: R^2 adjusted = 0.070, $F(0.928) = 31.167$, p -value < 0.01. According to these results, the co-creation practices explain the global engagement on Twitter.

These findings provide evidence that supports our general hypothesis: value co-creation practices (linking and materializing) positively influence engagement (popularity, commitment, virality and global engagement). Therefore, *the general hypothesis (H) is supported*.

Following further, to take the decision to accept or reject the three main hypotheses and their 28 specific sub-hypotheses, we analyzed the transformation and the media graphs (Figure 2).

Regarding the *liking practices (H1)*, *co-ideation* (a linking practice) is the most positively influential practice on commitment. According to these findings, the usage of co-ideation practices influences positively commitment on Twitter. It means that the specific hypothesis H1.1.b should be accepted. Additionally, *co-evaluation* (linking practices) is the second most positively influential practice on popularity, virality and global engagement. Considering that the media of co-evaluation is upper the average of popularity, virality and global engagement, the usage of co-evaluation practices influences positively on popularity, virality



Note(s): The discontinued line on media graphs shows the total media for the data

Figure 2.
Transformation and
media graphs
categorized according
to the co-creation
practices

and global engagement on Twitter. Thus, the specific hypotheses H1.3.a, H1.3.c and H1.3.d have been accepted. These findings are slightly like those reported by Fernandes and Remelhe (2016), Füller (2006), Hsieh and Chang (2016) and Wu *et al.* (2007).

Regarding the *materializing practices*, *co-design* (a materializing practice) is the most positively influential practice on popularity, virality and global engagement. Thus, the usage of co-design practices influences positively on popularity, virality and global engagement on Twitter. Therefore, hypotheses H2.1.a, H2.1.c and H2.1.d are supported. Additionally, co-design is also the second positively most influential practice on commitment. Considering

that the media of co-design is upper the average of commitment, the usage of co-design practices influence positively commitment on Twitter. Thus, we support the specific hypothesis H2.1.b. These results are consistent with those found by other researchers (i.e. Carpenter and Krutka (2015) or Haro-de-Rosario *et al.* (2018)).

To test H3, we run a Kruskal–Wallis Test to check if there are differences between the co-creation practices regarding the production of engagement and its dimensions (McKnight and Najab, 2010). The results of this test show that the *p*-values are less than 0.05 for engagement and its dimensions. Therefore, there are differences between the co-creation practices as it was expected. It means that some co-creation practices generate more engagement than others. Consequently, H3.a, H3.b, H3.c and H3.d have been accepted. Finally, we can affirm that there are *differences* between the *linking* (co-diagnosis, co-ideation and co-evaluation) and the *materializing* practices (co-design, co-testing and co-launching) regarding the production of engagement. In general, this finding is consistent with previous studies (Hsieh and Chang, 2016; Xing and Gao, 2018).

Regarding the 28 specific hypotheses, in total 12 of the 28 specific hypotheses were confirmed as can be seen in Table 5. The main hypotheses H1 and H2 are partially supported and H3 is supported. The results were interpreted considering the nonlinear relationships between value co-creation practices and engagement.

According to the 28 specific sub-hypotheses accepted (Table 5), we can state the following. First, there are differences between the linking and materializing practices influential on popularity, commitment, virality and global engagement on Twitter. Second, the usage of co-ideation practices positively influences commitment on Twitter. Third, the usage of co-evaluation practices positively influences popularity, virality and global engagement on Twitter. Fourth, the usage of co-design practices influences positively popularity, commitment, virality and global engagement on Twitter. Finally, we can affirm that messages related to business cases (the content classified as co-ideation) produce more commitment than other practices. It means that this kind of content increases participation on social media.

5. Conclusions, implications, limitations and future lines of research

5.1 Conclusions

The aim of this research was to analyze the influence of value co-creation practices on engagement at ITS organizer association on Twitter. From a general point of view, the contributions of this study are related, on the one hand, to the contribution of more research on these practices in B2B contexts (Frow *et al.*, 2016), and on the other hand, to the analysis of the relationship between value co-creation practices and engagement in social networks (Fernandes and Remelhe, 2016). In specific terms, the main contributions to the scientific literature are as follows:

This research highlights the relevance of value co-creation practices (co-ideation, co-evaluation, co-design, co-testing and co-launching) in the production of engagement in a social network such as Twitter. The findings show that value co-creation practices positively influence engagement and its dimensions (popularity, engagement, virality and global engagement) in B2B contexts. Furthermore, the study confirms the existence of differences between linking and materializing practices in terms of their engagement production.

Moreover, the study contributes to the understanding of value co-creation practices in the context of social media by providing answers related to the identification, the use of these practices by B2B actors and the effect on engagement on Twitter. Overall, these findings demonstrate the usefulness of value co-creation practices in generating engagement in B2B contexts.

The proven relationship between value co-creation practices and engagement, a key variable in social media platforms such as Twitter, is consistent with the alternative logic of value creation (Ramaswamy, 2011). This approach considers interactions as a source of value co-creation thanks to the collaborative and dynamic environment of social networks.

Considering the dimensions of engagement, materializing practices produce more popularity, virality and global engagement than linking practices, while linking practices produce more engagement (a dimension of engagement, measured by the number of comments on tweets) than materializing practices. More specifically, firstly, we observed that co-design and co-evaluation practices (materializing practices) are the practices that produce the most engagement on a social network such as Twitter. In other words, tweets that included live events and online events where concepts and knowledge are developed (co-design practices) together with tweets that included comments about business ideas (co-evaluation practices), are the value co-creation practices that generate the most popularity, virality and global engagement on the Twitter social network.

Secondly, we observed that the practice of co-ideation (linking practice) is the practice that produces the most commitment, a dimension of engagement that was measured through the number of comments on tweets. In other words, co-ideation practices produce more comments than other practices. In this case, the tweets that included business cases generated more comments than the other practices.

5.2 Implications

The managerial implications of this study allow us to suggest to marketing directors and managers of companies that organize trade fairs or B2B events, the use of co-design, co-evaluation and co-ideation practices, prioritizing them over others, given that they are powerful motivators of engagement and its dimensions on Twitter. Therefore, it is suggested to create publications that are framed within co-design, co-evaluation and co-ideation value-creation practices. This will foster engagement through: virality (retweets), popularity (favorites), commitment (comments), and global engagement.

We recommend, in order of importance, to enhance co-creation practices aimed at: (1) developing concepts and knowledge in live and online events (co-design practices), (2) sharing valuable business ideas (co-evaluation practices) and (3) sharing business cases (co-ideation practice).

From a general overview, to generate more engagement on social media in B2B contexts, it is recommended to prioritize posts that incorporate events based on collaborative and dynamic human interactions. Research has shown that, in the case of Twitter, tweets that post live events and online events, where concepts and knowledge are developed (co-design practices), produced the most engagement.

5.3 Limitations and further research

In our study, the data were carefully collected, coded and analyzed. Our findings are valid, and our research can be replicated by other authors. However, there are also limitations in our research. The main limitation is that only one case, one social network, in a single country was analyzed.

Consequently, the findings should not be generalized to contexts with different settings from the one studied. We suggest the development of new studies applied across different sectors, platforms and countries to confirm the effect of value co-creation practices on engagement.

Additionally, there are low percentages of explained variance in the results, as it is usual in social sciences studies (Attewell *et al.*, 2015). This means that engagement and its dimensions are also explained by other variables, not just co-creation practices. The influence of other

variables on engagement in B2B contexts could be analyzed in new studies such as the brand image (Islam and Rahman, 2016). It would also be interesting to study how other variables are influenced by the co-creation practices. Finally, it can be studied as the usage of co-creation practice in other ITS.

References

- AbdelAziz, K., Saad, N.H.M. and Thurasamy, R. (2021), "Analysing the factors influencing customer engagement and value co-creation during COVID-19 pandemic: the case of online modest fashion SMEs in Egypt", *Journal of Islamic Marketing*, Vol. 14 No. 1, pp. 146-173, doi: 10.1108/JIMA-09-2020-0294.
- Alves, H., Ferreira, J.J. and Fernandes, C.I. (2016), "Customer's operant resources effects on co-creation activities", *Journal of Innovation and Knowledge*, Vol. 1 No. 2, pp. 69-80.
- Attewell, P., Monaghan, D. and Kwong, D. (2015), *Data Mining for the Social Sciences: an Introduction*, University of California Press, California.
- Bonsón, E. and Ratkai, M. (2013), "A set of metrics to assess stakeholder engagement and social legitimacy on a corporate Facebook page", *Online Information Review*, Vol. 37 No. 5, pp. 787-803.
- Bonsón, E., Bednárová, M. and Wei, S. (2016), "Corporate Twitter use and stakeholder engagement: an empirical analysis of the Spanish hotel industry", *European Journal of Tourism Research*, Vol. 13, pp. 69-83.
- Botti, A., Grimaldi, M. and Vesce, M. (2018), "Customer value co-creation in a service-dominant logic perspective: some steps toward the development of a measurement scale", *Social Dynamics in a Systems Perspective*, Springer, Cham, pp. 137-157.
- Brambilla, F.R., Hantt, A.F. and Ferreira, B.M. (2022), "Value Co-creation and the media market segment: a multiple case studies analyzed under the approach of service dominant logic of marketing: an abstract", *Academy of Marketing Science Annual Conference-World Marketing Congress*, Cham, Springer, pp. 25-26.
- Brodie, R.J., Hollebeek, L.D., Jurić, B. and Ilić, A. (2011), "Customer engagement: conceptual domain, fundamental propositions, and implications for research", *Journal of Service Research*, Vol. 14 No. 3, pp. 252-271.
- Brodie, R.J., Ilic, A., Juric, B. and Hollebeek, L. (2013), "Consumer engagement in a virtual brand community: an exploratory analysis", *Journal of Business Research*, Vol. 66 No. 1, pp. 105-114.
- Busser, J.A. and Shulga, L.V. (2018), "Co-created value: multidimensional scale and nomological network", *Tourism Management*, Vol. 65, pp. 69-86.
- Carpenter, J.P. and Krutka, D.G. (2015), "Engagement through microblogging: educator professional development via Twitter", *Professional Development in Education*, Vol. 41 No. 4, pp. 707-728.
- Chathoth, P.K., Ungson, G.R., Harrington, R.J. and Chan, E.S. (2016), "Co-creation and higher order customer engagement in hospitality and tourism services: a critical review", *International Journal of Contemporary Hospitality Management*, Vol. 28 No. 2, pp. 222-245.
- Cheng, Y.Y., Tung, W.F., Yang, M.H. and Chiang, C.T. (2019), "Linking relationship equity to brand resonance in a social networking brand community", *Electronic Commerce Research and Applications*, Vol. 35, 100849.
- Costa, J., Silva, C., Antunes, M. and Ribeiro, B. (2013), "Defining semantic meta-hashtags for twitter classification", *International Conference on Adaptive and Natural Computing Algorithms*, Berlin, Heidelberg, Springer, pp. 226-235.
- Del Vecchio, P., Mele, G., Ndou, V. and Secundo, G. (2018), "Creating value from social big data: implications for smart tourism destinations", *Information Processing and Management*, Vol. 54 No. 5, pp. 847-860.
- Echeverri, P. and Skålén, P. (2011), "Co-creation and co-destruction: a practice-theory based study of interactive value formation", *Marketing Theory*, Vol. 11 No. 3, pp. 351-373.

- Fang, S.C., Chen, C.H. and Yang, C.W. (2021), "Implementing a value Co-creation network: some lessons from taiwan's steel industry", *Journal of Business-To-Business Marketing*, Vol. 28 No. 1, pp. 67-79.
- Fernandes, T. and Remelhe, P. (2016), "How to engage customers in co-creation: customers' motivations for collaborative innovation", *Journal of Strategic Marketing*, Vol. 24 Nos 3-4, pp. 311-326.
- Frow, P., McColl-Kennedy, J.R., Hilton, T., Davidson, A., Payne, A. and Brozovic, D. (2014), "Value propositions: a service ecosystems perspective", *Marketing Theory*, Vol. 14 No. 3, pp. 327-351.
- Frow, P., McColl-Kennedy, J.R. and Payne, A. (2016), "Co-creation practices: their role in shaping a health care ecosystem", *Industrial Marketing Management*, Vol. 56, pp. 24-39.
- Füller, J. (2006), "Why consumers engage in virtual new product developments initiated by producers", in, Pechmann, C. and Priceeds, L. (Eds), *NA - Advances in Consumer Research*, Association for Consumer Research, Duluth, MN, Vol. 33, pp. 639-646.
- Godar, S.H. and O'connor, P.J. (2001), "Same time next year—buyer trade show motives", *Industrial Marketing Management*, Vol. 30 No. 1, pp. 77-86.
- Gopalakrishna, S., Malthouse, E.C. and Lawrence, J.M. (2019), "Managing customer engagement at trade shows", *Industrial Marketing Management*, Vol. 81, pp. 99-114.
- Gopalakrishna, S., Lilien, G.L. and Donsbach, A. (2022), "Trade shows in the business marketing communications mix", *Handbook of Business-To-Business Marketing*, Edward Elgar Publishing, pp. 247-265.
- Grissemann, U.S. and Stokburger-Sauer, N.E. (2012), "Customer co-creation of travel services: the role of company support and customer satisfaction with the co-creation performance", *Tourism Management*, Vol. 33 No. 6, pp. 1483-1492.
- Grönroos, C. (2012), "Conceptualising value co-creation: a journey to the 1970s and back to the future", *Journal of Marketing Management*, Vol. 28 Nos 13-14, pp. 1520-1534.
- Gummeson, E. and Mele, C. (2010), "Marketing as value co-creation through network interaction and resource integration", *Journal of Business Market Management*, Vol. 4 No. 4, pp. 181-198.
- Haro-de-Rosario, A., Sáez-Martín, A. and del Carmen Caba-Pérez, M. (2018), "Using social media to enhance citizen engagement with local government: twitter or Facebook?", *New Media and Society*, Vol. 20 No. 1, pp. 29-49.
- Harrigan, P., Evers, U., Miles, M. and Daly, T. (2017), "Customer engagement with tourism social media brands", *Tourism Management*, Vol. 59, pp. 597-609.
- Hartmann, A., Van Der Kooij, A.J. and Zeeck, A. (2009), "Exploring nonlinear relations: models of clinical decision making by regression with optimal scaling", *Psychotherapy Research*, Vol. 19 Nos 4-5, pp. 482-492.
- Hollebeek, L.D. (2019), "Developing business customer engagement through social media engagement-platforms: an integrative SD logic/RBV-informed model", *Industrial Marketing Management*, Vol. 81, pp. 89-98.
- Hollebeek, L.D., Glynn, M.S. and Brodie, R.J. (2014), "Consumer brand engagement in social media: conceptualization, scale development and validation", *Journal of Interactive Marketing*, Vol. 28 No. 2, pp. 149-165.
- Hollebeek, L.D., Sprott, D.E., Sigurdsson, V. and Clark, M.K. (2022), "Social influence and stakeholder engagement behavior conformity, compliance, and reactance", *Psychology and Marketing*, Vol. 39 No. 1, pp. 90-100.
- Hsieh, S.H. and Chang, A. (2016), "The psychological mechanism of brand co-creation engagement", *Journal of Interactive Marketing*, Vol. 33, pp. 13-26.
- Islam, J.U. and Rahman, Z. (2016), "Examining the effects of brand love and brand image on customer engagement: an empirical study of fashion apparel brands", *Journal of Global Fashion Marketing*, Vol. 7 No. 1, pp. 45-59.

- Kerlinger, F.N. (1973), *Foundations of Behavioral Research: Educational, Psychological and Sociological Inquiry*, Holt Rinehart & Winston.
- Klafke, R. and de Oliveira, M.C. (2022), "Value co-creation and donation in non-profits: a social analysis through the service-dominant logic", *SN Social Sciences*, Vol. 2 No. 3, pp. 1-16.
- Kohtamäki, M. and Rajala, R. (2016), "Theory and practice of value co-creation in B2B systems", *Industrial Marketing Management*, Vol. 56, pp. 4-13.
- Krippendorff, K. (2004), "Reliability in content analysis: some common misconceptions and recommendations", *Human Communication Research*, Vol. 30 No. 3, pp. 411-433.
- Landis, J.R. and Koch, G.G. (1977), "The measurement of observer agreement for categorical data", *Biometrics*, Vol. 33 No. 1, pp. 159-174.
- Lapoule, P. and Rowell, J. (2016), "Using social media to support trade shows: developing the capabilities", *South Asian Journal of Business and Management Cases*, Vol. 5 No. 1, pp. 88-98.
- Lee, Y.J., Wang, G.L., Kao, K.S., Chen, C.Y. and Zhu, F.P. (2010), "The investment behavior, decision factors and their effects toward investment performance in the Taiwan stock market", *Journal of Global Business Management*, Vol. 6 No. 2, p. 1.
- Leek, S., Houghton, D. and Canning, L. (2019), "Twitter and behavioral engagement in the healthcare sector: an examination of product and service companies", *Industrial Marketing Management*, Vol. 81, pp. 115-129.
- Lilien, G.L. (2016), "The B2B knowledge gap", *International Journal of Research in Marketing*, Vol. 33 No. 3, pp. 543-556.
- Lovelock, C.H. and Young, R.F. (1979), "Look to consumers to increase productivity", *Harvard Business Review*, Vol. 57 No. 3, pp. 168-178.
- Marcos-Cuevas, J., Nätti, S., Palo, T. and Baumann, J. (2016), "Value co-creation practices and capabilities: sustained purposeful engagement across B2B systems", *Industrial Marketing Management*, Vol. 56, pp. 97-107.
- McColl-Kennedy, J.R., Cheung, L. and Ferrier, E. (2015), "Co-creating service experience practices", *Journal of Service Management*, Vol. 26 No. 2, pp. 249-275.
- McKnight, P.E. and Najab, J. (2010), "Kruskal-wallis test", *The Corsini Encyclopedia of Psychology*, p. 1.
- Merz, M.A., Zarantonello, L. and Grappi, S. (2018), "How valuable are your customers in the brand value co-creation process? The development of a Customer Co-Creation Value (CCCV) scale", *Journal of Business Research*, Vol. 82, pp. 79-89.
- Payne, A.F., Storbacka, K. and Frow, P. (2008), "Managing the co-creation of value", *Journal of the Academy of Marketing Science*, Vol. 36 No. 1, pp. 83-96.
- Ponte, E.B., Carvajal-Trujillo, E. and Escobar-Rodríguez, T. (2015), "Influence of trust and perceived value on the intention to purchase travel online: integrating the effects of assurance on trust antecedents", *Tourism Management*, Vol. 47, pp. 286-302.
- Prahalad, C.K. and Ramaswamy, V. (2004), "Co-creation experiences: the next practice in value creation", *Journal of Interactive Marketing*, Vol. 18 No. 3, pp. 5-14.
- Ramaswamy, V. (2011), "It's about human experiences... and beyond, to co-creation", *Industrial Marketing Management*, Vol. 40 No. 2, pp. 195-196.
- Roberts, D., Hughes, M. and Kertbo, K. (2014), "Exploring consumers' motivations to engage in innovation through co-creation activities", *European Journal of Marketing*, Vol. 48 1/2, pp. 147-169.
- Rodesiler, L. (2015), "The nature of selected English teachers' online participation", *Journal of Adolescent and Adult Literacy*, Vol. 59 No. 1, pp. 31-40.
- Saha, V., Mani, V. and Goyal, P. (2020), "Emerging trends in the literature of value co-creation: a bibliometric analysis", *Benchmarking: An International Journal*.

- Sarmiento, M. and Simões, C. (2018), "Trade fairs, trade shows, and exhibitions: a literature review: an abstract", *Academy of Marketing Science World Marketing Congress*, Cham, Springer, p. 227.
- Singh, J., Shukla, P. and Kalafatis, S.P. (2017), "IT usage for enhancing trade show performance: evidence from the aviation services", *Journal of Business and Industrial Marketing*.
- Tafesse, W. and Skallerud, K. (2017), "A systematic review of the trade show marketing literature: 1980-2014", *Industrial Marketing Management*, Vol. 63, pp. 18-30.
- Terblanche, N.S. (2014), "Some theoretical perspectives of co-creation and co-production of value by customers", *Professional Accountant*, Vol. 14 No. 2, pp. 1-8.
- Vargo, S.L. and Lusch, R.F. (2004), "The four service marketing myths: remnants of a goods-based, manufacturing model", *Journal of Service Research*, Vol. 6 No. 4, pp. 324-335.
- Vargo, S.L. and Lusch, R.F. (2008), "Service-dominant logic: continuing the evolution", *Journal of the Academy of Marketing Science*, Vol. 36 No. 1, pp. 1-10.
- Viglia, G., Pera, R. and Bigné, E. (2018), "The determinants of stakeholder engagement in digital platformers", *Journal of Business Research*, Vol. 89, pp. 404-410.
- Villamediana, J., Küster, I. and Vila, N. (2019), "Destination engagement on Facebook: time and seasonality", *Annals of Tourism Research*, Vol. 79, 102747.
- Villamediana-Pedrosa, J.D., Vila-Lopez, N. and Küster-Boluda, I. (2019), "Secrets to design an effective message on Facebook: an application to a touristic destination based on big data analysis", *Current Issues in Tourism*, Vol. 22 No. 15, pp. 1841-1861.
- Wang, Y., Liu, J., Huang, Y. and Feng, X. (2016), "Using hashtag graph-based topic model to connect semantically-related words without co-occurrence in microblogs", *IEEE Transactions on Knowledge and Data Engineering*, Vol. 28 No. 7, pp. 1919-1933.
- Wu, C.G., Gerlach, J.H. and Young, C.E. (2007), "An empirical analysis of open source software developers' motivations and continuance intentions", *Information and Management*, Vol. 44 No. 3, pp. 253-262.
- Xing, W. and Gao, F. (2018), "Exploring the relationship between online discourse and commitment in Twitter professional learning communities", *Computers and Education*, Vol. 126, pp. 388-398.
- Yi, Y. and Gong, T. (2013), "Customer value co-creation behavior: scale development and validation", *Journal of Business Research*, Vol. 66 No. 9, pp. 1279-1284.

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A sentiment analysis of Michelin-starred restaurants

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Abstract

Purpose – With the growing popularity of social media, it has become common practice for consumers to write online reviews to share their opinion and experience as well as consider others' reviews to inform purchase decision-making. This study investigated how online review sentiments towards four key aspects (food, service, ambience and price) change after a restaurant is awarded a Michelin Star to shed light on how the award of a Michelin Star affects online reviews as well as what factors contribute to positive online restaurant reviews.

Design/methodology/approach – The authors conducted a sentiment analysis of online restaurant reviews on TripAdvisor. A total of 8,871 English-written reviews from 87 restaurants located in Europe were extracted using a web crawler developed by Beautiful Soup, and data were then processed using Semantria.

Findings – The study findings revealed that overall sentiments decreased after restaurants were awarded a Michelin Star, in which service sentiment was the most affected aspect, followed by food and ambience. Yet, price sentiment showed a prominent increase. This provides valuable insights for Michelin-starred restaurant operators and owners to create a unique and compelling gastronomic experience that triggers positive online reviews.

Practical implications – The results of this study argue that consumers tend to hold higher expectations for this type of upscale restaurants given its recognition and quality assurance, so they are more likely to have negative feelings when their expectations are disconfirmed. Therefore, restaurants should continuously improve their food and service while paying attention to small details such as ambience, through creativity and innovation. Also, high-end restaurants, especially Michelin-starred restaurants, usually have the edge in premium pricing, yet competitive pricing may backfire considering its perceived luxurious values.

Originality/value – This study analyzed changes in customer sentiments when a restaurant is awarded a Michelin Star through text analytics. Through the lens of online restaurant reviews, the study findings contribute to identifying aspects that are most or least affected by the award of a Michelin Star as well as highlight the role of ambience in customer satisfaction which might have been overlooked in previous studies.

Keywords Online restaurant reviews, TripAdvisor, Sentiment analysis, Text analytics, Michelin-starred restaurants

Paper type Research paper

Introduction

Consumers' decision-making is often influenced by peer recommendations (Libai *et al.*, 2010; Van Doorn *et al.*, 2010). Nowadays, with the increased use of Internet and social media platforms (Hennig-Thurau *et al.*, 2010), consumers do not just rely on their friends' opinions when making purchase decisions; they place their trust in a much wider group of people who have already used the product or service. Such behavior has increased the influence of online reviews on consumer decisions since they have become the new form of word-of-mouth, and customers tend to find them more reliable (Banerjee *et al.*, 2017). Accordingly, high rating



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and positive reviews on online social platforms or review platforms present some advantages for businesses to build online reputation and eventually influence sales (Banerjee *et al.*, 2017). Particularly, in the context of high-end restaurants, word-of-mouth and review ratings are considered important sources influencing one's decision-making (Harrington *et al.*, 2013). Alternatively, perhaps more traditional, the Michelin Guide is acknowledged as an authoritative reference for consumers who intend to dine at a fine-dining establishment.

With the aim of promoting road travel, the Michelin Guide started as a guide to provide motorists with information such as maps, petrol stations and accommodation. In 1926, the Guide began to award a single star for restaurant excellence, followed five years later by a rating system from zero to three stars (Michelin Guide, n.d.-a). Today, Michelin-starred restaurants are internationally recognized for culinary excellence, with restaurants usually experiencing a substantial increase in customers after being awarded a star (Chiang and Guo, 2021; Vargas-Sanchez and López-Guzmán, 2022). Accordingly, this type of high-end restaurants has attracted considerable scholarly attention.

Michelin-starred restaurants are often regarded as fine-dining establishments (Chiang and Guo, 2021), positioned in the high-end or luxury segment (Pacheco, 2018) and characterized as haute cuisine that is driven by excellence (Svejenova *et al.*, 2007). On a rating system from zero to three stars, Michelin stars are awarded to restaurants based on five criteria: "quality of the ingredients used, mastery of flavor and cooking techniques, the personality of the chef in his/her cuisine, value for money and consistency between visits," in which one star is given to restaurants with "high-quality cooking", two stars represents "excellent cooking", while three stars means "exceptional cooking" (Michelin Guide, n.d.-b).

Prior studies on Michelin-starred restaurants primarily adopted traditional approaches such as surveys and interviews to understand consumers' perceptions (Chiang and Guo, 2021; Liu *et al.*, 2022), decision process in high-end restaurant selection (Harrington *et al.*, 2013), drivers of fine-dining consumption (Kiatkawsin and Han, 2019), fine-dining customer satisfaction and loyalty formation (Kiatkawsin and Sutherland, 2020). In recent years, the prevalent use of online social media or review platforms in consumers' restaurant decision-making process has attracted hospitality and tourism scholars to move toward the adoption of analytical methods in their studies. For example, the performance of sentiment analysis to identify attributes that affect restaurant star ratings (Gan *et al.*, 2017), the analysis of TripAdvisor reviews on Michelin-starred restaurants to investigate the relationship between overall satisfaction and the four commonly accepted attributes that explain restaurant experience (food, service, ambience and price) (Pacheco, 2018), the use of online restaurant reviews and text analytics to provide insights into tourists' dining preferences (Vu *et al.*, 2019) and the adoption of the text mining approach to identify what drives customers to write explicit online reviews (Guerreiro and Rita, 2020). Nevertheless, studies that apply data-driven approaches like social media analytics in the context of Michelin-starred restaurants remain scarce. Concerning the benefits of Michelin stars for restaurants, such as increased reputation and sales, this study aims to investigate the changes in customer sentiments toward a restaurant before and after the award of a Michelin Star through sentiment analysis of online restaurant reviews.

In this study, we address three research questions: (1) Does the award of a Michelin Star influence customers' overall sentiment towards the restaurant? (2) What dimensions (food, service, price and ambience) are most or least affected after a restaurant has obtained a Michelin Star? (3) What are the dimensions that impact the overall sentiment the most?

The remainder of this paper is organized as follows: section 2 reviews literature related to Michelin-starred restaurants, consumer dining experience, perceptions and attitudes toward Michelin-starred restaurants, natural language processing and sentiment analysis; section 3 presents the conceptualization and research hypotheses; section 4 introduces the

methodology used in the analysis; finally, section 5 discusses the results, whereas section 6 provides theoretical and practical implications, identifies limitations and puts forward recommendations for future research.

Literature review

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Online reviews

Electronic word-of-mouth (e-WOM) has attracted much attention from researchers and practitioners in the last decades given its significant influence on consumers' decision making and behaviors (Tsao and Hsieh, 2015). Litvin *et al.* (2008) defined it as "all informal communications directed at consumers through Internet-based technology related to the usage or characteristics of particular goods and services, or their sellers", based on Westbrook's (1987) WOM definition.

One of the forms that e-WOM can take is online reviews, which can "be defined as peer-generated product evaluations posted on the company or third-party websites" (Mudambi and Schuff, 2010). Online reviews can be found on retail, restaurant, and hotel review platforms, such as TripAdvisor, Zomato, or Yelp. Amazon.com initiated the rating system in the late 1990s and since then, it has become a widely used tool for consumers to share their experiences and voice their opinions online (Bilgihan *et al.*, 2018). These can usually be composed of two components: a quantitative review (usually on a scale from 1 to 5 stars) and a qualitative review, i.e. a written comment.

Gretzel and Yoo (2008) found that other travelers' reviews increased confidence and reduced the risk of regretting a purchase. Given the intangible nature of services, consumers tend to rely on peer recommendations such as online reviews when selecting a restaurant (Hennig-Thurau *et al.*, 2010; Lee and Kim, 2020; Libai *et al.*, 2010; Meek *et al.*, 2021; Van Doorn *et al.*, 2010). Nowadays, consumers tend to consider online reviews when making a purchase decision. Banerjee *et al.* (2017) investigated what characteristics of reviewers affected their trustworthiness the most and proposed a model that can be used to predict reviewer's trustworthiness. There were also studies conducted to understand how online reviews affect sales. For example, Zhu and Zhang (2010) stated that previous studies were not conclusive regarding the effect of reviews on sales as the reviews studied applied to products that were sold solely online, rather than those sold offline. Even if we do not find a direct correlation between both, we can understand that online reviews have an influence on sales based on their trustworthiness and the amount of positive or negative reviews.

Consumer dining experience in Micheline-starred restaurants

Generally, dining experience may be divided into four aspects: food quality, service, ambience, and price fairness (Nakayama and Wan, 2019). Particularly, Berry *et al.* (2006) proposed that dining experience is a multidimensional concept that encompasses three major clues, including mechanic, humanic, and functional. Mechanic clues focus on the "what" that contributes to customers' cognitive perceptions and refer to the physical setting such as environment and ambience; humanic and functional clues focus on the "how" that contributes to customers' affective perceptions, in which the former is concerned with the service providers and the way they behave, while the latter is generated from food and services that are considered the core attributes of a restaurant (Berry *et al.*, 2006; Garg and Amelia, 2016). Different clues vary in importance in different contexts. In fine-dining, functional clues do not necessarily lead to success but are considered the basics for any high-end restaurant as fine-dining customers usually expect quality and unique experience beyond good food (Berry *et al.*, 2006), while functional clues are the tangible aspects that assist customers in evaluating their dining experience (Chua *et al.*, 2014). Humanic clues (i.e. staff's appearance and how the

staff serves customers) play a vital role in influencing one's first impression of a fine dining restaurant, and accordingly customer satisfaction and loyalty (Amelia and Garg, 2016). Similarly, Alcoba *et al.* (2020)'s findings suggested that the experiential aspects, particularly treatment, are what customers value the most in a Michelin-starred restaurant. Also, Kiatkawsin and Sutherland (2020) indicated that dining experience in Michelin-starred restaurants is not only about food and beverage, but more importantly, luxury restaurant patrons particularly look for experiential quality such as interaction with the restaurant and service performance throughout the meal. Meanwhile, recent scholars suggested that a business model driven by innovation and creativity is crucial for the success of Michelin-starred restaurants because the core is to provide customers with unique gastronomic experiences (Madeira *et al.*, 2022; Vargas-Sanchez and López-Guzmán, 2022).

Consumer perceptions and attitudes towards Michelin-starred restaurants

Perception and attitude are two key determinants of consumers' purchase intention. Chiang and Guo (2021) found that consumers' perception of Michelin Guide positively affected their attitude towards Michelin-starred restaurants given its credibility and trustworthiness. Consumers often perceive Michelin-starred restaurants as prestige and luxury brands that offer unique and luxurious values, and therefore are willing to pay a higher price (Kiatkawsin and Han, 2019; Liu *et al.*, 2022). However, purchasing luxury services such as dining at a Michelin-starred restaurant is associated with relatively high levels of uncertainty given its intangible nature and premium price (Chen and Peng, 2018). Consequently, consumers' perceptions of luxury restaurants, such as perceived financial risk, may affect their purchase decision (Yang and Mattila, 2016). Nevertheless, consumers' perceived risk may reduce if they have sufficient information on the products and services offered by luxury restaurants, particularly through word-of-mouth, thus creating a positive perception (Chiang and Guo, 2021; Garg and Amelia, 2016).

Consumer attitude is a consumer's overall assessment of a product or service (Hwang and Ok, 2013). Understanding consumers' attitudes towards Michelin-starred restaurants is crucial as it will eventually influence one's purchase intention (Chiang and Guo, 2021). Voss *et al.* (2003) proposed that consumer attitude is a complex concept but may be generally measured by two dimensions, namely hedonic (e.g. fun, excitement, and surprise) and utilitarian (e.g. convenience, value for money, and service quality). Hwang and Ok (2013)'s findings suggested that fine-dining patrons placed greater emphasis on the hedonic aspect than utilitarian because they usually seek excitement or unique experience rather than simply satisfying hunger; meanwhile, utilitarian attitude may be enhanced through service excellence in a fine-dining setting. In addition, consumers with different needs might hold different attitudes towards Michelin-starred restaurants. For example, Lee and Hwang (2011) found that consumers whose luxury consumption is motivated by materialism that signifies high status and possession or by hedonism that emphasizes emotional pleasure tend to hold a positive attitude towards luxury restaurants, while consumers who desire to feel different from other people by possessing unusual or unique items hold negative attitudes towards luxury restaurants.

Natural language processing and sentiment analysis

Natural language processing (NLP) is a branch of artificial intelligence that is capable of reading and understanding a large amount of text generated by humans, such as reviews on social media platforms, and converting it into structured data for analysis purposes (Patel and Patel, 2021). As posting online reviews has become a common practice for consumers to share their opinions and experiences about particular products or services (Rouliez *et al.*, 2019), and the majority of travelers tend to rely on online reviews to inform travel decision

making (Hu and Yang, 2021), online review platforms have become valuable sources for marketers to obtain firsthand information about their customers' feedback and needs. Accordingly, the application of NLP has gained popularity in the hospitality and tourism domain (Vargas-Calderón *et al.*, 2021). In particular, sentiment analysis is one of the most significant applications of NLP that serves as a cost and time effective approach for hospitality and tourism businesses to better understand their customers' needs and sentiments through extracting and analyzing opinions on online review platforms such as TripAdvisor (Geetha *et al.*, 2017).

Sentiment analysis (or opinion mining) can be described as the field of study that analyses people's opinions, sentiments, and emotions towards a product, service, company, or any other subject (Liu, 2012). Text analytics usually identifies sentiments as positive, negative, or neutral (Mostafa, 2013). In recent years, hospitality and tourism scholars have been paying increasing attention to the application of sentiment analysis in social media studies (Xiang *et al.*, 2017; Yu *et al.*, 2021). Nakayama and Wan (2019) applied text mining software to conduct a sentiment analysis of restaurant reviews on both Yelp.com (English version) and Yelp.co.jp (Japanese version) based on the four aspects of dining experience, namely food quality, service, ambience, and price fairness. Their study revealed that cultural differences exist in how Japanese and Western customers generate review content and their perception of what makes a quality review. Similarly, taking into account cultural differences, Sann and Lai (2020) used sentiment analysis to study the type of service failures that come across by Asian and Non-Asian guests. Through an analysis of 390,236 complaint terms extracted from TripAdvisor posts about 353 hotels in the UK by guests from 63 nations, the results indicated that both Asian and Non-Asian guests often encountered service failures during occupancy, while the former was found to complain about equipment-related failures, and the latter more about housekeeping-related issues. Analyzing data on user's restaurant reviews from online platforms can represent huge benefits to companies and can make them turn negative reviewers into brand advocates. For this reason, there are studies, like Nave *et al.* (2018), that propose a Decision Support System (DSS) to help managers develop insights and define strategies that are more in line with the customers' expectations.

Conceptualization and research hypotheses

In general, previous studies on online restaurant reviews primarily focused on four fundamental aspects of service quality in restaurant operations, namely food, service, ambience, and price, as they are considered important factors influencing customers' dining experience and customer satisfaction (Alamoudi and Alghamdi, 2021; Nakayama and Wan, 2019; Ramanathan *et al.*, 2016; Yan *et al.*, 2015; Zhu *et al.*, 2019). Also, Nakayama and Wan (2019) suggested that these four aspects are proven to be relatively stable in restaurant reviews over time. Therefore, the sentiment analysis of restaurant reviews conducted in the present study is based on these four key attributes. By analyzing the sentiment around these four dimensions, we aim to understand which factors affect the overall sentiment the most. As the analysis is intended to investigate how the overall sentiment of customers changes when a restaurant receives a Michelin Star, the award of a Michelin Star is an important variable. This enabled us to pinpoint the date of the award and understand how the sentiment was before and after this date. Another variable that adds value to the analysis is how many stars a restaurant has. For instance, the impact of receiving the first Michelin Star might be different from a restaurant achieving an additional star. The star rating and local language variables allow us to get a deeper understanding of how the language of the review and the given star rating are correlated to the overall sentiment. Finally, we have the overall sentiment, which is a variable that depends on the remaining ones.

According to Yoon *et al.* (2019), consumers are influenced by others' reviews, meaning that when consumers review a restaurant, they pay attention to the experiences and opinions of others. This suggests that there is a social influence in writing online reviews. Accordingly, we posit that the award of a Michelin Star will increase the overall sentiment towards the restaurant:

H1a. The award of Michelin Star increases consumers' overall sentiment towards a restaurant in terms of written reviews.

H1b. The award of Michelin Star increases consumers' overall sentiment towards a restaurant in terms of star rating.

According to Pacheco (2018), food and service are significant factors that affect customers' overall satisfaction in the segment of Michelin-starred restaurants. Moreover, consumers tend to hold higher expectations for this type of restaurants (Chiang and Guo, 2021). Therefore, we propose:

H2. Sentiment towards food is affected by the award of a Michelin Star.

H3. Sentiment towards service is affected by the award of a Michelin Star.

Although the mechanical aspect, such as ambience, may contribute to one's dining experience (Berry *et al.*, 2006), it does not always affect customer satisfaction in the context of fine-dining (Arora and Singer, 2006; Pacheco, 2018). Hence, we propose that:

H4. Sentiment towards ambience is not affected when a restaurant is awarded a Michelin Star

Based on Aron *et al.* (2013)'s self-expansion theory, Liu *et al.* (2022) found that consumers are willing to pay a higher price to dine at a Michelin-starred restaurant for the social, unique and luxurious values that this type of restaurant offers. Given consumers' willingness to pay more, we propose the following hypothesis:

H5. Sentiment towards price is not affected by the award of a Michelin Star.

Methodology

The dataset

The data analyzed in the current study were collected from TripAdvisor (www.tripadvisor.com), an online platform that allows users to review restaurants and other hospitality and tourism services. The list of Michelin-starred restaurants was obtained from www.viamichelin.com, which also includes information on the number of Michelin stars, type of cuisine, and location.

The criteria for restaurants to be included in the analysis are as follows: (1) Restaurants with a total of more than 20 reviews in the six months prior to and following the award of a Michelin Star; (2) The difference between the number of reviews before and after the award should be small, in which one period represented 70% or more of the total amount of reviews will be excluded.

For this analysis, a list of 35 restaurants awarded a star in the 2018 Michelin Guide was created. The restaurants included in the analysis are in Europe and have 1, 2, or 3 Michelin stars by the time of the release of the 2018 Michelin Guide (Table 1).

Moreover, a list of 2,316 reviews related to these restaurants was retrieved from TripAdvisor. In addition, a list of 52 restaurants that were not awarded a star but are similar in price, rating, location, and cuisine, was added to be used as a control group. Finally, 6,555 reviews about these restaurants were also retrieved (Table 2).

From the 35 Michelin restaurants, 2,316 English reviews were extracted from TripAdvisor. These reviews spanned a period of one year, where six months were prior to the restaurant obtaining the Michelin Star, and six months after that event. In doing so we attempted to control other factors that might explain variations in the sentiment other than obtaining the award. On the other hand, six months allowed us to have a considerable number of reviews. The awards were given on different dates depending on the country. Table 3 summarises the dates for each country.

Of the total number of reviews in the Michelin Group, 77.5% were given to restaurants that received their first star in 2018, 18.3% to restaurants that received their second star, and 4.2% to restaurants that received their third star, respectively as shown in Table 4.

Analytical tools and procedures

The collected raw data were filtered, transformed, mined, and finally, interpreted to be converted into information. Information from TripAdvisor was extracted using a web crawler developed by Beautiful Soup, a Python library for parsing HTML. For each restaurant, information extracted were restaurant name, price range, text review, star review, and date of the visit. Restaurant names and price ranges are provided by the restaurant representative (manager or owner), and can be used to categorize restaurants. Reviews are provided by users, and these are sets of unstructured data that need to be processed after crawling. Date of the visit is also provided by users and can be used to segment them. For this step, we used a python script that crawled TripAdvisor's website, getting the name of the restaurant, date of the visit, star review, and a written review. After getting the reviews, those were stored in CSV (comma-separated values) files and, later, uploaded to a sentiment analysis software.

Subsequently, data processing was performed using Semantria (e.g. Santos *et al.*, 2018). Semantria uses lexicon-based linguistic information and rules to detect sentiments in short

Table 1.
Number of restaurants
in the sample

Group (87)	Number of stars	# Restaurants	% of group	% of total
Control group (52)	0	52	100%	59.8%
Michelin group (35)	1	26	74.3%	40.2%
	2	6	17.1%	
	3	3	8.6%	

Table 2.
Geographic
distribution of the
restaurants and
reviews

Country	Michelin group		Control group	
	# Restaurants	# Reviews	# Restaurants	# Reviews
United Kingdom	8	943	12	2,627
Spain	6	334	8	486
Italy	6	231	7	597
Austria	4	179	8	533
Germany	3	196	4	337
France	2	63	4	642
Netherlands	2	133	2	293
Sweden	1	20	1	59
Denmark	1	22	2	119
Hungary	1	171	2	563
Finland	1	22	2	299
Total	35	2,316	52	6,555

Country		Date of award
United Kingdom		17 October, 2017
Spain		27 November, 2017
Italy		16 November, 2017
Austria		26 March, 2018
Germany		15 November, 2017
France		5 February, 2018
Netherlands		11 December, 2017
Sweden		19 February, 2018
Denmark		19 February, 2018
Hungary		26 March, 2018
Finland		19 February, 2018

Michelin-
starred
restaurants

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Table 3.
Date of Michelin Star
award per country

	# of stars	Time of review	# Reviews	% of subtotal	Average sentiment	Standard deviation	% of group total
Control group	0	After award	3,083	47.0%	0.65	0.43	100%
		Before award	3,472	53.0%	0.66	0.42	
		Total	6,555	—	0.65	0.42	
Michelin group	1	After award	845	47.1%	0.51	0.33	77.5%
		Before award	950	52.9%	0.54	0.36	
		Total	1,795	—	0.52	0.34	
	2	After award	222	52.4%	0.53	0.31	18.3%
		Before award	202	47.6%	0.57	0.34	
		Total	424	—	0.55	0.32	
	3	After award	45	46.4%	0.42	0.34	4.2%
		Before award	52	53.6%	0.42	0.33	
		Total	97	—	0.42	0.34	
Group total		After award	1,112	48.0%	0.51	0.32	100%
		Before award	1,204	52.0%	0.54	0.36	
		Total	2,316	—	0.52	0.34	
			8,871				

Table 4.
Detailed review
information per group
before and after
the award

sentences, and lexical chains to create topic-specific summaries in text. Semantria uses synonym expansion and other techniques to construct chains of topics in pieces of text (Lexalytics, n.d.-b). Semantria also analyses entire documents (reviews) and gives them a sentiment score from -3 to 3 , and components (queries, entities, or topics) from -10 to 10 , where the negative end represents an extremely negative sentiment and the positive end an extremely positive sentiment. This range varies depending on the configuration. These documents and components also receive a tag (negative, neutral, or positive) depending on the sentiment score. A document sentiment is considered negative when it is lower than -0.05 and positive when it is greater than 0.22 (the remaining are neutral). A component sentiment is negative when it is lower than -0.45 and positive when it is greater than 0.5 . The software also uses modifiers that affect the sentiment, such as intensifiers (very, a lot, super, etc.) and negators (not, never, etc.). Moreover, Semantria has industry packs which contain queries, topics, and categories that are related to the restaurant industry. Some words might be seen as negative in a certain context, but they can also be positively perceived in the restaurant world. One example could be the word “explosion”, which has a negative connotation in general; however, in the restaurant world, the phrase “explosion of flavors” is commonly used. For this reason, industry packs are essential for the analysis. Here

we crossed both sources of data, organized and prepared the data to perform the sentiment analysis. The properties of our data set are described in Table 5.

To process the data, the reviews had to be uploaded into a tokenization algorithm, in which the reviews were broken into words, phrases, symbols and other elements which are called tokens. In this process, the words were normalized, all letters were turned into lower case and all symbols and numbers were removed. Also, words like “loved” and “loving” were turned into “love” (verb). Then each word was tagged with a type (noun, verb, or adjective) and categorized according to Lexalytics concept topics (Lexalytics, n.d.-a) and user-defined ones (see Figure 1). Subsequently, these words were matched with a large set of words, and sentiments were applied to those (positive, negative, or neutral) based on sentences inside a review.

After the pre-processing stage, data were analyzed. During this step, we not only analyzed the reviews in general but also took into consideration the most relevant dimensions: price, food quality, waiting time, waiters service, the physical environment and other dimensions that came up during the analysis. Afterward, we grouped them in the four dimensions that we identified earlier: price, food, service, and ambiance. These steps enabled us to understand the sentiment around the four main dimensions. To do so, we created a taxonomy in Semantria with the help of an industry pack that allowed us to group queries and dimensions in a hierarchical way as shown in Figure 1. This means that dimensions and queries were grouped under a parent dimension and the sentiment around them represented the sentiment around the main one, i.e. our four main dimensions.

Results

Overall sentiment in the form of written reviews

As shown in Figure 2, the overall sentiment towards restaurants in both the control group and the Michelin group exhibits a decrease from one period to another. In the control group, the decrease was 2.1%, and in the 1- and 2-star restaurants, the decrease was about 5%. In the 3-star restaurants, the decrease was less than 1%, but this category represents only 4.2% of the group's reviews. The average decrease in the Michelin Group was 4.8%.

Category	Property	Description
Restaurant	Restaurant name	The name of the restaurant
	Michelin stars	The number of Michelin stars the restaurants have at the date of this analysis, after the award
	Restaurant location	The location of the restaurant
Review	Price range	The restaurant price range extracted from the Michelin website
	Star rating	The quantitative part of the review—a rating that ranges between 1 and 5
	Written review	The qualitative part of the review—a type of unstructured data where we conducted a sentiment analysis. Here, we only considered reviews written in English
	Date of visit	The reviewer's visit date. We only considered reviews given 6 months before and after the award. This allowed us to narrow the time frame, eliminate other factors that could lead to eventual changes and increase the likelihood of the changes being a result of the award
	After award	This is a binary property to separate the reviews given before (0) and after the award (1)
	Local language	This is a binary property that separates reviews written in the local language of the country (1), i.e. English in the United Kingdom, from reviews written in English where it is not the local language (0)

Table 5.
Description of dataset
properties

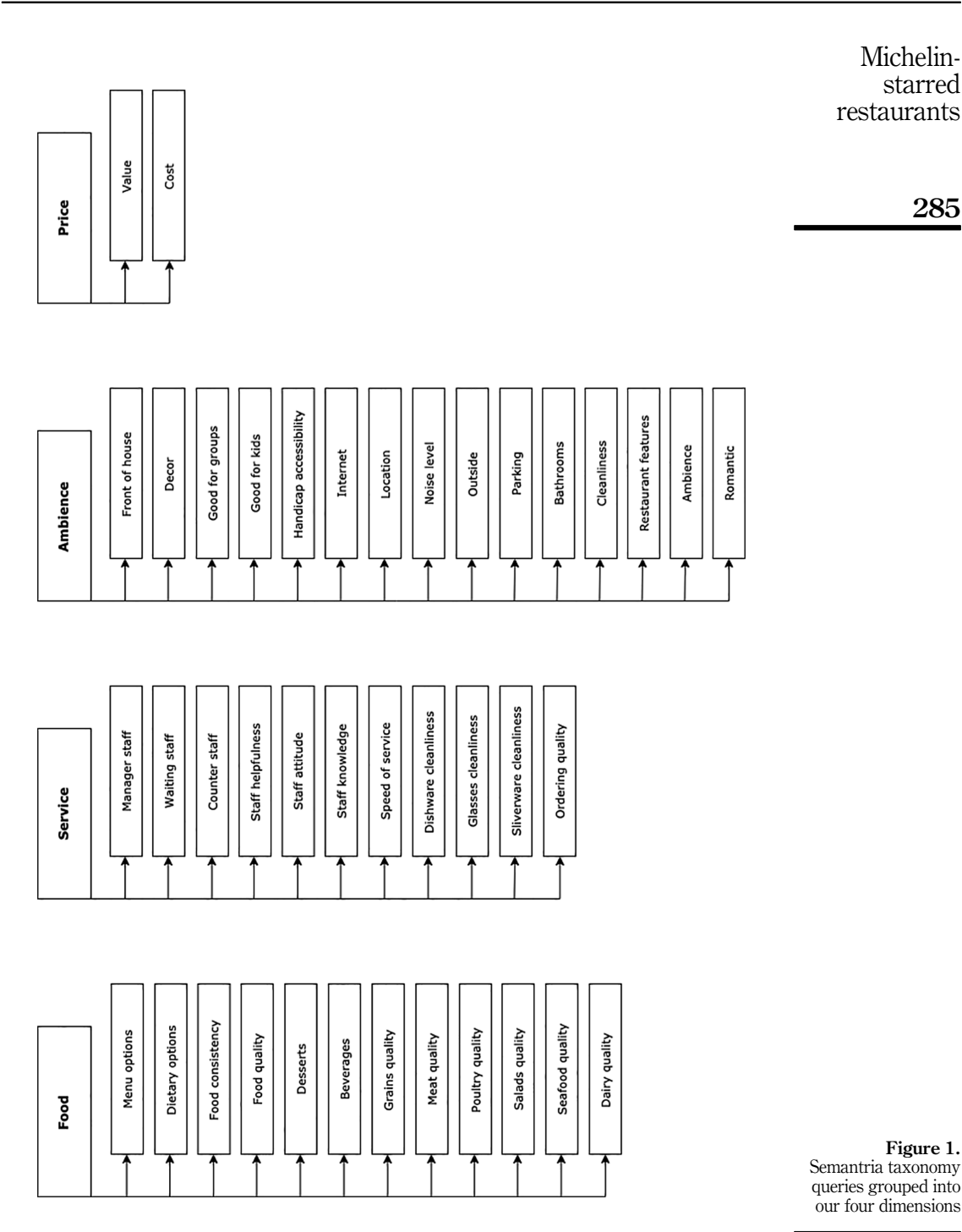
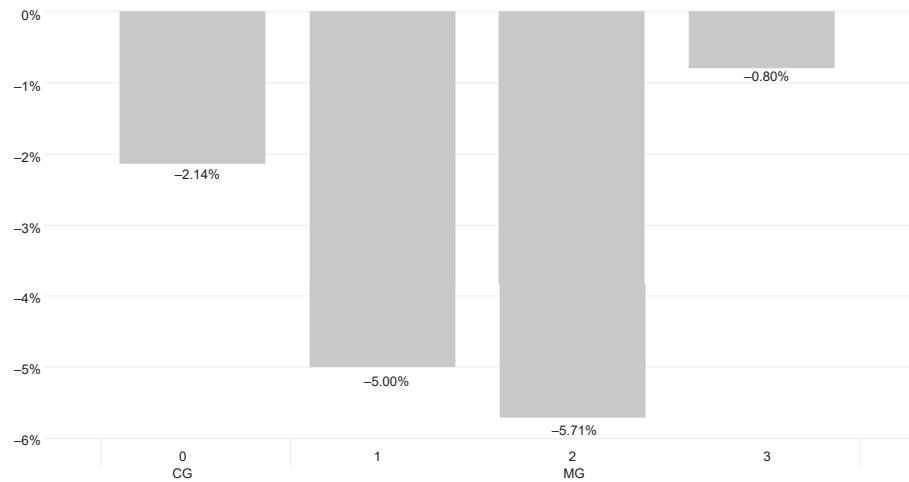


Figure 2.
Change in average
sentiment from before
to after the award in the
control group (CG) and
Michelin group (MG)



A sentiment tag (i.e. positive, negative, or neutral) was attributed to each review. Figure 3 shows that the percentage of positive reviews decreased after the date the Michelin Star was awarded, while the number of neutral and negative reviews increased, which is consistent with the pattern identified in Figure 2. An increase in the percentage of neutral and negative reviews and a decrease in percentage of positive reviews may explain a decrease in the overall sentiment after the award.

Although the overall sentiment in both groups decreased after the award of a Michelin Star, the decrease in the Michelin Group was 2.7% higher, doubling the decrease in the Control Group. Hence, H1a is rejected.

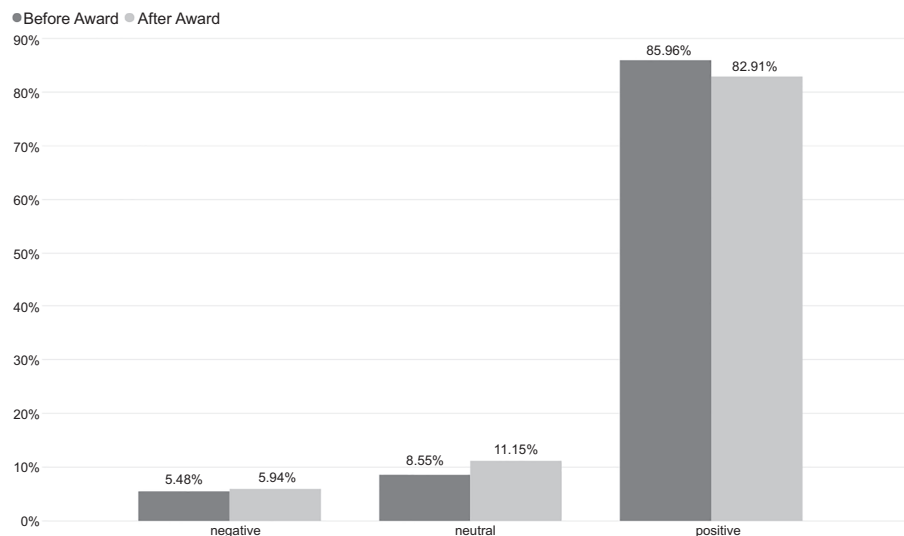


Figure 3.
Reviews per sentiment
before and after the
award (Michelin group)

Overall sentiment in the form of star rating

As previously mentioned, apart from written reviews, star rating of each review was also extracted from TripAdvisor. The average sentiment (indicated with a dot in Figure 4) increased as the star rating increased, except in 1- and 2-star ratings. It is shown that only the sentiment of those who gave 2 stars was negative. The sentiment of those who rated 1 star was neutral, but highly close to negative. The sentiment of those who rated 3 stars was neutral, and of those who rated 4 and 5 stars were positive. Therefore, average sentiment is nearly consistent with star rating.

Most of the reviews (87.9%) rated the restaurants with 4 or 5 stars (see Table 6), in which 71.6% rated the restaurants with 5 stars, resulting in an average of 4.5 out of 5. Moreover, when analysing the reviews before and after the award, the average rating was the same, i.e. 4.5, which did not show any changes in customers' sentiment when a restaurant was awarded a Michelin Star. Therefore, H1b is rejected.

Sentiment analysis towards the four key aspects: food, service, ambience, and price

From the 2,316 reviews of restaurants in the Michelin group, 13,618 sentiments about service, food, ambience, and price were extracted. Of these sentiments, food and service were the most mentioned items, accounting for 41.4 and 40.5%, respectively, followed by ambience (11.4%), and price (6.8%). Also, sentiment analysis for each dimension before and after the award shows that the average sentiment decreased in each dimension except for price, where it increased from 0.18 to 0.30, falling within neutral values. However, price sentiment only consisted of a relatively small proportion (6.8%) of the total sentiments (see Table 7).

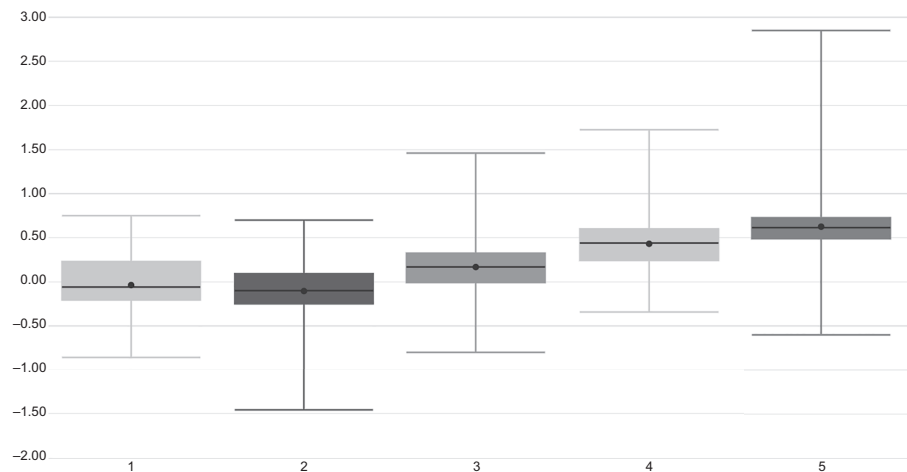


Figure 4.
Review sentiments per
star rating (from 1 to 5)
with minimum and
maximum value
(whisker), average as
dot, median as line and
the interquartile range
as interval

Star rating	# Reviews	% of total	Average sentiment	Standard deviation	Average rating
1	51	2.2%	-0.04	0.33	4.5
2	75	3.2%	-0.10	0.35	
3	156	6.7%	0.17	0.31	
4	377	16.3%	0.43	0.28	
5	1,657	71.6%	0.63	0.27	
Total	2,316	100.0%			

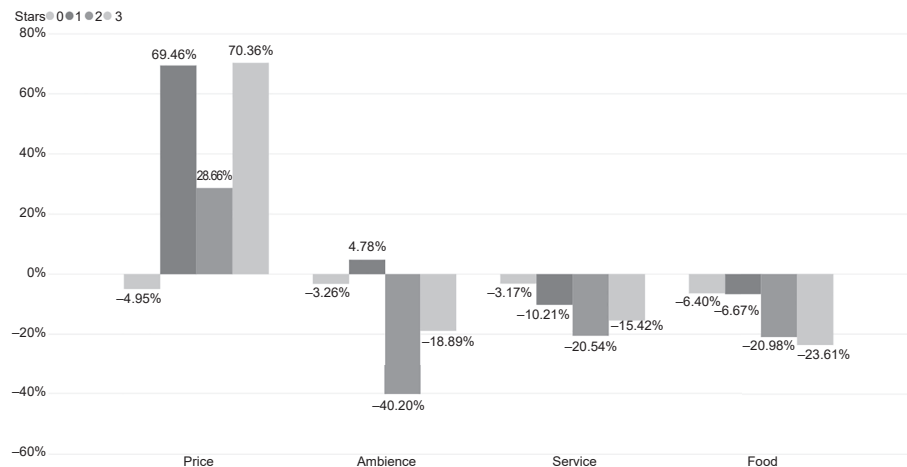
Table 6.
Reviews' star rating

Table 7.
Detailed sentiment
information per
dimension
(Michelin group)

Dimension	Time of review	# Sentiments	% of subtotal	Average sentiment	Standard deviation	% of total
Service	After award	2,647	48.0%	0.99	1.15	40.5%
	Before award	2,866	52.0%	1.14	1.22	
	Total	5,513	–	1.07	1.19	
Price	After award	420	45.6%	0.30	0.92	6.8%
	Before award	501	54.4%	0.18	1.09	
	Total	921	–	0.23	1.02	
Food	After award	2,798	49.7%	0.78	1.00	41.4%
	Before award	2,837	50.3%	0.86	1.01	
	Total	5,635	–	0.82	1.01	
Ambiance	After award	762	49.2%	0.57	0.86	11.4%
	Before award	787	50.8%	0.60	0.85	
	Total	1,549	–	0.59	0.86	
Total	After award	6,627	48.7%	0.81	1.06	100%
	Before award	6,991	51.3%	0.89	1.12	
	Total	13,618	–	0.85	0.86	

Figure 5 shows changes in the sentiment towards each dimension for control group and different categories under the Michelin group (i.e. 1-, 2-, and 3-starred Michelin restaurants), in which changes in the control group were slight, varying between -3.2% and -6.4% , while the changes in the Michelin group were rather pronounced. Particularly, the sentiments towards price increased by a relatively large amount for restaurants that won their first or third star (approximately 70%) and increased by about 29% for restaurants that won their second star. Interestingly, there was an evident decrease in the ambience sentiment in the 2-starred Michelin restaurants (-40.2%). In terms of food and service, sentiments exhibited a mild to moderate decrease, particularly in the 2- (food and service: approximately -21% respectively) and 3-starred Michelin restaurants (food: -23.6% ; service: -15.4%).

In terms of overall changes, the patterns are consistent with those in Figure 5 (see Figure 6). Meanwhile, the increase in sentiment towards price was significantly higher in the Michelin group, and the decrease in sentiment towards other dimensions was also apparent in the Michelin group, except for the ambience sentiment which exhibited a mild decrease. In addition,

**Figure 5.**
Change in sentiments
per dimension (price,
ambience, service and
food) and restaurant
stars before and after
the award of 1, 2 or
3 stars

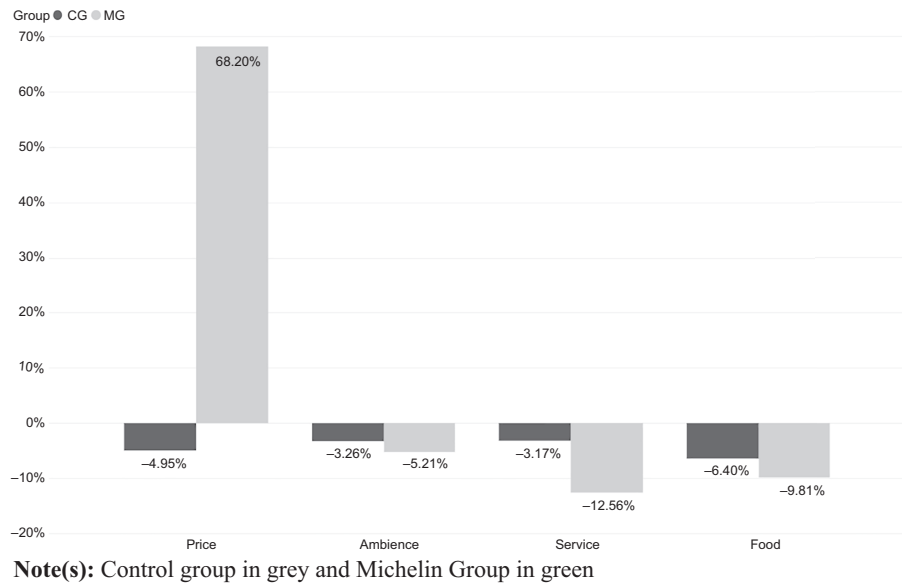


Figure 6.
Change in sentiments
per dimension (price,
ambience, service and
food) and restaurant
group – control group
in grey and Michelin
group in green

it is worth pointing out that one-Michelin-starred restaurants experienced a mild increase (4.8%), yet two-Michelin-starred restaurants saw an evident decrease (−40.2%) in the ambience sentiments. Therefore, H2 and H3 are supported, while H4 and H5 are rejected.

Discussion

Nowadays, it has become a common practice that consumers take into consideration online reviews before purchasing a product or service, particularly the purchase of fine-dining services such as a meal at a Michelin-starred restaurant given its intangible nature and the risk associated with the purchase such as financial risk (Chiang and Guo, 2021). Moreover, Zhang *et al.* (2010) suggested that consumers tend to find consumer-generated reviews more reliable than editor reviews, asserting the importance of e-WOM. Therefore, it is of fundamental importance to understand what factors affect consumers' review sentiments on online review platforms. Specifically, this study investigated how online review sentiments changed after restaurants were awarded a Michelin Star in order to shed light on how the award of Michelin Star affects online reviews as well as what factors contribute to positive online restaurant reviews.

Changes in the online sentiment after the award of a Michelin Star

The award of a Michelin Star is usually considered beneficial for restaurants such as enhanced reputation and awareness (Chiang and Guo, 2021). Moreover, it may serve as a competitive advantage for attracting wider markets such as international tourists (Batat, 2021). Nevertheless, this may not be the case in the realm of online review platforms. Our findings revealed decrease in the average online sentiment after the award of a Michelin Star. Specifically, sentiment towards 2-star Michelin restaurants experienced the greatest decrease, closely followed by 1-star Michelin restaurants. Regarding sentiment orientation, there was also decrease in positive review sentiments, yet increase in both negative and neutral sentiments. This may be explained by the fact that consumers tend to develop higher expectations for Michelin-starred restaurants (Chiang and Guo, 2021), and accordingly, customer satisfaction will be negatively affected if one's expectation is not met (Arora and Singer, 2006).

In particular, consistent with Pacheco (2018)'s findings, food and service sentiments were both affected by the award of a Michelin Star, in which service sentiment was the most affected aspect, followed by food. Again, this may be attributed to the increased expectations of customers (Chiang and Guo, 2021) and their important role in customer satisfaction (Liu and Jang, 2009).

In contrast to our hypotheses, ambience sentiment was also slightly affected by the award of a Michelin Star. Although previous studies suggested that ambience is not a significant factor determining customer satisfaction (Arora and Singer, 2006), it contributes to one's dining experience (Berry *et al.*, 2006; Chua *et al.*, 2014). Also, customers tend to dine at a Michelin-starred restaurant for its unique and luxurious experience, which is created by not only food and service, but also ambience (Liu *et al.*, 2022). Specifically, sentiment towards the ambience aspect of two-Michelin-starred restaurants was highly negatively affected. One possible explanation for this result is that restaurants maintained the same ambience when obtaining an additional Michelin Star, yet customers expected to experience something different from this upgrade.

Interestingly, we found that price sentiment was positively affected by the award of a Michelin Star, with a prominent increase of 68.2%. This surprising result may be due to the luxurious values perceived by customers. As mentioned previously, customers who dine at a Michelin-starred restaurant are willing to pay a higher price because they perceive that such luxury consumption will bring them a sense of social status and unique experiences (Liu *et al.*, 2022). Moreover, Kiatkawsin and Han (2019) suggested that luxury restaurants, Michelin-starred restaurants in particular, often have the edge in premium pricing over non-luxury restaurants; meanwhile, competitive pricing may backfire because prestige, exclusive and unique experiences are what luxury dining patrons value.

Conclusion

Theoretical implications

Our work made three main theoretical contributions. First, this study extends extant literature by investigating changes in customer sentiments towards four fundamental aspects (i.e. food, service, ambience, and price) before and after a restaurant has received a Michelin Star. Second, it adopted a novel approach by using data extracted from TripAdvisor to conduct a sentiment analysis of online reviews for Michelin-starred restaurants, which contributes to identifying aspects that are most or least affected by the award of a Michelin Star. Third, this study contributes to the literature on customer satisfaction of Michelin-starred restaurants in the online review context by also highlighting the role of ambience; albeit a small role, it should not be overlooked by researchers in the field.

Managerial implications

With the growth of online social media, writing online reviews to share user experience and relying on others' reviews to inform purchase decision-making are common practices for consumers. This sentiment analysis provides valuable insights into key aspects that Michelin-starred restaurant operators and owners need to pay attention in order to create a unique and compelling gastronomic experience that will surprise their customers, leave a lasting impression, and trigger positive online restaurant reviews. The results of our study argue that consumers tend to hold higher expectations for this type of upscale restaurants given its recognition and quality assurance, so they are more likely to have negative feelings when their expectations are disconfirmed. Therefore, restaurants should continuously improve their food, and service while paying attention to small details such as ambience, through creativity and innovation. For example, in addition to food quality and outstanding service that are the basics of any Michelin-starred restaurant, culinary creativity should be emphasized, such as the artistic presentation of dishes, the use of new culinary techniques and unique ingredients. As suggested

by Jeong and Jang (2011), dish presentation, employee appearance, décor and ambience that are visually appealing may influence customers' post-dining behavior, such as writing positive online reviews. In terms of pricing, high-end restaurants, especially Michelin-starred restaurants, have the edge in premium pricing, yet competitive pricing may backfire considering the luxurious values perceived by their patrons. In addition, people are more motivated to write online reviews of luxury dining consumption to conspicuously affiliate themselves with high-status restaurant (Kovács and Horwitz, 2018).

Limitations and future research

This study demonstrated that the overall sentiments decreased after restaurants were awarded a Michelin Star, in which service sentiment was the most affected aspect, followed by food and ambience. Yet, price sentiment showed a prominent increase. These findings could be explained by customers' increased expectations and perceived luxurious values that lead to the willingness to pay more.

The present work is not without limitations. First, this study was based on a sample of reviews on European restaurants, but the important role of cultural differences in shaping customer reviews could not be ignored (Nakayama and Wan, 2019). Therefore, future work may investigate how the Michelin award affects sentiments toward the four key dimensions in different geographical areas, such as Japan, the United States and China, as these are some of the countries with the highest number of Michelin-starred restaurants (Chefs' Pencil, 2021). Second, the inclusion of factors such as age, gender, fine-dining occasion and income could further improve the value of a future study. Third, the reasons attributed to the change in customers' sentiment may require further empirical testing to better understand customers' post-dining behavior.

References

- Alamoudi, E.S. and Alghamdi, N.S. (2021), "Sentiment classification and aspect-based sentiment analysis on yelp reviews using deep learning and word embeddings", *Journal of Decision Systems*, Vol. 30 Nos 2-3, pp. 259-281.
- Alcoba, J., Mostajo, S., Paras, R., Ebron, R.A. and Balderas-Cejudo, A. (2020), "On finding the voice of the customer in the digital traces of the Michelin-star gastronomy experience: unveiling insights for service design", *International Conference on Exploring Services Science*, pp. 21-34.
- Amelia, M. and Garg, A. (2016), "The first impression in a fine-dining restaurant. A study of C restaurant in Tampere, Finland", *European Journal of Tourism, Hospitality, and Recreation*, Vol. 7 No. 2, pp. 100-111.
- Aron, A., Lewandowski, G.W. Jr, Mashek, D. and Aron, E.N. (2013), "The self-expansion model of motivation and cognition in close relationships", in Simpson, J.A. and Campbell, L. (Eds), *The Oxford Handbook of Close Relationships*, Oxford University Press, pp. 90-115.
- Arora, R. and Singer, J. (2006), "Customer satisfaction and value as drivers of business success for fine dining restaurants", *Services Marketing Quarterly*, Vol. 28 No. 1, pp. 89-102.
- Banerjee, S., Bhattacharyya, S. and Bose, I. (2017), "Whose online reviews to trust? Understanding reviewer trustworthiness and its impact on business", *Decision Support Systems*, Vol. 96, pp. 17-26, doi: 10.1016/J.DSS.2017.01.006.
- Batat, W. (2021), "The role of luxury gastronomy in culinary tourism: an ethnographic study of Michelin-Starred restaurants in France", *International Journal of Tourism Research*, Vol. 23 No. 2, pp. 150-163.
- Berry, L.L., Wall, E.A. and Carbone, L.P. (2006), "Service clues and customer assessment of the service experience: lessons from marketing", *Academy of Management Perspectives*, Vol. 20 No. 2, pp. 43-57.

- Bilgihan, A., Seo, S. and Choi, J. (2018), "Identifying restaurant satisfiers and dissatisfiers: suggestions from online reviews", *Journal of Hospitality Marketing and Management*, Vol. 27 No. 5, pp. 601-625.
- Chef's Pencil (2021), "Countries with the highest density of michelin-starred restaurants - Chef's Pencil", available at: <https://www.chefspencil.com/density-of-michelin-starred-restaurants/>.
- Chen, A. and Peng, N. (2018), "Examining consumers' intentions to dine at luxury restaurants while traveling", *International Journal of Hospitality Management*, Vol. 71, pp. 59-67, doi: 10.1016/J.IJHM.2017.11.009.
- Chiang, C.F. and Guo, H.W. (2021), "Consumer perceptions of the Michelin guide and attitudes toward Michelin-starred restaurants", *International Journal of Hospitality Management*, Vol. 93, p. 102793, doi: 10.1016/J.IJHM.2020.102793.
- Chua, B.-L., Jin, N., Lee, S. and Goh, B. (2014), "Influence of mechanic, functional, and humanic clues on customers' experiential values and behavioral intentions in full-service restaurants", *Journal of Foodservice Business Research*, Vol. 17 No. 2, pp. 67-84.
- Gan, Q., Ferns, B.H., Yu, Y. and Jin, L. (2017), "A text mining and multidimensional sentiment analysis of online restaurant reviews", *Journal of Quality Assurance in Hospitality and Tourism*, Vol. 18 No. 4, pp. 465-492.
- Garg, A. and Amelia, M. (2016), "Service clues' influence on customers' dining experience in fine dining restaurants", *Asia-Pacific Journal of Innovation in Hospitality and Tourism*, Vol. 5 No. 1, pp. 91-109.
- Geetha, M., Singha, P. and Sinha, S. (2017), "Relationship between customer sentiment and online customer ratings for hotels - an empirical analysis", *Tourism Management*, Vol. 61, pp. 43-54, doi: 10.1016/J.TOURMAN.2016.12.022.
- Gretzel, U. and Yoo, K.H. (2008), "Use and impact of online travel reviews", *Information and Communication Technologies in Tourism 2008*, pp. 35-46.
- Guerreiro, J. and Rita, P. (2020), "How to predict explicit recommendations in online reviews using text mining and sentiment analysis", *Journal of Hospitality and Tourism Management*, Vol. 43, pp. 269-272, doi: 10.1016/J.JHTM.2019.07.001.
- Harrington, R.J., Fauser, S.G., Ottenbacher, M.C. and Kruse, A. (2013), "Key information sources impacting Michelin restaurant choice", *Journal of Foodservice Business Research*, Vol. 16 No. 3, pp. 219-234.
- Hennig-Thurau, T., Malthouse, E.C., Friegle, C., Gensler, S., Lobschat, L., Rangaswamy, A. and Skiera, B. (2010), "The impact of new media on customer relationships", *Journal of Service Research*, Vol. 13 No. 3, pp. 311-330.
- Hu, X. and Yang, Y. (2021), "What makes online reviews helpful in tourism and hospitality? A bare-bones meta-analysis", *Journal of Hospitality Marketing and Management*, Vol. 30 No. 2, pp. 139-158.
- Hwang, J. and Ok, C. (2013), "The antecedents and consequence of consumer attitudes toward restaurant brands: a comparative study between casual and fine dining restaurants", *International Journal of Hospitality Management*, Vol. 32 No. 1, pp. 121-131, doi: 10.1016/J.IJHM.2012.05.002.
- Jeong, E.H. and Jang, S.C.S. (2011), "Restaurant experiences triggering positive electronic word-of-mouth (eWOM) motivations", *International Journal of Hospitality Management*, Vol. 30 No. 2, pp. 356-366, doi: 10.1016/J.IJHM.2010.08.005.
- Kiatkawsin, K. and Han, H. (2019), "What drives customers' willingness to pay price premiums for luxury gastronomic experiences at Michelin-starred restaurants?", *International Journal of Hospitality Management*, Vol. 82, pp. 209-219, doi: 10.1016/J.IJHM.2019.04.024.
- Kiatkawsin, K. and Sutherland, I. (2020), "Examining luxury restaurant dining experience towards sustainable reputation of the Michelin restaurant guide", *Sustainability*, Vol. 12 No. 5, p. 2134, doi: 10.3390/SU12052134.

- Kovács, B. and Horwitz, S. (2018), "Conspicuous reviewing: affiliation with high-status organizations as a motivation for writing online reviews", *Socius*, Vol. 4, p. 2378023118776848.
- Lee, J.H. and Hwang, J. (2011), "Luxury marketing: the influences of psychological and demographic characteristics on attitudes toward luxury restaurants", *International Journal of Hospitality Management*, Vol. 30 No. 3, pp. 658-669, doi: 10.1016/J.IJHM.2010.12.001.
- Lee, J. and Kim, Y.K. (2020), "Online reviews of restaurants: expectation-confirmation theory", *Journal of Quality Assurance*, Vol. 21 No. 5, pp. 582-599.
- Lexalytics (n.d.a), "Categorization | Lexalytics", available at: <https://www.lexalytics.com/technology/categorization> (accessed 15 March 2022).
- Lexalytics (n.d.b), "Data analytics with NLP and text analytics | Lexalytics", available at: <https://www.lexalytics.com/> (accessed 15 March 2022).
- Libai, B., Bolton, R., Bügel, M.S., De Ruyter, K., Götz, O., Risselada, H. and Stephen, A.T. (2010), "Customer-to-customer interactions: broadening the scope of word of mouth research", *Journal of Service Research*, Vol. 13 No. 3, pp. 267-282.
- Litvin, S.W., Goldsmith, R.E. and Pan, B. (2008), "Electronic word-of-mouth in hospitality and tourism management", *Tourism Management*, Vol. 29 No. 3, pp. 458-468.
- Liu, Y. and Jang, S.C. (2009), "Perceptions of Chinese restaurants in the U.S.: what affects customer satisfaction and behavioral intentions?", *International Journal of Hospitality Management*, Vol. 28 No. 3, pp. 338-348, doi: 10.1016/J.IJHM.2008.10.008.
- Liu, C.R., Kuo, T.M., Wang, Y.C., Shen, Y.J., Chen, S.P. and Hong, J.W. (2022), "Perceived luxurious values and pay a price premium for Michelin-starred restaurants: a sequential mediation model with self-expansion and customer gratitude", *International Journal of Hospitality Management*, Vol. 103, p. 103185, doi: 10.1016/J.IJHM.2022.103185.
- Liu, B. (2012), "Sentiment analysis and opinion mining", *Synthesis Lectures on Human Language Technologies*, Vol. 5 No. 1, pp. 1-167, 9781608458844.
- Madeira, A., Palrão, T., Mendes, A.S. and Ottenbacher, M.C. (2022), "The culinary creative process of Michelin Star chefs", *Tourism Recreation Research*, Vol. 47 No. 3, pp. 258-276.
- Meek, S., Wilk, V. and Lambert, C. (2021), "A big data exploration of the informational and normative influences on the helpfulness of online restaurant reviews", *Journal of Business Research*, Vol. 125, pp. 354-367.
- Michelin Guide (n.d.a), "About us. Michelin guide", available at: <https://guide.michelin.com/en/about-us> (accessed 28 February 2022).
- Michelin Guide (n.d.b), "What the Michelin guide's symbols mean", available at: <https://guide.michelin.com/th/en/to-the-stars-and-beyond-th> (accessed 7 March 2022).
- Mostafa, M.M. (2013), "More than words: social networks' text mining for consumer brand sentiments", *Expert Systems With Applications*, Vol. 40 No. 10, pp. 4241-4251.
- Mudambi, S.M. and Schuff, D. (2010), "Research note: what makes a helpful online review? A study of customer reviews on Amazon. com", *MIS Quarterly*, Vol. 34 No. 1, pp. 185-200.
- Nakayama, M. and Wan, Y. (2019), "The cultural impact on social commerce: a sentiment analysis on Yelp ethnic restaurant reviews", *Information and Management*, Vol. 56 No. 2, pp. 271-279, doi: 10.1016/J.IM.2018.09.004.
- Nave, M., Rita, P. and Guerreiro, J. (2018), "A decision support system framework to track consumer sentiments in social media", *Journal of Hospitality Marketing and Management*, Vol. 27 No. 6, pp. 693-710.
- Pacheco, L.M. (2018), *An Analysis of Online Reviews of Upscale Iberian Restaurants*, Universidade Portucalense, Porto.
- Patel, R. and Patel, S. (2021), "Deep learning for natural language processing", *Information and Communication Technology for Competitive Strategies (ICTCS 2020)*, Springer, pp. 523-533.

- Ramanathan, R., Di, Y. and Ramanathan, U. (2016), "Moderating roles of customer characteristics on the link between service factors and satisfaction in a buffet restaurant", *Benchmarking: An International Journal*, Vol. 23 No. 2, pp. 469-486.
- Rouliez, P., Tojib, D. and Tsarenko, Y. (2019), "The influence of online review exposure on reviewers' intensity level of negative word of mouth", *Journal of Hospitality and Tourism Research*, Vol. 43 No. 5, pp. 712-733.
- Sann, R. and Lai, P.C. (2020), "Understanding homophily of service failure within the hotel guest cycle: applying NLP-aspect-based sentiment analysis to the hospitality industry", *International Journal of Hospitality Management*, Vol. 91, p. 102678, doi: 10.1016/J.IJHM.2020.102678.
- Santos, C.L., Rita, P. and Guerreiro, J. (2018), "Improving international attractiveness of higher education institutions based on text mining and sentiment analysis", *International Journal of Educational Management*, Vol. 32 No. 3, pp. 431-447.
- Svejenova, S., Mazza, C. and Planellas, M. (2007), "Cooking up change in haute cuisine: ferran Adrià as an institutional entrepreneur", *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, Vol. 28 No. 5, pp. 539-561.
- Tsao, W.-C. and Hsieh, M.-T. (2015), "eWOM persuasiveness: do eWOM platforms and product type matter?", *Electronic Commerce Research*, Vol. 15 No. 4, pp. 509-541.
- Van Doorn, J., Lemon, K.N., Mittal, V., Nass, S., Pick, D., Pirner, P. and Verhoef, P.C. (2010), "Customer engagement behavior: theoretical foundations and research directions", *Journal of Service Research*, Vol. 13 No. 3, pp. 253-266.
- Vargas-Calderón, V., Moros Ochoa, A., Castro Nieto, G.Y. and Camargo, J.E. (2021), "Machine learning for assessing quality of service in the hospitality sector based on customer reviews", *Information Technology and Tourism*, Vol. 23 No. 3, pp. 351-379.
- Vargas-Sanchez, A. and López-Guzmán, T. (2022), "Creative process and culinary experiences in Michelin-starred restaurants", *Journal of Culinary Science and Technology*, Vol. 20 No. 2, pp. 97-116.
- Voss, K.E., Spangenberg, E.R. and Grohmann, B. (2003), "Measuring the hedonic and utilitarian dimensions of consumer attitude", *Journal of Marketing Research*, Vol. 40 No. 3, pp. 310-320.
- Vu, H.Q., Li, G., Law, R. and Zhang, Y. (2019), "Exploring tourist dining preferences based on restaurant reviews", *Journal of Travel Research*, Vol. 58 No. 1, pp. 149-167.
- Westbrook, R.A. (1987), "Product/consumption-based affective responses and postpurchase processes", *Journal of Marketing Research*, Vol. 24 No. 3, pp. 258-270.
- Xiang, Z., Du, Q., Ma, Y. and Fan, W. (2017), "A comparative analysis of major online review platforms: implications for social media analytics in hospitality and tourism", *Tourism Management*, Vol. 58, pp. 51-65, doi: 10.1016/J.TOURMAN.2016.10.001.
- Yan, X., Wang, J. and Chau, M. (2015), "Customer revisit intention to restaurants: evidence from online reviews", *Information Systems Frontiers*, Vol. 17 No. 3, pp. 645-657.
- Yang, W. and Mattila, A.S. (2016), "Why do we buy luxury experiences? Measuring value perceptions of luxury hospitality services", *International Journal of Contemporary Hospitality Management*, Vol. 28 No. 9, pp. 1848-1867.
- Yoon, Y., Kim, A.J., Kim, J. and Choi, J. (2019), "The effects of eWOM characteristics on consumer ratings: evidence from TripAdvisor. com", *International Journal of Advertising*, Vol. 38 No. 5, pp. 684-703.
- Yu, T., Rita, P., Moro, S. and Oliveira, C. (2021), "Insights from sentiment analysis to leverage local tourism business in restaurants", *International Journal of Culture, Tourism and Hospitality Research*, Vol. 16 No. 1, pp. 321-336.
- Zhang, Z., Ye, Q., Law, R. and Li, Y. (2010), "The impact of e-word-of-mouth on the online popularity of restaurants: a comparison of consumer reviews and editor reviews", *International Journal of Hospitality Management*, Vol. 29 No. 4, pp. 694-700, doi: 10.1016/J.IJHM.2010.02.002.

-
- Zhu, F. and Zhang, X. (2010), "Impact of online consumer reviews on sales: the moderating role of product and consumer characteristics", *Journal of Marketing*, Vol. 74 No. 2, pp. 133-148.
- Zhu, P., Chen, Z., Zheng, H. and Qian, T. (2019), "Aspect aware learning for aspect category sentiment analysis", *ACM Transactions on Knowledge Discovery from Data (TKDD)*, Vol. 13 No. 6, pp. 1-21.

Michelin-
starred
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Explanatory power of the tourist destination competitiveness index on the control of the first wave of COVID-19

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Abstract

Purpose – This article intends to analyse the explanatory power of the Travel and Tourism Competitiveness Index (TTCI) and some of its constituent factors on national success metrics in managing the initial surge of the COVID-19 pandemic.

Design/methodology/approach – The authors study the outbreak control effectiveness of 132 countries during the first semester of 2020. The authors apply generalized linear regression models and weighted least squares models using 6 COVID-19-related dependent variables, 9 TTCI-related independent variables and 12 control variables.

Findings – The results suggest that countries with superior TTCI values and selected constituent factors have the highest daily averages of coronavirus infections and fatalities per million and the highest speed rates of COVID-19 spread. The authors also find that these countries have the shortest government response time, the lowest daily average of the social restrictions index and the shortest time from the first case reported in China to the first case reported nationally.

Originality/value – To the best of the authors' awareness, no previous study exists analysing the statistical relationship between the TTCI and some of its constituent factors with the selected metrics of national success at managing the initial surge of the COVID-19 pandemic. This fact represents the primary evidence of this article's unique contribution.

Keywords Destination competitiveness, Competitiveness index, Travel and tourism competitiveness index, Preventive healthcare, COVID-19

Paper type Research paper

1. Introduction

This article aims to provide statistical evidence about the Travel and Tourism Competitiveness Index's (TTCI) explanatory power on some countries' success metrics in managing the initial surge of the COVID-19 pandemic. Calderwood and Soshkin (2019), working at the World Economic Forum, compiled the TTCI. The Forum calculates the TTCI biannually in the context of their Industry Program for Aviation, Travel and Tourism. The TTCI compares the Travel and Tourism (T&T) competitiveness of 140 countries and assesses those national strategies and policies that allow sustainable growth for the T&T industry sector, promoting a country's development and competitiveness. The TTCI is a strategic benchmarking tool that enables the analysis of the strengths and weaknesses of each country's T&T sector to assess its competitiveness. The index constitutes a quantitative representation of the attractiveness of the national T&T business development rather than a



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country's attractiveness as a T&T destination. The index informs about factors that drive domestic T&T competitiveness based on appropriate national policies, strategies, management systems and infrastructure aimed at attracting the T&T demand while preserving the local natural and cultural assets that support the domestic T&T industry.

The pandemic crisis' severe impact on the T&T industry sector has forced the creation of new industry standards and benchmarks. For example, in May 2021, the International Organization for Standardization published the ISO/PAS 5643 titled "Tourism and related services – Requirements and guidelines to reduce the spread of Covid-19 in the tourism industry" (International Organization for Standardization, 2021). Similarly, the World Travel and Tourism Council (2020) launched the global safety stamp to identify governments and businesses implementing global standardized health and hygiene protocols to provide a safe travel experience. Likewise, the UK-based consulting company Skytrax responsible for the prestigious international benchmark of airline excellence (the five-Star airline and airport ranking of quality achievement) launched the COVID-19 Safety Ratings covering airlines and airports across the world in 2020 (Skytrax, 2022).

Equally, the International Labour Organization (2020) suggested new standards called the prevention and control checklist for COVID-19 and accommodation and food service activities. In the same way, the World Health Organization (2020) informed about some guidelines for the COVID-19 management in hotels and other entities of the accommodation sector. Because of these new T&T standards and benchmarks, some T&T industry leaders have started to suggest the need to modify the TTCI's sub-indexes, pillars, and indicators. Indeed, Vinod Zutshi (2020), former Secretary at the Ministry of Tourism of India (2020), suggests that a review of the TTCI Health Safety pillar should include new national health protocols and safety standards for travellers.

The severe impact of the COVID-19 crisis on the T&T industry is responsible for the surge of new T&T industry standards and benchmarks listed above. Indeed, the outbreak has produced significant devastation in many economies worldwide, with those depending on T&T being the most affected. Before the COVID-19 crisis, T&T was considered a strategic industry sector for most economies. Indeed, the World Travel and Tourism Council (2019) estimated that T&T contributed 10.3% of the global gross domestic product (GDP), supporting around 330 million jobs worldwide. They also estimated that one out of ten jobs in 2019 was supported by the T&T industry globally and that one out of four new jobs created in 2019 came from the T&T sector. Similarly, the United Nations (UN, 2020) highlights that the T&T sector constitutes the livelihood of millions, representing over 20% of the GDP for some countries. The United Nations (UN) asserts that T&T was the third-largest export sector of the global economy before the pandemic and the most impacted by the COVID-19.

Some multilateral organizations have documented the significant impact of the COVID-19 crisis in the T&T sector. The UN Conference on Trade and Development (UNCTAD, 2021a), jointly with the United Nations World Tourism Organization (UNWTO), informs that the economic impact of the COVID-19 crisis was estimated to represent a loss of more than US\$ 4 tn of the world's GDP for the period 2020–2021. In that report, the T&T sector alone was estimated to suffer a loss of US\$ 2.4 tn worldwide, which would result in an average increase of 5.5% in global unemployment. They also inform about a reduction of one billion tourist arrivals in 2020, a decline of 74%, including many developing nations with a reduction of 80–90% and another reduction of 84% for the first quarter of 2021. According to Richter (2021a), this decline brought the T&T industry back to the late 1980s' levels.

In the same way, the World Travel and Tourism Council (2021a) informs that the T&T sector worldwide had shrunk 49.1% from 2019 to 2020. The T&T sector has declined from 10.4% of the global GDP (US\$ 9.2 tn) in 2019 to 5.5% (US\$ 4.7 tn) in 2020, representing a decrease of 49.1%. Similarly, the T&T jobs decreased from 334 million in 2019 to 272 million in 2020, constituting an 18.5% annual decline or 62 million lost jobs due to the

pandemic crisis. Likewise, the Council also informs that in 2020, the average domestic visitor spending declined by 45%, while international visitors experienced an unprecedented 69.4% decrease. Richter (2021b) qualifies 2020 as the worst year in the T&T industry, with losses estimated at \$1.3 tn in export revenue. Škare *et al.* (2021) estimate that the T&T industry's contribution to the world's GDP may decline from −4.1 US\$ tn to −12.8 US\$ tn by the end of the COVID-19 crisis. The UNCTAD (2021b) also informs about the UNWTO Panel of Tourism Experts survey, suggesting that T&T experts do not anticipate returning to pre-COVID arrival figures until 2023 or later. Another UNCTAD (2021c) report informs that almost 50% of the surveyed T&T experts suggest a return to 2019 levels in 2024 or later.

In the middle of the COVID-19 crisis, the World Bank (2020) provided some figures on the impact of the pandemic on individual T&T industry sub-sectors. According to the World Bank (2020), scheduled flights declined by 63% on a year-on-year basis during the first half of 2020. Similarly, in the accommodation and lodging sub-sector, Marriott, one of the world's leading hotel companies with 1.4m rooms worldwide, experienced a quarterly revenue contraction of 75%, a loss worse than that experienced during the 9/11 and the 2008 global financial crises combined. The World Bank also provides data from the American Hotel and Lodging Association regarding a decline of 80% of hotel rooms by April 15, 2020, with hotel occupancy rates below 20%. Equally, the World Bank's report on the Cruise Lines International Association informs a temporary suspension of all cruise operations starting in the first semester of 2020. This suspension represented a significant economic impact for most leading cruise companies worldwide, with Carnival Corporate as the most emblematic example experiencing a \$500 m cash burn just in March 2020. In the same way, the World Bank informs about restaurants suffering a record decline in reservations worldwide in late February 2020, plummeting to zero by mid-March, representing the business death of thousands of independent entrepreneurs in this T&T sub-sector.

In this article, we study the influence of the TTCI and some of its constituent factors on some national success metrics in controlling the first wave of the COVID-19. To achieve this goal, we analysed a sample of 132 countries using generalized linear regression models and weighted least squares models to provide an insight into the impact of national T&T policies and strategies measured by the TTCI's sub-indexes and pillars at managing the initial surge of the COVID-19 pandemic. Our central hypothesis is that the TTCI and some of its constituent sub-indexes and pillars represent dimensions of national T&T policies, which may directly affect some selected metrics of effectiveness at controlling the first wave of COVID-19. No previous study exists to measure the efficacy of such national T&T policies in controlling the pandemic. Our exploratory study aims to identify whether such national T&T policies have been beneficial or detrimental in managing the outbreak. Our results may also shed light on some additional relevant factors to include in the TTCI sub-indexes and pillars for a post-COVID-19 world.

2. Literature review

There is a nascent and growing literature on the influence of COVID-19 in the T&T sector, but no previous article has addressed the relationship between TTCI and COVID-19. Balasundharam (2021) studies the impact of previous external shocks in the T&T sector of countries in the Asia and Pacific region. They find that the Pacific Island Countries have remained insulated from external shocks like the 9/11 attacks, the severe acute respiratory system (SARS) epidemic, etc. For this reason, these countries could benefit from temporary diversion gains from tourism competitor countries on visitor inflows. Similarly, Lai and Wong (2020) compare the hotel industry's performance at the beginning and during the COVID-19 crisis. They find that the strategies applied in the initial stage of the outbreak included price reductions and epidemic

prevention practices. The lack of demand increases triggered the abandonment of price-based marketing tactics at later stages of the pandemic. However, epidemic prevention practices, including cutting labour and maintenance costs, remained in place.

Likewise, Knight *et al.* (2020) perform a vulnerability assessment of cruise lines, hotels, travel agencies and touristic attractions in the Wuhan and Hubei province. They find that most industry leaders in these sectors experienced economic losses due to the pandemic, with an immediate focus on cost control strategies and search for government subsidies. Respondents also informed about their plans for product adjustment and organizational business transformation strategies to be applied at later stages of the outbreak. Correspondingly, Jones and Comfort (2020) study the impact of the COVID-19 crisis on the sustainability of the hospitality industry sector. They identify a high risk of corporate sustainability programs being placed on hold due to the pandemic. Equally, Zhang *et al.* (2020) study hotel safety leadership's impact on labour safety behaviour during the COVID-19 crisis by applying a survey in four Chinese star-rated hotels in early February 2020. They find that safety leadership positively affects employee compliance, maintenance and improvement of hotel safety performance.

Some previous academic articles have partially addressed the relationship between government policies and the COVID-19 pandemic. Herren *et al.* (2020) study several dimensions influencing non-pharmaceutical interventions. These interventions were defined as the attempts to reduce social mobility to minimize the spread of the COVID-19. They find that GDP per capita, nation-individual pandemic trajectory and democracy index are significant variables in verifying peoples' acceptance of non-pharmaceutical interventions.

2.1 Travel and tourism competitiveness index

The TTCI is defined as a benchmarking metric that provides a unique insight into the strengths and weaknesses of each nation regarding its national T&T industry sector. As such, TTCI allows identifying emerging trends and risks related to the T&T industry, allowing governments to design their T&T policies and strategies better. Our exploratory study uses the TTCI and some of its constituent sub-indexes and pillars to determine the impact of national T&T policies' dimensions on selected variables measuring the effectiveness of controlling the first wave of COVID-19. No previous study exists analysing the impact of such national T&T policies on controlling the pandemic. The TTCI has been used in previous academic articles to compare the competitive factors identified by the T&T sector among different countries (Montanari and Giraldo, 2013; Javed and Tučková, 2019; Montero-Muradas and Oreja-Rodríguez, 2017; Kovalov *et al.*, 2017). The TTCI sub-indexes, pillars and indicators can also provide valuable information about different national policies to foster the T&T industry. For example, Ferreira and Castro (2020) make a TTCI factor analysis of 46 European countries and find that three TTCI factors explain 76.54% of the entire variation affecting tourism competitiveness.

Using a similar analysis, Kayar and Kozak (2010) apply a cluster analysis and multidimensional scaling techniques to study 13 TTCI factors of 28 European countries, including Turkey. They find that the most significant TTCI factors affecting their sample of countries' T&T competitiveness are air transport infrastructure, natural and cultural resources, ground transport infrastructure and health and hygiene. Similarly, Popescu *et al.* (2018) study 16 Central and Eastern Europe counties participating in the 16 + 1 platform initiated by China in 2011. By applying a multidimensional analysis of the tourism industry in their sample of countries, they find that tourism infrastructure is one of the main determinants of tourism competitiveness. In the same way, Nazmfar *et al.* (2019) study the tourism competitiveness index in a sample of Middle East countries by analysing the TTCI with a PROMETHEE model comparative analysis using data from 2015 to 2017. They find

that the United Arab Emirates (UAE), Turkey and Saudi Arabia have the most robust T&T competitive performance.

Like in the present article, the TTCI sub-indexes, pillars and indicators have been used as independent variables for analytical purposes in previous academic articles. Indeed, Terzić (2018) studies the impact of the TTCI on the GDP growth rate among certain European countries. Using correlation analysis, he finds that GDP growth relies on a superior T&T environment, higher tourism destination competitiveness, new business opportunities and government backing. Equally, Petrova *et al.* (2018) study some leading macroeconomic indicators of the T&T industry for all the countries included in the TTCI. They select macroeconomic factors, including the TTCI general and intermediary scores, GDP and unemployment figures, income and expenditures for national markets' T&T services and foreign commerce. They find a lack of significant relationship between a national policy supporting the local T&T industry and the efficiency of the domestic T&T market. Likewise, Webster and Ivanov (2014) study the relationship between TTCI and economic growth, applying a cross-sectional analysis to a sample of 132 countries. They find that TTCI has no statistically significant relationship with tourism's support for economic growth.

The TTCI has been criticized as a valid measure of T&T's competitiveness. Indeed, Salinas *et al.* (2020) propose a synthetic index based on the 2017 TTCI's variables but using a different methodology. They aim to fix the TTCI's aggregation of calculated factors using different scales, subjective weighting, and information duplicity. They find that the most significant factors in tourism competitiveness are air transport infrastructures, cultural resources and information and communication technology readiness.

Previous academic articles have scarcely addressed the causal relationship between the T&T industry and the COVID-19 crisis. Only König and Adalbert (2020) find that national GDP growth projections made by multilateral agencies like the International Monetary Fund, the World Bank and the Organization for Economic Co-operation and Development are driven by the effectiveness of the government response to the outbreak and by the countries' exposure to the coronavirus transmission notably via tourism. According to the authors' knowledge, no previous research exists about the explanatory power of the TTCI and some of its constituent factors over applied metrics of national success at managing the initial surge of the COVID-19 pandemic. This fact constitutes the principal evidence of our study's original contribution.

According to the authors' knowledge, no previous research exists about the explanatory power of the TTCI and some of its constituent factors over applied metrics of national success at managing the initial surge of the COVID-19 pandemic. This fact constitutes the principal evidence of our study's original contribution. Additionally, our results can provide valuable statistical evidence that the TTCI and some of its metrics reflect national policies for pandemic control, which can help policymakers in evaluating the required time to adopt national government restriction policies and international coordination for minimize the outbreak T&T-based spread. Our results can also support the design of government information and communication technology policies aimed at minimizing the infodemic risk documented in previous research works (Dempere, 2021b).

3. Methodology

Our sample includes 132 countries with available data for our dependent and independent variables. We excluded countries with less than 250 K people to avoid outliers in our dependent variables. We also excluded countries with domestic conflicts (Libya, Yemen and Syria) and countries with external political confrontations affecting their capacity to manage the COVID-19 pandemic (Iran and Venezuela). Our dependent variables include the government's daily average of social restrictions index (DV1), the response time for outbreak

control (DV2), the daily average of coronavirus infections (DV3) and deaths (DV4) per million, the COVID-19 speed of contagion/spread (DV5) and the time from the first case reported in China to the first case reported nationally (DV6). Similar to Erdem (2020) and Herren *et al.* (2020), we retrieved our dependent variables' data from the website Our World in Data, which was compiled by Hannah *et al.* (2020). The beginning outbreak date differs for every country; however, no country has data from a date before December 31, 2019. Correspondingly, the ending date for all countries in our sample is the same: July 10, 2020.

The government's daily average social restrictions index is a variable based on nine response scores, including school closings, workplace closures, travel forbids, etc. This index is quantified on a scale from 0 to 100, where 100 represents the strictest government social restrictions to contain the COVID-19. The daily average of this index for each country in our sample is determined from the first reported case's date until July 10, 2020. The government response time for outbreak control is defined as the number of days between the first reported COVID-19 infection's date and the date of the first maximum of the curve resulting from the five-day moving average of the daily new coronavirus infections.

Our methodology is similar to that of Bjørnskov (2016), who finds a negative association between the recovery time measured by the peak-to-trough ratio of real GDP per capita and the initial economic freedom. However, he studies crises of economic nature. The daily averages of coronavirus infections and deaths per million were calculated by dividing the total number of infections and deaths per million by July 10, 2020, over the number of days since the first COVID-19 infection date. The speed of contagion/spread of the coronavirus is defined as the approximation of the first derivative of the new cases per million curve. This approximation was determined by calculating the average daily change of new coronavirus infections per million from the first reported case until July 10, 2020. The outbreak arrival time is defined as the time from the first case reported in China to the first case reported nationally, which intends to measure how fast the coronavirus was brought to a particular country in our sample.

Our primary independent variables include the 2019 TTCI (IVAR1) and some of its constituent variables. The TTCI comprises 4 sub-indexes, 14 pillars and 90 independent metrics. The TTCI sub-indexes and pillars selected as relevant independent variables include the T&T policy and enabling conditions (IVAR2), infrastructure (IVAR3), health and hygiene (IVAR4), information and communication technology readiness (IVAR5), T&T prioritization (IVAR6), international openness (IVAR7), air transportation infrastructure (IVAR8) and ground and port infrastructure (IVAR9).

The enabling environment sub-index measures the overall national requirements for running a business and comprises five pillars. These pillars are a country's business environment, safety and security, health and hygiene, human resources and labour market, and information and communication technology readiness. Only the health and hygiene and information and communication technology readiness pillars are included in our analysis since the other pillars include metrics that have no explanatory power over our COVID-19 dependent variables (e.g. property rights, cost and time to start a business, total tax rate, time and cost of construction permits, hiring and firing practices, reliability of police services, homicide rates, business costs of crime, violence, terrorism, etc).

The T&T policy and enabling conditions sub-index considers the national policies and strategies directly influencing the T&T industry sector. This sub-index includes four pillars: the prioritization of travel and tourism, international openness, price competitiveness, and environmental sustainability. Only the first two pillars listed before are included in our analysis since the excluded pillars' estimations require metrics that have no explanatory power over our COVID-19 dependent variables (e.g. hotel price index, purchasing power parity, fuel price levels, stringency and enforcement of environmental regulations, number of environmental treaty ratifications, etcetera).

The infrastructure sub-index measures the quality and availability of each country's physical infrastructure and includes three pillars: air transportation infrastructure, ground and port infrastructure, and tourism service infrastructure. This last pillar was excluded because it includes dimensions with no explanatory power over our pandemic-related variables (e.g. hotel rooms, presence of major car rental companies, automated teller machines per adult population, etc). The natural and cultural resource sub-index measures the main motivations to travel and includes two pillars: natural resources and cultural resources and business travel. Our analysis excludes this last sub-index and its two constituent pillars because they include metrics with no explanatory power over our outbreak-related variables (e.g. number of World Heritage natural sites, total known species, the attractiveness of natural assets, number of oral and intangible cultural heritage expressions, etc).

The health and hygiene pillar includes but is not limited to measuring access to potable drinking water and sanitation, the accessibility of hospital beds and medical doctors, prevalence of human immunodeficiency virus, malaria, etc. The information and communication technology readiness pillar captures the nature of modern hard infrastructure (e.g. mobile network coverage and reliability of power supply) and the capacity of businesses and people to provide and receive benefits from online services. The prioritization of the T&T pillar measures the degree to which a country prioritizes the T&T sector by channelling project development funds and resources necessary to develop this industry. The pillar includes, but is not limited to, the effectiveness of national T&T marketing promotions and country brand, government spending, the comprehensiveness and timeliness of T&T national data supply to global organizations, etcetera.

The international openness pillar assesses the degree of a country's openness and T&T facilitation. It includes but is not limited to a government's openness to joint national air service arrangements, number of regional subscribed trade agreements, visa requirements, etc. The air transportation infrastructure pillar calculates the air transportation applying variables such as available seat kilometres, total departures, airport density and quantity of operational airlines. It also measures the air transportation's infrastructure quality for local and transnational flights. The ground and port infrastructure pillar considers road and railroad network readiness, determined by the densities of domestic roads and railroads.

Lastly, we chose some control variables that have shown a significant relationship with our dependent variables (Dempere, 2021a). These control variables comprise the population density (CV1) compiled by Hannah *et al.* (2020) and the percentage of urban population (CV2) gathered by the World Bank (2020). We also include the freedom of foreign movement (CV3) compiled by the V-Dem Institute (2020). This variable is defined as the degree of freedom of a country's people to travel freely to and from their country and emigrate without government restrictions. Similarly, we use the estimated 2019 body mass index trends (CV4) among adults, age-standardized (kg/m²) compiled by the World Health Organization (2020), as a measure of national obesity. We also use the 2019-forecasted average body mass data for men (CV5) and women (CV6) retrieved from the same source. Likewise, we use the population's median age (CV7) and proportion of 65 years old or older (CV8); the death rate from cardiovascular illness, cancer, diabetes or recurring lung diseases (CV9) and the GDP per capita (CV10) all recorded by Hannah *et al.* (2020).

We apply the same methodology as König and Winkler (2020). They find that cross-country heterogeneity based on the T&T exposure has a significant relationship with the economic impact of the COVID-19 crisis projected by international multilateral agencies. They find that countries with greater economic dependence on T&T exhibit significantly greater negative economic growth corrections than nations where T&T has a less meaningful economic role. Like König and Winkler (2020), we also use the international tourism receipts as a percentage of total exports (CV11). Additionally, we use the number of 2019 T&T

arrivals as a percentage of the total population (CV12). Data for these last two control variables were retrieved from the World Bank's (2021) website.

Generalised linear regression models have been used for analysis purposes in our study. We also apply weighted least squares models to analyse the relationship between our dependent and independent variables. Finally, we use logarithmic transformations to our dependent and independent variables when analysing our regression models.

4. Results

We grouped our sample based on the 2019 TTCI from highest to lowest and determined the first (lowest or Q1) and fourth (highest or Q4) quartiles. The results in Table 1 provide evidence that countries with the highest TTCI (Q4) have the lowest daily average of the social restrictions index (Q4:27.92 vs Q1:53.16), the shortest government response time for outbreak control (Q4:74.3 days vs Q1:99.9 days) and the highest daily average of coronavirus infections per million (Q1:4.56 vs Q4:22.3). Table 1 also shows that these countries have the highest daily average of fatalities per million (Q4:1.63 vs Q1:0.15), the highest speed of coronavirus contagion/spread (Q4:2.12 vs Q1:0.26) and the shortest outbreak arrival time (Q4:39.70 days vs Q1:77.36 days).

The results of Table 1 imply that on average and *ceteris paribus*, nations enjoying the highest TTCI did not impose rigorous social restrictions on their citizens to manage the initial surge of COVID-19. Such restrictions may have been considered initially incompatible with a reputable T&T destination. However, these countries could react faster to manage the initial coronavirus surge. Nevertheless, this faster response did not avoid suffering the highest daily average of coronavirus infections and fatalities per million. Equally, these highly ranked TTCI countries experienced the highest average coronavirus contagion/spread rate and the quickest arrival of the pandemic to their communities. Our results reinforce those of Wang (2021), who finds that nations with strict government policies determine the success of social distancing and the effectiveness of government efforts to mitigate the spread of COVID-19.

Similarly, we grouped our sample according to our dependent variables from highest to lowest and established the first (lowest or Q1) and fourth (highest or Q4) quartiles for each variable. Table 2 contains the independent sample tests' results comparing the first and fourth quartiles based on our dependent variables to analyse our independent variables. The significant results suggest that nations with the lowest daily average of social restrictions index and the shortest outbreak response and arrival times have (*ceteris paribus*) the highest TTCI values, better T&T policies and enabling conditions, superior infrastructure, health and hygiene, information and communication technology readiness, T&T prioritization, international openness, air transport infrastructure, and ground and port infrastructure. Table 2 provides similar results for nations with the lowest government response time, except that the TTCI, T&T prioritization and the air transportation infrastructure are not statistically significant.

2019 TTCI (IVAR1)	DV1	DV2	DV3	DV4	DV5	DV6
Q1	53.16	99.88	4.56	0.15	0.26	77.36
Q4	27.92	74.3	22.30	1.63	2.12	39.70
<i>t</i> -sta	4.99	2.74	-5.18	-4.5	-3.83	9.55
<i>p</i> -val	[0.00]****	[0.008]***	[0.00]****	[0.00]****	[0.00]****	[0.00]****

Note(s): ****, ***, **, and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly

Table 1.
Results of independent
samples tests.
Dependent variables
contrast of countries
grouped by their
2019 TTCI

Table 2.
Results of independent
samples tests.
Independent variables
contrast of nations
grouped by our
dependent variables

	IVAR1	IVAR2	IVAR3	IVAR4	IVAR5	IVAR6	IVAR7	IVAR8	IVAR9
<i>Daily average of social restrictions index (DV1)</i>									
Q1	4.19	4.57	4.13	5.65	5.18	4.98	3.67	3.65	4.01
Q4	3.72	4.29	3.23	4.92	4.31	4.48	3.12	2.87	3.12
t-sta	3.04	2.90	3.68	2.92	3.28	2.48	2.67	2.86	3.63
p-val	[0.003]	[0.005]	[0.00]	[0.005]	[0.002]	[0.016]	[0.01]	[0.006]	[0.001]
<i>Government response time (DV2)</i>									
Q1	4.12	4.59	4.12	5.69	5.26	4.98	3.69	3.48	4.00
Q4	3.87	4.37	3.43	4.93	4.48	4.59	3.20	3.08	3.32
t-sta	1.72	2.51	2.96	2.86	3.09	1.99	2.48	1.54	2.94
p-val	[0.09]	[0.015]	[0.004]	[0.006]	[0.003]	[0.05]	[0.016]	[0.13]	[0.005]
<i>Daily average cases per million (DV3)</i>									
Q1	3.41	4.18	2.90	3.86	3.71	4.32	2.83	2.44	2.88
Q4	4.25	4.48	4.27	5.66	5.31	4.80	3.52	3.84	4.03
t-sta	-5.41	-3.33	-5.61	-6.97	-6.32	-2.62	-3.35	-5.33	-4.48
p-val	[0.00]	[0.001]	[0.00]	[0.00]	[0.00]	[0.01]	[0.001]	[0.00]	[0.00]
<i>Daily average deaths per million (DV4)</i>									
Q1	3.49	4.22	3.07	3.96	3.91	4.45	2.97	2.60	3.03
Q4	4.42	4.57	4.31	5.81	5.27	4.76	3.84	3.91	4.03
t-sta	-5.45	-3.96	-4.54	-7.10	-5.17	-1.52	-4.36	-4.24	-3.47
p-val	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.135]	[0.00]	[0.00]	[0.001]
<i>Speed of contagion/Spread of the coronavirus (DV5)</i>									
Q1	3.41	4.17	2.84	3.85	3.56	4.26	2.88	2.54	2.95
Q4	4.30	4.53	4.36	5.82	5.34	4.81	3.67	3.93	4.25
t-sta	-4.89	-3.57	-5.82	-7.28	-6.88	-2.45	-3.66	-5.00	-4.66
p-val	[0.00]	[0.001]	[0.00]	[0.00]	[0.00]	[0.017]	[0.001]	[0.00]	[0.00]
<i>Time from the first case reported in China to the first case reported nationally (DV6)</i>									
Q1	4.43	4.51	4.44	5.59	5.32	4.98	3.54	4.21	4.25
Q4	3.15	4.09	2.52	3.66	3.36	4.05	2.80	2.02	2.58
t-sta	9.63	4.83	9.33	7.51	8.24	5.21	3.86	10.32	7.56
p-val	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

Note(s): , , and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly

Table 2 also has significant outcomes for nations with the highest daily average of coronavirus infections per million and the highest speed of contagion who have (*ceteris paribus*) the lowest TTCI, worse T&T policies and empowering conditions, inadequate infrastructure, health and hygiene, information and communication technology readiness, T&T prioritization, international openness, air transport infrastructure and ground and port infrastructure. Correspondingly, Table 2 shows similar significant results for countries with the highest fatalities per million, except that the T&T prioritization is not statistically significant.

Tables 3–5 show the results of the cross-sectional analysis using our generalized linear models. The significant results provide evidence that the TTCI and all its sub-indexes and pillars considered in this article have a negative and significant relationship with the daily average of the social restrictions index, the government response time for outbreak control and the outbreak arrival time. These results support those in Table 2 since the negative coefficients in Tables 3–5 match the relationships reported in Table 2. These results also indicate that those nations with high TTCI values and selected sub-indexes and pillars enforced the softest social restrictions to manage the initial surge of COVID-19 and experienced the shortest outbreak response and arrival times.

Similarly, Tables 3–5 show that the TTCI and its selected sub-indexes and pillars have a positive and significant association with the coronavirus's speed of contagion/spread, except for the air transportation infrastructure sub-pillar, which has a marginally significant relationship with this variable. The same positive and significant relationship is verified between the daily average of coronavirus infections and fatalities per million and some of the TTCI sub-indexes and pillars considered in this study. Specifically, the daily average of coronavirus infections per million has a positive and significant relationship with the country's health and hygiene, information and communication technology readiness, and the T&T prioritization sub-pillars. Likewise, the daily average of fatalities per million has a statistically significant and positive relationship with the corresponding country's TTCI, its T&T policy and enabling conditions, infrastructure, health and hygiene, T&T prioritization, international openness and air transportation infrastructure. Our results are consistent with those of Nunkoo *et al.* (2021), who find a positive and significant relationship between domestic T&T and the number of COVID-19 cases and deaths for the first six months of 2020.

Similarly, our results regarding a positive and significant relationship between a country's information and communication technology readiness and its daily average of coronavirus infections and deaths per million are consistent with the difficulties posed by fake news during the early pandemic stages. Pandemic fake news and social media deception have challenged countries with superior information and communication technology readiness. Indeed, the World Health Organization (WHO, 2021a) united the UK government in the consciousness campaign named "*Stop The Spread*," which intended to increase awareness about the threats of COVID-19 misinformation.

Tables 3–5 also show that the only control variable with consistent statistically significant results is the percentage of the urban population. This independent variable has a positive and significant association with the daily average of coronavirus infections and fatalities per million. Our results are consistent with Allcott *et al.* (2020), who study partisan differences in the US response to COVID-19 and find significant partisan gaps in pandemic-related beliefs and behaviours. They find that Democrats tend to live in populous urban areas severely impacted by the pandemic and exposed to mobility restrictions and higher motivations for social distance, while Republicans engage in less social distancing. Our results also agree with the study of Ando *et al.* (2021). They study a stochastic model for COVID-19 with variables measuring viral transmission probability, detection probability and individual mobility within a population. They find that lockdown policies should be adjusted according to differences between high versus low-density populated areas.

Table 3.
Cross-sectional
analysis

Daily average restrictions index (LOG[DV1])												
C	659	1096	406	485	532	680	540	443	489			
t-sta	6.48	4.97	4.15	4.68	5.51	4.69	5.14	4.57	5.23			
p-val	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	IVAR9		
	IVAR1	IVAR2	IVAR3	IVAR4	IVAR5	IVAR6	IVAR7	IVAR8	IVAR9			
LOG(IVAR)	-2.49	-4.69	-2.40	-1.01	-2.26	-1.69	-1.22	-1.30	-2.05			
t-sta	-3.72	-3.92	-6.11	-2.24	-4.15	-2.23	-2.55	-3.64	-5.21			
p-val	(0.00)	(0.00)	(0.00)	(0.03)	(0.00)	(0.03)	(0.01)	(0.00)	(0.00)			
LOG(CV1)	-0.01	-0.02	0.06	-0.04	-0.01	-0.06	-0.02	-0.01	0.10			
t-sta	-0.16	-0.33	1.07	-0.63	-0.25	-1.00	-0.37	-0.26	1.51			
p-val	(0.87)	(0.74)	(0.29)	(0.53)	(0.81)	(0.32)	(0.71)	(0.79)	(0.13)			
LOG(CV2)	0.40	0.33	0.83	0.31	0.65	0.10	0.11	0.42	0.48			
t-sta	1.67	1.47	3.18	1.21	2.29	0.46	0.57	1.65	2.07			
p-val	(0.10)	(0.14)	(0.002)	(0.23)	(0.02)	(0.65)	(0.57)	(0.10)	(0.04)			
LOG(CV3)	-0.05	-0.14	-0.19	-0.15	0.00	-0.12	0.02	-0.20	-0.07			
t-sta	-0.18	-0.48	-0.80	-0.57	0.00	-0.45	0.06	-0.79	-0.26			
p-val	(0.86)	(0.63)	(0.43)	(0.57)	(1.00)	(0.65)	(0.95)	(0.43)	(0.80)			
LOG(CV11)	-0.03	0.12	0.10	-0.06	-0.01	0.01	-0.04	-0.04	-0.05			
t-sta	-0.57	1.32	1.14	-1.29	-0.30	0.14	-0.83	-0.79	-1.07			
p-val	(0.57)	(0.19)	(0.26)	(0.20)	(0.77)	(0.89)	(0.41)	(0.43)	(0.29)			
Government response time (LOG[DV2])												
C	605	959	508	535	556	1084	565	446	464			
t-sta	6.69	4.93	6.41	6.11	0.78	6.12	6.28	4.87	4.95			
p-val	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	IVAR9		
	IVAR1	IVAR2	IVAR3	IVAR4	IVAR5	IVAR6	IVAR7	IVAR8	IVAR9			
LOG(IVAR)	-1.23	-2.99	-1.33	-0.93	-1.69	-4.67	-0.83	-0.77	-1.40			
t-sta	-2.02	-2.68	-3.45	-2.30	0.37	-3.68	-2.01	-2.42	-4.07			
p-val	(0.04)	(0.008)	(0.00)	(0.02)	(0.00)	(0.00)	(0.05)	(0.02)	(0.00)			
LOG(CV1)	-0.03	-0.02	0.01	-0.03	-0.01	0.43	-0.02	-0.01	0.07			
t-sta	-0.54	-0.57	0.24	-0.57	0.04	2.42	-0.48	-0.38	1.53			
										(continued)		

Government response time (LOGDV2)										
<i>p</i> -val	(0.59)	(0.57)	(0.81)	(0.57)	(0.88)	(0.02)**	(0.64)	(0.71)	(0.13)	
<i>LOG</i> (CV2)	0.19	0.11	0.39	0.28	0.50	0.14	0.07	0.40	0.51	
<i>t</i> -sta	0.98	0.71	1.84	1.39	0.21	0.55	0.45	1.64	2.23**	
<i>p</i> -val	(0.33)	(0.48)	(0.07)*	(0.17)	(0.90)	(0.59)	(0.65)	(0.10)	(0.03)**	
<i>LOG</i> (CV3)	-0.10	-0.02	-0.08	-0.13	-0.02	0.02	-0.03	-0.36	-0.27	
<i>t</i> -sta	-0.41	-0.08	-0.34	-0.54	0.24	0.07	-0.10	-1.62	-1.21	
<i>p</i> -val	(0.69)	(0.94)	(0.74)	(0.59)	(0.93)	(0.94)	(0.92)	(0.11)	(0.23)	
<i>LOG</i> (CV11)	-0.02	0.00	-0.01	-0.02	0.00	-0.03	-0.02	-0.01	-0.01	
<i>t</i> -sta	-0.55	-0.01	-0.15	-0.63	0.04	-1.49	-0.56	-0.07	-0.10	
<i>p</i> -val	(0.58)	(0.99)	(0.88)	(0.53)	(0.98)	(0.14)	(0.58)	(0.94)	(0.92)	
Note(s): ****, ***, **, and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly. The table contains <i>t</i> -statistic and their corresponding <i>p</i> -values below in brackets. The independent variables were included separately in the same regression model to avoid problems of multicollinearity. We applied the Breusch-Pagan-Godfrey and the White heteroskedasticity tests. We analysed the same models using the number of 2019 T&T arrivals as a percentage of the total population (CV12) and get similar results in terms of significance and signs. Similarly, we also applied weighted least squares models with the same significant results and signs, but these additional results were omitted due to our article's length restrictions for publication purposes										

Table 3.

Daily average infections per million (LOGDV3)									
C	-6.46	-7.95	-4.33	-5.21	-4.81	5.10	-5.20	-4.74	-4.90
<i>t</i> -sta	-3.83	-2.18	-3.31	-4.00	-3.64	2.64	-3.68	-3.76	-3.82
<i>p</i> -val	(0.00)	(0.02)	(0.001)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
	<i>IVAR1</i>	<i>IVAR2</i>	<i>IVAR3</i>	<i>IVAR4</i>	<i>IVAR5</i>	<i>IVAR6</i>	<i>IVAR7</i>	<i>IVAR8</i>	<i>IVAR9</i>
<i>LOG(IVAR)</i>	1.93	1.99	0.98	1.20	1.70	-5.85	0.58	0.66	0.68
<i>t</i> -sta	1.27	0.78	1.28	2.03	1.97	-4.68	0.69	1.05	0.91
<i>p</i> -val	(0.21)	(0.44)	(0.21)	(0.05)	(0.05)	(0.00)	(0.49)	(0.30)	(0.36)
<i>LOG(CV1)</i>	0.06	0.09	-0.01	0.04	-0.02	0.43	0.05	0.05	0.02
<i>t</i> -sta	0.59	0.95	-0.12	0.39	-0.16	2.48	0.55	0.50	0.18
<i>p</i> -val	(0.55)	(0.35)	(0.90)	(0.70)	(0.87)	(0.02)	(0.59)	(0.62)	(0.86)
<i>LOG(CV2)</i>	1.33	1.58	1.29	1.28	1.07	1.58	1.61	1.45	1.50
<i>t</i> -sta	2.76	4.07	3.24	3.34	2.65	4.74	5.07	4.04	4.34
<i>p</i> -val	(0.007)	(0.00)	(0.007)	(0.001)	(0.009)	(0.00)	(0.00)	(0.00)	(0.00)
<i>LOG(CV3)</i>	-0.10	-0.08	-0.13	-0.09	-0.21	-0.03	-0.14	-0.04	-0.08
<i>t</i> -sta	-0.33	-0.26	-0.53	-0.38	-0.84	-0.14	-0.52	-0.14	-0.32
<i>p</i> -val	(0.74)	(0.79)	(0.60)	(0.70)	(0.40)	(0.89)	(0.61)	(0.89)	(0.75)
<i>LOG(CV11)</i>	-0.07	-0.06	-0.02	-0.02	-0.03	0.01	-0.02	-0.02	-0.01
<i>t</i> -sta	-0.63	-0.49	-0.35	-0.45	-0.57	0.31	-0.33	-0.35	-0.16
<i>p</i> -val	(0.53)	(0.62)	(0.73)	(0.66)	(0.57)	(0.76)	(0.74)	(0.73)	(0.87)
Daily average deaths per million (LOGDV4)									
C	-1.71	-3.12	-0.97	-1.01	-1.11	0.86	-1.59	-1.13	-0.98
<i>t</i> -sta	-2.98	-3.22	-1.79	-2.07	-1.98	0.76	-2.67	-2.07	-1.99
<i>p</i> -val	(0.00)	(0.00)	(0.08)	(0.04)	(0.05)	0.45	(0.009)	(0.04)	(0.05)
	<i>IVAR1</i>	<i>IVAR2</i>	<i>IVAR3</i>	<i>IVAR4</i>	<i>IVAR5</i>	<i>IVAR6</i>	<i>IVAR7</i>	<i>IVAR8</i>	<i>IVAR9</i>
<i>LOG(IVAR)</i>	0.97	1.33	0.58	0.23	0.27	-0.97	0.61	0.48	0.34
<i>t</i> -sta	3.53	2.48	3.03	1.98	1.25	-2.59	3.69	2.71	1.71
<i>p</i> -val	(0.00)	(0.02)	(0.003)	(0.05)	(0.21)	(0.01)	(0.00)	(0.008)	(0.09)
<i>LOG(CV1)</i>	0.01	0.03	0.00	0.02	0.02	0.22	0.02	0.02	0.00
<i>t</i> -sta	0.20	0.92	-0.05	0.72	0.67	2.95	0.85	0.68	0.05
(continued)									

Daily average deaths per million (LOGDV4)										
<i>p</i> -val	(0.84)	(0.36)	(0.96)	(0.47)	(0.51)	(0.004) ^{***}	(0.40)	(0.50)	(0.96)	
<i>LOG</i> (CV2)	0.21	0.37	0.22	0.31	0.32	0.31	0.37	0.27	0.30	
<i>t</i> -sta	2.11 ^{**}	3.10 ^{***}	1.86	2.76 ^{***}	2.12 ^{**}	1.94 ^{**}	3.47 ^{****}	2.34 ^{**}	2.92 ^{***}	
<i>p</i> -val	(0.04)	(0.002)	(0.07) [*]	(0.007)	(0.04) ^{**}	(0.05) ^{**}	(0.00)	(0.02)	(0.004)	
<i>LOG</i> (CV3)	0.08	0.08	0.10	0.13	0.14	-0.41	0.04	0.16	0.12	
<i>t</i> -sta	1.51	1.31	1.69	2.21	1.93	-1.69	0.66	2.52	2.20	
<i>p</i> -val	(0.13)	(0.19)	(0.09) [*]	(0.03) ^{**}	(0.06) [*]	(0.10)	(0.51)	(0.01) ^{**}	(0.03) ^{**}	
<i>LOG</i> (CV11)	-0.02	-0.06	-0.04	-0.01	-0.02	0.02	-0.06	-0.04	-0.01	
<i>t</i> -sta	-0.84	-1.64	-1.27	-0.35	-0.50	1.53	-1.66	-1.21	-0.27	
<i>p</i> -val	(0.40)	(0.10)	(0.21)	(0.73)	(0.62)	(0.13)	(0.10)	(0.23)	(0.79)	

Note(s): ****, ***, ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly. The table contains *t*-statistic and their corresponding *p*-values below in brackets. The independent variables were included separately in the same regression model to avoid problems of multicollinearity. We applied the Breusch-Pagan-Godfrey and the White heteroskedasticity tests. We analysed the same models using the number of 2019 T&T arrivals as a percentage of the total population (CV12) and get similar results in terms of significance and signs. Similarly, we also applied weighted least squares models with the same significant results and signs, but these additional results were omitted due to our article's length restrictions for publication purposes

Table 5.
Cross-sectional
analysis

Speed of contagion/spread of the coronavirus (LOG(DV5))									
C	-1.50	-5.14	-0.96	-1.18	-1.17	0.65	-1.51	-0.58	-1.17
<i>t</i> -sta	-2.26	-2.99	-1.54	-2.34	-2.19	0.90	-2.34	-1.11	-2.03
<i>p</i> -val	(0.03)	(0.003)	(0.13)	(0.02)	(0.03)	0.37	(0.02)	0.27	(0.05)
	<i>IVAR1</i>	<i>IVAR2</i>	<i>IVAR3</i>	<i>IVAR4</i>	<i>IVAR5</i>	<i>IVAR6</i>	<i>IVAR7</i>	<i>IVAR8</i>	<i>IVAR9</i>
<i>LOG(IVAR)</i>	0.95	2.72	0.89	0.61	1.15	-0.77	0.71	0.38	0.99
<i>t</i> -sta	2.12	2.38	2.53	2.24	3.60	-2.13	2.14	1.67	3.46
<i>p</i> -val	(0.04)	(0.02)	(0.01)	(0.03)	(0.00)	(0.04)	(0.03)	(0.098)	(0.00)
<i>LOG(CV1)</i>	0.01	-0.02	-0.05	-0.01	-0.04	0.12	-0.02	0.01	-0.07
<i>t</i> -sta	0.16	-0.35	-0.99	-0.26	-0.88	2.53	-0.46	0.23	-1.46
<i>p</i> -val	(0.87)	(0.73)	(0.32)	(0.80)	(0.38)	(0.01)	(0.65)	(0.82)	(0.15)
<i>LOG(CV2)</i>	0.21	0.34	0.16	0.25	0.07	0.35	0.37	0.23	0.21
<i>t</i> -sta	1.55	2.33	0.87	1.54	0.47	3.08	3.09	1.76	1.57
<i>p</i> -val	(0.13)	(0.02)	(0.38)	(0.13)	(0.64)	(0.002)	(0.002)	(0.08)	(0.12)
<i>LOG(CV3)</i>	0.07	0.08	0.15	0.15	0.07	-0.06	0.06	0.10	0.12
<i>t</i> -sta	0.79	0.72	1.26	1.48	0.70	-0.57	0.66	1.15	1.23
<i>p</i> -val	(0.43)	(0.47)	(0.21)	(0.14)	(0.49)	(0.57)	(0.51)	(0.25)	(0.22)
<i>LOG(CV11)</i>	-0.01	-0.08	-0.02	-0.02	-0.03	-0.01	-0.02	-0.01	-0.01
<i>t</i> -sta	-1.15	-1.50	-0.60	-0.79	-1.31	-1.22	-1.16	-1.16	-0.69
<i>p</i> -val	(0.25)	(0.14)	(0.55)	(0.43)	(0.19)	(0.23)	(0.25)	(0.25)	(0.49)
Time from the first case reported in China to the first case reported nationally (LOG(DV6))									
C	7.19	7.54	5.42	5.19	5.86	5.71	5.44	5.12	5.58
<i>t</i> -sta	13.18	7.98	9.27	10.33	10.81	6.39	7.60	7.89	7.51
<i>p</i> -val	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	<i>IVAR1</i>	<i>IVAR2</i>	<i>IVAR3</i>	<i>IVAR4</i>	<i>IVAR5</i>	<i>IVAR6</i>	<i>IVAR7</i>	<i>IVAR8</i>	<i>IVAR9</i>
<i>LOG(IVAR)</i>	-2.15	-1.58	-1.56	-0.73	-1.21	-0.83	-0.83	-0.68	-0.66
<i>t</i> -sta	-6.07	-3.07	-5.94	-4.03	-3.84	-2.11	-3.11	-2.21	-2.15
<i>p</i> -val	(0.00)	(0.003)	(0.00)	(0.00)	(0.00)	(0.04)	(0.002)	(0.03)	(0.03)
<i>LOG(CV1)</i>	-0.05	-0.12	-0.02	-0.36	-0.45	0.12	-0.12	-0.31	-0.47
<i>t</i> -sta	-0.70	-1.63	-0.19	-1.62	-1.64	0.46	-0.45	-0.88	-1.71
(continued)									

(continued)

Time from the first case reported in China to the first case reported nationally (LOG(DV6))										
<i>p</i> -val	(0.48)	(0.11)	(0.85)	(0.11)	(0.10)	(0.65)	(0.38)	(0.09)		
<i>LOG</i> (CV2)	0.12	-0.14	0.32	0.04	0.25	-0.03	0.09	0.03		
<i>t</i> -sta	1.03	-1.16	1.77	0.24	1.57	-0.23	0.43	0.22		
<i>p</i> -val	(0.30)	(0.25)	(0.08)	(0.81)	(0.12)	(0.82)	(0.67)	(0.83)		
<i>LOG</i> (CV3)	0.15	0.15	0.03	0.49	-0.01	-0.03	-0.06	-0.02		
<i>t</i> -sta	1.36	1.25	0.21	2.72	-0.12	-0.25	-0.47	-0.20		
<i>p</i> -val	(0.18)	(0.21)	(0.84)	(0.008)	(0.91)	(0.80)	(0.64)	(0.84)		
<i>LOG</i> (CV11)	0.01	0.00	-0.01	-0.01	-0.02	-0.02	-0.03	-0.03		
<i>t</i> -sta	0.86	-0.15	-1.46	-0.54	-1.03	-1.06	-1.44	-1.56		
<i>p</i> -val	(0.39)	(0.88)	(0.15)	(0.59)	(0.30)	(0.29)	(0.15)	(0.12)		
Note(s): ****, ***, ** and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly. The table contains t-statistic and their corresponding <i>p</i> -values below in brackets. The independent variables were included separately in the same regression model to avoid problems of multicollinearity. We applied the Breusch-Pagan-Godfrey and the White heteroskedasticity tests. We analysed the same models using the number of 2019 T&T arrivals as a percentage of the total population (CV12) and get similar results in terms of significance and signs. Similarly, we also applied weighted least squares models with the same significant results and signs, but these additional results were omitted due to our article's length restrictions for publication purposes										

According to previous academic works, these control variables significantly correlate with the average of daily coronavirus fatalities per million (Miller and Englund, 2020; Caci *et al.*, 2020; Tahmasebi *et al.*, 2020; Rali and Sauer, 2020; Urashima *et al.*, 2020). Additionally, the urban population proportion directly influences a nation's challenges in imposing social distance-related restrictions, which also affects the speed of contagion/spread of the coronavirus and the average coronavirus infections per million (Ashraf, 2020). Our results are coherent with those of Dempere (2021a) and Valev (2020), who conclude that wealthy nations were the most severely impacted by COVID-19 due to their substantial proportion of ageing population and their population's comorbidity with serious chronic illnesses and obesity.

We analysed a sample of 132 countries with available data for the first half of 2020 to study the explanatory power of the TTCI and some of its constituent factors over national success metrics in managing the initial surge of the COVID-19 pandemic. Our results provide evidence that the daily average of coronavirus infections per million has a positive and significant relationship with the country's infrastructure, health and hygiene, and information and communication technology readiness. Likewise, the daily average of coronavirus deaths per million has a significant and positive association with the country's TCI, its T&T policy and enabling conditions, infrastructure, health and hygiene, information and communication technology readiness, international openness and air transportation infrastructure. We also find that these countries have the shortest government

Table 6. Results of independent samples tests. Control variables contrast of nations grouped by their health and hygiene (H&H) Pillar

	CV2	CV4	CV5	CV6	CV7	CV8	CV9	CV10
Q1	72.45	27.36	26.12	27.23	45.36	15.32	312.34	35,532.84
Q4	44.48	25.34	23.68	22.78	25.45	5.23	192.63	4,345.63
t-sta	-7.32	-4.92	-3.42	-8.32	-12.45	-11.56	5.34	-8.93
p-val	[0.00]****	[0.00]****	[0.001]***	[0.00]****	[0.00]****	[0.00]****	[0.00]****	[0.00]****

Note(s): ****, ***, **, and * indicate statistical significance at the 0.1, 1, 5 and 10% level of confidence, correspondingly

response time for outbreak control, the lowest daily average of the social restrictions index and the shortest time from the first case reported in China to the first case reported nationally.

These results suggest that these countries enforced the softest social constraints to control the outbreak and experienced the shortest outbreak response and arrival times. The combination of quick coronavirus arrival time and soft social restrictions may have explained their high spread rates and daily averages of infections and deaths. Mobility restrictions are effective government policies at the early stages of the pandemic only if these policies are focalized on specific locations acting as primary contagion sources. In addition, these policies must be accompanied by strict social distance restrictions, hygiene controls, polymerase chain reaction (PCR) test requirements, etc. Kraemer *et al.* (2020) find that focalized travel restrictions are valuable policies only at the early pandemic stages, but they become less effective once the contagion has become widespread.

Similarly, our results suggest that the information and communication technology readiness-related capabilities may constitute a double-edged sword during pandemic times. While countries with superior information and communication technology readiness can provide proper tech-based communicational resources to support their national T&T industry, these resources can also increase the national averages of coronavirus infections and deaths. Our results can help government policymakers to sharpen health communication strategies. Governments must prepare existing information and communication technology capabilities to communicate rapidly, regularly and transparently with their population to enhance the effectiveness of any public health communication policy.

The WHO (2019) has emphasized national risk communication and community engagement as a critical government health policy dimension in all countries. Notably, the WHO has also warned about the risk of infodemic defined as the COVID-19 information overload (some accurate and some fake), making it difficult for people to identify truthful sources of information and dependable guidance when needed. The WHO (2021b) has warned that the spread of COVID-19 misinformation amplified on social media and similar digital platforms constitutes a much more significant threat to global public health than the coronavirus itself. They find that 43.9% of respondents read scientific content on their social media, and 59.1% of Gen Z and Millennials were very aware of fake news regarding COVID-19. Our results reinforce the notion suggested in previous articles about the convenience for T&T industry's participants to take advantage of Gen Z's technology savviness when recruiting staff (Self *et al.*, 2019).

Our results can help support the adoption of new national T&T policies and the change of some existing ones. In a post-COVID-19 world, national policies to foster and support the T&T industry sector must also include the risks of this industry when facing a pandemic crisis. Our results show that nations with the maximum T&T competitive index values also experienced the highest daily averages of coronavirus infections and fatalities per million. Equally, the uppermost speed rate of COVID-19 spreads constitutes clear evidence of a generalized lack of adequate government health policies to control an outbreak in these countries. Similarly, we provide evidence that these nations also have the lowest daily average of social restrictions index values, suggesting that imposing social restrictions constitutes a challenge for top T&T destinations. This result also reinforces the notion that these countries face challenges to restrict some freedom rights during crises. Finally, these countries also experienced the shortest time from the first case reported in China to the first case reported nationally, highlighting the paramount importance of time as the critical success factor in controlling the outbreak among top T&T destinations.

Our results are consistent with those of Bickley *et al.* (2021). They find that more globalized nations experienced a delay in imposing travel restrictions during the COVID-19 crisis compared to less globalized countries. The chronological dimension of our results also

suggests a lack of international coordination when implementing policies to control the outbreak. Indeed, Seyfi *et al.* (2020) find that many national border controls implemented during the COVID-19 crisis responded to political considerations (e.g. reciprocal restrictions faced by nationals when travelling abroad) than to health advice or scientific data. This result is also consistent with Bickley *et al.* (2021), who find that nations were prone to adopt reciprocal travel restriction policies during the pandemic only if their nearest neighbour did the same.

Our results suggest that national policies for outbreak control should consider a country's outbreak exposure proxied by the TTCI, which seems to have predictive power in measuring the government's effectiveness at pandemic control. In particular, the TTCI and some of its constituent factors may help assess the available time to implement effective government restriction policies and forecast the time framework for pandemic emergence and spread across borders. Our results may also be valuable for policymakers to update their national crisis management strategies and practices.

Our results also show that many T&T destinations are clustered in regions where physical mobility (e.g. European Union) supports both the T&T industry and the COVID-19 spread. Chica *et al.* (2021) highlight that a critical success factor in controlling the outbreak is national government policy coordination among countries in the same region for an optimal outcome of such policies. Similarly, Škare *et al.* (2021) conclude that the T&T industry's recovery worldwide will need cooperation rather than competition among countries to decrease the costs of such recovery. Unfortunately, this has not been the case yet (Seyfi *et al.*, 2020; Bickley *et al.*, 2021).

Our results also support the inclusion of the TTCI and some of its constituent pillars into proposed models to support government policies regarding social mobility restrictions. For example, Chang *et al.* (2021) find that limiting maximum occupancy and mobility in a small minority of physical locations identified as points of interest can maximize the effectiveness of government efforts to control an outbreak rather than uniformly reducing mobility. Our results suggest that the TTCI and its constituent factors may be priceless to identifying T&T destinations as points of interest where national governments can impose selective mobility restrictions rather than national lockdowns or total border closures.

The significant influence of COVID-19 in the T&T sector remains a critical factor among T&T private stakeholders. For example, the United Nations World Tourism Organization (2022) informs a 130% increase in global international tourist arrivals in January 2022 compared to 2021 but also warns that this T&T recovery has been affected by the new waves of Omicron virus and their associated travel restrictions in several destinations. T&T companies looking to expand their business operations into new markets must incorporate new COVID-related variables in their decision-making processes. Such variables can include the TTCI sub-indexes, pillars and indicators significantly influencing the pandemic control analysed in our study. For example, the World Travel and Tourism Council (2021b) acknowledges that T&T health and hygiene requirements have changed permanently due to COVID-19 in the same way that global T&T security standards changed because of the US 9/11 attacks.

Likewise, our results suggest that national approaches to implementing information and communication technologies will constitute a critical factor in many T&T private stakeholders' business decisions. Indeed, the World Travel and Tourism Council (2021b) informs of a permanent change in the T&T global landscape by introducing technological innovations ranging from digital COVID certificates to hotel contactless check-ins.

The constraints of our research work comprise a lack of scientific agreement about which variables are the most appropriate to analyse the effectiveness of managing the initial surge of the COVID-19 pandemic. Another limitation is the sensitivity of our dependent variables to the selected cut-off date, namely July 10, 2020. Finally, Morris and Reuben (2020) also mention

some limitations when comparing the coronavirus crisis among countries. They inform about a lack of consistency when recording COVID-19 deaths, disparities in testing efforts, differences in health care services, etc. Another limitation of our study is the TTCI's weakness identified by Salinas *et al.* (2020). These weaknesses include the TTCI's aggregation of calculated factors using different scales, subjective weighting and information duplicity.

An appealing extension of our study includes an analysis of the COVID-19 impact on the TTCI ranking of each country in our sample after the publication of the 2021 TTCI. The magnitude of the change in the TTCI value and ranking of 2019 versus 2021 TTCI would constitute the primary dependent variables of such study, while the dependent variables considered in this study may be used as explanatory variables.

References

- Allcott, H., Boxell, L., Conway, J., Gentzkow, M., Thaler, M. and Yang, D. (2020), "Polarization and public health: partisan differences in social distancing during the coronavirus pandemic", *Journal of Public Economics*, Vol. 191 No. 1, pp. 1-11, doi: 10.1016/j.jpubeco.2020.104254.
- Ando, S., Matsuzawa, Y., Tsurui, H., Mizutani, T., Hall, D. and Kuroda, Y. (2021), "Stochastic modelling of the effects of human-mobility restriction and viral infection characteristics on the spread of COVID-19", *Scientific Reports*, Vol. 11 No. 1, doi: 10.1038/s41598-021-86027-2.
- Ashraf, B. (2020), "Devastation caused by COVID-19: is democracy to blame?", *SSRN Electronic Journal*, pp. 1-22.
- Balasundharam, V. (2021), "Diversion of tourism flows in the Asia and Pacific region: lessons for COVID-19 recovery", IMF Working Papers, Vol. 2021 No. 224, p. A001, Oct 9, 2021, available at: <https://www.elibrary.imf.org/view/journals/001/2021/224/article-A001-en.xml>.
- Bickley, S., Chan, H., Skali, A., Stadelmann, D. and Torgler, B. (2021), "How does globalization affect COVID-19 responses?", *Globalization and Health*, Vol. 17 No. 1, pp. 1-19, doi: 10.1186/s12992-021-00677-5.
- Bjørnskov, C. (2016), "Economic freedom and economic crises", *European Journal of Political Economy*, Vol. 45 No. 1, pp. 11-23, doi: 10.1016/j.ejpoleco.2016.08.003.
- Caci, G., Albini, A., Malerba, M., Noonan, D.M., Pochetti, P. and Polosa, R. (2020), "COVID-19 and obesity: dangerous liaisons", *Journal of Clinical Medicine*, Vol. 9 No. 8, available at: www.mdpi.com/2077-0383/9/8/2511/pdf.
- Calderwood, L. and Soshkin, M. (2019), "The travel and tourism competitiveness report 2019. Travel and tourism at a tipping point", *World Economic Forum (WEF)*, available at: <https://www.weforum.org/reports/the-travel-tourism-competitiveness-report-2019> (accessed 22 January 2021).
- Chang, S., Pierson, E., Koh, P., Gerardine, J., Redbird, B., Grusky, D. and Leskovec, J. (2021), "Mobility network models of COVID-19 explain inequities and inform reopening", *Nature*, Vol. 589 No. 1, pp. 82-87, doi: 10.1038/s41586-020-2923-3.
- Chica, M., Hernández, J. and Bulchand-Gidumal, J. (2021), "A collective risk dilemma for tourism restrictions under the COVID-19 context", *Scientific Reports*, Vol. 11 No. 1, p. 5043, doi: 10.1038/s41598-021-84604-z.
- Dempere, J. (2021a), "A recipe to control the first wave of COVID-19: more or less democracy?", *Transforming Government: People, Process, and Policy*, Vol. 15 No. 4, pp. 597-611, doi: 10.1108/TG-08-2020-0206.
- Dempere, J. (2021b), "Control of the first wave of COVID-19: some economic freedom-related success factors", *Journal of International Studies*, Vol. 14 No. 4, pp. 187-200, doi: 10.14254/2071-8330.2021/14-4/13.
- Erdem, O. (2020), "Freedom and stock market performance during Covid-19 outbreak", *Finance Research Letters*, Vol. 36 No. 1, p. 101671, doi: 10.1016/j.frl.2020.101671.

- Ferreira, F. and Castro, C. (2020), "Competitiveness of European tourism: a cluster Analysis", *Proceedings of the 3rd International Conference on Tourism Research*, Spain, Universidad Europea de Valencia, available at: https://www.academic-conferences.org/wp-content/uploads/dlm_uploads/2020/07/000_ICTR-2020-abstract-booklet.pdf.
- Hannah, R., Ortiz-Ospina, E., Beltekian, D., Mathieu, E., Hasell, J., Macdonald, B., Giattino, C. and Roser, M. (2020), "Statistics and research. Coronavirus pandemic (COVID-19)", *Our World in Data*, available at: <https://ourworldindata.org/coronavirus> (accessed 10 July 2020).
- Herren, C., Brownwright, T., Liu, E., El Amiri, N. and Majumder, M. (2020), "Democracy and mobility: a preliminary analysis of global adherence to non-pharmaceutical interventions for COVID-19", working paper, available at: https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID3570206_code4099104.pdf?abstractid=3570206&mirid=1.
- International Labour Organization (2020), "COVID-19 and accommodation and food service activities. Prevention and control checklist", available at: https://www.ilo.org/wcmsp5/groups/public/-dgreports/-dcomm/documents/publication/wcms_754201.pdf (accessed 30 May 2022).
- International Organization for Standardization (2021), "ISO/PAS 5643:2021. Tourism and related services — requirements and guidelines to reduce the spread of Covid-19 in the tourism industry", available at: <https://www.iso.org/standard/81500.html> (accessed 30 May 2022).
- Javed, M. and Tučková, Z. (2019), "Competitiveness in tourism: a comparative analysis of selected south-asian countries", *2nd International Conference on Tourism Research: 381-388, IX, XII, The UK, ICTR-2019 by ACPI*, available at: <https://www.proquest.com/openview/7ff11cecc42bbf76c865d7dd980c64e/1?pq-origsite=gscholar&cbl=4451210>.
- Jones, P. and Comfort, D. (2020), "The COVID-19 crisis and sustainability in the hospitality industry", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 10, pp. 3037-3050, available at: <https://www.emerald.com/insight/0959-6119.htm>.
- Kayar, C. and Kozak, N. (2010), "Measuring destination competitiveness: an Application of the travel and tourism competitiveness index (2007)", *Journal of Hospitality Marketing and Management*, Vol. 19 No. 1, pp. 203-216, doi: 10.1080/19368621003591319.
- Knight, D., Xiong, L., Lan, W. and Gong, J. (2020), "Impact of COVID-19: research note on tourism and hospitality sectors in the epicentre of Wuhan and Hubei Province, China", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 12, pp. 3705-3719, available at: <https://www.emerald.com/insight/0959-6119.htm>.
- König, M. and Winkler, A. (2020), "COVID-19 and economic growth: does good government performance pay off?", *Intereconomics*, Vol. 55 No. 4, pp. 224-231, doi: 10.1007/s10272-020-0906-0.
- Kovalov, B., Burlakova, I. and Vorenenko, V. (2017), "Evaluation of tourism competitiveness of Ukraine's regions", *Journal of Environmental Management and Tourism*, Vol. VIII Nos 2(18), pp. 460-466, available at: <https://journals.aserspublishing.eu/jemt/article/view/1204>.
- Kraemer, M.U., Yang, C.H., Gutierrez, B., Wu, C.H., Klein, B., Pigott, D.M., Open COVID-19 Data Working Group, Du Plessis, L., Faria, N.R., Li, R. and Hanage, W.P. (2020), "The effect of human mobility and control measures on the COVID-19 epidemic in China", *Science*, Vol. 368 No. 6490, pp. 493-497, doi: 10.1126/science.abb4218.
- Lai, I. and Wong, J. (2020), "Comparing crisis management practices in the hotel industry between initial and pandemic stages of COVID-19", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 10, pp. 3135-3156, available at: <https://www.emerald.com/insight/0959-6119.htm>.
- Miller, R. and Englund, K. (2020), "Transmission and risk factors of COVID-19", *Cleveland Clinic Journal of Medicine*, available at: www.ccm.org/content/ccjom/early/2020/05/12/ccjm.87a.ccc029.full.pdf.
- Montanari, M. and Giraldo, J. (2013), "Competitiveness in tourism: a comparison between Brazil and Switzerland", *Revista Brasileira de Pesquisa em Turismo*, Vol. 7 No. 1, pp. 92-113, doi: 10.7784/rbtur.v7i1.564.

- Montero-Muradas, I. and Oreja-Rodríguez, J. (2017), "Determining competitive factors in tourism leadership in Spain 2015", *Cuadernos de Turismo*, Vol. 40 No. 1, pp. 701-710, doi: 10.6018/turismo.40.310071.
- Morris, C. and Reuben, A. (2020), "Coronavirus: why are international comparisons difficult?", *BBC News*, available at: <https://www.bbc.com/news/52311014> (accessed 7 August 2020).
- Narayan, P.K., Narayan, S. and Smyth, R. (2011), "Does democracy facilitate economic growth or does economic growth facilitate democracy? An empirical study of Sub-Saharan Africa", *Economic Modelling*, Vol. 28 No. 3, pp. 900-910, doi: 10.1016/j.econmod.2010.11.004.
- Nazmfar, H., Eshghei, A., Alavi, S. and Pourmoradian, S. (2019), "Analysis of travel and tourism competitiveness index in middle-east countries", *Asia Pacific Journal of Tourism Research*, Vol. 24 No. 6, pp. 501-513, doi: 10.1080/10941665.2019.1590428.
- Nunkoo, R., Daronkola, H.K. and Gholipour, H.F. (2021), "Does domestic tourism influence COVID-19 cases and deaths?", *Current Issues in Tourism*, Vol. 1 No. 1, pp. 1-14, doi: 10.1080/13683500.2021.1960283.
- Petrova, M., Dekhtyar, N., Klok, O. and Loseva, O. (2018), "Regional tourism infrastructure development in the state strategies", *Problems and Perspectives in Management*, Vol. 16 No. 4, pp. 259-274, doi: 10.21511/ppm.16(4).2018.22.
- Popescu, D., Oehler-Şincai, I., Bulin, D. and Tănase, I. (2018), "CEE-16: a cluster Analysis based on tourism competitiveness and correlations with major determinants", *The AMFITEATRU ECONOMIC Journal, Academy of Economic Studies - Bucharest, Romania*, Vol. 20 No. 12, pp. 833-853, available at: https://www.amfiteatruconomic.ro/temp/Article_2769.pdf.
- Rali, A. and Sauer, A.J. (2020), "COVID-19 pandemic and cardiovascular disease", *US Cardiology Review*, Vol. 14 No. 1, available at: <https://www.uscjournal.com/articles/covid-19-pandemic-and-cardiovascular-disease>.
- Richter, F. (2021a), "Tourism back to 1990 levels as pandemic halts travel", *Statista*, available at: <https://www.statista.com/chart/21793/international-tourist-arrivals-worldwide/>.
- Richter, F. (2021b), "Tourism industry experts fear long road to recovery", *World Economic Forum*, available at: <https://www.weforum.org/agenda/2021/02/tourism-industry-covid19-recovery-government-response/>.
- Salinas, J., Azevedob, P., Martín, J. and Rodríguez, J. (2020), "Determinants of tourism destination competitiveness in the countries most visited by international tourists: proposal of a synthetic index", *Tourism Management Perspectives*, Vol. 33 No. 1, pp. 1-13, doi: 10.1016/j.tmp.2019.100582.
- Self, T., Gordon, S. and Jolly, P.M. (2019), "Talent management: a Delphi study of assessing and developing GenZ hospitality leaders", *International Journal of Contemporary Hospitality Management*, Vol. 31 No. 10, pp. 4126-4149, doi: 10.1108/IJCHM-11-2018-0915.
- Seyfihttps, S., Hall, M. and Shabani, B. (2020), "COVID-19 and international travel restrictions: the geopolitics of health and tourism", *Tourism Geographies*, Vol. 1 No. 17, pp. 1-17, doi: 10.1080/14616688.2020.1833972.
- Škare, M., Soriano, D.R. and Porada-Rochoń, M. (2021), "Impact of covid-19 on the travel and tourism industry", *Technological Forecasting and Social Change*, Vol. 163 No. 120469, DOI: 10.1016/j.techfore.2020.120469.
- Skytrax (2022), "Airline, airport and COVID-19 safety ratings", available at: <https://skytraxratings.com/> (accessed 30 May 2022).
- Tahmasebi, P., Shokri-Kuehni, S., Sahimi, M. and Shokri, N. (2020), "How do environmental, economic and health factors influence regional vulnerability to COVID-19?", *Working Paper*, available at: www.medrxiv.org/content/10.1101/2020.04.09.20059659v1.full.pdf.
- Terzić, L. (2018), "How tourism destination competitiveness contributes to GDP growth - the case of selected European economies", *Acta Oeconomica Pragensia, Prague University of Economics and Business*, Vol. 2018 No. 3, pp. 24-34, doi: 10.18267/j.aop.606.

- The World Health Organization (2020), "The global health observatory. Explore a world of health data", available at: [www.who.int/data/gho/data/indicators/indicator-details/GHO/mean-bmi-\(kgm\)-\(age-standardized-estimate](http://www.who.int/data/gho/data/indicators/indicator-details/GHO/mean-bmi-(kgm)-(age-standardized-estimate) (accessed 10 July 2020).
- United Nations - UN (2020), "Policy brief: COVID-19 and transforming tourism", available at: https://www.un.org/sites/un2.un.org/files/sg_policy_brief_covid19_tourism_august_2020.pdf (accessed 10 July 2020).
- United Nations Conference on Trade and Development - UNCTAD (2021a), "COVID-19 and Tourism. An update", available at: https://unctad.org/system/files/official-document/ditcinf2021d3_en_0.pdf (accessed 10 August 2020).
- United Nations Conference on Trade and Development - UNCTAD (2021b), "Tourist numbers down 83% but confidence slowly rising", available at: <https://www.unwto.org/news/tourist-numbers-down-83-but-confidence-slowly-rising> (accessed 10 August 2020).
- United Nations Conference on Trade and Development - UNCTAD (2021c), "The World Tourism Barometer", available at: <https://www.unwto.org/unwto-world-tourism-barometer-data> (accessed 10 August 2020).
- United Nations World Tourism Organization (2022), "Tourism enjoys strong start to 2022 while facing new uncertainties", available at: <https://www.unwto.org/news/tourism-enjoys-strong-start-to-2022-while-facing-new-uncertainties> (accessed 1 June 2022).
- Urashima, M., Otani, K., Hasegawa, Y. and Akutsu, T. (2020), "BCG vaccination and mortality of COVID-19 across 173 countries: an ecological study", *International Journal of Environmental Research and Public Health*, Vol. 17 No. 15, available at: www.mdpi.com/1660-4601/17/15/5589/pdf.
- V-Dem Institute (2020), "V-Dem varieties of democracy. Global standards, local knowledge", available at: www.v-dem.net/en (accessed 23 January 2021).
- Valev, D. (2020), "Relationships of total COVID-19 cases and deaths with ten demographic, economic and social indicators", *medRxiv*, License CC BY-ND 4.0, doi: 10.1101/2020.09.05.20188953.
- Wang, Y. (2021), "Government policies, national culture and social distancing during the first wave of the COVID-19 pandemic: international evidence", *Safety Science*, Vol. 135 No. 1, pp. 1-13, doi: 10.1016/j.ssci.2020.105138.
- Webster, C. and Ivanov, S. (2014), "Transforming competitiveness into economic benefits: does tourism stimulate economic growth in more competitive destinations?", *Tourism Management*, Vol. 40 No. 1, pp. 137-140, doi: 10.1016/j.tourman.2013.06.003.
- WHO - World Health Organization (2019), "Novel coronavirus (2019-nCov). Situation report - 13", available at: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf> (accessed 12 November 2021).
- WHO - World Health Organization (2021a), "Fighting misinformation in the time of COVID-19, one click at a time", available at: <https://www.who.int/news-room/feature-stories/detail/fighting-misinformation-in-the-time-of-covid-19-one-click-at-a-time> (accessed 12 November 2021).
- WHO - World Health Organization (2021b), "Social media and COVID-19: a global study of digital crisis interaction among Gen Z and Millennials", available at: <https://www.who.int/news-room/feature-stories/detail/social-media-covid-19-a-global-study-of-digital-crisis-interaction-among-gen-z-and-millennials> (accessed 12 November 2021).
- World Bank (2020), "The global economic outlook during the COVID-19 pandemic: a changed world", available at: <https://www.worldbank.org/en/news/feature/2020/06/08/the-global-economic-outlook-during-the-covid-19-pandemic-a-changed-world> (accessed 7 August 2020).
- World Bank (2021), "DataBank - world development indicators", available at: <https://databank.worldbank.org/source/world-development-indicators#> (accessed 1 November 2021).
- World Health Organization (2020), "COVID-19 management in hotels and other entities of the accommodation sector", *Interim Guidance*, available at: <https://apps.who.int/iris/rest/bitstreams/1297222/retrieve> (accessed 30 May 2022).

- World Travel & Tourism Council (2019), "The importance of travel and tourism in 2019", available at: <https://wttc.org/Research/Economic-Impact/moduleId/1226/itemId/67/controller/DownloadRequest/action/QuickDownload> (accessed 22 January 2021).
- World Travel & Tourism Council (2020), "WTTC launches world's first-ever global safety stamp to recognise 'Safe Travels' protocols around the world", available at: <https://wttc.org/News-Article/WTTC-launches-worlds-first-ever-global-safety-stamp-to-recognise-safe-travels-protocols-around-the-world> (accessed 30 May 2022).
- World Travel & Tourism Council (2021a), "Travel and tourism, economic impact 2021", *Global Economic Impact 2021*, available at: [https://wttc.org/Portals/0/Documents/Reports/2021/Global %20Economic%20Impact%20and%20Trends%202021.pdf?ver=2021-07-01-114957-177](https://wttc.org/Portals/0/Documents/Reports/2021/Global%20Economic%20Impact%20and%20Trends%202021.pdf?ver=2021-07-01-114957-177) (accessed 19 July 2021).
- World Travel & Tourism Council (2021b), "Lessons Learnt during COVID-19. The lessons learnt so far and how these can be used to prepare for future crises", available at: <https://wttc.org/Portals/0/Documents/Reports/2021/Lessons-Learnt-%20COVID-19.pdf?ver=2021-08-19-095731-037> (accessed 1 June 2022).
- Zhang, J., Xie, C., Wang, J., Morrison, A. and Coca-Stefaniak, J. (2020), "Responding to a major global crisis: the effects of hotel safety leadership on employee safety behaviour during COVID-19", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 11, pp. 3365-3389, available at: <https://www.emerald.com/insight/0959-6119.htm>.
- Zutshi, V. (2020), "Handling the COVID-19 crisis and comeback planning - Vinod Zutshi, former tourism secretary", *BWHOTELIER*, available at: <http://bwhotelier.businessworld.in/article/Handling-the-COVID-19-Crisis-Comeback-Planning-Vinod-Zutshi-Former-Tourism-Secretary/13-04-2020-188953/> (accessed 25 October 2021).

Further reading

- The World Bank (2020), "Databank. World development indicators", available at: <https://databank.worldbank.org/source/world-development-indicators> (accessed 10 July 2020).

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Survival of Russian banks: how efficient are the control measures?

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Abstract

Purpose – In this paper, the authors study the failure of Russian banks between 2012 and 2019.

Design/methodology/approach – The authors analyze the entire population of Russian banks and combine a logit model with the survival analysis.

Findings – In addition to the usual determinants, the authors find that not-failed banks have higher levels of fulfillment of the Central Bank requirements of solvency, liquidity, provide fewer loans to their shareholders and own more shares of other banks. The results of this study suggest an asymmetric effect of the strategic orientation of banks: whereas the proportion of deposits from firms is negatively related to the probability of failure, the loans to firms are positively related to bankruptcies. According to this research, the fact of being controlled by a foreign bank has a significant negative relationship with the likelihood of failure and moderates the effect of bank size, performance and growth on the bankruptcy likelihood.

Practical implications – On the whole, the results of this study support the new Central Bank rules, but show that the thresholds imposed by the Russian regulator actually do not make a difference between failed and not failed banks in the short and medium term.

Originality/value – The authors specially focus on the effectiveness of new rules issued by the Central Bank of Russia in 2013.

Keywords Bankruptcy, Bank failure prediction, Capital adequacy, Russia

Paper type Research paper

1. Introduction

According to the official statistics of Russian Central Bank [1], in 2013, there were 953 banks in the Russian Federation. Seven years later, only 427 banks remained. The Russian banking system seems to mimic with some lag the trend in other institutional settings such as the USA or the European Union. Eurostat reports, in the same period, the number of banks decreased from 7,727 to 5,442, i.e. a reduction of 29.6%. Within the EU – considering the data from the

JEL Classification — E58, G21, G33

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Statistical Data Warehouse of the European Central Bank [2] – this fall is stronger in countries such as the Netherlands (65.6%), Denmark (37.9%) or France (34.5%). Especially significant is the case of the Spanish saving banks (*Cajas de ahorro*), some hundred-year old deposit institutions that merged or were acquired by commercial banks. Thus, at the light of what happened in European countries some years earlier, it could be of interest to understand the process of banking restructuring in other countries as Russia. Furthermore, this process of shrinking of the banking system has not ended in Russia, so that a better knowledge of the recent past could provide the policy makers with effective tools to guide forthcoming episodes.

In this paper we study the failure of Russian banks between 2012 and 2019. The wave of failures among Russian banks can have dramatic social consequences and be detrimental for the stability of the financial system as a whole (Fungáčová and Weill, 2013). However, at the same time, the banking concentration can strengthen the financial system because bigger banks have better chances to diversify their risk, and it is easier to monitor a reduced number of banks (Etudaiye-Muhtar and Abdul-Baki, 2021). Although there are a number of papers about bankruptcy prediction in Russian banks, most of them are based on outdated data, so that there is room for new evidence. The appointment of Elvira Nabiullina the head of the Central Bank of Russia (CBR) in 2013 is a turning point in the financial history of Russia and has resulted in a far-reaching process of cleaning the country's banking sector (Fojcik, 2019; The Economist, 2017). With the exception of Mäkinen and Solanko (2018) and Zubarev and Bekirova (2020), who analyze information for the 2013–2017 and 2013–2019 periods, the prior studies use data sets well before the new policy [3]. Malyutina and Parilova (2001) show that, both before the 1998 crisis and right after it, the Russian regulator followed forbearance policy and followed discretion rather than a rule to withdraw the banking license. Besides, the too-big-to-fail mantra seemed to be important for the CBR and Bochenkova (2017) states that noncompliance with the risk-regulating norms can have led sometimes to higher survival chances.

The CBR has established a set of rules to monitor the activity of the banks, being the guidelines N199-I of 29.11.2019 the most recent version. These rules are aimed to control for sufficiency of capital, current and long-term liquidity, large credit risks, the amount of loans, the bank guarantees provided to the bank's shareholders, the cumulative risk for bank insiders, and the use of the bank's funds to purchase shares of other legal entities. To the best of our knowledge, these norms have received scarce attention in other failure prediction models, and we extend our field of knowledge by testing the effect of these rules on the probability of bank survival. Thus, we address the following two research questions: (1) which are the main characteristics of Russian banks that allow predicting the bankruptcy likelihood; and (2) whether the fulfillment of the CBR assures the survival of financial institutions.

We combine a logit model with the survival analysis and study three sets of banks characteristics: the usual financial issues such as size, growth and profitability, the strategic orientation in deposits and loans and the characteristics related to the ownership of the bank. We try to fill three gaps in the literature on banks failure prediction. First, we consider the bank strategic orientation (i.e. corporate oriented vs. retail banking) to know whether the type of bank business can have any relationship with the likelihood of failure. Second, we develop our analysis in the framework of the CBR new policy and check whether the fulfillment of the financial requirements is enough to avoid the bankruptcy, and to which extent these requirements can serve as an early warning signal. Third, we combine two empirical methods (logistic regression and survival analysis) to reinforce the reliability of our results.

Our research shows that not-failed banks are significantly larger and more profitable. These banks also have higher levels of fulfillment of the CBR requirements of solvency, liquidity, provide fewer loans to their shareholders and own more shares of other banks. We also find an asymmetric effect of the strategic orientation of banks: whereas the proportion of deposits from firms is negatively related to the probability of failure, the loans to firms are

positively related to bankruptcies. According to our research, the fact of being controlled by a foreign bank has a significant negative relationship with the likelihood of failure. Not only is there a direct relationship but the foreign ownership also moderates the effect of bank size, performance and growth on the bankruptcy likelihood.

The next section of the paper presents the framework of the Russian financial system and reviews the literature. Section 3 describes the main aspects of the methodology. We report univariate analyses, discuss multivariate results, and present several additional analyses in section 4. Finally, section 5 concludes.

2. Theoretical background

2.1 *The Russian banking system*

The commercial banking sector in Russia is young. Under the centralized planned economy in 1986, the former USSR had just four banks; all of them were state-owned and each one was dedicated to a certain function [4]. Karminsky and Kostrov (2017) identify four stages in the development of the commercial banking sector in Russia: the period from 1988 to 1999 can be considered the formation, followed by a rapid development between 2000 and 2008. Then, the 2008–2009 financial crises appeared and, finally since 2010, the banking industry is in a restructuring process.

In the first years of the current century, along with a fast-economic growth, the banking regulations were substantially improved. Private deposit insurance and Basel I compliance were enacted. The CBR introduced curators for each bank who individually monitored prudential ratios on a daily basis (Lanine and Vennet, 2006). Russia was severely affected by the 2007–2008 world financial crises and the CBR bailed out several systemic banks (Fidrmuc and Süß, 2011). The latest years have witnessed a strengthening of the regulation adopted by the CBR, especially after the appointment of Elvira Nabiullina as the head of the CBR in 2013. The so-called “cleaning up” policy entered into force and, in the period 2013–2020, on average 67 banks per year disappeared in Russia.

This policy implies removing the unsustainable players from the Russian financial sector. On top of that, the Central Bank works on the improvement of the banking regulation (e.g. adoption of Basel III), supporting the competition (e.g. promoting of free interbank payment system for private clients), the adoption of new technologies (e.g. blockchain and biometric identification) and fostering banks transparency (e.g. publishing financial statements monthly and quarterly of each commercial bank on the Central Bank website).

2.2 *Literature review*

The research on bank’s failure prediction model has a longstanding tradition and, so far, there is no single universally accepted method and the choice can be affected a number of different factors (Kovacova *et al.*, 2019; Moreno *et al.*, 2022; Wu *et al.*, 2010). Alaka *et al.* (2018) classify the models of bankruptcy prediction into two groups: the statistical tools and the artificial intelligence methods. Among the first ones, they underline the multiple discriminant analysis and logistic regression. Although the discriminant analysis was the primary method, the research has shifted to logit analysis and neural networks (Bellovary *et al.*, 2007). The logistic regression outperforms the discriminant analysis in the way it involves qualitative alongside quantitative variables.

The predictive accuracies of different models seem to be generally comparable, although artificially intelligent expert system models perform marginally better than statistical models (Jing and Fang, 2018; Tseng and Hu, 2010). However, Le and Viviani (2018) found that there is not a big difference in the prediction accuracy between neural network methods and the traditional logistic regression. Moreover, the traditional logistic regression models perform

quite well and machine learning techniques can just help to detect the most difficult cases. Some recent examples of authors who employ the logit regression are Betz *et al.* (2014), Lin and Yang (2016) and Pessarossi *et al.* (2020) in the international arena. This method has been widely used in the research on the Russian banking system by Claeys and Schoors (2007), Fidrmuc and Süß (2011), Fungáčová and Weill (2013), Karminsky and Kostrov (2017), Lanine and Vennet (2006), Peresetsky *et al.* (2011), Styurin (2005), Zakirova *et al.* (2018), Zhivaikina and Peresetsky (2017) and Zubarev and Bekirova (2020) for the Russian case.

An important issue in the models of bankruptcy prediction is the selection of factors. A large group of literature uses the so-called CAMEL (Capital, Asset Quality, Management, Earnings and Liquidity) indicators (Petroopoulos *et al.*, 2020). Consistently with this view, the models of bankruptcy prediction of Russian banks have highlighted the role of financial indicators as determinants of bankruptcy. The liquidity and the liquidity creation are the main factors for Fidrmuc and Süß (2011) and Zubarev and Bekirova (2020), although earnings, the assets quality and the capital adequacy are also important determinants (Lanine and Vennet, 2006). In addition, the impact of capital adequacy and earnings decreases with the lag length, such that the level of liquidity is the only significant indicator for longer lags (Mäkinen and Solanko, 2018). Zubarev and Bekirova (2020) find some evidence that excessive reserves are an important indicator of default as well, which can be due to the possible losses these reserves are supposed to make up for. Interestingly, Bochenkova (2017) and Maljutina and Parilova (2001) report a change in the Central Bank of Russia procedures since the violation of prudential factors did not mean the bank's closure. Tighter competence in the banking system is also positively related to the probability of failure (Fungáčová and Weill, 2013).

The size of the bank has been one of the most usual determinants of failure probability. As far as Russian banks are concerned, there is no unanimity in the literature regarding this effect. Whereas Claeys and Schoors (2007) and Fungáčová and Weill (2013) find a negative impact of the bank's size on the probability of failure, the lack of significance of this variable in the research of Lanine and Vennet (2006) and Karminsky and Kostrov (2017) suggests that there is no "too-big-to-fail" effect in Russia. The difference in the results might be due to the different set of variables and time periods. Another explanation could be the indirect effect of bank's size since the impact of some financial characteristics is moderated by the size of the entity, making the small and medium-size entities more vulnerable (Zubarev and Bekirova, 2020).

We expand the set of explanatory variables with two additional types: the ownership structure and the strategical orientation of the bank. The relationship between the ownership structure and the failure likelihood in Russian banks has not yet been analyzed. Related research is that of Karas *et al.* (2010) and Belousova *et al.* (2021), who study the relationship between bank efficiency and find that foreign banks are more efficient than domestic banks.

As far as the bank strategy is concerned, prior literature has analyzed the weight of deposits and loans on the balance sheet but, as far as we are aware, the structure of deposits and loans has not yet taken into account. We posit that when developing the strategy, bank's managers have to decide on the key client segments. This decision is twofold: deposits attraction and loans allocation. For most of the banks the primary segments are individuals and firms. Regarding deposits, Karminsky and Kostrov (2017) highlight the role of the deposits insurance. Firms' deposits are not covered by this insurance, such that firms will be more selective when choosing their bank. In addition, although borrowing from individuals could be cheaper, large exposure to deposits of individuals makes a bank vulnerable to bank runs. Thus, deposits from individuals could enhance the bank's risk appetite. Loans to individuals also have been proved to be riskier than loans to firms in Russia. Although theoretically loans to individuals are more transparent and have higher resistance to abrupt loss of value, the empirical evidence shows that the proportion of this kind of loans on the loan portfolio tends to increase the probability of bank failure for the model with two-quarters

horizon (Karminsky and Kostrov, 2017). In a more recent study, Zubarev and Bekirova (2020) report that lower proportion of the deposits from individuals and higher proportion of deposits from firms in bank's liability portfolio reduces the failure probability.

3. Empirical methods

3.1 Data set

We have collected a panel data set containing quarterly observations for all Russian banks with license at the beginning of the period of study. The initial number of banks was 954. The observation period is from December 31st 2012 to December 31st 2019. The combination of 954 banks with 29 quarters results in a total sample of 13,578 bank-quarter observations. Our dataset structure is similar to previous studies on the Russian banks probability of default (Karminsky and Kostrov, 2013, 2014, 2017). If a bank has operated during the whole analyzed period, there will be 29 observations for it. Otherwise, there is data until its failure. The data were collected from the CBR database and Spark database. We picked the data for the variables of interest and merged the separate quarterly data sets into a single one using a script in R programming language. The data on ownership structure were taken from Karas and Vernikov (2019).

3.2 Variables

There is a wide range of variables that can help predict bank failures (Isik and Uygur, 2021). We define FAILURE, a dummy variable that equals one for all outcomes that mean a failure of the bank strategy. We consider a bank has failed when it stops its operations as independent entity and lose its license. It can be due to voluntary liquidation, license withdrawal by the CBR or supervisory mergers when the failing bank is merged with a more stable, usually bigger, bank.

We consider three sets of independent variables: balance sheet variables that are descriptive of the financial situation of the bank, variables concerning the bank strategical orientation, and variables on the ownership structure (See Appendix for a complete definition of variables). Regarding the financial variables, we select those included in the Central Bank guidelines N199-I to monitor banks activity. These rules aim to control for capital adequacy, current and long-term liquidity, large credit risks, the amount of loans, the bank guarantees provided to the bank's shareholders, the cumulative risk for bank insiders, and the use of the bank's own funds to purchase shares of other legal entities.

First, we use the bank size (SIZE) defined as the log of total assets in Russian rubles. The growth of assets (GROWTH) is defined as the quarterly growth of total assets. Additionally, we also consider the quarterly growth of deposits (DEPOSGROWTH) and of loans (LOANSGROWTH). The return on assets (ROA) is the ratio of earnings before taxes and depreciation over total assets. We define CAPITAL as the ratio of equity to total assets. The Russian Central Banks requires this ratio to be higher than 8% weighted by risk level. LIQ is our measure of current liquidity, i.e. the ratio between assets and liabilities for up to 30 days. We also control for risk accumulation with RISKSH, which is the maximum amount of loans, bank guarantees and sureties provided by the bank to its shareholders. This ratio may not exceed 50%. We also introduce the use of the bank's own funds to purchase shares of other legal entities (SHARES). According to the CBR, the aggregate risk of bank investments in shares of other legal entities may not exceed 25% of equity. To avoid any bias due to outliers we drop out the observations beyond the 1 and 99% percentiles.

To measure the strategic orientation of a bank we use two criteria: the deposits portfolio and the loan portfolio. The CBR provides information about the amount of deposits that come both from firms and from individuals. The same information is available about the loans that

are lent to firms and to individuals. Thus, we define CORPDEPOS as the deposits from corporations over the sum of deposits from firms and individuals. Similarly, CORPLOAN is the fraction of loans lent to firms over the sum of loans to firms and individuals.

We use two variables on the ownership structure of the bank. FORCON is a dummy variable that equals 1 when the bank is controlled by a foreign bank that owns more than 50% of the shares and 0 otherwise. FORSUB is a dummy variable that equals 1 when the bank is a subsidiary of a foreign privately-owned bank, and 0 otherwise.

3.3 Method

We first run a descriptive analysis to check whether there are significant differences between the failed and the non-failed banks. This analysis is only a first step and is aimed to shed some initial light on the possible factors explaining the different bankruptcy probability. Secondly, we run an explanatory analysis using the logit regression. Among the possible statistical (i.e. non artificial intelligence based) methods for bank failure prediction, the logit model is likely to be the most popular, especially in Russian samples (Karminsky and Kostrov, 2014, 2017; Peresetsky *et al.*, 2011). We then run some additional analyses: the Kaplan–Meier survival estimate and the Cox regression hazard model. The aim of these latest analyses is to check the robustness of our results and to provide some additional clues about the policies of the CBR. The survival analysis is a more and more common technique in the financial field to estimate the treatment effect on survival after adjusting for other explanatory variables (Caselli *et al.*, 2021). The Kaplan–Meier survival estimate is commonly used to analyze time to event data and to compare two groups of subjects. The Kaplan–Meier survival curve is used to determine the fraction of banks surviving a specified event, during a given period. The Cox regression hazard model explores the relationship between the survival of a bank and the explanatory variables. The dependent variable is the hazard function at a given time t . The advantage of the Cox regression is that the model considers that the effect of time on the hazard of an event changes with time. This form of analysis also allows estimation of the hazard (risk) of default for a bank considering its characteristics (Caselli *et al.*, 2021).

On top of the usual control variables (i.e. size, growth and performance) we first introduce the effect of the measures required by the CBR (solvency, liquidity, credit concentration, shares of other firms, etc.) as shown in Model 1. In this model, CV_i is the vector of control variables and N_i are the regulatory variables. Then we study some issues related to the bank strategy such as the loan and deposit orientation (corporations *vs.* individuals) as shown in Model 2. In Models 3 and 4 we study the effect of the growth and the ownership structure (FORCON and FORSUB are the dummy variables to control for the bank ownership structure, respectively). Some of these models also include interacted variables to check the specific influence of some factors.

$$\text{Logit}(p_i) = \beta_0 + \beta_1 \cdot CV_i + \beta_2 \cdot N_i \quad (1)$$

$$\text{Logit}(p_i) = \beta_0 + \beta_1 \cdot CV_i + \beta_2 \cdot \text{Corporate Deposits} + \beta_3 \cdot \text{Corporate Loans} \quad (2)$$

$$\text{Logit}(p_i) = \beta_0 + \beta_1 \cdot CV_i + \beta_2 \cdot \text{Growth Deposits} + \beta_3 \cdot \text{Growth Loans} \quad (3)$$

$$\text{Logit}(p_i) = \beta_0 + \beta_1 \cdot CV_i + \beta_2 \cdot \text{FORCON} + \beta_3 \cdot \text{FORSUB} \quad (4)$$

4. Results

4.1 Descriptive analysis

In Table 1, we report the main descriptive statistics (mean, standard deviation and quartiles) of our variables. These values are similar to those of previous research (Zubarev and Bekirova, 2020). Table 2 shows the results of the test of means comparisons between the

Variable	# Obs	Mean	Std. Dev.	Q25	Q50	Q75
FAILURE	13,578	0.411	0.492			
SIZE	13,578	22.705	1.842	21.387	22.406	23.764
GROWTH	13,578	0.026	0.125	-0.037	0.015	0.071
ROA	13,578	0.006	0.020	0.001	0.005	0.012
CAPITAL	13,578	24.965	17.200	13.068	18.222	30.885
LIQ	13,578	148.520	112.833	84.598	113.622	165.000
RISKSH	13,578	1.719	4.427	0.000	0.000	0.430
SHARES	13,578	0.841	2.908	0.000	0.000	0.000
CORPDEPOS	13,376	0.304	0.320	0.059	0.178	0.454
CORPLOANS	13,515	0.718	0.258	0.593	0.796	0.916
DEPOSGROWTH	13,375	1.974	92.564	-0.046	0.017	0.091
LOANSRGROWTH	13,517	0.073	3.857	-0.048	0.011	0.073

Note(s): Mean standard deviation and quartiles of the main variables. FAILURE is a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets, CAPITAL is the ratio of equity to total assets (%), LIQ is the ratio assets over liabilities for up to 30 days (%), RISKSH is the ratio of loans, bank guarantees and sureties provided to the bank shareholders over their total value, SHARES is the ratio of the amounts bank spends to purchase shares of other legal entities to its capital; CORPDEPOS is the proportion of deposits from firms over the sum of deposits from firms and from individuals; CORPLOANS is the proportion of loans to firms over the sum of loans to firms and to individuals; DEPOSGROWTH is the rate of quarterly growth of deposits; LOANSRGROWTH is the rate of quarterly growth of loans

Table 1.
Descriptive statistics

Variable	Non-failed	Failed	t-test	Variable	Non-failed	Failed	t-test
SIZE	22.947	22.014	31.80***	SHARES	0.893	0.666	5.20***
GROWTH	0.034	0.040	-0.99	CORPDEPOS	0.346	0.282	12.49***
ROA	0.009	0.002	10.46***	CORPLOANS	0.744	0.728	4.19***
CAPITAL	27.149	25.299	6.65***	DEPOSGROWTH	0.288	0.021	1.73*
LIQ	164.99	139.99	13.37***	LOANSRGROWTH	0.019	0.014	1.67**
RISKSH	1.566	1.897	-4.62***				

Note(s): Test of means comparison between failed and non-failed banks. FAILURE is a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets, CAPITAL is the ratio of equity to total assets (%), LIQ is the ratio assets over liabilities for up to 30 days (%), RISKSH is the amount of loans, bank guarantees and sureties provided to the bank shareholders, SHARES is the use of the bank's own funds to purchase shares of other legal entities; CORPDEPOS is the proportion of deposits from firms over the sum of deposits from firms and from individuals; CORPLOANS is the proportion of loans to firms over the sum of loans to firms and to individuals; DEPOSGROWTH is the rate of quarterly growth of deposits; LOANSRGROWTH is the rate of quarterly growth of loans. ***, ** and * for 99%, 95% and 90% confidence level

Table 2.
Means comparisons

failed and the non-failed banks. The picture that emerges is that of significant differences in terms of size, growth, performance, solvency and liquidity. Non-failed banks are significantly larger and more profitable. The test of means comparisons also show that non-failed banks have higher levels of fulfillment of the CBR requirements of solvency, liquidity, provide less guarantees to their shareholders, and own more shares of other banks. On the contrary, failed banks seem less oriented to corporations given the lower proportion of both deposits from firms and of loans to firms (as opposed from and to individuals).

We also report the correlation matrix among the variables (Table 3). Although the correlation coefficients are low, we compute the variance inflation factor (VIF) to test the lack

	FAILURE	SIZE	GROWTH	ROA	CAPITAL	LIQ	RISKSH	SHARES	CORPDEPOS	CORPLOANS	DEPOSGROWTH
SIZE	-0.2057										
GROWTH	0.0007	0.0737									
ROA	-0.0981	0.0127	0.0903								
CAPITAL	-0.079	-0.4958	-0.0412	0.0821							
LIQ	-0.1092	-0.0046	-0.0417	-0.0025	0.1978						
RISKSH	0.0353	-0.0207	-0.0024	-0.0343	-0.031	-0.0492					
SHARES	-0.0317	0.3021	0.0054	-0.0397	-0.1625	-0.0046	0.0268				
CORPDEPOS	-0.1064	0.1216	0.0472	0.0782	0.1898	-0.0248	0.0021	0.0032			
CORPLOANS	0.0423	-0.0243	0.0153	0.0007	0.0663	-0.1258	0.0178	-0.0074	0.11		
DEPOSGROWTH	-0.0075	0.038	0.4001	0.0647	-0.018	0.0092	0.0016	-0.0009	0.0786	0.0062	
LOANS	0.0267	0.0464	0.2594	0.0301	-0.0833	-0.1129	0.0113	0.0028	0.0331	0.069	0.1677

Note(s): Matrix of correlations. FAILURE is a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles); GROWTH is the quarterly growth of total assets; ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets; CAPITAL is the ratio of equity to total assets (%); LIQ is the ratio assets over liabilities for up to 30 days (%); RISKSH is the amount of loans, bank guarantees and sureties provided to the bank shareholders; SHARES is the use of the bank's own funds to purchase shares of other legal entities; CORPDEPOS is the proportion of deposits from firms over the sum of deposits from firms and from individuals; CORPLOANS is the proportion of loans to firms over the sum of loans to firms and to individuals; DEPOSGROWTH is the rate of quarterly growth of deposits; LOANS is the rate of quarterly growth of loans. ***, ** and * for 99%, 95% and 90% confidence level

Table 3.
Correlation matrix

of multicollinearity in our estimates, and we find that VIF values are all below 2. Given that a lack of multicollinearity is broadly accepted when VIF values are under 5 (Studenmund, 1997), we determine that multicollinearity is not an issue with our sample.

4.2 Explanatory analysis

We follow a parsimonious pattern and initially run a series of models to test the effect of each variable (columns 1–5 in Table 4) before a joint estimate of the effect of all the variables (Column 6). In Column (1), we report the results for the basic determinants of the likelihood of bankruptcy: the size of the bank, the growth (of assets) and the ROA. As expected, the performance and the size of the bank have a negative relationship with the probability of bankruptcy. Similar results for the ROA have been reported by Lanine and Vennet (2006). As far as the relationship between bank failures and bank size, whereas Lanine and Vennet (2006) and Karminsky and Kostrov (2017) fail to find any significant relationship, Fungáčová and Weill (2013) report a negative effect of bank size on the probability of bankruptcy.

In column (2) we introduce the effect of bank solvency measured as the equity-to-assets ratio (CAPITAL). We find a negative and statistically significant coefficient for CAPITAL, so that the more the equity of the bank, the lower the probability of default. This result corroborates those of Peresetsky *et al.* (2011). In column (3), we test the effect of liquidity (LIQ). Our negative and significant coefficient is similar to that of Lanine and Vennet (2006), for

	(1)	(2)	(3)	(4)	(5)	(6)
GROWTH	0.001 (0.151)	0.038 (0.155)	0.003 (0.151)	0.003 (0.152)	0.007 (0.152)	0.043 (0.155)
ROA	−14.10*** (1.007)	−12.13*** (1.014)	−14.02*** (1.008)	−14.03*** (1.007)	−13.95*** (1.007)	−11.999*** (1.016)
SIZE	−0.236*** (0.011)	−0.378*** (0.014)	−0.240*** (0.011)	−0.236*** (0.011)	−0.248*** (0.011)	−0.385*** (0.014)
CAPITAL		−0.026*** (0.001)				−0.025*** (0.001)
LIQ			−0.001*** (0.000)			−0.000 (0.000)
RISKSH				0.009** (0.004)		0.005 (0.004)
SHARES					0.030*** (0.007)	0.026*** (0.007)
Intercept	3.528*** (0.292)	7.457*** (0.373)	3.768*** (0.297)	3.508*** (0.292)	3.781*** (0.298)	7.618*** (0.376)
# obs.	13,578	13,578	13,578	13,578	13,578	13,578
Likelihood ratio	1803.26***	2133.1***	1826.4***	1808.16***	1821.7***	2169.06***
Pseudo R^2	0.0981	0.1171	0.0992	0.0983	0.0991	0.1180
Correct %	65.15	66.75	65.16	65.25	65.29	66.91
VIF	1.01	1.01	1.01	1.01	1.01	1.02

Note(s): Estimated coefficients (std. errors) of the logit estimation of Model 1. The dependent variable is FAILURE, a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets, CAPITAL is the ratio of equity to total assets, LIQ is the ratio assets over liabilities for up to 30 days (%), RISKSH is the amount of loans, bank guarantees and sureties provided to the bank shareholders, and SHARES is the use of the bank's own funds to purchase shares of other legal entities. All the estimates include quarterly time dummy variables. ***, ** and * for 99%, 95% and 90% confidence level

Table 4.
Explanatory analysis:
Baseline analysis

whom bank failures are mainly caused by insufficient liquidity, although deteriorated profits and low levels of capital adequacy are also important predictors.

Interestingly, the credits to shareholders (RISKSH) have a positive relationship with the probability of failure (column 4). As far as the use of bank funds to purchase shares of other legal entities (SHARES) is concerned, the results in Column 5 suggest a positive relationship with the failure probability. This result can be understood as a confirmation of the suitability of the measures of the CBR since both the credits to shareholders and the purchase of shares of other entities can lead to much risk concentration and exacerbate the risk of bank failure. When all the variables are included together in one single model (column 6), most of the conclusions remain: the negative effect of the performance, the size and the solvency of the bank, along with the positive effect of the shares of other banks.

The explanatory power of our model can be assessed with two indicators. First, the pseudo- R^2 coefficient, which is close to the one of Fidrmuc and Süß (2011) and slightly higher than that of Zubarev and Bekirova (2020). Second, and more importantly, the proportion of observations correctly classified. Our models correctly classify around two-thirds of the observations (between 65.15 and 66.91 %). In this case, there can be two types of errors. On the one hand, the type I error arises when the model wrongly classified as not failed a bank that actually went bankruptcy. On the other hand, the type II error is the wrong classification as failed of a bank that actually did not go bankruptcy. Most studies assert that the cost of type I error is greater than the cost of the type II error (Fidrmuc and Süß, 2011). Although not tabulated, the performance of our models is due to the ability to identify the failed banks, avoiding the type I error. Indeed, our models correctly identify around 75% of the bankruptcies but the rate of non-failed banks correctly classified is around 58%.

We now analyze the strategic orientation of the banks in the sense of the choice between firms and individuals for the deposits and loans. The analysis of the relationship between deposits and banking failure in Russia has been previously done by Konstandina (2007), who has shown the relevance of deposits to avoid bankruptcies. Our results, reported in Table 5, show an asymmetric effect of such orientation. Regarding the proportion of deposits from firms, results reported in columns 1 and 3 show a negative relationship with the probability of failure. The explanation can be on the coverage of individuals' deposits by the deposit insurance, which can have a moral hazard effect and incentivize the risk taking of banks. On the contrary, the loans to firms are positively related to bankruptcies (columns 2 and 3). These results are consistent with those of Karminsky and Kostrov (2017), who state that in comparison with loans to firms, loans to individuals are more transparent and have higher resistance to abrupt loss of value. This assessment is corroborated in column (4), in which two dummy variables have been created on the basis of the median value of the proportion of deposits from firms and the proportion of loans to firms (HIGHCORPDEPOS and HIGHCORPLOANS). These dummy variables equal one when such proportion is over the median value, and zero otherwise.

As far as the growth of assets is concerned, our baseline estimates did now show any significant relationship with the likelihood of bankruptcy. We know wonder whether this lack of significance can be due to an asymmetric effects conditional on the banks' characteristics. Thus, in column 5 of Table 5 we interact the GROWTH variable with the two dummies on the orientation to firms in the deposits and the loans portfolios. The results reveal relevant insights. The negative (positive) and significant coefficient of $GROWTH \cdot HIGHCORPDEPOS$ ($GROWTH \cdot HIGHCORPLOAN$) suggest that assets growth amplifies the asymmetric effect of the strategic orientation to firms. It means that the growth of assets reduces even more the risk of the banks that borrow most of the deposits from the firms, but the growth of assets increases the risk of the banks that lend most of the loans to the firms.

We revisit the issue of the growth again by testing whether the growth of deposits and the growth of loans can have any effect. To this purpose, we define DEPOSGROWTH and

	(1)	(2)	(3)	(4)	(5)
SIZE	-0.225*** (0.011)	-0.235*** (0.011)	-0.223*** (0.011)	-0.218*** (0.011)	-0.218*** (0.011)
GROWTH	0.078 (0.155)	-0.001 (0.153)	0.066 (0.156)	0.029 (0.155)	0.245 (0.276)
ROA	-14.082*** (1.031)	-14.322*** (1.017)	-14.244*** (1.038)	-14.641*** (1.036)	-14.691*** (1.036)
CORPDEPOS	-0.650*** (0.061)		-0.687*** (0.062)		
CORPLOANS		0.406*** (0.075)	0.515*** (0.077)		
HIGHCORPDEPOS				-0.427*** (0.039)	-0.405*** (0.040)
HIGHCORPLOANS				0.241*** (0.038)	0.228*** (0.039)
GROWTH · HIGHCORPDEPOS					-0.858*** (0.313)
GROWTH · HIGHCORPLOANS					0.517* (0.310)
Intercept	3.462*** (0.299)	3.217*** (0.299)	3.064*** (0.306)	3.199*** (0.301)	3.194*** (0.301)
# obs.	13,376	13,515	13,340	13,340	13,430
Likelihood ratio	1892.64***	1004.4***	1732.37***	1909.08***	1918.27***
Pseudo R2	0.1045	0.0985	0.0970	0.1056	0.1061
Correct %	65.51	65.25	65.88	66.15	64.52
VIF	1.01	1.01	1.01	1.01	1.03

Note(s): Estimated coefficients (std. errors) of the logit estimation of Model 2. The dependent variable is FAILURE, a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets; CORPDEPOS is the proportion of deposits from firms over the sum of deposits from firms and from individuals; CORPLOANS is the proportion of loans to firms over the sum of loans to firms and to individuals. All the estimates include quarterly time dummy variables. ***, ** and * for 99%, 95% and 90% confidence level

Table 5.
Explanatory analysis:
strategic orientation on
clients

LOANS GROWTH as the quarterly rate of growth of deposits and loans, respectively. In columns 1 and 2 of Table 6, we test the isolated effect of each variable, and in column 3, we introduce both variables jointly. As it can be seen, both variables exhibit a different impact: while the growth of deposits has not any significant relationship with the probability of failure, the growth of loans is positively related to such probability.

We also address the effect of the ownership structure. We introduce the fact of a Russian bank being related to a foreign bank, either as controlled by a foreign bank (FORCON) or as a subsidiary of a foreign privately-owned bank (FORSUB). The results are reported in Table 7. In columns 1 and 2, we test the separated effects of each variable, and in column 3, they are jointly introduced. We can see that the fact of being controlled by a foreign bank has a significant negative relationship with the likelihood of failure.

In order to study more in-depth the effect of the control by a foreign bank, we define the variables SIZEFOR, GROWTHFOR, and ROAFOR as the interaction of SIZE, GROWTH and ROA with the dummy variable FORCON. The same is done for the ratios CAPITAL, LIQ, RISKSH and SHARES, and the variables CORPDEPOS and CORPLOANS. Table 8 shows the results of the new estimations. Since there are many coefficients, we focus on the most relevant ones. In column 1, we report the specific effect of the control variables (size, growth

	(1)	(2)	(3)
SIZE	-0.231*** (0.011)	-0.232*** (0.011)	-0.232*** (0.011)
GROWTH	0.079 (0.171)	-0.050 (0.164)	-0.003 (0.175)
ROA	-14.772*** (1.045)	-14.818*** (1.046)	-14.804*** (1.046)
DEPOSGROWTH	-0.049 (0.084)		-0.066 (0.084)
LOANSRGROWTH		0.292** (0.131)	0.300** (0.132)
Intercept	3.437*** (0.298)	3.460*** (0.298)	3.457*** (0.299)
# Obs.	13,203	13,203	13,203
Likelihood ratio	1731.6***	1736.2***	1736.81***
Pseudo R2	0.0968	0.0970	0.0971
Correct %	65.05	65.17	65.20
VIF	1.13	1.05	1.13

Note(s): Estimated coefficients (std. errors) of the logit estimation of Model 3. The dependent variable is FAILURE, a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets; DEPOSGROWTH is the rate of quarterly growth of deposits; LOANSRGROWTH is the rate of quarterly growth of loans. All the estimates include quarterly time dummy variables. ***, ** and * for 99%, 95% and 90% confidence level

Table 6.
Explanatory analysis:
growth

	(1)	(2)	(3)
SIZE	-0.235*** (0.011)	-0.237*** (0.011)	-0.236*** (0.011)
GROWTH	0.001 (0.152)	0.002 (0.152)	0.002 (0.152)
ROA	-14.163*** (1.007)	-14.107*** (1.007)	-14.164*** (1.007)
FORCON	-0.993*** (0.168)		-0.989*** (0.168)
FORSUB		0.130 (0.100)	0.114 (0.100)
Intercept	3.519*** (0.292)	3.538*** (0.292)	3.527*** (0.292)
# Obs.	13,578	13,578	13,578
Likelihood ratio	1843.31	1804.94***	1844.59***
Pseudo R2	0.1003	0.0982	0.1003
Correct %	65.46	65.16	65.49
VIF	1.00	1.00	1.01

Note(s): Estimated coefficients (std. errors) of the logit estimation of Model 4. The dependent variable is FAILURE, a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets; FORCON equals 1 when the bank is controlled by a foreign bank that owns more than 50% of the shares, and 0 otherwise; FORSUB equals 1 when the bank is a subsidiary of a foreign privately-owned bank, and 0 otherwise. All the estimates include quarterly time dummy variables. ***, ** and * for 99%, 95% and 90% confidence level

Table 7.
Direct influence of the
foreign ownership

EJMBE
32,3

332

	(1)	(2)	(3)
SIZE	−0.241*** (0.011)	−0.381*** (0.014)	−0.223*** (0.011)
SIZEFOR	0.503*** (0.097)		
GROWTH	−0.020 (0.152)	0.033 (0.155)	0.051 (0.156)
GROWTHFOR	4.199** (1.916)		
ROA	−13.924*** (1.011)	−12.103*** (1.019)	−14.332*** (1.040)
ROAFOR	−49.460*** (13.777)		
CAPITAL		−0.025*** (0.001)	
CAPITALFOR		−0.014 (0.013)	
LIQ		−0.000 (0.000)	
LIQFOR		0.005** (0.003)	
RISKSH		0.005 (0.004)	
RISKSHFOR		0.019 (0.036)	
SHARES		0.021*** (0.007)	
SHARESFOR		0.309*** (0.070)	
CORPDEPOS			−0.698*** (0.062)
CORPDEPOSFOR			−0.934 (0.803)
CORPLOANS			0.554*** (0.078)
CORPLOANSFOR			−2.969*** (0.717)
FORCON	−12.588*** (2.273)	−1.874*** (0.418)	1.239** (0.625)
Intercept	3.649*** (0.294)	7.535*** (0.377)	3.036*** (0.306)
# Obs.	13,578	13,578	13,340
Likelihood ratio	1883.4***	2241.9***	1978.75***
Pseudo R2	0.1024	0.1219	0.1094
Correct %	65.42	67.17	66.21
VIF	5.42	2.17	4.09

Note(s): Estimated coefficients (std. errors) of the logit estimation of Model 4. The dependent variable is FAILURE, a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets; LIQ is the ratio assets over liabilities for up to 30 days (%), RISKSH is the amount of loans, bank guarantees and sureties provided to the bank shareholders, SHARES is the use of the bank's own funds to purchase shares of other legal entities; CORPDEPOS is the proportion of deposits from firms over the sum of deposits from firms and from individuals; CORPLOANS is the proportion of loans to firms over the sum of loans to firms and to individuals; FORCON equals 1 when the bank is controlled by a foreign bank that owns more than 50% of the shares, and 0 otherwise. XXXFOR means the interaction of the XXX variable with FORCON. All the estimates include quarterly time dummy variables. ***, ** and * for 99%, 95% and 90% confidence level

Table 8.
Indirect influence of the
foreign ownership

and profitability). These estimates suggest that a foreign bank controlling the Russian bank modifies the impact of the financial determinants. For instance, whereas the bank size has a negative relationship with the failure probability, this relationship switches into positive for banks under foreign control. On the contrary, the negative relationship of the performance (ROA) is amplified by the foreign control. Regarding the growth of the bank, whereas it does not have a general impact, the growth of banks under foreign control increases the probability of bankruptcy.

In column 2 of Table 8, we report the results of the solvency, liquidity and risk concentration. The most relevant result is the effect of the shares of other banks (SHARES): the positive coefficient of SHARESFOR reinforces the likelihood of failure in the banks controlled by a foreign bank. Finally, in column 3, we study the specific effect of the strategic orientation. Interestingly, the effect of the orientation to firms in the loans policy is reversed by the foreign control.

4.3 Additional analyses

Due to the nature of failure, performing a survival analysis of the banks can bring some light to understand what has happened in this industry since the appointment of the current head of the Central Bank in 2013. In January of that year, there were 953 banks, and only 427 of them were still active at the end of the first quarter of 2020. Table 9 shows the evolution of the failure and the survival probability since that moment.

Despite the rules set up by the CBR to avoid bankruptcies, it seems that the fulfillment of those rules does not assure the survival of the bank. The percentage of banks that fulfill those requirements is shown in Table 10. Given that most of the banks fulfill these requirements, their discriminant capacity is limited. Then we run a test of equality for the survival functions between the banks that fulfill each requirement and those that do not, whose results are reported in the fifth column. Interestingly, we observe that there are not significant differences between both groups in the case of five ratios. In the next step we change the limits imposed by the CBR and set them in the median value of the variables reported in Table 1. In this case, we find that significant differences appear in the survival probability for the purchase of own shares, instant and current liquidity. This means that the CBR should reconsider the limits set for the ratios.

Since the degree of fulfillment is very high, it seems that these factors do not bring enough discrimination power to distinguish the banks with high probability of failure. To address this issue we run a series of Kaplan–Meier survival estimates.

Time (years)	Initial sample	Fails	Survival	Std. error	95% confidence interval	
0	953	21	0.9780	0.0048	0.9664	0.9856
1	932	85	0.8888	0.0102	0.8671	0.9071
2	847	93	0.7912	0.0132	0.7640	0.8156
3	754	121	0.6642	0.0153	0.6333	0.6932
4	633	73	0.5876	0.0159	0.5557	0.6181
5	560	66	0.5184	0.0162	0.4862	0.5496
6	494	53	0.4627	0.0162	0.4308	0.4941
7	441	14	0.4343	0.0169	0.4001	0.467

Note(s): This table shows the number of existing banks at the beginning of each year and the bankruptcies during each year. The survivor function represents the probability that the bank is still alive after some specified time t

Table 9.
Survivor function of
banks in Russia
2013–2019

Notation	Limit	Normative ratio	Degree of fulfillment (%)	Significant difference	Significant difference (changing limit)
n1.0	min 8%	Capital to assets	98.72	YES	YES
n10.1	max 3%	Cumulative risk for bank insiders	99.88	YES	YES
n12	max 25%	Purchase of own shares	99.97	NO	YES
n2	min 15%	Instant liquidity	98.99	NO	YES
n3	min 50%	Current liquidity	98.91	NO	YES
n4	max 120%	Long-term liquidity	99.95	NO	NO
n7	max 800%	Large credit risks	99.77	YES	YES
n9.1	max 50%	Loans to shareholders	99.98	NO	NO

Note(s): This table shows the proportion of firm-year observations that fulfill the CBR requirements. The two right hand side columns report whether there are significant differences in the survival function depending on the fulfillment of the requirements. The minimum capital to the amount of its assets is set in 8%. The maximum risk with bank insiders is established in 3%. The CBR limits to 25% the proportion of investment in shares of other legal entities over equity (Purchase of shares), to 120% the ratio of long term credit to equity and liabilities (long term liquidity), to 800% the ratio of major credit risk to equity (large credit risk), and to 50% the ratio of loans to shareholders to equity. The CBR requires at least 15% in the ratio of highly liquid assets to liabilities (instant liquidity) and 50% in the ratio of liquid assets to liabilities (current liquidity)

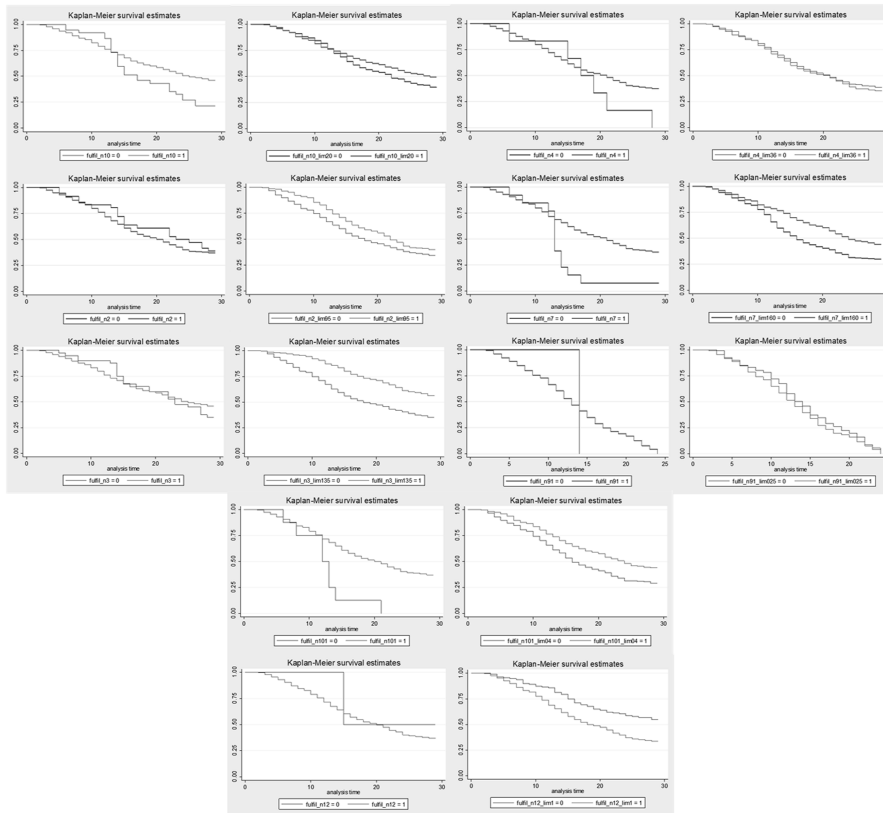
Table 10.
Fulfillment of the CBR requirements and difference in survival

In the top left chart in Figure 1, we report the results of the survival analysis for the capital adequacy ratio. The CBR requires at least the ratio of equity to assets to be 8% weighted by risk level. The red (blue) line depicts the survival function of the banks that do (not) meet this ratio. It can be seen that, initially, the banks with the lowest level of equity have a higher survival. Nevertheless, after 12 quarters the survival rates switch dramatically and, after 30 quarters, the survival probability of the banks that fulfill this requirement is twice as much as that of those whose equity is under 8% of risk-adjusted assets. Consequently, the capital adequacy requirement of 8% does not play a deterrent role of bank failure in the short and medium term. On the contrary, the second chart starting from the top left in Figure 1 displays the survival function of banks with a capital adequacy of 20%. This level has been chosen discretionary because it is close to the average of all the banks reported in Table 1. If this was the case, the banks with a capital adequacy ratio over 20% show a higher likelihood of survivor (red line) than those under this threshold throughout the time horizon.

We also run a Cox regression hazard model to check the influence of the strategic orientation (Table 11). This kind of analysis introduces the possibility of the time effect changing along the sample span. Coherently with the results reported in Table 5, the results in columns 1, 3 and 4 show that a higher proportion of deposits from corporations decrease the risk of failure. On the contrary, as shown in columns 2, 3 and 4, the higher the proportion of loans to firms, the higher the bankruptcy probability.

5. Discussion

Before concluding, it could be interesting to discuss some of the findings shown in the previous section. The results presented in Table 2, on the one hand, are consistent with those of Karminsky and Kostrov (2017) who report that a large share of deposits from individuals leads to a higher probability of bank failure. The underlying intuition is that, since firms are



Note(s): This figure displays the Kaplan-Meier survival function of Russian banks depending on the fulfillment of the different criteria set by the CBR. The first chart (top left) represents the survival estimates considering the capital adequacy requirement of 8% of risk weighted assets. The second chart shows the same survival estimates when the capital adequacy requirement is set at 20% (close to the median value). The rest of the charts represent the survival function for the different ratios controlled by the CBR and the new survival function considering new limits (see explanation in Table 10)

Figure 1.
Kaplan-Meier survival
estimates

not protected by the deposit insurance, they are more selective in their bank choice. In addition, large exposure to deposits of individuals makes a bank vulnerable to bank runs. On the other hand, these results deviate from their finding that larger share of loans to individuals tends to decrease the probability of bank failure. This deviation can be due to the different definition of variables: while these authors use the proportion of loans to individuals on assets, we use a more precise measure of loans orientation that is the proportion of loans to individuals on the whole loans' portfolio.

Although the growth of assets is not statistically different between both groups of banks, the deposits and the loans of non-failed banks grow more than those of the failed counterparts. These results corroborate that of (Mäkinen and Solanko, 2018), who find that the changes in the levels of the CAMEL indicators are significantly correlated with the probability of bank closure.

	(1)	(2)	(3)	(4)
SIZE	-0.129*** (0.0340)	-0.135*** (0.0328)	-0.126*** (0.0345)	-0.122*** (0.0344)
GROWTH	0.0390 (0.139)	0.0547 (0.162)	0.0593 (0.151)	0.0483 (0.154)
ROA	-14.28*** (2.381)	-15.15*** (2.299)	-14.40*** (2.377)	-14.84*** (2.316)
CORPDEPOS	-0.752*** (0.197)		-0.780*** (0.200)	
CORPLOANS		0.527** (0.230)	0.663*** (0.241)	
HIGHCORPDEPOS _{t-1}				-0.619*** (0.115)
HIGHCORPLOANS _{t-1}				0.368*** (0.109)
Observations	13,614	13,751	13,569	13,751

Note(s): Estimated coefficients (std. errors) of the Cox regression estimation. The dependent variable is FAILURE, a dummy variable that equals 1 if the bank has failed during the analysis period, and 0 otherwise; SIZE is the log of total assets (in Russian rubles), GROWTH is the quarterly growth of total assets, ROA (return on assets) is the ratio earnings before taxes and depreciation over total assets; CORPDEPOS is the proportion of deposits from firms over the sum of deposits from firms and from individuals; CORPLOANS is the proportion of loans to firms over the sum of loans to firms and to individuals; FORCON equals 1 when the bank is controlled by a foreign bank that owns more than 50% of the shares, and 0 otherwise. XXXFOR means the interaction of the XXX variable with FORCON. All the estimates include quarterly time dummy variables. ***, ** and * for 99%, 95% and 90% confidence level

Table 11.
Additional analysis:
strategic orientation
(Cox regression)

The performance of our logistic models is reasonably good due to their ability to identify the failed banks, avoiding the type I error. Our models identify bankruptcies correctly in around 75% of the cases but the rate of non-failed banks correctly classified falls below 60%.

Banks that borrow most of the deposits from firms diminish the risk of bankruptcy when their assets grow, but the risk of the banks that lend most of the loans to the firms increases when their assets grow. Continuing with growth, the probability of failure is not related significantly with the growth of deposits. However, the growth of loans is positively related to such probability. Thus, it seems that a policy of excessive loan granting is detrimental for the survival of the bank.

It has been found (Table 7) that being controlled by a foreign bank has a significant negative relationship with the likelihood of failure. This result is coherent with the research of Karas *et al.* (2010) and Belousova *et al.* (2021), who find that foreign banks are more efficient than Russian domestic banks. On the contrary, for a sample of Middle East and North African banks, Otero *et al.* (2020) find that banks with high institutional investors' stakes take more risk.

The positive coefficient of the interaction effect between the foreign control and the use of the bank's own funds to acquire shares of other entities reinforces the likelihood of failure in the banks controlled by a foreign bank. Thus, the use of Russian banks by foreign banks to expand their influence on other entities and corporations seems to increase the bankruptcy likelihood. Considering the specific effect of the strategic orientation, the effect of the orientation to firms in the loans policy is reversed by the foreign control, as if the choice of borrowers in these banks was more selective so that the orientation to firms as possible clients reduces the risk of bankruptcy.

6. Implications and conclusion

The models of bankruptcy predictions have a longstanding tradition in the financial research. Russia provides a unique setting to study bank failures for two reasons. On the one hand,

given the dimension of the financial system in absolute numbers, the number of banking crashes is considerable and can have dramatic consequences. On the other hand, it is a young financial system arisen after the fall of the Soviet Union, whose managers and supervisors may have not enough expertise, such that calls for new knowledge and insights. From this point of view, the study of the Russian case has policy implications for advancing regulation in the banking system of some East European countries such as Hungary (between 2013 and 2020 the number of banks fell in 70%), Croatia (31.4%) and Bulgaria (20%). Actually, the appointment of the current Head of the CBR in 2013 is a turning point in the policy of the main regulator, and we base on this fact to study the effect of the cleaning policy.

The research on bankruptcy prediction can be divided into two trends: the one on the situation of failed firms in order to find the symptoms and the one that compares the prediction accuracy of the different methods (Tseng and Hu, 2010). Our papers belong to the first stream and focuses on the characteristics of failed banks that can signal the forthcoming bankruptcy. In addition to the usual financial characteristics of banks (size, growth and performance), we have introduced three sets of possible determinants: the fulfillment of the rules recently issued by the CBR, the strategic orientation (in terms of loans and deposits from firms vs. individuals) and the ownership structure (in the sense of the foreign participation in the ownership).

Our research shows that not-failed banks are significantly larger and more profitable. These banks also have higher levels of fulfillment of the CBR requirements of solvency, liquidity. They provide fewer loans to their shareholders, and own more shares of other banks. We also find an asymmetric effect of the strategic orientation of banks: whereas the proportion of deposits from firms is negatively related to the probability of failure, the loans to firms are positively related to bankruptcies. The explanation could rely on the more in-depth supervision of firms whose deposits are not covered by the deposit insurance. The underlying intuition is that, since firms are not protected by the deposit insurance, they are more selective in their bank choice while the loans to individuals by their nature are more transparent relative to those to firms and have higher resistance to abrupt loss of value. In addition, large exposure to deposits of individuals can have a moral hazard effect and incentivize the risk taking of banks and make them vulnerable to bank runs. Further analysis revealed that the growth of assets reduces even more the risk of the banks that borrow most of the deposits from the firms, but the growth of assets increases the risk of the banks that lend most of the loans to the firms.

Finally, according to our research, the fact of being controlled by a foreign bank has a significant negative relationship with the likelihood of failure. Not only is there a direct relationship, but the foreign ownership also moderates the effect of bank size, performance and growth on the bankruptcy likelihood. Strategic orientation to loans to firms has reverse effect on the foreign controlled banks, as if the choice of borrowers in these banks was more selective so that the orientation to firms as possible clients reduces the risk of bankruptcy. We also found that the use of Russian banks by foreign banks to expand their influence on other entities and corporations seems to increase the bankruptcy likelihood.

Taken together, although the results apparently support the new CBR rules, our subsequent analyses show that the thresholds imposed by the Russian regulator actually do not make a difference between failed and not failed banks in the short and medium term. We found evidence suggesting that the capital adequacy requirement imposed by the CBR should be increased since the current 8% level does not work as an early warning signal for periods shorter than three years. The same applies to other requirements. As a direct implication of our study, we propose to reconsider those thresholds given the lack of predictive capacity. Thus, these requirements are a step in the right direction, but they should be augmented to prevent the bankruptcy of the fulfilling banks.

Notes

1. These statistics can be found in https://www.cbr.ru/eng/statistics/bank_sector/lic/
2. It can be consulted in <https://sdw.ecb.europa.eu/browse.do?node=9691593>
3. Zhivaikina and Peresetsky (2017) also use information from the period 2012–2016, but their objective is different to ours since they focus on the relationship between credit ratings and bank license withdrawal in a sample of 11 banks.
4. *Gosbank* played the role of Central Bank, *Stroibank* dealt with the corporate sector, *Vneshtorgbank* focused on international transactions, and *Sberbank* on retail banking and savings.

References

- Alaka, H.A., Oyedele, L.O., Owolabi, H.A., Kumar, V., Ajayi, S.O., Akinade, O.O. and Bilal, M. (2018), "Systematic review of bankruptcy prediction models: towards a framework for tool selection", *Expert Systems with Applications*, Vol. 94, pp. 164-184, doi: 10.1016/j.eswa.2017.10.040.
- Bellovary, J.L., Giacomino, D.E. and Akers, M.D. (2007), "A review of bankruptcy prediction studies: 1930 to present", *Journal of Financial Education*, Vol. 33, pp. 1-42.
- Belousova, V., Karminsky, A., Myachin, N. and Kozyr, I. (2021), "Bank ownership and efficiency of Russian banks", *Emerging Markets Finance and Trade*, Vol. 57 No. 10, pp. 2870-2887, doi: 10.1080/1540496x.2019.1668764.
- Betz, F., Oprică, S., Peltonen, T.A. and Sarlin, P. (2014), "Predicting distress in European banks", *Journal of Banking and Finance*, Vol. 45, pp. 225-241, doi: 10.1016/j.jbankfin.2013.11.041.
- Bochenkova, P. (2017), "What determines a bank failure? Survival in the Russian banking sector", *Student Undergraduate Research E-journal*.
- Caselli, S., Corbetta, G., Cucinelli, D. and Rossolini, M. (2021), "A survival analysis of public guaranteed loans: does financial intermediary matter?", *Journal of Financial Stability*, Vol. 54, 100880, doi: 10.1016/j.jfs.2021.100880.
- Claeys, S. and Schoors, K. (2007), "Bank supervision Russian style: evidence of conflicts between micro- and macro-prudential concerns", *Journal of Comparative Economics*, Vol. 35 No. 3, pp. 630-657.
- Etudaiye-Muhtar, O.F. and Abdul-Baki, Z. (2021), "Market structure, institutional quality and bank capital ratios: evidence from developing countries", *European Journal of Management and Business Economics*, Vol. 30 No. 1, pp. 92-107, doi: 10.1108/ejmbe-09-2019-0158.
- Fidrmuc, J. and Süß, P. (2011), "The outbreak of the Russian banking crisis", *AUCO Czech Economic Review*, Vol. 5 No. 1, pp. 46-64.
- Fojcik, B. (2019), "Fitch: Russia spent \$70B on banking sector cleanup, with more funds still needed", S&P Global Market Intelligence, 1st April 2019.
- Fungáčová, Z. and Weill, L. (2013), "Does competition influence bank failures? Evidence from Russia", *Economics of Transition*, Vol. 21 No. 2, pp. 301-322.
- Isik, I. and Uygur, O. (2021), "Financial crises, bank efficiency and survival: theory, literature and emerging market evidence", *International Review of Economics and Finance*, Vol. 76, pp. 952-987, doi: 10.1016/j.iref.2021.07.016.
- Jing, Z. and Fang, Y. (2018), "Predicting US bank failures: a comparison of logit and data mining models", *Journal of Forecasting*, Vol. 37 No. 2, pp. 235-256, doi: 10.1002/for.2487.
- Karas, A. and Vernikov, A. (2019), "Russian bank data: birth and death, location, acquisitions, deposit insurance participation, state and foreign ownership", *Data in Brief*, Vol. 27, 104560, doi: 10.1016/j.dib.2019.104560.
- Karas, A., Schoors, K. and Weill, L. (2010), "Are private banks more efficient than public banks?", *Economics of Transition and Institutional Change*, Vol. 18 No. 1, pp. 209-244, doi: 10.1111/j.1468-0351.2009.00364.x.

- Karminsky, A. and Kostrov, A. (2013), "Modeling the default probabilities of Russian banks: extended abilities", *Journal of the New Economic Association*, Vol. 17 No. 1, pp. 64-86.
- Karminsky, A. and Kostrov, A. (2014), "The probability of default in Russian banking", *Eurasian Economic Review*, Vol. 4 No. 1, pp. 81-98, doi: 10.1007/s40822-014-0005-2.
- Karminsky, A. and Kostrov, A. (2017), "The back side of banking in Russia: forecasting bank failures with negative capital", *International Journal of Computational Economics and Econometrics*, Vol. 7 Nos 1-2, pp. 170-209.
- Konstandina, N.V. (2007), "Measuring efficiency and explaining failures in banking: application to the Russian banking sector", PhD Dissertation.
- Kovacova, M., Klietnik, T., Valaskova, K., Durana, P. and Juhaszova, Z. (2019), "Systematic review of variables applied in bankruptcy prediction models of Visegrad group countries", *Oeconomia Copernicana*, Vol. 10 No. 4, pp. 743-772.
- Lanine, G. and Vennet, R.V. (2006), "Failure prediction in the Russian bank sector with logit and trait recognition models", *Expert Systems with Applications*, Vol. 30 No. 3, pp. 463-478, doi: 10.1016/j.eswa.2005.10.014.
- Le, H.H. and Viviani, J.-L. (2018), "Predicting bank failure: an improvement by implementing a machine-learning approach to classical financial ratios", *Research in International Business and Finance*, Vol. 44, pp. 16-25, doi: 10.1016/j.ribaf.2017.07.104.
- Lin, C.-C. and Yang, S.-L. (2016), "Bank fundamentals, economic conditions, and bank failures in East Asian countries", *Economic Modelling*, Vol. 52, pp. 960-966, doi: 10.1016/j.econmod.2015.10.035.
- Mäkinen, M. and Solanko, L. (2018), "Determinants of bank closures: do levels or changes of CAMEL variables matter", *Russian Journal of Money and Finance*, Vol. 77 No. 2, pp. 3-21.
- Malyutina, M. and Parilova, S. (2001), "The determinants of excessive risk-taking by banks in transition", *Economics Education and Research Consortium-Russia and CIS*.
- Mamonov, M.E. (2019), "Depleting net worth of Russian banks: changes in banks' risk-taking and the interest rate policy of the Bank of Russia", *Voprosy Ekonomiki*, No. 6, pp. 30-55.
- Moreno, I., Parrado-Martínez, P. and Trujillo-Ponce, A. (2022), "Using the Z-score to analyze the financial soundness of insurance firms", *European Journal of Management and Business Economics*, Vol. 31 No. 1, pp. 22-39, doi: 10.1108/EJMBE-09-2020-0261.
- Otero, L., Alaraj, R. and Lado-Sestayo, R. (2020), "How corporate governance and ownership affect banks' risk-taking in the MENA countries?", *European Journal of Management and Business Economics*, Vol. 29 No. 2, pp. 182-198, doi: 10.1108/ejmb-01-2019-0010.
- Peresetsky, A.A., Karminsky, A.A. and Golovan, S.V. (2011), "Probability of default models of Russian banks", *Economic Change and Restructuring*, Vol. 44 No. 4, pp. 297-334, doi: 10.1007/s10644-011-9103-2.
- Pessarossi, P., Thevenon, J.-L. and Weill, L. (2020), "Does high profitability improve stability for European banks?", *Research in International Business and Finance*, Vol. 53, 101220, doi: 10.1016/j.ribaf.2020.101220.
- Petropoulos, A., Siakoulis, V., Stavroulakis, E. and Vlachogiannakis, N.E. (2020), "Predicting bank insolvencies using machine learning techniques", *International Journal of Forecasting*, Vol. 36 No. 3, pp. 1092-1113, doi: 10.1016/j.ijforecast.2019.11.005.
- Studenmund, A.H. (1997), *Using Econometrics: A Practical Approach*, Addison-Wesley, Boston.
- Styrin, K. (2005), "X-inefficiency, moral hazard, and bank failures", 01-258e-2, Economic Education and Research Consortium Research Network, Russia and CIS.
- The Economist (2017), "A purge of Russia's banks is not finished yet".
- Tseng, F.-M. and Hu, Y.-C. (2010), "Comparing four bankruptcy prediction models: logit, quadratic interval logit, neural and fuzzy neural networks", *Expert Systems with Applications*, Vol. 37 No. 3, pp. 1846-1853, doi: 10.1016/j.eswa.2009.07.081.

Wu, Y., Gaunt, C. and Gray, S. (2010), "A comparison of alternative bankruptcy prediction models", *Journal of Contemporary Accounting and Economics*, Vol. 6 No. 1, pp. 34-45, doi: 10.1016/j.jcae.2010.04.002.

Zakirova, D.F., Pantelev, D.S. and Zakirova, E.F. (2018), "Estimating bankruptcy probability of credit organizations", *International Transaction Journal of Engineering, Management, and Applied Sciences and Technologies*, Vol. 9 No. 4, pp. 307-315, doi: 10.14456/ITJEMAST.2018.27.

Zhivaikina, A. and Peresetsky, A. (2017), "Russian bank credit ratings and bank license withdrawal 2012-2016", *Journal of the New Economic Association*, Vol. 36 No. 4, pp. 49-80.

Zubarev, A. and Bekirova, O. (2020), "Analysis of bank default factors in 2013-2019 [Анализ Факторов Банковских Дефолтов 2013-2019 Годов]", *Economic Policy*, Vol. 3, pp. 106-133.

Abbreviation	Definition	Previous research
<i>Financial variables</i>		
SIZE	The log of total assets in Russian Rubles	Fungáčová and Weill (2013), Lanine and Vennet (2006), Karas <i>et al.</i> (2010), Mamonov (2019), Peresetsky <i>et al.</i> (2011) and Zubarev and Bekirova (2020).
GROWTH	Quarterly growth of total assets	Lanine and Vennet (2006), Mamonov (2019), Peresetsky <i>et al.</i> (2011) and Zhivaikina and Peresetsky (2017). Fungáčová and Weill (2013), Lanine and Vennet (2006), Karas <i>et al.</i> (2010), Mamonov (2019), Peresetsky <i>et al.</i> (2011) and Zubarev and Bekirova (2020)
DEPOSGROWTH	Quarterly growth of deposits	
LOANSRGROWTH	Quarterly growth of loans	
ROA	Earnings before taxes and depreciation over total assets	
CAPITAL	The ratio of equity to total assets	
LIQ	Assets over liabilities for up to 30 days	Belousova <i>et al.</i> (2021), Karas <i>et al.</i> (2010) and Karminsky and Kostrov (2017)
RISKSH	Maximum amount of loans, bank guarantees and sureties provided to the bank shareholders	
SHARES	Use of the bank's own funds to purchase shares of other legal entities	
<i>Strategic orientation</i>		
CORPDEPOS	Deposits from firms over the sum of deposits from firms and from individuals	Belousova <i>et al.</i> (2021), Karas <i>et al.</i> (2010) and Karminsky and Kostrov (2017)
CORPLOAN	Loans to firms over the sum of loans to firms and to individuals	
<i>Ownership structure</i>		
FORCON	Equals 1 when the bank is controlled by a foreign bank that owns more than 50% of the shares, and 0 otherwise.	Karas <i>et al.</i> (2010) and Karminsky and Kostrov (2017)
FORSUB	Equals 1 when the bank is a subsidiary of a foreign privately-owned bank, and 0 otherwise	Belousova <i>et al.</i> (2021) and Karas <i>et al.</i> (2010)

Table A1.
Definition of variables**Corresponding author**Félix J. López-Iturriaga can be contacted at: felix.lopez@uva.es

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Environmental disclosures and corporate attributes, from the lens of legitimacy theory: a longitudinal analysis on a developing country

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Abstract

Purpose – The study seeks to evaluate the extent and quality of environmental reporting following a longitudinal analysis and covering a wide spectrum of industries in a single frame. The study also attempts to identify the set of most favored environmental reporting items by firms and items which are least disclosed. Furthermore, the study attempts to test whether certain corporate attributes such as firm size, age of the firm, leverage ratio, profitability, presence of independent directors in the board and gender diversity have any influencing power over environmental disclosure practices. The whole study has been carried out from legitimacy theory setting.

Design/methodology/approach – The study follows longitudinal analysis to identify the extent and quality of environmental disclosures. A self-constructed checklist of 12 environmental reporting items has been developed analyzing the annual report and content analysis method is followed to measure the extent and quality of environmental disclosures and identify environmental reporting items which are mostly disclosed and which are least disclosed. The study further uses panel data regression analysis to investigate whether certain corporate attributes have any impact on environmental disclosures using multiple linear regression. Total of 345 annual reports of listed financial and nonfinancial institutions have been observed in this study ranging from 2015 to 2019.

Findings – The key finding suggests that strict enforcement of Green Banking Rules 2011 fosters country's commercial banks to invest more to protect the environment and commercial banks encourage nonfinancial institutions for environmental performance and related disclosures through finance. Therefore, almost 50% of sample firms disclose their environmental performance through reporting in either narrative, quantitative or monetary format which was only 2.23% in the last decade. Findings also reveal that tree plantation is the most



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reported environment disclosure followed by investment in renewable energy and green infrastructural projects and the least reported items are fund allocation for climatic changes and carbon management policy. Further analysis shows that firm size and leverage ratio both have positive impact on environmental reporting.

Research limitations/implications – An in-depth analysis may be conducted to identify why certain environmental items are least disclosed such as fund allotment for climatic changes, carbon management policy, etc. and how corporations may earn social appreciation and motivation by investing in those least preferred items in legitimacy theory setting. Future research may also take into consideration other corporate attributes which are not considered in the study.

Originality/value – The study conducted an in-depth analysis to understand the most favored form of environmental disclosures (narrative/quantitative/monetary) and their extent after incorporation of regulatory guidelines, which is the first of its kind in the research of environmental disclosures. The study indeed contributes to the documentation of environmental reporting in the context of a developing country where there is a lack of longitudinal analysis from the lens of legitimacy theory. Moreover, a wide spectrum of industries has been taken into consideration which facilitates the generalized findings on the environmental disclosure practices of corporations in Bangladesh.

Keywords Environmental disclosures, Corporate attributes, Legitimacy theory

Paper type Research paper

1. Introduction

Due to radical climatic changes, the business world is going through tremendous pressure from various stakeholders to behave responsibly toward society (Liesen *et al.*, 2017). Within a very short span of time, climate change has gone from bad to worse (Benlemlih *et al.*, 2020; Bose *et al.*, 2018; Chowdhury *et al.*, 2020; Liesen *et al.*, 2017; Luo and Tang, 2014; Masud *et al.*, 2018; Nurunnabi, 2016). Society started realizing how important it is to disclose environmental activities performed by committed corporate citizens. Therefore, environmental reporting is gaining significant attention in today's globalized and competitive business arena than it had been in the past (Benlemlih *et al.*, 2020; Liesen *et al.*, 2017). Due to climate changes, natural disasters like drought, flood, cyclones and earthquakes have become common phenomena, and scientists identified changes in temperature and rainfall causes because of a growing amount of carbon emission and degradation of ecosystems (Lee, 2007; Becker *et al.*, 2020). This situation has affected people's livelihoods, society, culture and health worldwide and threatens global economic growth, sustainable development and poverty reduction. Nurunnabi (2016) mentioned that as per UN Framework Convention on Climate Change (UNFCCC), thousands of underprivileged people would face scarcity of fundamental needs such as food and water and are prone to critical diseases. Nurunnabi (2016) also stated that developed countries have already enforced a few laws where all the companies enlisted in Stock Exchange are bound to disclose their environmental activities where failure to comply may cause a considerable penalty. Developing countries also follow their footprints.

Like many other countries, climate change has become a significant concern for Bangladesh since, geographically, Bangladesh is located in the most vulnerable position. According to Masud *et al.* (2018), the country has to bear a heavy price if the situation remains stagnant. It is estimated that the annual loss would be 2–9.4% of the Gross Domestic Product by 2050 and 2100, respectively, while the country is itself responsible for less than 0.35% of global carbon emission. Therefore, it is high time that global leaders and corporate citizens work together toward “Green” and “Sustainability” (Masud *et al.*, 2018).

Ideally, companies are expected to disseminate carbon emission and other environmental-related information to the public (Li *et al.*, 2018; Liesen *et al.*, 2017) because companies can be both causes and solutions for carbon emission and other environmentally hazardous activities (Li *et al.*, 2018). Due to a wide range of information asymmetries, stakeholders will not get the actual environmental performance of a firm unless firms take measures to let them know (Belal *et al.*, 2015; Li *et al.*, 2018).

Environmental reporting refers to any financial or nonfinancial disclosure made by firms on their business's social and environmental effects and remains mostly a voluntary activity

(Hossain *et al.*, 2017; Parker, 2005). It has become increasingly relevant to enterprises. Environmental disclosure practices have become an essential issue in the development process to ensure environmental protection. The rapid growth of industries in our country has helped to raise economic development, but at the same time, it has brought many environmental problems, and these problems led to a conception on the natural well-being is in danger such as global warming, pollution of water, air, soil, etc. (Qureshi *et al.*, 2012).

Environmental reporting studies documenting Bangladesh fail to click a longitudinal picture of environmental disclosure practices of corporations after the enforcement of Bangladesh Bank Green Reporting Guidelines 2011. Nurunnabi (2015) found that Environmental Disclosure Practices of Bangladeshi Corporations at their naive stage (only 2.23% disclosure) and expressed expectations that strict enforcement of regulatory pressure may boost the disclosure trend.

Moreover, numerous studies have been investigated focusing on corporate social reporting practices from a legitimacy perspective. But the studies were limited either solely to the banking industry (Islam *et al.*, 2020) or manufacturing industries like tobacco (Tilling and Tilt, 2010), minerals (Deegan and Blomquist, 2006), chemicals (Milne and Patten, 2002), etc. Li *et al.* (2018) argued that there had been very scant literature focusing on the determinants of green disclosures integrating environmental legitimacy. Hardly any study investigated corporate legitimacy by analyzing environmental reporting covering a wide range of industries in a single frame which is essential to draw a generalized statement. Therefore, the study is an attempt to mitigate the research gap taking into consideration all financial, manufacturing and service-providing industries like cement industries, shipbuilders, steel industries, telecommunication industries, Internet service provider firms, power distribution companies, tobacco companies, agro-based industries, pulp and paper mills and jute processing companies.

The legitimacy theory sets the tone of the paper. The theory states that firms must have some accountability to society, and firms should act responsibly and maturely to meet investors' and the general public's expectations (Gregory *et al.*, 2016; Joshi *et al.*, 2011). To gain enormous social acceptability and credibility, firms should meet society's diverse needs and thus act as legitimate corporate citizens (Deegan, 2019; Li *et al.*, 2018).

More particularly, the strategic legitimacy perspective has been applied to focus on positive environmental disclosures while carrying out the research. The reason is embedded in the fact that the strategic legitimacy aspect sheds light on the desire and motivation of the firms to earn social support where firms spend resources and try to exert control to attain social acknowledgment (Comyns, 2016; Yingjun *et al.*, 2015). Such corporate citizens disclose positive environmental activities in their annual report as a *modus operandi* to communicate with vast social groups and are highly reluctant to disclose any adverse information; perhaps their reputation falls at stake.

The study follows annual reports as a data source and some industry-specific adjustments as a data coding method. Total of 345 annual reports with a span of five years ranging from 2015 to 2019 of listed financial and nonfinancial institutions of Bangladesh are used for data analysis in the legitimacy theory setting to answer the following research questions.

- RQ1. What extent and quality (narrative, quantitative and monetary) of green disclosures made by the listed financial and nonfinancial institutions from 2015 to 2019?
- RQ2. What are the items (content) of green disclosures made by listed Bangladeshi companies in the year 2019?
- RQ3. Which set of items are highly disclosed and which are neglected?
- RQ4. Do corporate attributes impact green disclosure practices made by listed financial and nonfinancial institutions in Bangladesh?

The present study investigates the extent and quality of environmental disclosures practiced by listed firms in Bangladesh. Furthermore, a self-constructed checklist of 12 green disclosure items has been prepared by analyzing annual reports and identified a list of green activities which are highly disclosed and are least disclosed both by financial and nonfinancial institutions. The study also seeks to test whether corporate attributes such as firm size, firm's age, human resource, leverage ratio, profitability, presence of independent directors in the board and gender diversity can influence green disclosures made by companies practicing in Bangladesh.

The novelty of the research stems from the fact that the study has taken into consideration the longitudinal trend of environmental disclosure practices after the enforcement of Bangladesh Bank Green Reporting Guidelines 2011, which is the first of its kind in the research of environmental disclosures. The study makes several contributions to the existing literature on environmental disclosures. First, the study will add a new dimension to the current literature by covering a wide array of industries in a single frame. Ahmad (2012) surveyed 40 Chartered Accountants of 40 publicly listed firms in the year 2010. He found that respondents strongly feel the need for a mandatory regulatory framework to enhance the environmental disclosure practices in annual reports. A similar study was conducted by Nurunnabi (2016) on 71 leading corporations for the fiscal year 2010–2011 and found an abysmal level of environmental disclosures (on an average 2.23%). Ahmad (2012) and Nurunnabi (2016) expressed deep expectation of the fact that enforcement of the first-ever mandatory regulatory framework, Bangladesh Bank Green Policy Guidelines 2011, will enhance the extent and quality of environmental disclosure practices of banks and other financial institutions and also indirectly boost up environmental disclosure practices of all nonfinancial publicly listed firms but studies to analyze the longitudinal trend of environmental disclosure practices after enforcement of the Bangladesh Bank Green Policy Guidelines 2011 has hardly been observed.

Thus a significant contribution of the present study is to demonstrate the effectiveness of Green Policy Guidelines 2011 in shaping corporate behavior toward environment disclosures through longitudinal analysis. Besides, the study conducted an in-depth analysis to understand the most favored form of environmental exposures (narrative/quantitative/monetary) and their extent after incorporating regulatory guidelines, which is the first of its kind in the research of environmental disclosures.

The study also addresses corporate attributes, which have influencing power for accelerating environment-related disclosures. Panel data regression analysis shows that both financial and nonfinancial institutions, which are larger in size and have higher leverage ratios, tend to disclose environmental information since they are confronted with legitimacy pressure from a diverse group of stakeholders and society. The paper is divided into six sections. Section 1 introduces the paper, Section 2 includes the underpinning theory, literature review and hypotheses development, Section 3 contains the research methodology, Section 4 presents analysis and findings, Section 5 discussions, Section 6 managerial and theoretical implications and Section 7 sheds light on the future avenue for research.

2. Underpinning theory, literature review and hypotheses development

Archel *et al.* (2009, p. 4) consider that “the legitimacy theory is a mechanism that supports organisations in implementing and developing voluntary social and environmental disclosures in order to fulfil their social contract that enables the recognition of their objectives and the survival in a jumpy and turbulent environment”. Legitimacy theory has gained enormous acceptability in social accounting and disclosure-based research that has invaluable contribution to unearthing the goals and incentives of revealing environmental disclosures (Chowdhury *et al.*, 2020; Islam *et al.*, 2020; Joshi *et al.*, 2011). The theory mandates

that organizations have some obligations toward society and firms' activities are affected by the behavior of community in which it operates (Comyns, 2016; Yingjun *et al.*, 2015). Therefore, to gain acceptability and credibility in society, firms should act responsibly and maturely (Gregory *et al.*, 2016; Li *et al.*, 2018). According to the legitimacy theory settings, organizations should not merely focus on meeting the expectations of investors. Instead, it should consider the rights of the general public (Joshi *et al.*, 2011). Joshi *et al.* (2011) also opined that organizations strive to build a strong congruence between social values offered by their behavior and the norms of expected behavior. Any mismatch between the two may create potential threats in the form of economic, legal or other sanctions. Recently, there has been a global concern for environmental issues, and as a developing country, Bangladesh is no exception. Economic liberation and deregulation of industries have created more awareness among the Bangladeshi nation concerning environmental issues; therefore, we may expect that there is increased disclosure of environmental information in companies' websites and annual reports to gain organizational legitimacy (Guillamon-Saorin *et al.*, 2017; Joshi *et al.*, 2011). Legitimacy theory can be categorized from two different perspectives: strategic and institutional. Strategic legitimacy includes resources and control that an organization exerts to attain social acknowledgment (Comyns, 2016; Yingjun *et al.*, 2015).

Furthermore, strategic legitimacy illustrates organizations' desire and motivation to earn social support. Legitimacy offers inspiration to the firms to maintain a reputed position and status in the society and to feel the reactions of observant from the society (Kaium Masud *et al.*, 2017) to legitimacy pressure; companies tend to disclose positive rather than negative information. As a part of legitimacy, environmental disclosures act as an influential catalyst of a company to share a strong and credible relationship with society (Comyns, 2016; Gregory *et al.*, 2016; Guillamon-Saorin *et al.*, 2017; Hossain *et al.*, 2020; Luo and Tang, 2014; Masud *et al.*, 2018; Nurunnabi, 2016). Therefore, both developed and developing countries are now reporting their environmental performance in their annual reports, websites and other forms of publications to mitigate legitimacy pressure vested upon them and to improve public perception (Gregory *et al.*, 2016; Hahn and Lölfs, 2014; Yingjun *et al.*, 2015). Institutional legitimacy is considered a set of fundamental beliefs. For instance, institutional dynamics, which stem from the industry environment in which a firm operates, generate external pressure on companies to behave in a perceived legitimate way by external institutions. In this sense, companies possess minimal control over society's perception (Hahn and Lölfs, 2014).

On the contrary, an interesting observation revealed by Hahn and Lölfs (2014) that disclosing adverse events by the firms does not necessarily mean that firm is gradually losing its credibility among stakeholders. Instead, it sends a positive message to the market, signaling proactive and honest disclosures and acts as a risk mitigation tool, whereas not reporting negative aspects might conversely lead to speculation that the report is overly optimistic, whitewashed and hence not a reliable source of information (Reimsbach, 2013). The legitimacy theory sets the tone of the paper. More particularly, the strategic legitimacy perspective has been applied to focus on positive environmental disclosures while carrying out the research.

2.1 Review of literature

Bangladesh took fourth place in terms of worst air quality (Masud *et al.*, 2018). The statement was given by WHO to visualize the vulnerability of the world environment, particularly in South Asian countries (Nurunnabi, 2016). Regulations related to environmental reporting foster the essence of accountability among corporate entities to protect the environment (Hubbard, 2009). Since organizations are doing business in society, they have to legitimize their actions and consider a wide range of stakeholders' information demands. Environmental disclosures may be monetary or nonmonetary, quantitative or qualitative,

or contain positive or negative information, indicating whether the particular entity is environmentally friendly or hazardous. The benefits offered by environmental reporting are manifold. Such disclosures create a positive impression among stakeholders, thus leading the board of directors to make decisions that favor the environment. Environmental reporting has become a leading parameter considered by investors and creditors. At the same time, they assess risks related to their investment (Belal *et al.*, 2015) and revise strategies while dealing with foreign investors. Entities intend to disclose environmental information not merely to save the environment but also to reduce the insurance premium, cut costs, uphold social profile and gain a competitive advantage (Alsaad *et al.*, 2021; Chowdhury *et al.*, 2020; Markard and Holt, 2003). Furthermore, Cho and Patten (2013) and Chowdhury *et al.* (2020) posit that firms display such information to show that they abide by government-imposed regulations and standards, avoid negative publicity and manage compliance costs (Benlemlih *et al.*, 2020). Few internal firm characteristics are also deeply connected to their environmental performance (McGuinness *et al.*, 2017).

The economy of Bangladesh is primarily dependent on the manufacturing and financial sectors (Masud *et al.*, 2018). The banking sector may play a pivotal role in influencing the corporate board's accountability for the environment. Since 2008, Bangladesh Bank (the central bank of Bangladesh) has issued circulars related to social and environmental issues. The guardian bank also played a significant role in recent years by giving a comprehensive circular regarding the implementation of green policies by financial institutions (Bank, 2011). At present, Bangladesh Bank's green policy guidelines provide the only mandatory framework in the history of Bangladesh's financial organizations. Bangladesh Bank also began publishing an annual Green Banking review report on the financial sector in 2013. Despite having so many regulatory attempts, the environmental disclosure practices by firms and related research are still in a naive stage in Bangladesh (Chowdhury *et al.*, 2020; Kaium Masud *et al.*, 2017; Masud *et al.*, 2018).

Chandok and Singh (2017) stated that the richness of environmental disclosures infers management's attitude toward social commitment and is appreciated by the information users. Chandok and Singh (2017) found significant differences between disclosures practiced among the firms. Ahmad (2012) reported that corporations are willing to disclose only positive environmental information and reluctant to publish bad news. The finding is consistent with the conclusions made by Chatterjee and Mir (2008). Sobhani *et al.* (2012) posited that all listed firms provide environmental disclosures in an unstructured manner in annual reports. A few of the most disclosed environmental items are waste management, energy conservation, water management and green policy for in-house management (Chandok and Singh, 2017; Kaium Masud *et al.*, 2017; Masud *et al.*, 2018). Carbon management policy should also be an integral part of environment disclosure due to excessive carbon emission, its adverse impact on the environment and local, and international pressure to mitigate the carbon emission (Yu *et al.*, 2020). Several nonprofit associations have discussed standards for environmental disclosure practices (e.g. the Global Reporting Initiative (GRI), the Federation des Experts Comptables Europeens, and the International Federation of Accountants) (Chandok and Singh, 2017). In 2011, Bangladesh Bank issued Green Banking Guidelines, mandatorily followed by all commercial banks operating in Bangladesh.

Moreover, Bangladesh Bank promises to incentivize the compliant banks of Bangladesh through various forms of sustainable environmental disclosure practices. Green Banking Guidelines 2011 and GRI standards facilitate commercial banks to encourage environmental sensitive nonfinancial institutions to practice green and sustainable initiatives through policies of Green Finance and Green Product, Green Strategies for In house management and other forms of environmental disclosures such as carbon management policy, climate change fund, investment in renewable energy, etc. (Kaium Masud *et al.*, 2017). The authors of the present study developed a checklist considering GRI environmental standards that are

matched with Bangladesh Bank Green Reporting Content and commonly disclosed in annual reports of all types of industries (Appendix 2).

2.2 Hypotheses development

2.2.1 Size of the firm and environmental disclosures. Legitimacy theory illuminates light that large firms are accountable to their stakeholders and responsible corporate citizens should disclose all relevant information (Chowdhury *et al.*, 2020). Islam *et al.* (2020), Michelon and Parbonetti (2012) and Gray *et al.* (2001) also opined that large firms tend to share more environmental-related information than small firms as they have enough funds to spend for the welfare of society. Similar findings were also obtained by Joshi *et al.* (2011). Brammer and Pavelin (2008) stated that firm size influence positively to disclose environmental information. Furthermore, such disclosures create a platform for big firms who run their businesses through a wide range of branches to obtain social appreciation for their activity (Chowdhury *et al.*, 2020; Hasseldine *et al.*, 2005; Islam *et al.*, 2020; Joshi *et al.*, 2011). The earned appreciation and credibility will attract more investors and help the firm to gain public support. Firm size commonly known for its visibility also represents firms' worthiness to be involved in social and environmental activities (Joshi *et al.*, 2011). Based on the discussion above, the following hypothesis is developed:

H1. There is a positive relationship between firm size and environmental disclosures.

2.2.2 Profitability and environmental disclosure. Legitimacy theory states that profitable firms are more accountable to society because they have to protect society by safeguarding the environment to retain profit and sustain in the long run. Stakeholders also have high expectations from profitable firms and will not allow them to engage in hazardous activities for the environment (Joshi *et al.*, 2011). Researchers revealed a significant positive relationship between profitability and environmental disclosures (Al-Tuwaijri *et al.*, 2004; Gray *et al.*, 2001; Rehman *et al.*, 2021; Said *et al.*, 2009). In a corporation with fewer economic resources, management will probably focus on activities that directly affect the corporation's earnings than the production of social and environmental disclosures (Tagesson *et al.*, 2009). On the contrary, profitable corporations are more exposed to political pressure and public scrutiny and use more self-regulating mechanisms, such as voluntary disclosure. Investors generally perceive that in the absence of disclosure of environmental information, there is an indication of bad news about the firm. Therefore, to maintain public impression and raise capital, most firms tend to disclose environmental information (Chowdhury *et al.*, 2020; Joshi *et al.*, 2011; Yusoff and Lehman, 2008). Companies are providing environmental information mainly to alleviate the concerns from the government (Hummel and Hörisch, 2020; Hutman *et al.*, 2021; Liu and Anbumozhi, 2009). Therefore, the following hypothesis is developed:

H2. There is a positive relationship between profitability and environmental disclosures.

2.2.3 Leverage and environmental disclosure. Companies with high debts tend to establish a good rapport with their interest groups and are more likely to reveal their environmental activities. Clarkson *et al.* (2008), Islam *et al.* (2015) and Al Arussi *et al.* (2009) found a positive relationship between leverage and level of environmental disclosures. Leverage depends on external debt financing and the loan borrower corporations must comply with environmental safety dimensions to get loans and grants. Therefore, levered companies are likely to disclose environmental information due to the regulations of financial institutions. With the increase of debt proportion in capital structure, the greater is expected to be the interest conflicts between shareholders, creditors and managers, the higher the agency cost, and the managers have an incentive to disclose more information. From the perspective of social and environmental responsibilities, companies with higher financial leverage (LEV) are more

inclined to establish good relations with stakeholders; therefore, they are more likely to disclose environmental information. The Central Bank of the country, Bangladesh Bank, has made a laudable effort since 2008 to issue circulars related to social and environmental performances and implementation of green projects (Masud *et al.*, 2018). Consequently, commercial banks impose environmental safety dimensions for issuing loans and grants to implement green policies by financial institutions (Bangladesh Bank, 2011). Based on the discussion above, this study proposes the following:

H3. There is a positive relationship between firms' leverage on environmental disclosure.

2.2.4 Age of the firm and environmental disclosure. Drawing on the legitimacy theory, "companies' societal existence depends on the acceptance of the society where they operate. Since the companies can be influenced by, and have influences to the society, legitimacy is assumed an important resource determining their survival" (Juhmani, 2014, p. 81). The interaction between the company and the community is deemed very important for the existence of the company and its competitiveness (Khan *et al.*, 2019). This provides the company which operates longer a wider interaction with the community an effective public image (Asif *et al.*, 2013; Samarah *et al.*, 2021). Age is considered an essential corporate attribute that can influence the level of environmental disclosures. Age also reflects the perceived stability, financial strength and strategic posture of a firm (Abubakar *et al.*, 2019; Akbas, 2014; Joshi *et al.*, 2011) and represents some aspects of stakeholders' power, strategic posture and financial performance (Liu and Anbumozhi, 2009). It is also argued that as a company matures, its reputation and involvement in discretionary activities, such as environmental protection activities and disclosure of environmental information, can become entrenched and more valuable to the company (Liu and Anbumozhi, 2009). In this sense, a positive relationship can be predicted between the level of environmental disclosures and the age of firms (Akbas, 2014; Joshi *et al.*, 2011). Therefore, the following hypothesis is developed:

H4. There is a positive relationship between firms' age on environmental disclosure.

2.2.5 Presence of nonexecutive directors in board decisions and environmental disclosures. Corporate boards with a more significant proportion of independent directors may monitor and influence board decisions for common interest (Fama and Jensen, 1983; Alnabsha *et al.*, 2018). Independent directors can also play an active role as an internal control mechanism and protect communities' rights. According to BSEC, at least one-fifth of any public listed companies' total board of directors must be independent. Terjesen *et al.* (2016) stated in their article that independent directors are entrusted with overseeing the board's activities and protecting the minorities. Their presence in board meetings will ensure lawful and transparent, and credible board decisions. But the finding revealed that the company of nonexecutive or independent directors does not contribute any effectiveness in board decisions. Instead, they have a very minimal role to play (Terjesen *et al.*, 2016). Few studies found a positive relationship between independent directors and the extent of environmental and other voluntary disclosures (Ntim *et al.*, 2012; Samaha *et al.*, 2012), while findings of few studies suggest negative association (Alnabsha *et al.*, 2018; Gul and Leung, 2004; Mohd Ghazali and Weetman, 2006) or no relation (Alhazaimeh *et al.*, 2014; Ho and Shun Wong, 2001). Based on the discussion that independent directors exert a positive influence on board decisions, the study conjectured that.

H5. There is a positive impact of the presence of nonexecutive directors on the level of environmental disclosures.

2.2.6 Gender diversity in board composition and environmental disclosures. According to legitimacy theory, an increasing number of female directors in the board can accelerate firms'

reputation by strengthening environmental responsibilities (Elmagrhi *et al.*, 2018; Gyapong *et al.*, 2016; Nasr and Ntim, 2018; Shahab *et al.*, 2018). Numerous prior studies navigate the behavioral aspects of women and found women are more law-abiding and sincere in terms of performing responsibilities as opposed to their male counterparts (Terjesen *et al.*, 2016). He also added that female directors enhance the effectiveness of the board. Although there is no compulsion from a legal perspective to aspiring gender diversity, it may be expected that the inclusion of more female directors in the board tends to boost boards' positive attitude toward all sorts of mandatory and voluntary disclosures (Gyapong *et al.*, 2016). Therefore, the study assumes the following:

H6. There is a positive impact of gender diversity in board composition on environmental disclosure.

2.2.7 Relationship between human resource cost and environmental disclosures. Human Resources is alternatively known as Human Capital, often termed as a value creator and strategic resource of an organization and a robust corporate attribute representing the organization's attitude toward its employees (Akhter *et al.*, 2021; Chen and Lin, 2004; Dinca *et al.*, 2019; Taamneh *et al.*, 2018). According to American Accounting Association, Human Capital Reporting refers to the recognition and measurement of organizational expenditure to maintain the organization's human resources. The purpose of disclosing human resource costs in the annual report is to provide relevant information for the intended users and ensure transparency in reporting (Said *et al.*, 2013; Ur Rehman *et al.*, 2021). Reporting human resource costs can increase the efficiency of human resource management to facilitate managerial decisions in important aspects (Aggarwal and Verma, 2020; Alnajdawi *et al.*, 2017; Said *et al.*, 2013).

The role of human resources in the organization's decision-making and value creation process can be measured by the level of costs in human resources (Aggarwal and Verma, 2020; Ur Rehman *et al.*, 2021; Vazakidis *et al.*, 2013). Human resource cost refers to the expenditures that an organization incurs to retain employees through salaries, organizing training programs and offering a reward to employees for professional excellence to attain economic goals and sustainability of the organization (Kaur *et al.*, 2014). The Human resource cost is the only quantifiable variable to measure how the organization values its employees (Elrehail *et al.*, 2020; Said *et al.*, 2013). The variable's value can be extracted from annual reports of listed companies of Bangladesh, which demonstrate the organizational expenditures on employee salaries, incentives, training and other personnel development programs, the reward for motivation, etc.

A study conducted by Guenther *et al.* (2016) explains that motivated and committed employee groups positively impact carbon disclosure which is part of environmental disclosure.

Such expenditures also provide an essential supplement to traditional income measurement and thus widen the coverage of the firm's financial well-being and financial success. Dinca *et al.* (2019) also claimed that Romanian companies, which spend more on development and retention of human resources, reported environmental issues elaborately than companies with minimum human resources investment. The higher human resource cost is an indicator that may help to reduce expected costs and negative impacts on firm value. It may also demonstrate to society and the company's stakeholders that individual firms are doing their part to help solve social and environmental problems through proper disclosures (Elrehail *et al.*, 2021; Said *et al.*, 2013). Based on the discussion above, it can be hypothesized that

H7. There is a positive impact of human resource expenditures on environmental disclosures.

3. Research methodology

3.1 Sampling strategy

The 69 listed companies (Appendix 1) have been selected from the Dhaka Stock Exchange (DSE) based on non-probability sampling. Out of 69 companies, 34 companies belong to financial industries including bank and nonbank financial institutions and 35 sample companies from manufacturing and service-oriented industries of varied nature such as cement industries, shipbuilders, steel industries, telecommunication industries, Internet service provider firms, power distribution companies, tobacco companies, agro-based industries, pulp and paper mills and jute processing companies. There were 47 scheduled banks under Bangladesh Bank (the central bank of Bangladesh) in 2013. Out of these 47 banks, 30 banks were listed in DSE until 2015. We studied 28 of all those listed banks to get relevant information. Our sample covers 93% of the listed banks. Besides, the study also takes six nonbank financial institutions such as leasing companies and insurance companies. Furthermore, to address the inter-rater reliability concerns, all data were collected by a single researcher.

3.2 Data collection procedures

This study uses annual reports as a source of data. The authors collected the data from the annual reports using a self-constructed checklist of 12 items (demonstrated in Table 1) under three thematic items. Authors considered a set of GRI codes matched with Green Reporting

	Items disclosed	Sources	Percentages (%)
Green finance (product-wise): A	Renewable energy and investment disclosure	Maama and Appiah (2019), Chandok and Singh (2017),	79
	Tree plantation and forestry-related disclosure	Kaium Masud <i>et al.</i> (2017), Masud <i>et al.</i> (2018), Perez-Batres <i>et al.</i>	85
	Waste management disclosure	(2012), Global Reporting	56
	Land and air pollution-related disclosures and investment in biogas/bio-fertilizer plants	Initiatives (2016), Bangladesh Bank (2011)	69
	Water pollution and control related disclosures through effluent treatment plants		69
	Miscellaneous green infrastructure project		71
	Green office and green management disclosures: B	Maama and Appiah (2019), Bose <i>et al.</i> (2018), Masud <i>et al.</i> (2018)	77
Other green disclosures: C	Energy savings and improvement disclosures		74
	Award and recognition for environmental initiatives		66
	Employee training and customer awareness related to environment disclosures		69
	Climate change, fund allotment for climatic changes	Yu <i>et al.</i> (2020), Global Reporting Initiatives (2016), Bangladesh Bank (2011)	42
	Consumer awareness related to environmental disclosures		69
	Ecological and carbon management policy		56

Table 1.
Environmental
disclosure checklist

Guidelines 2011; Bangladesh Bank (Appendix 2) and segregated the items into three themes based on homogeneity. The theme, Green Finance, addresses disclosures that institutions used to show their investment to promote eco-friendly projects such as investment in hydropower projects, solar energy generation, approving or borrowing loans for wastewater treatment, disposal of hazardous plants and innovation of technology for environmental safety. The second theme, Green Policy-related disclosures, focuses on GRI codes GR5, GR7 and GR11, demonstrating the internal office management policies and training initiatives to promote green culture. The third theme, Other Green Disclosures, covers GR2 and GR4 to illustrate institutional performance for climate change and environmental risk management.

The annual reports were collected from the banks, DSE library and company websites. The study carefully examines prior literature and annual reports published by listed firms to develop the environmental disclosure checklist. The author's compiled index was sent to two professors of Accounting who have research experience in the same field and two practicing Chartered Accountants to examine the relevance of the checklist. After receiving their feedback, any disagreement regarding any disclosure item is consulted and rechecked (Joshi *et al.*, 2011), and a final checklist has been prepared (exhibited in Table 1).

Data for corporate attributes such as firm size, age of the firm, human resource cost, leverage ratio, profitability, presence of independent directors in the board and gender diversity are collected from the annual report. To conduct the study, secondary data have been collected from annual reports for the years 2014–2015, 2015–2016, 2016–2017, 2017–2018 and 2018–2019. Total of 345 annual reports are analyzed in this study. To answer the first research question, a longitudinal analysis has been conducted for five years ranging from 2015 to 2019. For the second and third research questions, Environmental Disclosure Checklist (Table 1) has been evaluated only for the year 2019. For the fourth research question, again five years (2015–2019), annual report data are analyzed.

3.3 Analysis tools

The study follows the content analysis method to meet the answer of the first three research questions as the content analysis method is a popularly used method in earlier disclosure-based studies (Bose *et al.*, 2018; Chowdhury *et al.*, 2020; Guillamon-Saorin *et al.*, 2017; Kaium Masud *et al.*, 2017; Singh and Kansal, 2011). For the first research question, the space incidence method was used, taking a sentence as a unit of analysis for measuring environmental disclosures in measuring disclosures.

Every sentence reported on environmental disclosures in the annual report was further categorized into the narrative, quantitative or monetary, depending on the nature of the disclosure. Thus, the longitudinal analysis has been conducted using the following formula:

- (1) Narrative Disclosures: $(\text{Items disclosed in terms of sentences related to green activities in a year} / \text{Total number of companies in the sample}) \times 100$
- (2) Quantitative Disclosures: $(\text{Items disclosed in terms of numbers related to green activities in a year} / \text{Total number of companies in the sample}) \times 100$
- (3) Monetary Disclosures: $(\text{Items disclosed in terms of monetary value related to green activities in a year} / \text{Total number of companies in the sample}) \times 100$

The Environmental Disclosure Index (EDI) has been computed using a self-constructed green disclosure checklist of 12 items for the second and third research questions. The EDI has been measured in terms of how many companies reported a particular item of the self-constructed checklist in the year 2018–2019. R_p is the percentage of companies reporting specific items of green activities.

- (4) $R_p = (\text{Number of companies disclosing } i\text{th items} / \text{Total number of companies in the sample}) \times 100$

After having the value of R_p , the third question can be answered by showing the five most disclosed and five least disclosed green activities.

For the fourth research question, a regression model has been developed to investigate whether corporate attributes such as firm size, age of the firm, human resource, leverage ratio, profitability, presence of independent directors in the board and gender diversity influence the environmental disclosure practices.

3.4 Selection of variables

Dependent variable: The dependent variable of the study is EDI. The content analysis method is used to obtain the value of EDI. In examining each of these EDI values, a dichotomous procedure was followed. Each company was awarded a score of “1” if the company appears to have disclosed the concerned reporting variable and “0” otherwise – the total score obtained by the company was deemed to be the net score of the company. EDI is computed by using the following formula: $EDI = (\text{Total score of the individual company} / \text{Maximum score obtainable } (12) \times 100$. In this study, the following independent variables are considered for the model such as FSZ = Size of the firm (Log of total assets), AG = Age of the firm (Number of years since its inception in DSE), HRC = Human resource cost (Investment for human resource retention and development), LEVR = Leverage ratio (Total debt/Total equity)*100, PROF = Profitability (Net income–Preferred dividend)/End of the period common shares outstanding, INDDR = Percentage of independent directors in a board (Number of independent directors/Total number of board of directors) and GENDI = Percentage of female directors in a board (Number of female directors/Total number of board of directors).

3.5 Model specification

$$\begin{aligned} \text{ENVDI} = & a0 + a1 \text{FSZ} + a2 \text{AGF} + a3 \text{HR} + a4 \text{LEVR} + a5 \text{PROF} + a6 \text{INDDR} \\ & + a7 \text{GENDI} + E \end{aligned}$$

Statistical Package of Social Science is used to analyze the relationship between EDI and firm attributes. Multiple regression analysis is used in analyzing the study.

4. Analysis and findings

To fulfill the first research question, “What is the trend and quality (narrative, quantitative and monetary) of green disclosures made by the Listed Financial and nonfinancial institutions from 2015–2019?”, the authors have analyzed the published annual report to usher the trends and quality of environmental disclosures which are projected in the following graph (see Figure 1).

The figure sheds light on the environmental disclosures trend of listed firms operating in Bangladesh for five years spanning from 2015 to 2019. The trend analysis shows a steady trend with a slight deviation meanwhile. From 2015 onward, almost 50% of the sample firms publish their contribution toward the environment either in the narrative, quantitative, monetary, or adopting three approaches simultaneously. The narrative approach is the most favored disclosure approach, followed by quantitative and monetary environmental disclosures. On the contrary, such disclosure practices in annual reports were scanty

before Green Banking Rules 2011. Therefore, it can be recapitulated that the enforcement of Green Banking Rules 2011 positively influences commercial banks' environmental or green disclosures. Simultaneously, commercial banks encourage other industries through green financing, green product and green policy to accelerate environmental disclosures in the annual report.

To satisfy the research question "What are the items (content) of Green disclosures made by listed Bangladeshi Companies in 2019?", the authors have reviewed the annual reports of 2019. The following graph presents the disclosed items.

Figures 2–4 show that tree plantation (85%) is the most favored environmental disclosure practiced by firms. Therefore, it can be implied that firms invest most in tree plantations to perform their ecological commitment. Furthermore, firms also showcase the use of renewable energy and green management policy through their disclosures to let the stakeholders know about their responsibility toward a greener world. As a result, 79% of sample firms publish their investment for renewable energy and 77% of firms prefer to reveal how they embrace green policy to run their internal management. Moreover, many firms (71% of sample firms) highlight how they facilitate green infrastructure projects or

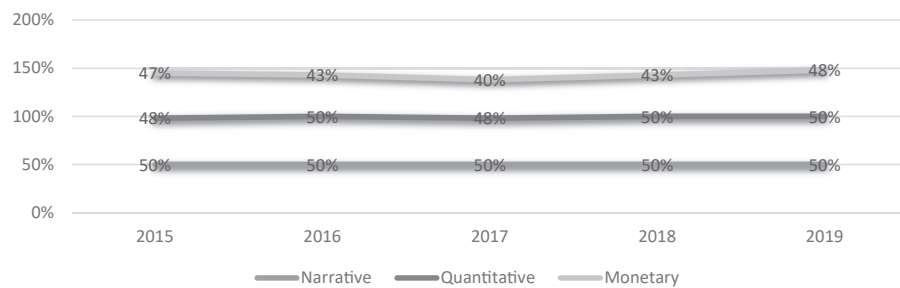


Figure 1.
Longitudinal analysis
of environmental
disclosures

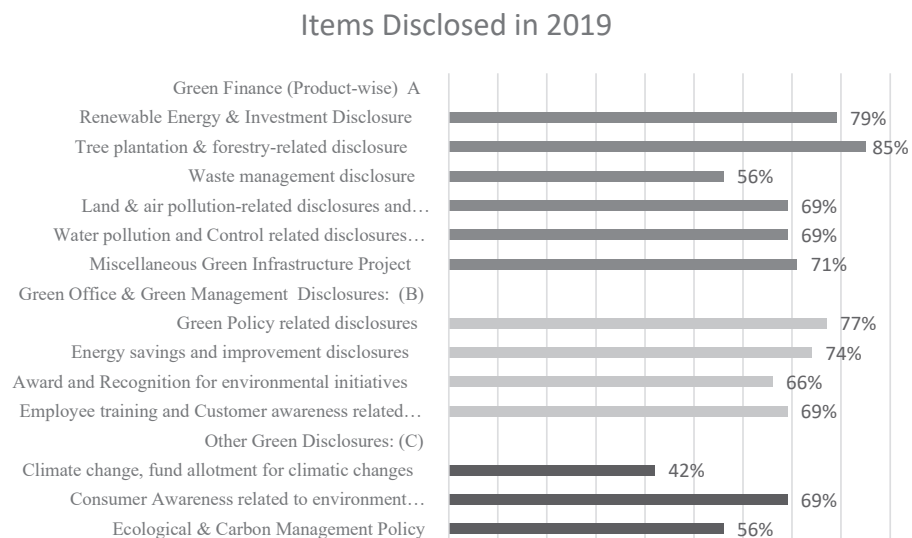


Figure 2.
Items disclosed in
annual reports of 2019

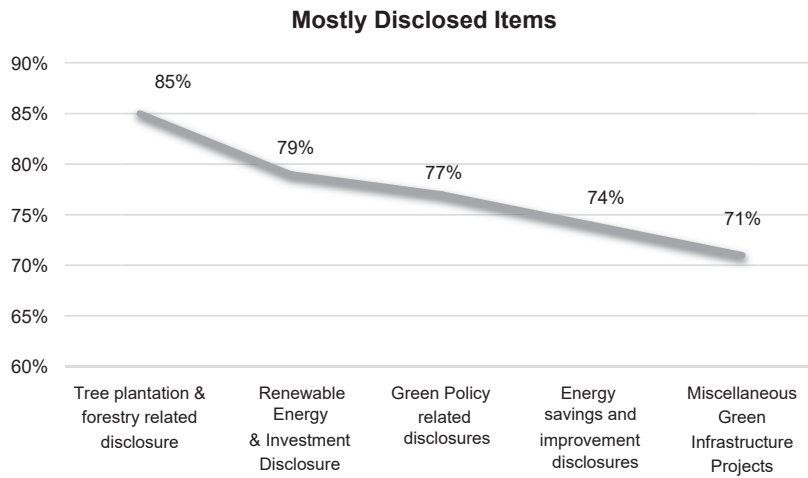


Figure 3. Mostly disclosed items in annual reports of 2019

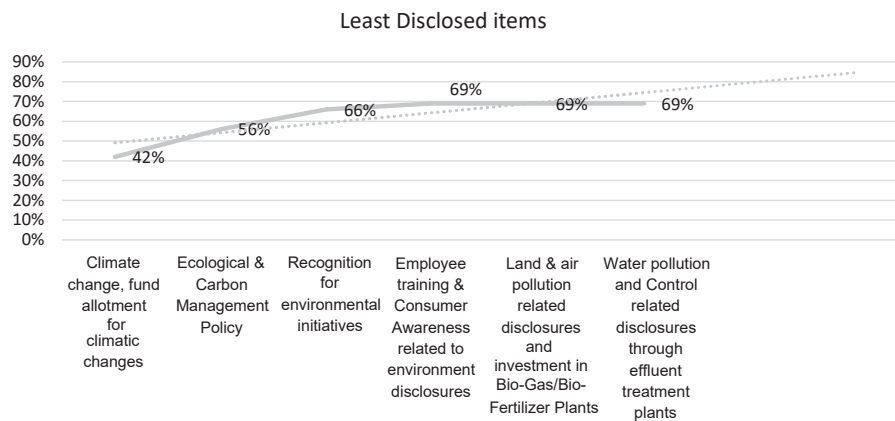


Figure 4. Least disclosed items in annual reports of 2019

green finance. On the contrary, the most neglected environmental disclosure item is fund allotment for climatic changes. Among 69 representative firms, only 24 firms disclose their contribution or fund allotment to face various natural disasters or climatic changes. In addition, the firm's policy toward carbon management policy is also not up to a satisfactory level. Our committed corporate citizens should also facilitate more training programs to make their employees aware of the significance of green policy and its implications. Simultaneously, firms accused of harming the environment in the form of air, water or land pollution should develop technology to minimize their harmful effect and save nature from inevitable extinction. With the authors' best knowledge, investigation to detect the environmental activities that are disclosed mainly by the firms and which items are least disclosed in the context of Bangladesh is the first in its kind in the history of environmental disclosure research and the context of Bangladesh. Therefore, the study adds value to the existing literature by mitigating the current research gap and stimulating future researchers to work further in the same field.

To investigate the answer to the last research question, “Do corporate attributes have any impact on green disclosure practices made by listed financial and nonfinancial institutions in Bangladesh?”, two regression analyses were conducted for financial and nonfinancial institutions (see Table 2).

The regressions are conducted taking EDI as a dependent variable. Two regression models have been developed to carry out the study. The first model is designed for financial institutions and the second model is for nonfinancial institutions.

The regression results show that the two regression models are significant at a 5% level as the F value of the models are 4.83 and 12.924, respectively, suggesting that corporate attributes have an impact on environmental disclosures of both types of firms. The R^2 under the first model is 0.172, which indicates that the model can explain 17.2% of the variability of environmental information disclosure in the sample companies in the study. Furthermore, R^2 under the second model is 0.356, which implies that the model can explain 35.6% of the variability of dependent variables for nonfinancial institutions. The adjusted R^2 for the first regression model is 13.6%. For the second regression model, the value is 32.8%, indicating that more explanatory independent variables have not been considered in the model. The VIF of independent variables is less than 10, which means there is no multicollinearity problem, and sample data fit multiple regression.

The coefficient value of the first regression model shows that firm size, leverage ratio and Human resource cost have passed the significance test at 0.05 level. Among these three independent variables, firm size and leverage ratio have a significant positive relation with EDI, whereas human resource cost (HRC) negatively relates with EDI. However, contrary to our expectations, age of the firms, profitability, independence of board decision and gender diversity in board did not pass the significance. Therefore, it can be concluded that in financial institutions, profitability, age of the firms, gender diversity, and presence of more independent directors in board composition do not impact environmental disclosures made by firms.

The coefficient table of the second regression model (Table 3) shows that firm size and leverage ratio have a significant positive association with EDI. The age of the firm offers a negative relation with EDI. On the contrary, gender diversification has a positive role on the dependent variable. Other variables such as profitability and the presence of independent directors have no relationship with EDI.

	Standardized coefficients (β)	t	Sig.	Tolerance	VIF
(Constant)		-0.429	0.668		
Size of firm	0.362	4.656	0.000	0.840	1.191
Age of firm	0.125	1.472	0.143	0.702	1.424
Human resource cost	-0.492	-4.412	0.000	0.409	2.444
Leverage ratio	0.239	2.305	0.022	0.473	2.116
Profitability	-0.052	-0.453	0.651	0.389	2.572
Independent director	0.010	0.095	0.924	0.445	2.247
Gender diversification	0.061	0.815	0.416	0.896	1.116

$F = 4.831$, $P = 0.00$, $R = 0.172$, R square = 0.172, Adjusted R square = 0.136

Note(s): a. Dependent variable: Environmental disclosure index

b. Selecting only cases for which firm measures = Financial institution

c. Predictors: (Constant), Gender diversification, Age of firm, Size of firm, Leverage ratio, Independent director, Human resource cost, Profitability

Table 2.
Regression result
(financial institution)

	Standardized coefficients (β)	<i>t</i>	Sig.	Tolerance	VIF	Environmental disclosures and corporate attributes
(Constant)		6.221	0.000			
Size of firm	0.537	6.539	0.000	0.583	1.714	
Age of firm	-0.212	-2.656	0.009	0.618	1.619	
Human resource cost	0.148	1.890	0.061	0.642	1.558	
Leverage ratio	0.261	3.874	0.000	0.865	1.156	
Profitability	0.103	1.390	0.167	0.714	1.401	
Independent director	-0.087	-1.236	0.218	0.796	1.256	
Gender diversification	0.174	2.637	0.009	0.904	1.107	
<i>F</i> = 12.924, <i>P</i> = 0.00, <i>R</i> = 0.172, <i>R</i> square = 0.356, Adjusted <i>R</i> square = 0.328						
Note(s): a. Dependent variable: Environmental disclosure index						
b. Selecting only cases for which firm measures = Nonfinancial institution						
c. Predictors: (Constant), Gender diversification, Age of firm, Size of firm, Leverage ratio, Independent director, Human resource cost, Profitability						

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Table 3.
Regression result for nonfinancial institution

5. Discussions

The paper explores the environmental disclosure practices of the publicly listed firms of Bangladesh from the legitimacy theory perspective. A longitudinal analysis has been conducted over 345 annual reports ranging from 2015 to 2019 to gauge the extent of environmental disclosure practices of corporations through effective enforcement of Bangladesh Bank Green Policy Guidelines 2011. Environment-related disclosures are further categorized into three levels: Narrative, Quantitative and Monetary Disclosures to get a narrower view of disclosure trends. The findings suggest that there is a radical improvement in corporate attitude toward environmental reporting. Before the enforcement of Bangladesh Bank Green Policy Guidelines 2011, the disclosure level was poor. During the year 2010–2011, only 2.23% of corporations published their environmental performance as documented by Ahmad (2012), Bose *et al.* (2018) and Nurunnabi (2016).

In contrast, in 2015, almost 50% of the sample firms published their contribution toward the environment in the annual report either in the narrative, quantitative, monetary form or adopting three approaches simultaneously. The rate has been consistently maintained in subsequent years. Thus, it can be recapitulated that enforcement of Green Banking Rules 2011 and other circulars of Bangladesh Bank positively influence the environmental disclosures of commercial banks. The finding is consistent with Bose *et al.* (2018), who argued that strict enforcement of mandatory regulations issued by the Central Bank is the only effective mechanism to encourage environmental disclosure practices. Nurunnabi (2016) also concluded in a similar tone when they conducted a survey in the year 2010–2011 and expressed their urge for a mandatory regulatory framework that is essential to increase environmental disclosures and reshape corporate behavior toward the environment.

The longitudinal analysis also revealed that the narrative approach is the most favored form of environmental disclosure. Quantitative and monetary conditions of disclosures are also well-practiced as the minimum disclosure rate during the sample years is 48% and 40%. The finding is consistent with (Lena *et al.*, 2007), who argued that narrative disclosures are the most common form of companies and stated that quantitative and monetary information was not very popular since the beginning of environmental reporting practices. But strict enforcement of mandatory regulations may stem the practices. Lena *et al.* (2007) also added that companies are increasingly paying attention to quantitative and monetary forms of disclosures.

Further, to answer the second and third research questions, content analysis has been conducted on the authors' compiled checklist of 12 items of environmental disclosures to

compute EDI. Based on the EDI, most disclosed and least disclosed environmental reporting items had been identified. The investigation to address the most favored and neglected areas of environmental reporting items is the first of its kind in Environmental Disclosure research and the context of Bangladesh. Therefore, it will add significant insights to the existing research and offer new avenues for future research. The result revealed that listed companies mainly emphasize tree plantation and forestry-related disclosures (85%) in annual reports, implying that firms invest most in tree plantations. Many sample firms (55 out of 69) report renewable energy performance and reveal how they embrace green management policies (53 sample firms) to run their internal operations. Thus, disclosure on Renewable Energy and Green Management Policy took the second and third ranks of most favored environmental reporting items. The finding is consistent with Masud *et al.* (2018), who argued that Green Finance and Green Management policy are priority areas of environmental reporting of banks, and banks are increasing disclosures in these two areas. The present study also illuminates that the most neglected environmental reporting item is fund allotment for climate change and carbon management policy. Masud *et al.* (2018) expressed their frustration in a similar vein and stressed practicing and reporting on these components because they are labeled the most crucial weapon to combat global warming and the atrocity of climate change. In addition, disclosure rates regarding employees training and customer awareness are also very scanty compared to their merits.

The present study also attempts to examine the impact of corporate attributes on the environmental reporting practices of firms. The analysis revealed that firm size and leverage ratio positively impact environmental reporting for financial and nonfinancial institutions. By the legitimacy settings, large companies disclose a higher volume of information on their websites because they are more accountable to the public regarding environmental activities. Such disclosures often create a platform to gain social appreciation. Moreover, for more prominent companies, this information may already have been collected for internal reporting and decision-making. Hence, they can easily communicate it to external stakeholders by publishing it in their reports. But small firms may have limitations of resources to collect ample information and disseminate it to the public. The finding is also supported by Chowdhury *et al.* (2020), Islam *et al.* (2020), Joshi *et al.* (2011) and Gray *et al.* (2001). The study also found a positive relationship between the leverage ratio and environmental disclosures for financial and nonfinancial institutions. Bangladesh Bank makes it mandatory for all commercial banks to comply with Green Banking Rules 2011. All the financial institutions have to abide by the enforced regulations of the country's central bank. As a part of this mandatory regulation, commercial banks follow Green Finance Policy and impose environmental safety dimensions while approving loans and grants to borrower institutions.

Consequently, levered companies disclose environmental information due to the regulations of financial institutions than non-levered companies. Moreover, companies with high debts tend to establish a good rapport with their interest groups and are more likely to reveal their environmental activities. The finding is aligned with Clarkson *et al.* (2008), who also posited a positive relationship between leverage and level of environmental disclosures. The study observed a mixed relationship between environmental disclosures and the age of firms for financial and nonfinancial institutions. Age is an indicator to measure firms' financial stability and maturity. Findings demonstrate that in the case of nonfinancial institutions, age has an inverse relationship with environmental disclosures. It implies that younger firms want to be legitimate for their stakeholders and establish their reputation in the market. Such firms intend to incorporate environmental safety measures and investment in green policies to manage funds from external sources such as commercial banks. But the age of firms does not influence environmental disclosures of financial institutions because all the financial institutions regulated under Bangladesh Bank are bound to follow Green

Banking Rules 2011 in operating their business and publish annual reports accordingly. Akbas (2014) and Joshi *et al.* (2011) concluded that the age of a company is unrelated to the extent of environmental disclosure. The present study also shows that profitability does not influence environmental disclosure practices. Chowdhury *et al.* (2020), Yusoff and Lehman (2009) and Liu and Anbumozhi (2009) also found no significant relationship between the profitability of firms and environmental disclosures. The result explains that companies are providing the environmental information mainly to alleviate the concerns from the government and to avail myriad benefits such as Tax Rebate, Green Finance, etc.

A vast majority of investors do not find environmental reporting information relevant for their investment portfolios (Joshi *et al.*, 2011; Liu and Anbumozhi, 2009). However, the interest of stakeholders is slowly growing; thus, more firms will opt for opening environmental information. The regression result of the present study also showed that independent directors do not exert any influence on environmental disclosures; the finding is consistent with (Terjesen *et al.*, 2016). Terjesen *et al.* (2016) posited that independent directors are responsible for overseeing the board activities and protecting the minorities. Their presence in board meetings will ensure lawful, transparent and credible board decisions in all material aspects, including environmental contribution and environmental reporting of firms. However, the finding was reversed entirely. After a thorough investigation, they found that the presence of nonexecutive or independent directors does not contribute any effectiveness to a corporation's attitude toward the environment (Terjesen *et al.*, 2016). Guenther *et al.* (2016) and Dinca *et al.* (2019) argued that companies investing more in human resources also reported environmental issues elaborately. The negative relationship between human resource cost and environmental disclosures practices of financial institutions is a remarkable finding of the study, which interprets that banks and other financial institutions who spend more on human resources suffer from a lack of resources for social and environmental activities. Due to resource constraints often, these types of firms are compelled to prioritize their choices. However, it is a matter of hope that the government of Bangladesh has taken initiatives to incentivize corporate houses in different forms such as tax rebate, financial remuneration, award, etc., which may lead to a rapid change in the current scenario. On the contrary, the study obtained an inconclusive relation between human resource costs and environmental disclosures for nonfinancial institutions.

Furthermore, the study shows that female directors do not exert influence on environmental reporting in the case of financial institutions. It can be deduced from the finding that the Central Bank strictly monitors the financial institutions of Bangladesh to comply with the Green Banking Rules 2011. Therefore, all the commercial banks disclose environmental contributions regardless of the board composition. On the contrary, in the case of nonfinancial institutions presence of female directors in board composition has a positive impact on environmental disclosures. The finding is consistent as opined by Elmagrhi *et al.* (2018), Gyapong *et al.* (2016), Nasr and Ntim (2018) and Shahab *et al.* (2018) that if the number of female directors can be enhanced in board composition, they can play an active role to strengthen board attitude toward environmental responsibilities.

6. Managerial implications

6.1 Theoretical implications

The present study supports legitimacy theory and sheds light on the understanding of legitimacy dynamics in the environmental disclosure domain. The strategic legitimacy perspective has been applied to focus on positive environmental disclosures while carrying out the research. Legitimacy theory assumes that successful organizations appear to be operating in conformance with community expectations and are attributed the status of being legitimate (Deegan, 2019). The theory predicts tactics like consistent and predictable exchange behavior for maintaining legitimacy status with pragmatic audiences. Institutional investors,

small investors, public interest groups and the environmentally conscious general public are identified as audiences toward whom managers will direct moral legitimation efforts. These audiences are concerned with “doing the right thing” vis-à-vis the social contract. The Mandatory Environmental Regulatory framework, such as Green Banking Rules 2011, plays a role in the legitimacy dynamics of organization and society interactions. In accordance with the legitimacy theory, large organizations consider the rights of the public at large and not merely those of the investors only. In this manner, they attempt to narrow the legitimacy gap between society’s expectations and the organization’s value system (Joshi *et al.*, 2011).

Moreover, large firms perceive that they will earn social appreciation and public credibility through their legitimate behavior, thus attracting more investors and gaining public support. Highly levered companies also tend to behave in a legitimate approach than non-levered companies as they have to comply with environmental safety dimensions to receive loans and grants. Due to mandatory regulations of financial institutions, levered companies disclose environmental information. Furthermore, the increased debt proportion in capital structure generates incentives among managers to disclose more information to avoid potential nuisances among the shareholders, creditors and managers. It has also been derived from the findings that young nonfinancial entrants want to establish their reputation in the market and be legitimate toward their stakeholders. Compliance with environmental safety measures enables them to manage external funds from commercial banks. Besides, such practices help them avail tax rebates and many other facilities and alleviate concerns from the government. Thus, regardless of profitability, all nonfinancial institutions tend to disclose their environmental contribution in annual reports.

On the contrary, age and profitability seem unrelated to the environmental reporting of financial institutions. All the financial intuitions governed by the Central Bank of Bangladesh compulsorily practice and publish their Green initiatives according to Green Banking Rules 2011. The present study witnessed that none of the practicing firms of Bangladesh disclose any negative information, for instance, the hazardous impact of their operation on the environment and its volume/quantity. Perhaps they are in fear of losing credibility from stakeholders. Firms adopt environmental disclosure practices as an influential catalyst to share a credible and long-lasting relationship with society.

6.2 Practical implications

The findings of the study provide several managerial implications. The trend of environmental disclosures shows that around 50% of sample companies disclose environmental information in either narrative, qualitative or monetary form. These percentages remain consistent in the last five years, which is an exponential growth compared to the previous decade when such reporting rate was 2.23% on an average (Bose *et al.*, 2018). Bangladesh Bank deserves a lion portion of appreciation for such rapid growth in environmental reporting. Through Green Banking initiatives 2011, the central bank makes it mandatory for all financial institutions to disclose their environmental activities and encourage nonfinancial institutions to behave in the same manner through Green Finance policies. The study also observed that many listed institutions did not practice environmental reporting, and the rate remained stagnant over the years. Regulatory bodies of the country’s nonfinancial institutions may initiate institutional guidelines to stimulate these noncompliant firms to accelerate their environmental activities and green strategies and thus boost environmental reporting. The government and regulatory bodies may also consider increasing the benefits of compliance with the Green Law through market-based incentives to intensify the level of corporate commitment to save green.

The study highlights that the most neglected environmental reporting items are fund allotment for climate change and carbon management policy. The policymakers need to provide some orientation programs for listed companies to make them aware of climate

change, the role of carbon management policy in Bangladesh and how it will affect their businesses. International policymakers (such as the Intergovernmental Panel on Climate Change (IPCC), the European Union, the World Bank, the UN Environment Programme, the International Energy Agency and the World Economic Forum) can develop strategies to make the local companies more socially accountable to climate change reporting and carbon management policy in the most vulnerable countries.

In addition, our Government and regulatory bodies also put attention on the independence of independent board members appointed by listed firms. Independent directors influence firms' strategic attitude toward environmental performances and report without compromising their independence.

The study's findings can be generalized for other non-listed banks, nonbank financial institutions and non-listed firms across different industries like cement industries, shipbuilders, steel industries, telecommunication industries, tobacco companies, agro-based industries, pulp and paper mills and jute processing companies. The findings may also apply to other emerging economies where environmental contamination has become a rising concern and environmental performances and reporting initiatives have emerged in recent years.

7. Future avenues of research

Notwithstanding the observations mentioned above in the study, the current research acknowledges a few limitations of the study. First, the study observed that the R^2 value of regression models is low, indicating that few other vital variables could have been considered. Hence, a better conclusion could be drawn. Although the limitation may not affect the findings, further research may be warranted to navigate the field in a narrower approach. Future research may also take into consideration whether environmental disclosures provide long-term benefits for stakeholders. Although the study demonstrates the extent and quality of environmental disclosures, an in-depth analysis could also identify why certain items are least disclosed. For instance, the study observed that fund allotment for climatic changes; carbon management policy is the few least disclosed items. Future research may consider how corporations will earn social appreciation and motivation by investing in those least preferred items in the legitimacy theory setting. A comparative analysis among the environmentally sensitive industries may provide valuable insights to address any differences among the most disclosed and least disclosed environmental initiatives taken by them.

References

- Abubakar, A.M., Elrehail, H., Alatailat, M.A. and Elçi, A. (2019), "Knowledge management, decision-making style and organizational performance", *Journal of Innovation and Knowledge*, Vol. 4 No. 2, pp. 104-114, doi: 10.1016/j.jik.2017.07.003.
- Aggarwal, K. and Verma, A. (2020), "Effect of company characteristics on human resource disclosure index: empirical evidences from Indian corporates", *Management and Labour Studies*, Vol. 45 No. 1, pp. 85-117, doi: 10.1177/0258042x19890246.
- Ahmad, A. (2012), "Bangladeshi companies", *Global Journal of Management and Business Research*, Vol. 12 No. 14, pp. 118-127.
- Akbas, H.E. (2014), "Company characteristics and environmental disclosure: an empirical investigation on companies listed on Borsa Istanbul 100 index", *The Journal of Accounting and Finance*, Vol. 62, pp. 145-164.
- Akhter, F., Hossain, M.R., Omrane, A. and Kabir, M.R. (2021), "Impact of corporate attributes on human resource disclosure practices, evidences from commercial banks of Bangladesh", *FIIIB Business Review*. doi: 10.1177/23197145211039344.

- Al Arussi, A.S., Selamat, M.H. and Mohd Hanefah, M. (2009), "Determinants of financial and environmental disclosures through the internet by Malaysian companies", *Asian Review of Accounting*, Vol. 17 No. 1, pp. 59-76, doi: 10.1108/13217340910956513.
- Al-Tuwaijri, S.A., Christensen, T.E. and Hughes, K.E. (2004), "The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach", *Accounting, Organizations and Society*, Vol. 29 Nos 5-6, pp. 447-471, doi: 10.1016/S0361-3682(03)00032-1.
- Alhazaimieh, A., Palaniappan, R. and Almsafir, M. (2014), "The impact of corporate governance and ownership structure on voluntary disclosure in annual reports among listed Jordanian companies", *Procedia - Social and Behavioral Sciences*, Vol. 129, pp. 341-348, doi: 10.1016/j.sbspro.2014.03.686.
- Alnabsha, A., Abdou, H.A., Ntim, C.G. and Elamer, A.A. (2018), "Corporate boards, ownership structures and corporate disclosures : evidence from a developing country", *Journal of Applied Accounting Research*, Vol. 19 No. 1, pp. 20-41, doi: 10.1108/JAAR-01-2016-0001.
- Alnajdawi, S., Emeagwali, O.L. and Elrehail, H. (2017), "The interplay among green human resource practices, organization citizenship behavior for environment and sustainable corporate performance: evidence from Jordan", *Journal of Environmental Accounting and Management*, Vol. 5 No. 3, pp. 169-182, doi: 10.5890/JEAM.2017.9.001.
- Alsaad, A., Elrehail, H. and Saif-Alyousfi, A.Y.H. (2021), "The interaction among religiosity, moral intensity and moral certainty in predicting ethical consumption: a study of Muslim consumers", *International Journal of Consumer Studies*. doi: 10.1111/ijcs.12688.
- Archel, P., Husillos, J., Larrinaga, C. and Spence, C. (2009), "Social disclosure, legitimacy theory and the role of the state", *Accounting, Auditing and Accountability Journal*, Vol. 22 No. 8, pp. 1284-1307, doi: 10.1108/09513570910999319.
- Asif, M., Searcy, C., Zutshi, A. and Fisscher, O.A.M. (2013), "An integrated management systems approach to corporate social responsibility", *Journal of Cleaner Production*, Vol. 56, pp. 7-17, doi: 10.1016/j.jclepro.2011.10.034.
- Bank, B. (2011), "Banking regulation & policy department Bangladesh bank head office Dhaka", *Bangladesh Bank Website*, pp. 2-7.
- Becker, S., Bouzdine-Chameeva, T. and Jaegler, A. (2020), "The carbon neutrality principle: a case study in the French spirits sector", *Journal of Cleaner Production*, Vol. 274, 122739, doi: 10.1016/j.jclepro.2020.122739.
- Belal, A.R., Cooper, S.M. and Khan, N.A. (2015), "Corporate environmental responsibility and accountability: what chance in vulnerable Bangladesh?", *Critical Perspectives on Accounting*, Vol. 33, pp. 44-58, doi: 10.1016/j.cpa.2015.01.005.
- Benlemlih, M., Ge, J. and Zhao, S. (Emma) (2020), "Undervaluation and non-financial disclosure: evidence from voluntary CSR news releases", *SSRN Electronic Journal*, doi: 10.2139/ssrn.3565465.
- Bose, S., Khan, H.Z., Rashid, A. and Islam, S. (2018), "What drives green banking disclosure? An institutional and corporate governance perspective", *Asia Pacific Journal of Management*, Vol. 35 No. 2, pp. 501-527, doi: 10.1007/s10490-017-9528-x.
- Brammer, S. and Pavelin, S. (2008), "Factors influencing the quality of corporate environmental disclosure", *Business Strategy and the Environment*, Vol. 17 No. 2, pp. 120-136, doi: 10.1002/bse.506.
- Chandok, R.I.S. and Singh, S. (2017), "Empirical study on determinants of environmental disclosure: approach of selected conglomerates", *Managerial Auditing Journal*, Vol. 32 Nos 4-5, pp. 332-355, doi: 10.1108/MAJ-03-2016-1344.
- Chatterjee, B. and Mir, M.Z. (2008), "The current status of environmental reporting by Indian companies", *Managerial Auditing Journal*.
- Chen, H.M. and Lin, K.J. (2004), "The role of human capital cost in accounting", *Journal of Intellectual Capital*, Vol. 5 No. 1, pp. 116-130, doi: 10.1108/14691930410512950.

- Cho, C.H. and Patten, D.M. (2013), "Green accounting: reflections from a CSR and environmental disclosure perspective", *Critical Perspectives on Accounting*, Vol. 24 No. 6, pp. 443-447, doi: 10.1016/j.cpa.2013.04.003.
- Chowdhury, M.A.A., Dey, M. and Abedin, M.T. (2020), "Firms' attributes and environmental disclosure: evidence from listed firms in Bangladesh", *Asian Journal of Accounting Perspectives*, Vol. 13 No. 2, pp. 57-77, doi: 10.22452/ajap.vol13no2.4.
- Clarkson, P.M., Li, Y., Richardson, G.D. and Vasvari, F.P. (2008), "Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis", *Accounting, Organizations and Society*, Vol. 33 Nos 4-5, pp. 303-327, doi: 10.1016/j.aos.2007.05.003.
- Comyns, B. (2016), "Determinants of GHG reporting: an analysis of global oil and gas companies", *Journal of Business Ethics*, Vol. 136 No. 2, pp. 349-369, doi: 10.1007/s10551-014-2517-9.
- Deegan, C.M. (2019), "Legitimacy theory: despite its enduring popularity and contribution, time is right for a necessary makeover", *Accounting, Auditing and Accountability Journal*, Vol. 32 No. 8, pp. 2307-2329, doi: 10.1108/AAAJ-08-2018-3638.
- Deegan, C. and Blomquist, C. (2006), "Stakeholder influence on corporate reporting: an exploration of the interaction between WWF-Australia and the Australian minerals industry", *Accounting, Organizations and Society*, Vol. 31 Nos 4-5, pp. 343-372, doi: 10.1016/j.aos.2005.04.001.
- Dinca, M.S., Madaleno, M., Baba, M.C. and Dinca, G. (2019), "Environmental information transparency-evidence from Romanian companies", *Sustainability (Switzerland)*, Vol. 11 No. 18, pp. 1-22, doi: 10.3390/su11185040.
- Elmagrhi, M.H., Ntim, C.G., Elamer, A.A. and Zhang, Q. (2018), "A study of environmental policies and regulations, governance structures, and environmental performance: the role of female directors", *Business Strategy and the Environment*, Vol. 28 No. 1, pp. 206-220, doi: 10.1002/bse.2250.
- Elrehail, H., Harazneh, I., Abuhjeeleh, M., Alzghoul, A., Alnajdawi, S. and Ibrahim, H.M.H. (2020), "Employee satisfaction, human resource management practices and competitive advantage: the case of Northern Cyprus", *European Journal of Management and Business Economics*, Vol. 29 No. 2, pp. 125-149, doi: 10.1108/EJMBE-01-2019-0001.
- Elrehail, H., Behraves, E., Abubakar, A.M., Obeidat, S.M., Alsaad, A., Cizreliogullari, M.N. and Alatailat, M. (2021), "High-performance work systems, psychological capital and future time perspective: a cross-nations study Title", *European Journal of International Management*. doi: 10.1504/EJIM.2021.10038441.
- Fama, E.F. and Jensen, M.C. (1983), "Separation of ownership and control", *The Journal of Law and Economics*, Vol. 26 No. 2, pp. 301-325.
- Gray, R., Javad, M., Power, D.M. and Sinclair, C.D. (2001), "Social and environmental disclosure and corporate characteristics: a research note and extension", *Journal of Business Finance and Accounting*, Vol. 28 Nos 3-4, pp. 327-356, doi: 10.1111/1468-5957.00376.
- Gregory, A., Whittaker, J. and Yan, X. (2016), "Corporate social performance, competitive advantage, earnings persistence and firm value", *Journal of Business Finance and Accounting*, Vol. 43 Nos 1-2, pp. 3-30, doi: 10.1111/jbfa.12182.
- Guenther, E., Guenther, T., Schiemann, F. and Weber, G. (2016), "Stakeholder relevance for reporting: explanatory factors of carbon disclosure", *Business and Society*, Vol. 55 No. 3, pp. 361-397, doi: 10.1177/0007650315575119.
- Guillamon-Saorin, E., Isidro, H. and Marques, A. (2017), "Impression management and non-GAAP disclosure in earnings announcements", *Journal of Business Finance and Accounting*, Vol. 44 Nos 3-4, pp. 448-479, doi: 10.1111/jbfa.12238.
- Gul, F.A. and Leung, S. (2004), "Board leadership, outside directors' expertise and voluntary corporate disclosures", *Journal of Accounting and Public Policy*, Vol. 23 No. 5, pp. 351-379, doi: 10.1016/j.jaccpubpol.2004.07.001.
- Gyapong, E., Monem, R.M. and Hu, F. (2016), "Do women and ethnic minority directors influence firm value? Evidence from post-apartheid South Africa", *Journal of Business Finance and Accounting*, Vol. 43 Nos 3-4, pp. 370-413, doi: 10.1111/jbfa.12175.

- Hahn, R. and Lülfs, R. (2014), "Legitimizing negative aspects in GRI-oriented sustainability reporting: a qualitative analysis of corporate disclosure strategies", *Journal of Business Ethics*, Vol. 123 No. 3, pp. 401-420, doi: 10.1007/s10551-013-1801-4.
- Hasseldine, J., Salama, A.I. and Toms, J.S. (2005), "Quantity versus quality: the impact of environmental disclosures on the reputations of UK Plcs", *British Accounting Review*, Vol. 37 No. 2, pp. 231-248, doi: 10.1016/j.bar.2004.10.003.
- Ho, S.S.M. and Shun Wong, K. (2001), "A study of the relationship between corporate governance structures and the extent of voluntary disclosure", *Journal of International Accounting, Auditing and Taxation*, Vol. 10 No. 2, pp. 139-156, doi: 10.1016/S1061-9518(01)00041-6.
- Hossain, M.M., Momin, M.A., Rowe, A.L. and Quaddus, M. (2017), "Corporate social and environmental reporting practices: a case of listed companies in Bangladesh", *Sustainability Accounting, Management and Policy Journal*, Vol. 8 No. 2, pp. 138-165, doi: 10.1108/SAMPJ-04-2015-0027.
- Hossain, T., Ahammed, B., Chanda, S.K., Jahan, N., Ela, M.Z. and Islam, N. (2020), "Social and electronic media exposure and generalized anxiety disorder among people during COVID-19 outbreak in Bangladesh: a preliminary observation", *PLoS ONE*, Vol. 15, 9 September, doi: 10.1371/journal.pone.0238974.
- Hubbard, G. (2009), "Measuring organizational performance: beyond the triple bottom line", *Business Strategy and the Environment*, Vol. 18 No. 3, pp. 177-191, doi: 10.1002/bse.564.
- Hummel, P. and Hörisch, J. (2020), "It's not what you say, but how you say it: how the provision of qualitative, quantitative and monetary environmental information influences companies' internal decision making", *Journal of Cleaner Production*, Vol. 268, doi: 10.1016/j.jclepro.2020.122247.
- Hutman, F.C., Hussein, K.M. and Tariq Tawfeeq, Y.A. (2021), "Does environmental management accounting matter in promoting sustainable development? A study in Iraq", *Journal of Accounting Science*, Vol. 5 No. 2, pp. 114-126, doi: 10.21070/jas.v5i2.1543.
- Islam, M.S., Miah, M.S. and Fakir, A.A. (2015), "Environmental accounting and reporting-an analysis of Bangladeshi corporate sector", *Journal of International Business Studies*, Vol. 1, January, pp. 1-14.
- Islam, M.T., Kokubu, K. and Nishitani, K. (2020), "Corporate social reporting in the banking industry of Bangladesh: a test of legitimacy theory", *Social Responsibility Journal*, doi: 10.1108/SRJ-05-2019-0185.
- Joshi, P.L., Suwaidan, M.S. and Kumar, R. (2011), "Determinants of environmental disclosures by Indian industrial listed companies: empirical study", *International Journal of Accounting and Finance*, Vol. 3 No. 2, p. 109, doi: 10.1504/ijaf.2011.043843.
- Juhmani, O. (2014), "Determinants of corporate social and environmental disclosure on websites: the case of Bahrain", *Universal Journal of Accounting and Finance*, Vol. 2 No. 4, pp. 77-87, doi: 10.13189/ujaf.2014.020402.
- Kaium Masud, M.A., Mi Bae, S. and Kim, J.D. (2017), "Analysis of environmental accounting and reporting practices of listed banking companies in Bangladesh", *Sustainability (Switzerland)*, Vol. 9 No. 10, pp. 1-19, doi: 10.3390/su9101717.
- Kaur, S., Raman, A.V. and Singhanian, M. (2014), "Human resource accounting disclosure practices in Indian companies", *Vision: The Journal of Business Perspective*, Vol. 18 No. 3, pp. 217-235, doi: 10.1177/0972262914540227.
- Khan, S.Z., Yang, Q. and Waheed, A. (2019), "Investment in intangible resources and capabilities spurs sustainable competitive advantage and firm performance", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 2, pp. 285-295, doi: 10.1002/csr.1678.
- Lee, H. (2007), *Intergovernmental Panel on Climate Change*.
- Li, D., Huang, M., Ren, S., Chen, X. and Ning, L. (2018), "Environmental legitimacy, green innovation, and corporate carbon disclosure: evidence from CDP China 100", *Journal of Business Ethics*, Vol. 150 No. 4, pp. 1089-1104, doi: 10.1007/s10551-016-3187-6.

- Liesen, A., Figge, F., Hoepner, A. and Patten, D.M. (2017), "Climate change and asset prices: are corporate carbon disclosure and performance priced appropriately?", *Journal of Business Finance and Accounting*, Vol. 44 Nos 1-2, pp. 35-62, doi: 10.1111/jbfa.12217.
- Liu, X. and Anbumozhi, V. (2009), "Determinant factors of corporate environmental information disclosure: an empirical study of Chinese listed companies", *Journal of Cleaner Production*, Vol. 17 No. 6, pp. 593-600, doi: 10.1016/j.jclepro.2008.10.001.
- Llena, F., Moneva, J.M. and Hernandez, B. (2007), "Environmental disclosures and compulsory accounting standards: the case of Spanish annual reports", *Business Strategy and the Environment*, Vol. 16 No. 1, pp. 50-63, doi: 10.1002/bse.466.
- Luo, L. and Tang, Q. (2014), "Does voluntary carbon disclosure reflect underlying carbon performance?", *Journal of Contemporary Accounting and Economics*, Vol. 10 No. 3, pp. 191-205, doi: 10.1016/j.jcae.2014.08.003.
- Maama, H. and Appiah, K.O. (2019), "Green accounting practices: lesson from an emerging economy", *Qualitative Research in Financial Markets*, Vol. 11 No. 4, pp. 456-478, doi: 10.1108/QRFM-02-2017-0013.
- Markard, J. and Holt, E. (2003), "Disclosure of electricity products-lessons from consumer research as guidance for energy policy", *Energy Policy*, Vol. 31 No. 14, pp. 1459-1474, doi: 10.1016/S0301-4215(02)00201-X.
- Masud, M.A.K., Hossain, M.S. and Kim, J.D. (2018), "Is green regulation effective or a failure: comparative analysis between Bangladesh Bank (BB) green guidelines and global reporting initiative guidelines", *Sustainability (Switzerland)*, Vol. 10 No. 4, doi: 10.3390/su10041267.
- McGuinness, P.B., Vieito, J.P. and Wang, M. (2017), "The role of board gender and foreign ownership in the CSR performance of Chinese listed firms", *Journal of Corporate Finance*, Vol. 42, pp. 75-99, doi: 10.1016/j.jcorpfin.2016.11.001.
- Michelon, G. and Parbonetti, A. (2012), "The effect of corporate governance on sustainability disclosure", *Journal of Management and Governance*, Vol. 16 No. 3, pp. 477-509, doi: 10.1007/s10997-010-9160-3.
- Milne, M.J. and Patten, D.M. (2002), "Securing organizational legitimacy: an experimental decision case examining the impact of environmental disclosures", *Accounting, Auditing and Accountability Journal*, Vol. 15 No. 3, doi: 10.1108/09513570210435889.
- Mohd Ghazali, N.A. and Weetman, P. (2006), "Perpetuating traditional influences: voluntary disclosure in Malaysia following the economic crisis", *Journal of International Accounting, Auditing and Taxation*, Vol. 15 No. 2, pp. 226-248, doi: 10.1016/j.intaccaudtax.2006.08.001.
- Nasr, M.A. and Ntim, C.G. (2018), "Corporate governance mechanisms and accounting conservatism: evidence from Egypt", *Corporate Governance (Bingley)*, Vol. 18 No. 3, pp. 386-407, doi: 10.1108/CG-05-2017-0108.
- Ntim, C.G., Opong, K.K. and Danbolt, J. (2012), "The relative value relevance of shareholder versus stakeholder corporate governance disclosure policy reforms in South Africa", *Corporate Governance: An International Review*, Vol. 20 No. 1, pp. 84-105, doi: 10.1111/j.1467-8683.2011.00891.x.
- Nurunnabi, M. (2015), "The impact of cultural factors on the implementation of global accounting standards (IFRS) in a developing country", *Advances in Accounting*, Vol. 31 No. 1, pp. 136-149.
- Nurunnabi, M. (2016), "Who cares about climate change reporting in developing countries? The market response to, and corporate accountability for, climate change in Bangladesh", *Environment, Development and Sustainability*, Vol. 18 No. 1, pp. 157-186, doi: 10.1007/s10668-015-9632-3.
- Parker, L.D. (2005), "Social and environmental accountability research: a view from the commentary box", *Accounting, Auditing and Accountability Journal*, Vol. 18 No. 6, pp. 842-860, doi: 10.1108/09513570510627739.
- Perez-Batres, L.A., Doh, J.P., Miller, V.V. and Pisani, M.J. (2012), "Stakeholder pressures as determinants of CSR strategic choice: why do firms choose symbolic versus substantive self-regulatory codes of conduct?", *Journal of Business Ethics*, Vol. 110 No. 2, pp. 157-172, doi: 10.1007/s10551-012-1419-y.

- Qureshi, M.E., Reeson, A., Reinelt, P., Brozović, N. and Whitten, S. (2012), "Facteurs déterminant la valeur économique de l'eau souterraine", *Hydrogeology Journal*, Vol. 20 No. 5, pp. 821-829, doi: 10.1007/s10040-012-0867-x.
- Rehman, S.U., Elrehail, H., Nair, K., Bhatti, A. and Taamneh, A.M. (2021), "MCS package and entrepreneurial competency influence on business performance: the moderating role of business strategy", *European Journal of Management and Business Economics*. doi: 10.1108/EJMBE-04-2020-0088.
- Reimsbach, D. (2013), "The Effects of negative incidents in sustainability reporting on investors' judgments – an experimental study of third-party versus self-disclosure in the realm of sustainable development", doi: 10.1002/bse.1816.
- Said, R., Zainuddin, Y. and Haron, H. (2009), "The relationship between corporate social responsibility disclosure and corporate governance characteristics in Malaysian public listed companies", *Social Responsibility Journal*, Vol. 5 No. 2, pp. 212-226, doi: 10.1108/17471110910964496.
- Said, R., Omar, N. and Abdullah, W.N. (2013), "Empirical investigations on boards, business characteristics, human capital and environmental reporting", *Social Responsibility Journal*, Vol. 9 No. 4, pp. 534-553, doi: 10.1108/SRJ-02-2012-0019.
- Samaha, K., Dahawy, K., Hussainey, K. and Stapleton, P. (2012), "The extent of corporate governance disclosure and its determinants in a developing market: the case of Egypt", *Advances in Accounting*, Vol. 28 No. 1, pp. 168-178, doi: 10.1016/j.adiac.2011.12.001.
- Samarah, T., Bayram, P., Aljuhmani, H.Y. and Elrehail, H. (2021), "The role of brand interactivity and involvement in driving social media consumer brand engagement and brand loyalty: the mediating effect of brand trust", *Journal of Research in Interactive Marketing*. doi: 10.1108/JRIM-03-2021-0072.
- Shahab, Y., Ntim, C.G., Chengang, Y., Ullah, F. and Fosu, S. (2018), "Environmental policy, environmental performance, and financial distress in China: do top management team characteristics matter?", *Business Strategy and the Environment*, Vol. 27 No. 8, pp. 1635-1652, doi: 10.1002/bse.2229.
- Singh, S. and Kansal, M. (2011), "Voluntary disclosures of intellectual capital: an empirical analysis", *Journal of Intellectual Capital*, Vol. 12 No. 2, pp. 301-318, doi: 10.1108/14691931111123430.
- Sobhani, F.A., Amran, A. and Zainuddin, Y. (2012), "Sustainability disclosure in annual reports and websites: a study of the banking industry in Bangladesh", *Journal of Cleaner Production*, Vol. 23 No. 1, pp. 75-85.
- Taamneh, A., Alsaad, A.K. and Elrehail, H. (2018), "HRM practices and the multifaceted nature of organization performance", *EuroMed Journal of Business*, Vol. 13 No. 3, pp. 315-334, doi: 10.1108/EMJB-02-2018-0010.
- Tagesson, T., Blank, V., Broberg, P. and Collin, S.-O. (2009), "What explains the extent and content of social disclosures on corporate websites?", *Corporate Social Responsibility and Environmental Management*, Vol. 16, March, pp. 352-364.
- Terjesen, S., Couto, E.B. and Francisco, P.M. (2016), "Does the presence of independent and female directors impact firm performance? A multi-country study of board diversity", *Journal of Management and Governance*, Vol. 20 No. 3, pp. 447-483, doi: 10.1007/s10997-014-9307-8.
- Tilling, M.V. and Tilt, C.A. (2010), "The edge of legitimacy: voluntary social and environmental reporting in Rothmans' 1956-1999 annual reports", *Accounting, Auditing and Accountability Journal*, Vol. 23 No. 1, doi: 10.1108/09513571011010600.
- Ur Rehman, S., Elrehail, H., Alsaad, A. and Bhatti, A. (2021), "Intellectual capital and innovative performance: a mediation-moderation perspective", *Journal of Intellectual Capital*. doi: 10.1108/JIC-04-2020-0109.
- Vazakidis, A., Stavropoulos, A. and Galani, D. (2013), "Company characteristics and human resource disclosure in Greece", *Procedia Technology*, Vol. 8, Haicta, pp. 112-121, doi: 10.1016/j.protcy.2013.11.016.
- Yingjun, L., Indra, A. and Corinne, C. (2015), "Corporate social responsibility reporting quality, board characteristics and corporate social reputation: evidence from China", *Pacific Accounting Review*, Vol. 27 No. 1, pp. 95-118, doi: 10.1108/PAR-10-2012-0053.

- Yu, H.C., Kuo, L. and Ma, B. (2020), "The drivers of carbon disclosure: evidence from China's sustainability plans", *Carbon Management*, pp. 1-16. doi: 10.1080/17583004.2020.1796142.
- Yusoff, H. and Lehman, G. (2008), "International differences on corporate environmental accounting developments: a comparison between Malaysia and Australia", *Accounting and Finance in Transition*, Greenwich University Press, University of Greenwich, Vol. 4 No. 2, pp. 92-124.
- Yusoff, H. and Lehman, G. (2009), "Corporate environmental reporting through the lens of semiotics", *Asian Review of Accounting*, Vol. 17 No. 3, pp. 226-246, doi: 10.1108/13217340910991938.

Further reading

- Ara, M. and Harani, B. (2020), "Integrated reporting insight: why organisation voluntarily reports?", *International Journal of Scientific and Technology Research*, Vol. 9 No. 1, pp. 3055-3069.

Appendix 1

1. Dutch Bangla Bank Limited
2. The City Bank Limited
3. Islamic Bank Bangladesh Limited
4. Eastern Bank Limited
5. Al-Arafah Islamic Bank Limited
6. Dhaka Bank Limited
7. Uttara Bank Limited
8. Standard Bank Limited
9. BRAC Bank Limited
10. Prime Bank Limited
11. Social Islamic Bank Limited
12. First Security Bank Limited
13. Mercantile Bank Limited
14. One Bank Limited
15. IFIC Bank Limited
16. ICB Islamic Bank Limited
17. Shahjalal Islamic Bank Limited
18. EXIM Bank Limited
19. Bank Asia Limited
20. AB Bank Limited
21. Premier Bank Limited
22. Southeast Bank
23. National Bank Limited
24. UCB Limited
25. Jamuna Bank Limited
26. NCC Bank Limited
27. Pubali Bank Limited
26. Rupali Bank Limited
27. Trust Bank Limited
28. NCC Bank Limited
29. IDLC Finance Limited
30. United Finance Limited
31. City General Insurance Company Limited
32. Eastern Insurance Company Limited
33. Nitol Insurance Company Limited
34. Central Insurance Company Limited

Table A1.
List of sample bank and nonbank financial institutions under Dhaka Stock Exchange

EJMBE
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1. Heidelberg Cement Limited
2. Meghna Cement Limited
3. Crown Cement Limited
4. RAK Ceramic Limited
5. Fu-Wang Ceramic Industries Limited
6. Shinepukur Ceramics Limited
7. BSRM Steels Limited
8. RSRM Steels Limited
9. GPH Ishpat Limited
10. Navana CNG Limited
11. Singer Bangladesh Limited
12. Hakkani Pulp and Paper Mills Limited
13. Western Marine Shipyard Limited
14. Aamra Technology Limited
15. BDCOM Online Limited
16. Acme Laboratory
17. ACI Limited
18. Square Pharmaceutical
19. Reneta Limited
20. IBNSINA Pharma
21. Orion Pharma
22. Baximco Pharma
23. Titas Gas Transmission and Distribution Company Limited
25. Lanka Bangla
26. IDLC Finance Limited
27. United Finance Limited
28. City General Insurance Company Limited
29. United Power and Distribution
30. Meghna Petroleum Limited
31. Linde Bangladesh Limited
32. British American Tobacco Bangladesh Company Limited
33. Golden Harvest Agro Industries Limited
34. Bata Shoe Company (Bangladesh) Limited
35. Bangladesh Export Import Company Limited

Table A2.
List of sample
nonfinancial
institutions under
Dhaka Stock Exchange

Appendix 2**Environmental disclosures and corporate attributes**

Bangladesh Bank Green Reporting Guidelines 2011**GRI code****Green finance (A)**

GR3 – Encouraging investment in renewable energy project, clean water project, wastewater and management treatment plant, solid and hazardous disposal plant, and green and environmental innovation and technology

Green office and green management disclosures (B)GR5 – Green office management
Energy use, saving and efficiency; electricity consumption and saving; gas and fuel consumption and saving; water consumption and saving; less consumption of paper; eco-printing; using solar energy; green office guide; reduce business travel
GR7 – Stakeholders' training and awareness
Social, investors and customers awareness of environmental, water and air pollution; using renewable sources of energy; tree plantation; use energy-efficient vehicles; regular training to the employees; introducing green day and green events
GR11 – Reward and motivation
Ranking top ten green firms; risk rating facility; positive impact on CAMEL rating; opening new branches; CSR rating; tax benefit; gaining circulation of Green logo**Other green disclosures (C)**GR4 – Climate change risk fund
Climate change responsibility; formulation and utilization of climate change fund for flood, cyclone and drought; ensure more financing in the climate-vulnerable areas and sectors
GR2 – Environmental risk management auditing guidelines and reporting format considering environmental and climate risks; introducing environmental due diligence checklist

369**Table A3.**
Bangladesh
Green Banks**Corresponding author**Hamzah Elrehail can be contacted at: cs-hamzah@hotmail.com

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Saving the moral self: unethical leadership and employee behaviors – a moral cleansing perspective

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Abstract

Purpose – The purpose of this study is to investigate the concept of vicarious moral cleansing and scrutinize whether unethical behavior of leaders initiate moral cleansing in subordinates or not. This study also highlights a boundary condition under which employees are motivated to cleanse their moral self-image through increased organizational citizenship behaviors and decreased counterproductive work behaviors.

Design/methodology/approach – The study is quantitative based on hypothesis testing. By adopting convenience sampling technique, employees working at all managerial levels of service sector organizations were asked to fill out the questionnaires. Being a time-lagged study, data for independent variable (unethical leadership) and moderator (relational self-construal) were collected at T1, data for mediator (moral self-image) were collected at T2 and data for outcomes (OCBs, CWBs) were collected at T3 from same respondents. To rule out the possibility of common method bias and social desirability bias, a multi-wave design was adopted and respondents were asked to provide unique keys/IDs instead of their names.

Findings – This study investigated the impact that unethical leaders impose on employee self-concept. Moreover, this study also explored the motivational tendencies of moral self-image. Findings suggest that employees' desirable or undesirable behaviors against leader are dependent upon the perceptions related with their own role, self-image and perception of leader's integrity and intentions. Leader's unethicality is perceived threatening for their own moral self-image and they deal with it constructively. This study has laid the foundation for presence of vicarious moral cleansing in organizational setup, and it is advised that researchers must investigate this phenomenon in different settings to provide useful insights.

Research limitations/implications – Due to lack of resources, employing a pure longitudinal research design was not feasible, and therefore a time-lagged research design was used to gather data from only two cities of Pakistan. However, authors believe that a longitudinal research design, with data collection from a larger sample, will provide more fine-grained results. Secondly, use of perceived leader's integrity scale to measure unethical leadership is another limitation. Although the authors tried to address this issue by conducting an EFA and adopting only suitable items, yet a new scale which is able to measure the true essence of unethical leadership ought to be developed.

Originality/value – Use of moral self-image as an indicator of moral cleansing is an additional contribution of this study, as previous studies used levels of guilt as driving force behind moral cleansing and compensatory cleansing. Most of the studies on unethical leadership as well as moral cleansing took place in the Western context and scholars' stress that culture can substantially influence outcomes of these constructs. Thus, this study extends the literature on moral cleansing and moral self-regulation by developing and testing a model in cultural settings of Pakistan.

Keywords Unethical leadership, Moral cleansing, Moral self-image, Self-construal

Paper type Research paper



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Introduction

Current era has witnessed many communal scandals linked with unethical and immoral practices of leaders, which urged researchers to investigate when and how unethical leaders are affecting their subordinates and how the subordinates respond toward them (Schyns and Schillings, 2013; Shaw *et al.*, 2020). Unethical leadership, as defined by Brown and Mitchell (2010), is a leadership style where leaders themselves act unethically and also impose practices and procedures which permit and promote unethicity of their followers. These leaders indulge in immoral and unethical practices, set up an environment conducive for unethical practices and impose great harm for the organization, yet research on this important leadership style is lagging both empirically and theoretically (Brown and Mitchell, 2010; Eisenbeiß and Brodbeck, 2014).

Mainstream research comprehends that leader's unethical conduct results in low productivity, poor performance, decreased well-being, emotional dissonance and psychological disorders (Ferris *et al.*, 2009; Mesdaghinia *et al.*, 2019; Vriend *et al.*, 2020). Moreover, subordinates of these leaders respond with hostility, deviance, supervisor-directed aggression and organizational sabotage (Chi and Liang, 2013; Burton and Hoobler, 2011; Thau and Mitchell, 2010). Yet, there is some recent evidence which suggests that employees differ in their response toward leaders and different employees deal with them differently. Employees play an agentic role, and instead of passively absorbing the harm caused by unethical leaders, they behave mindfully and consciously try to mitigate the effects of these leaders (Milosevic *et al.*, 2020), that is, some employees respond toward unethical leaders with deviance, while others indulge in impression management, thus handling this adverse experience positively. The literature investigating the positive responses to dark leadership is sparse. Yet, scholars and practitioners are interested in knowing that why and when employees indulge in prosocial actions, exercise self-control and regulate their behavior despite the negative experiences with the leader (Vogel and Mitchell, 2017; Wee *et al.*, 2017a, b). Lin *et al.* (2016) investigated the ethical and unethical behavior of individuals through the moral licensing lens and provided evidence that ethical behavior of an individual (leader in their case) could transform into abusive behavior via the mechanism of moral licensing and stressed to test the opposite mechanism, that is, that reverse of this could also be possible such that present unethical act could force an individual to indulge in ethical or altruistic actions to restore his/her threatened moral self-image.

This research comprehends that these varying responses to unethical leadership could be explained through the phenomenon of moral cleansing. Moral cleansing phenomenon is based on the premise that all individuals desire for a positive self-regard and whenever they feel that they have acted immorally and/or their identity of being a moral individual is under scrutiny, they undergo compensatory actions to restore their moral balance (Sachdeva *et al.*, 2009; West and Zhong, 2015). Moreover, moral cleansing not only comes into action by one's own action but it also gets initiated by morally dubious behaviors of close others. Although initial investigation of Monin and Miller (2001) posited that unethical practices of close others could initiate moral cleansing actions, yet there is no empirical investigation of this to date. Specifically, moral cleansing is highly prevalent at workplace; yet the theoretical and empirical investigations for exploring and understanding causes and effects of moral cleansing are sparse. This research is thus aimed at investigating whether or not unethical leadership instigates moral cleansing of their subordinates. Particularly, it is argued that moral self-image (MSI), that is, one's assessment of being a moral individual at any given instant, could explain the impact of unethical leadership on outcomes. It is argued that unethical leaders would threaten the self-concept of their subordinates, and to uphold their self-concept, they will undergo citizenship behaviors and refrain from CWBs. OCBs are discretionary actions which benefit the organizations and their members, whereas CWBs are deliberate actions to harm the organization or peers. The conceptual framework is presented in Figure 1.

This research is aimed at making following contributions to existing literature. First of all, it is augmenting the literature on unethical leadership by investigating it in organizational settings and unleashing its effects on subordinates. By doing this, it answers calls of researchers to study how unethical leaders affect their subordinates. Secondly, this research explains the moral self-regulation of subordinates of unethical leaders. By doing this, it aims to address calls of researchers to investigate that how and when moral self-regulation comes into action under unethical leaders. Thirdly, this research studies the self-serving motivations of individuals behind pro-social actions, that is, this research comprehends that OCBs are not always enacted for the organization or its members; rather, sometimes they serve as a reparative role in building one's self-image. Fourthly, this research also adds into domain of moral cleansing by investigating moral cleansing in work settings, and provides support for the fact that not only action of oneself, but also activities of close others (vicarious moral cleansing), such as unethical leaders, enforce cleansing action of their subordinates. This article is among the few studies which are testing the concept of vicarious moral cleansing, specifically in organizational settings. Above all, this study is developing and testing in new cultural settings of Pakistan.

Literature review and hypothesis development

Definition of unethical leadership

Before proceeding further, it is worthwhile to define unethical leadership and differentiate it from other comparable constructs. The first definition for unethical leadership came from Brown and Mitchell (2010) who defined unethical leadership style as “behaviors conducted and decisions made by organizational leaders that are illegal and/or violate moral standards, and those that impose processes and structures that promote unethical conduct by followers” (p. 588). Later, Ünal *et al.* (2012) added into their work and stated that leaders who are unjust, egotistic, immoral and who violate the rights of others lie in frame of unethical leadership. Afterward, Eisenbeiß and Brodbeck (2014) conducted a cross-cultural research to highlight the commonly held perceptions about unethical leaders and summarized that immoral foundations, egoism, urge to exploit and manipulate others and indifference toward feelings of subordinates are frequently associated with unethical leadership. Lašáková and Remišová (2017) described unethical leadership as a style where intentional or unintentional behaviors of leaders are harmful for their peers, subordinates and/or for the organization. Hence, unethical leadership style can be summed up as a leadership style where leaders act unethically themselves, possess self-serving intentions and to achieve their self-interest they exploit their subordinates and organizational resources.

Though many conceptually overlapping constructs exist in extant literature such as abusive supervision, tyrannical leadership and despotic leadership, yet unethical leadership is distinct. Specifically, not a single construct as mentioned above has taken exploitation and

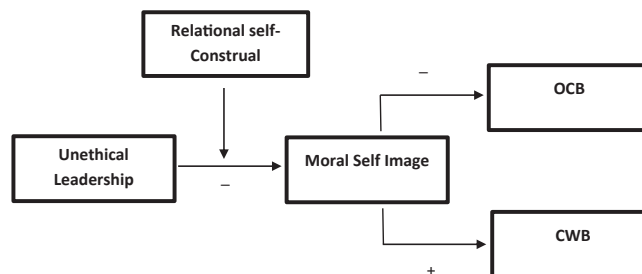


Figure 1.
The conceptual
framework

violation of interest of subordinates and organization together. For example, abusive supervision as well as tyrannical leadership exploits their followers and mistreat them, but their behaviors toward organizations are not a part of these constructs. Similarly, despotic and pseudo-transformational leaders exploit followers for their self-interest, yet none of these leaders force them to act unethically. However, unethical leaders not only act immorally themselves but also force their subordinates to act so. Hence, we can conclude that unethical leadership is a broader concept which might be conceptually overlapping with some dark leadership styles, yet it is distinct in its scope.

Moral cleansing theory

The concept of moral cleansing is a part of moral licensing theory (Monin and Miller, 2001) which is supported by the moral balance model (Nisan and Horenczyk, 1990). Moral licensing theory put forth the concept of moral licensing and moral cleansing, and argues that one's self-worth is derived from one's actions. Every morally dubious action diminishes one's moral self-worth, and every good action enhances one's moral self-image (Sachdeva *et al.*, 2009). In other words, people tend to maintain a desired level of moral standing and constantly monitor their actions (West and Zhong, 2015). Individuals who perceive that their moral standing exceeds the desired level tend to feel licensed to engage in immoral behavior (moral licensing), and they are motivated to engage in moral behavior when they feel that their moral standing is below a desired level (moral cleansing).

According to moral cleansing theory, every immoral/unethical action has repercussions on one's moral self-image, which then motivates one to act morally. Moral actions are motivated by the desire to retain a preferred moral self-worth. Further, this theory contends that not only one's own actions but the actions of close others have the same effect on one's self-image, that is, individuals tend to act morally in response to their own morally dubious actions as well others' morally degenerate actions. This is termed as vicarious moral cleansing.

Existing research has validated the notion of moral cleansing. The research shows that individuals often experience negative emotions, such as guilt and shame, which leads them to believe they are morally deficient (Ding *et al.*, 2016; Wang *et al.*, 2021; West and Zhong, 2015), prompting them to act in a morally acclaimed manner. Drawing support from the basic tenants of moral cleansing theory, this study argues that unethical leaders' behavior will negatively affect employees' moral self-image. Considering that unethical leaders not only act unethically but also encourage and compel their subordinates to do the same, it is likely that the moral self-image of employees will also be threatened under these leaders. In order to retain their moral self-worth, employees will then engage in more OCBs and less CWBs.

Unethical leadership and moral self-image

Jordan *et al.* (2015) stressed that individuals wish to retain a positive self-image and constantly evaluate their moral standing by asking themselves, "How moral I am?" The answer to this question changes with every favorable or unfavorable doing. Monin and Jordan (2009) argued that moral self-image is not static and, while verifying the malleable nature of self-image, stressed that moral self-image varies from one instant to another depending upon the situation. They highlighted that situational influence has substantial impact on one's self-image, which then shapes subsequent behaviors.

Followers emulate their leaders by internalizing their moral/immoral values, and these values, standards and behavioral patterns are made a part of one's self-image (Bandura, 1991; Gardner *et al.*, 2005). Unethical leaders are self-serving who misbehave with others, abuse and mistreat them, violate organizational norms, exploit organizational resources and are dishonest (Brown and Mitchell, 2010; Unal *et al.*, 2012); thus, followers, while perceiving these

moral transgressions as a reflection of their own behavior, would begin to perceive a diminished moral self-image.

Moreover, moral self-image is also shaped by one's own actions (Monin and Miller, 2001; Sachdeva *et al.*, 2009); unethical leaders encourage or sometimes force their followers to act unethically. They promote unethical conduct of their followers by making unethical requests or by making them follow the dishonorable rules and regulations (Sparks, 2012). Such leaders implant disputes at workplace, turn employees against each other, force their subordinates to lie to cover for their own misdeeds and fuel clashes among employees for their self-interest (Craig and Gustafson, 1998). Thus, it is assumed that individuals who are working under unethical leaders would be, intentionally or unintentionally, acting unethically. All such behaviors are found to be detrimental for one's moral self-image.

Moral cleansing theory posits that one's own actions as well as the actions of close others have considerable impact on one's self-image. This research argues that manipulative, deceptive, aggressive, immoral and abusive conduct of unethical leaders (Brown and Mitchell, 2010; Ünal *et al.*, 2012) lies in the span of morally dubious behaviors which would affect moral self-image of their followers. Similarly, while working under these leaders, individuals are forced to act unethically, and previous research verified that unethical acts discount one's current moral self-image. Thus, depending upon this argument, it is proposed that

H1. Unethical leadership is negatively related to moral self-image.

Moral self-image and outcomes (OCBs, CWBs)

Individuals are substantially concerned about portraying an image of a moral being (Monin and Jordan, 2009). They want to appear moral to others as well as to themselves (Adler, 2006). This motivates them to undergo morally praiseworthy behaviors to present them as moral beings. All individuals possess an ideal image of character, which they want to achieve and strive to reach the ideal levels of morality in their daily endeavors (Barkan *et al.*, 2015; Ploner and Regner, 2013). When individuals perceive that their expected and actual moral self-images are not aligned, then they regulate their behaviors to reduce the discrepancy (Higgins, 1987; Jordan *et al.*, 2015).

Individuals always strive to maintain a positive self-image, and when they perceive that their self-image is threatened or their morality is questioned, then they strive to rebuild it by undergoing actions that could help them restore the morality in their own eyes as well as in eyes of others (Ploner and Regner, 2013). For instance, in an experiment when participants recalled their immoral behaviors, they tried to balance their declining self-image by either involving themselves more in moral activities, conveying pro-social intentions or by reducing later deceptive/cheating conduct (Jordan *et al.*, 2011). This serves as base argument for proposing that a diminished moral self-image could motivate individuals for prosocial actions at workplace such as OCBs and less CWBs.

Extant research has shown that OCBs are also performed for managing one's image such that helping others at workplace, staying late for work, taking extra responsibilities (Emami *et al.*, 2012) and involving in other relevant activities helped individuals in maintaining a positive image (Bolino *et al.*, 2008). Similarly, individuals often indulge in unethical practices for the sake of self-interest, but if these actions pose a threat to their moral self-image, then they withhold such behavior (Mazar *et al.*, 2008). Similarly, Bandura (2004) stressed that when people know the penalties of their actions, then they are more likely to exercise self-control and avoid immoral behavior.

This study argues that motivation behind OCBs and refraining from CWBs is to boost one's threatened moral self-image. Individuals who perceive low moral self-image would try to distance themselves from any action that would bring more harm to their self-concept; in

fact, they would indulge in more pro-social actions toward their peers and organization to enhance their moral self-worth. This proposition is in line with moral cleansing concept, which argues that when individuals identify a threat to their moral self or perceive that their moral self has been discounted due to any reason, then they actively try to heighten their image. Thus, it is proposed that

H2a. Moral self-image is negatively related to OCBs.

H2b. Moral self-image is positively related to CWBs.

Mediating role of moral self-image between unethical leadership and outcomes

Moral cleansing theory posits that one's own morally vile actions as well as those of close others can make individuals suspect their own standing of being a moral individual (Monin and Miller, 2001). Such actions can have emotional and cognitive ramifications, which then lead to reparative actions that mitigate the effects of these actions (Liao *et al.*, 2018).

Existing research has provided theoretical and empirical evidence that leader's behavior has substantial impact on follower's sense of self and they can threaten or even change the way individuals envisage themselves (Krylova *et al.*, 2017; Vogel and Mitchell, 2017). For example, these followers of ethical leaders begin to induce morality in their working self-concept and develop a self-image of being a moral person. Similarly, it is plausible to expect that followers of unethical leaders will perceive themselves to be unethical and thus will perceive a low moral self-image. Moreover, unethical leaders promote unethical behavior of their followers and contrive an environment where unethicality is promoted (Brown and Mitchell, 2010). Therefore, it is expected that in such a toxic environment, individuals will be bound to act in ways that do not go along with their moral values which will have implications for their moral self-image. Thus, this study posits that when individuals will perceive a threat to their morality and consider their moral self-image under scrutiny, then they would be encouraged to undergo reparative actions in the form of increased OCBs as well as refrain from acting unethically through decreased CWBs.

In line with existing evidence and in accordance with the concept of vicarious moral cleansing, it is posited that individuals, while seeing the deleterious and unethical conduct of their unethical leaders as a demonstration of their own character, will perceive that their moral self-image has deteriorated. The pressure of such leaders on subordinates to act unethically will have negative consequences for their moral self-image. Thus, to restore their moral self-image, they would then undergo compensatory actions in the form of increased OCBs and decreased CWBs. Moreover, they will also develop whistleblowing intentions which are a suitable predictor of accrual whistleblowing. Thus, it is proposed that

H3a. Moral self-image will mediate the relationship between unethical leadership and OCBs.

H3b. Moral self-image will mediate the relationship between unethical leadership and CWBs.

Relational self-construal as moderator in the relationship between unethical leadership and moral self-image

Among many associations found at workplace, leader-subordinate relationship holds a prime position and individuals define themselves in term of their leaders/supervisors (Brewer and Chen, 2007). Relational self-construal is defined as an individual's tendency to construe oneself in terms of relations with others including family member, supervisor and friend (Cross *et al.*, 2003). Individuals differ in the way in which they incorporate their valued associations into their self-view (Heintzelman and Bacon, 2015) such that for individuals with

higher levels of relational self-construal, close relationships hold a significant position in their self-concept (Cross *et al.*, 2003). Individuals high in relational self-construal, aiming at healthy relationship with significant others (i.e. leaders), do not stand against their unethical demands but comply with them and act unethically or unfairly (Van Houwelingenn *et al.*, 2017). This research argues that such followers will align their behavior with that of their leader's unethical behavior, and as a result their current moral self-image will be jeopardized.

The concept of vicarious moral cleansing asserts that actions of not only oneself but also close others such as friends, family member and colleagues are capable of instigating cleansing actions. Van Knippenberg *et al.* (2005) verified the notion that leaders have substantial influence on follower's self-concept and different leaders' behaviors could elicit different aspects of self. They expected that since different leaders' behaviors influence different facets of self-concept, the follower's self-construal – that is, the degree to which individuals include others in their self-definition – might interact with leader's behaviors and influence other facets of self-conception. Since unethical leaders frequently misbehave, lie, abuse and exploit others (Brown and Mitchell, 2010; Eisenbeiß and Brodbeck, 2014); therefore, those who are close to their leaders will perceive that their immoral actions are spilling on to their own self-image. Thus, in line with moral cleansing theory and arguments presented above, it is plausible to expect that relational self-construal will moderate the relationship between unethical leadership and moral-self-image.

Depending upon this argument, it is proposed that

- H4. Relational self-construal will moderate the negative relationship between unethical leadership and moral self-image such that this relationship will be stronger at higher levels of relational self-construal as compared to low

Methodology

This study is a quantitative study based on hypothesis testing. To gather data, a survey was conducted among service sector employees of Pakistan. By adopting convenience sampling technique, employees working at all managerial levels of service sector organizations of Rawalpindi and Islamabad were contacted and asked to fill out the questionnaires. Being a time-lagged study, data for IV (unethical leadership) and moderator (relational self-construal) were collected at T1, data for mediator (moral self-image) were collected at T2 and data for outcomes (OCBs, CWBs) were collected at T3 from same respondents. Previous researchers in same domain adopted the same methodology (Naseer *et al.*, 2016; Rasool *et al.*, 2018). The participation in the study was voluntary, and respondents were informed about the scope of the study before filling out the questionnaire. To rule out the possibility of common method bias and social desirability bias, a multi-wave design was adopted and respondents were asked to provide unique keys/IDs instead of their names. At T1, 600 questionnaires were distributed, whereas 557 were retrieved back; at T2, these 557 respondents were accessed and requested to provide data, but only 445 were retrieved back. At T3, of 445, only 390 responses were retrieved. Later, incomplete and unengaged responses were discarded, and a total of 362 usable responses were generated. The response rate for this study is 60.3%

Instruments

This study adopted the existing questionnaires. The questions were in English language, as English is the official language of Pakistan and also the medium of education. Moreover, no respondent complained about not understanding the questions, and thus authors did not feel any need to translate the questions into native language, that is, Urdu. Following questions were used.

Unethical leadership. Previous studies utilized 31 items that perceived leader integrity scale developed by Craig and Gustafson (1998) to tap into unethical leadership (e.g. Spark, 2012). They argued that items of this scale particularly refer to unethical behavior enacted by leaders. Still this scale has some items similar to that of abusive supervision scale. Therefore, exploratory factor analysis (EFA) was conducted to derive the items that measure unethical leadership, and later analysis was performed by utilizing these items. EFA yielded 26 items which truly represent unethical leadership; thus, these 26 items were used for further analysis (detailed results are presented in the next section).

Moral self-image. Data for moral self-image were collected through a 9-item scale developed by Jordan *et al.* (2015). Responses on 7-point Likert scale (1 = much less than what I want to be to 7 = much more than what I want to be) were obtained.

OCB. A 13-item scale developed by William and Anderson (1991) was used. It is divided into two sub-scales measuring organizational citizenship behavior individual (OCBI) and organizational citizenship behavior organization (OCBO). The items represent OCBs directed at peers and organization. Sample items include “takes time to listen to co-workers’ problems and worries” and “gives notice when unable to come to work.” Responses were obtained on a 7-point Likert scale ranging from “1-Never” to “7-Always.”

CWB. A 13-item scale developed by Aquino *et al.* (1999) was used. The items represent CWBs directed at peers and organization. Responses on a 7-point Likert scale (1 = Never, 7 = Always) were obtained. Sample items include “called in sick when he/she was not really ill” and “refused to talk to a coworker.”

Relational self-construal. A 11-item scale of relational-interdependent self-construal scale by Cross *et al.* (2000) was used. Responses on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree) were obtained. The statements were adapted to add leader as the focal person (e.g. “my relationship with the leader is an important part of my self-image”).

Analysis tools

SPSS and AMOS software were used for obtaining results. For preliminary analysis, SPSS v21 was used. Factor analysis was performed by using AMOS. PROCESS macro by Hayes was used for regression analysis. Since this study proposed mediation and moderation hypothesis, model 4 and model 1 were used, respectively, to test these hypotheses.

Results

Exploratory factor analysis

As discussed above, there is no validated scale of unethical leadership, and previously scholars have used perceived leader’s integrity scale to measure unethical leadership; therefore, an EFA was performed to assess the suitability of the items of this scale to measure unethical leadership.

The first step in the EFA is to check the suitability of data for factor analysis (Williams *et al.*, 2012). For this purpose, two tests are applied which include Kaiser-Meyer-Olkin (KMO) test to check for the adequacy of the sample (Kaiser, 1970, 1974) and Bartlett’s test for sphericity (Bartlett, 1950). The results of KMO and Bartlett’s tests are reported below. KMO values for individual questions were greater than 0.645, which is well above the acceptable limit of 0.5 (Field, 2009). Bartlett’s test of sphericity $\chi^2 = 27603.555$, $p = 0.000$, indicated that correlations between questions were sufficiently large for principal component analysis (PCA) (Table 1).

As the data were found suitable for factor analysis, we proceeded for the next step – the calculation of factor loadings. A PCA with varimax rotation was conducted on the items composing the unethical leadership instrument used in this study. The results obtained are shown in the Table 2. The factor loadings for item 21, item 22, item 26, item 30 and item 31

were 0.29, 0.19, 0.33, 0.18 and 0.16, respectively. These factor loadings are below acceptable limit (<0.4), and hence these five items were removed from further analysis. So EFA results highlight that among 31 items, 26 items are true representative of unethical leadership construct; hence, these 26 items were used further. The factor loadings and Eigen values along with the variance explained are shown in Appendix.

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Confirmatory factor analysis (CFA)

After EFA, CFA was performed to assess the discriminant and convergent validity of the study constructs. For CFAs, a five-factor model was run, and corresponding model fit indices were obtained. The following data represent the goodness of fit. We used the extracted 26-item scale for unethical leadership for conducting CFA. Factor loadings for all the variables were in acceptable limit, that is, greater than 0.3, whereas other indicators of fitness including IFI=0.90, CFI = 0.90, TLI = 0.89, BFI = 0.80 are also in acceptable range, that is, >0.8. Also, the RMSEA for five-factor model is 0.48 and χ^2/Df is 2.78. All these values are within the standard limit put forth by Marsh and Hocevar (1985).

Control variables

When collecting data, respondents provided information about their demographics, such as their age, gender and qualifications. SPSS was used to run an analysis of variance test to determine whether any of the demographics affected the mediating or dependent variable. However, none of the demographic variables had a significant effect on the mediating variable (MSI) as well as the dependent variables (OCBs, CWBs)., Thus, none of the demographic variables were controlled in the analysis.

Descriptive statistics

Table 2 presents means, standard deviations, Pearson's correlation coefficients and Cronbach's alpha for study constructs. Unethical leadership shows a positive correlation with relational

Table 1.
KMO and Bartlett's test

KMO and Bartlett's test			
Kaiser-Meyer-Olkin measure of sampling adequacy			0.942
Bartlett's test of sphericity	Approx. chi-square		27603.555
	Df		3,403
	Sig		0.000

Table 2.
Descriptive statistics,
correlation and
reliability statistics

	Mean	SD	UL	MI	CWB	OCB	RSI
UL	4.66	1.437	(0.96)				
MSI	4.56	1.311	-0.12*	(0.92)			
CWB	2.74	1.291	-0.36**	0.42**	(0.94)		
OCB	3.34	1.291	0.38**	-0.35**	-0.34**	(0.93)	
RSC	3.64	1.450	0.24**	0.45**	0.18**	-0.19**	(0.94)
Gender	1.56	0.497	-0.01	-0.08	0.02	0.07	-0.01
Age	28.12	5.110	0.17	0.13	0.13	0.28	0.20
Department	1.61	0.489	0.00	0.24	0.44	0.36	0.29
Education	2.85	1.394	0.13	0.47	0.27	0.50	0.41
Experience	3.225	3.4383	0.24*	0.15	0.39	0.04	-0.07

Note(s): UL = unethical leadership; MSI = moral self-image; RSC = relational self-construal

* $p < 0.05$ level (2-tailed); ** $p < 0.01$ level (2-tailed)

self-construal ($r = 0.24, p < 0.05$) and OCBs ($r = 0.38, p < 0.05$), and negative correlation with moral self-image ($r = -0.12, p < 0.01$) and CWBs ($r = -0.36, p < 0.05$). Similarly, moral self-image shows a positive correlation with relational self-construal ($r = 0.45, p < 0.05$), CWB ($r = 0.42, p < 0.05$) and negative correlation with OCBs ($r = -0.19, p < 0.05$).

Proposed direct effect hypothesis, mediation hypothesis and moderation hypothesis were tested using PROCESS macro by Preacher and Hayes. Detailed results of direct and mediation effects are depicted in Table 3a and b. H1 proposed a negative association between unethical leadership and moral self-image. Results fully support H1, that is, unethical leadership is negatively and significantly associated with moral self-image ($B = -0.3, t = 0.02, p < 0.005$).

H2a and H2b asserted a negative association between moral self-image and OCBs (H2a) and a positive association with CWBs (H2b). Results fully supported H2a and H2b, that is, moral self-image had a significant impact on OCBs ($B = -0.44, t = -6.71, p < 0.001$) and CWBs ($B = 0.55, t = 8.30, p < 0.001$).

H3 asserted that moral self-image acts as a mediator between unethical leadership and OCBs (H3a) and unethical leadership and CWBs (H3b). Results fully supported H3a and H3b, that is, significant indirect effect is witnessed between unethical leadership and OCBs (indirect effect = 0.02, $p < 0.01$) and CWBs (indirect effect = 0.02, $p < 0.001$). Furthermore, nonzero values in 95% bootstrapped confidence interval for OCBs ($-0.002, 0.003$) and CWBs ($-0.03, -0.04$) also supported H3a and H3b.

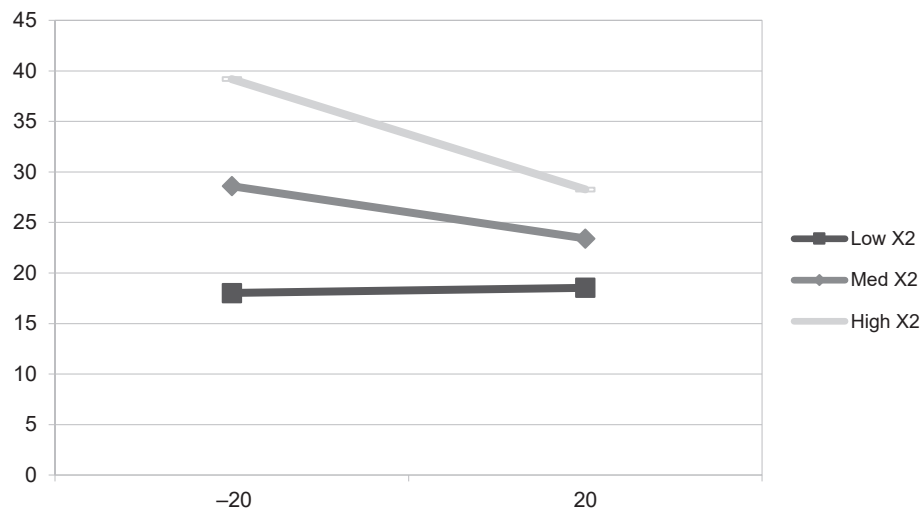
After the main effect and mediation effect hypothesis, the moderation hypothesis was also tested by conducting hierarchical moderated regression analysis using PROCESS macro. The moderation analysis results provided impact of high and low values of moderator (relational self-construal) on UL-MSI relationship. An interaction plot at ± 1 SD of moderator is shown in Figure 2. H4 proposed that the negative relationship between unethical leadership

(a) OCB						
Variable	<i>R</i>	<i>R</i> ²	<i>B</i>	SE	<i>T</i>	<i>P</i>
1 UL – MSI (direct effect)	0.12	0.03				0.020
			-0.03	0.02	-2.25	0.020
2 UL – OCB (direct effect)	0.52	0.27	0.14	0.02	7.30	0.000
3 MSI – OCB (direct effect)			-0.44	0.06	-6.71	0.000
<i>Bootstrap results for indirect effects</i>						
Indirect effect		<i>M</i> 0.02		SE 0.01	LL CI 95% -0.002	UL CI 95% -0.030
(b) CWB						
Variable	<i>R</i>	<i>R</i> ²	<i>B</i>	SE	<i>T</i>	<i>P</i>
1 UL – MSI (direct effect)	0.12	0.03				0.020
			-0.03	0.02	-2.25	0.020
2 UL – CWB (direct effect)	0.52	0.27	-0.13	0.01	-7.00	0.000
3 MSI – CWB (direct effect)			0.55	0.06	8.30	0.000
<i>Bootstrap results for indirect effects</i>						
Indirect effect		<i>M</i> -0.02		SE 0.01	LL CI 95% -0.03	UL CI 95% -0.04

Note(s): *N* = 362; UL = unethical leadership; MSI = moral self-image; bootstrap sample size = 5,000. LL = lower limit, CI = confidence interval, UL = upper limit. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3.
Mediated regression
analysis results

Figure 2.
Graph depicting
relationship between
unethical leadership
and moral self-image
on high, medium and
low levels of moderator



and moral self-image would be fortified for individuals having higher levels of relational self-construal. Table 4 represents the results of the moderated regression analysis. H4 received full support as the interaction term UL x RSC was significant for moral self-image ($B = -0.12$, $SE = 0.01$, $p < 0.05$). Furthermore, the bootstrap results for impact of different values of moderator on unethical leadership and moral self-image relationship also support H4, such that for high values of relational self-construal, the relationship between unethical leadership and moral self-image is the strongest (Table 4). Same can be seen in the interaction plot formulated at ± 1 SD (Figure 2). As shown in Figure 2, the relationship between unethical leadership and moral self-image is moderated by relational self-construal. Figure 2 highlights that the negative relationship between unethical leadership and moral self-image is significant and stronger at higher levels of relational self-construal ($B = -0.12$, $p < 0.001$), whereas the unethical leadership and moral self-image relationship is insignificant at low levels of relational self-construal, thus lending support to H4.

Discussion

The aim of this study was to investigate how and when moral self-regulation in the form of moral cleansing is instigated in employees of unethical leaders. Research suggests that moral cleansing is highly prevalent in our day-to-day life; however, only few studies have investigated it in organizational settings (Liao *et al.*, 2018). Specifically, while discussing moral cleansing, research has neglected the concept of vicarious moral cleansing. This research has shed light on the phenomenon of vicarious moral cleansing and integrated the literature of dark leadership and identification to explain the process of moral cleansing in response to transgressions of others (leader). The findings of this study have fully supported the proposed hypothesis. Though the proposed associations have not been developed and tested before, yet a burgeoning line of research highlights that instead of always behaving destructively, individuals act thoughtfully or practically in response to detrimental supervisory/leadership behaviors. For instance, followers of abusive leaders sometime increase their job performance with an aim to avoid future abuse (Shao *et al.*, 2018) or they indulge in ingratiation or façade creation to appear likeable in leader's eyes and restore their self-esteem (Vogel and Mitchell, 2017). Even individuals also increase their citizenship behaviors when they fear that they

Predictors	<i>R</i>	<i>R</i> ²	Moral self-image Estimate	SE	LLCI	ULCI
Step 1	0.59***	0.36***				
Constant			24.32***	5.02	22.3	26.03
UL			−0.14***	0.02	−0.16	−0.11
RSC			0.43*	0.03	0.37	0.50
Step 2	ΔR^2	0.10***				
UL × RSC			−0.12*	0.01	−0.01	−0.05
Conditional direct effects of UL on MSI at values of RSC (slope test results)						
Moderator				Moral self-image Boot SE	LLCI	ULCI
RSC			Effect			
−1 SD (−17.92)			−0.002**	0.01	−0.03	0.03
Mean (0.00)			−0.13***	0.01	−0.16	0.10
+1 SD (17.92)			−0.28***	0.03	−0.33	0.21
Index of moderated mediation						
Conditional indirect effects of UL on CW at values of RSC						
RSC			Effect	Boot SE	LLCI	ULCI
−1 SD			−0.0036	0.01	−0.03	
Mean			−0.155	0.02	−0.21	
+1 SD			−0.314***	0.05	−0.43	
Conditional indirect effects of UL on OCB at values of RSC						
RSC			Effect	Boot SE	LLCI	ULCI
−1 SD			0.003	0.01	−0.03	
Mean			0.134**	0.02	0.08	
+1 SD			0.27**	0.05	0.17	

Note(s): *N* = 362; UL = unethical leadership; MSI = moral self-image; RSC = relational self-construal; bootstrap sample size = 5,000. LL = lower limit, CI = confidence interval, UL = upper limit. **p* < 0.05, ***p* < 0.01, ****p* < 0.001

Table 4.
Moderation analysis

would be negatively evaluated (Syed *et al.*, 2018). Research in this domain is at nascent stage. This study is adding into this domain by comprehending the role of moral cleansing in compensatory altruistic behaviors under unethical leaders.

This study is unique as it is relating unethical leadership with outcomes via mechanism of moral self-image and increase in OCBs and decrease in CWBs under the tenets of moral cleansing effect. This study has specifically focused unethical leadership, which is an important yet theoretically and empirically overlooked construct (Eisenbeiß and Brodbeck, 2014). To the best of researcher's knowledge, no prior study has specifically investigated the moral self-regulation in the form of moral cleansing under a dark leader such as unethical leader. This research surpasses the mainstream literature and provides insight into the fact that followers of unethical leaders who identify with them have implications for their moral self-image. This diminished self-image forces them to undergo compensatory behaviors, and through these they try to revert to their moral self-image. Moreover, use of moral self-image as an indicator of moral cleansing is also an additional contribution of this study, as previous studies used levels of guilt (Liao *et al.*, 2018) as driving force behind moral cleansing and compensatory cleansing.

Most of the studies on unethical leadership as well as moral cleansing took place in the Western context, and scholars' stress that culture can substantially influence outcomes of

these constructs. Thus, this study extends the literature on moral cleansing and moral self-regulation by developing and testing a model in cultural settings of Pakistan. Since Pakistan has a distinct culture where people possess the collectivistic orientation and have high power distance, in such an environment aggressing against the leader or organization is least likely. In fact, the findings suggest that despite the negative influence of unethical leaders, employees tend to react mindfully, that is, instead of retaliating they try to neutralize the harm by using their discretionary altruistic behavior. Also, they actively try to evade themselves from any questionable action so that their moral self-image is not further harmed.

Practical implications

The findings of current study support the notion that increase in OCBs and decrease in CWBs are not necessarily enacted in the best interest of organization or peers; rather, employees may have personal reasons for such behavior, such as boosting their own moral self-image (Organ, 1997). Since these behaviors and intentions are thought to be a means of boosting one's self-esteem, it is quite possible that once employees feel they have maintained a positive image, they would cease to perform them. Thus, by understanding employees' behavior and the motivating factors behind them, managers and organizations will be able to work with them more effectively.

Although the findings indicate that unethical leadership promotes positive outcomes, it does not mean that it should be encouraged. Despite short-term benefits, in the long run, unethical leadership is to be discouraged. Employees with a diminished moral self-image become depressed, exhausted and burned-out over time. Therefore, a workplace with unethical leaders is emotionally stressful and morally demanding for their subordinates. Organizations should thus pay attention to the emotional state of their employees and keep a check on the conduct of the managers or supervisors. It is equally important to provide a safe channel for employees to speak up and highlight the challenges they are facing. Doing so will prevent long-term losses for the organizations.

Limitations and future research directions

This study has some limitations which must not be overlooked. First of all, due to scarcity of time and resources, employing a pure longitudinal research design was not feasible, and therefore a time-lagged research design was used to gather data from only two cities of Pakistan. However, authors believe that a longitudinal research design, with data collection from a larger sample, will provide more fine-grained results. Secondly, use of perceived leader's integrity scale to measure unethical leadership is another limitation. Previous researchers also utilized the same scale, yet it is critiqued that this scale has similarities with abusive supervision scale. Although we tried to address this issue by conducting an EFA and adopting only suitable items, a new scale which is able to measure the true essence of unethical leadership ought to be developed in future. Moreover, unethical leadership is not a new construct; however, theoretical and empirical work on this important construct is sparse. Thus, we encourage scholars to investigate the effects of such leaders by taking individual-level, team-level and organizational-level outcomes into account. Specifically, the mechanisms and boundary conditions through which these leaders exercise their influence are fruitful areas for investigation.

Conclusion

This study investigated the impact that unethical leaders impose on employee self-concept. Moreover, this study also explored the motivational tendencies of moral self-image. Based on the premise that every individual strives to maintain a moral self-image, thus study argued

that individual's desirable or undesirable actions are motivated by the perceptions of their own moral standing at any instant. The findings suggest that employees' desirable or undesirable behaviors against leader are dependent upon the perceptions related with their own role, self-image and perception of leader's integrity and intentions. Leader's unethicality is perceived threatening for their own moral self-image, and they deal with it constructively. In addition to extending the research on discretionary behaviors, the findings revealed that altruistic behaviors are not only enacted in the best interest of organization, but that they might have self-serving motives (increasing moral self-image) behind them. Therefore, one may not always refrain from CWBs just to maintain the moral self-image at a desired level. As once the moral self-image is balanced, employees may stop OCBs and engage in CWBs. Moreover, unethical leaders harm the moral self-image and emotional well-being of their subordinates, which adversely affects the organization. We can therefore deduce that unethical leadership must be discouraged, and effective ways must be devised to keep moral dilemmas in check in the workplace. This study has laid the foundation for the presence of vicarious moral cleansing in organizational setup, and it is advised that researchers must investigate this phenomenon in different settings and provide useful insights.

References

- Adler, N.J. (2006), "The arts and leadership: now that we can do anything, what will we do?", *Academy of Management Learning and Education*, Vol. 5 No. 4, pp. 486-499.
- Aquino, K., Lewis, M.U. and Bradfield, M. (1999), "Justice constructs, negative affectivity, and employee deviance: a proposed model and empirical test", *Journal of Organizational Behavior*, Vol. 20 No. 7, pp. 1073-1091.
- Bandura, A. (1991), "Social cognitive theory of self-regulation", *Organizational Behavior and Human Decision Processes*, Vol. 50 No. 2, pp. 248-287.
- Bandura, A. (2004), "Health promotion by social cognitive means", *Health Education and Behavior*, Vol. 31 No. 2, pp. 143-164.
- Barkan, R., Ayal, S. and Ariely, D. (2015), "Ethical dissonance, justifications, and moral behavior", *Current Opinion in Psychology*, Vol. 6, pp. 157-161.
- Bartlett, M.S. (1950), "Tests of significance in factor analysis", *British Journal of Psychology*, Vol. 3 No. 2, pp. 77-85, doi: 10.1111/j.2044-8317.1950.tb00285.x.
- Bolino, M.C., Kacmar, K.M., Turnley, W.H. and Gilstrap, J.B. (2008), "A multi-level review of impression management motives and behaviors", *Journal of Management*, Vol. 34 No. 6, pp. 1080-1109.
- Brewer, M.B. and Chen, Y.R. (2007), "Where (who) are collectives in collectivism? Toward conceptual clarification of individualism and collectivism", *Psychological Review*, Vol. 114 No. 1, p. 133.
- Brown, M.E. and Mitchell, M.S. (2010), "Ethical and unethical leadership: exploring new avenues for future research", *Business Ethics Quarterly*, pp. 583-616.
- Burton, J.P. and Hoobler, J.M. (2011), "Aggressive reactions to abusive supervision: the role of interactional justice and narcissism", *Scandinavian Journal of Psychology*, Vol. 52 No. 4, pp. 389-398.
- Chi, S.C.S. and Liang, S.G. (2013), "When do subordinates' emotion-regulation strategies matter? Abusive supervision, subordinates' emotional exhaustion, and work withdrawal", *The Leadership Quarterly*, Vol. 24 No. 1, pp. 125-137.
- Craig, S.B. and Gustafson, S.B. (1998), "Perceived leader integrity scale: an instrument for assessing employee perceptions of leader integrity", *The Leadership Quarterly*, Vol. 9 No. 2, pp. 127-145.
- Cross, S.E., Bacon, P.L. and Morris, M.L. (2000), "The relational-interdependent self-construal and relationships", *Journal of Personality and Social Psychology*, Vol. 78 No. 4, p. 791.
- Cross, S.E., Gore, J.S. and Morris, M.L. (2003), "The relational-interdependent self-construal, self-concept consistency, and well-being", *Journal of Personality and Social Psychology*, Vol. 85 No. 5, pp. 933-940.

- Ding, W., Xie, R., Sun, B., Li, W., Wang, D. and Zhen, R. (2016), "Why does the 'sinner' act prosocially? The mediating role of guilt and the moderating role of moral identity in motivating moral cleansing", *Frontiers in Psychology*, Vol. 7, pp. 13-17.
- Eisenbeiß, S.A. and Brodbeck, F. (2014), "Ethical and unethical leadership: a cross-cultural and cross-sectoral analysis", *Journal of Business Ethics*, Vol. 122 No. 2, pp. 343-359.
- Emami, M., Alizadeh, Z., Nazari, K. and Darvishi, S. (2012), "Antecedents and consequences of organisational citizenship behavior (OCB)", *Interdisciplinary Journal of Contemporary Research in Business*, Vol. 3 No. 9, pp. 391-414.
- Ferris, D.L., Brown, D.J. and Heller, D. (2009), "Organizational supports and organizational deviance: the mediating role of organization-based self-esteem", *Organizational Behavior and Human Decision Processes*, Vol. 108 No. 2, pp. 279-286.
- Field, A. (2009), *Discovering Statistics Using SPSS*, 3rd ed, Sage Publications, London.
- Gardner, W.L., Avolio, B.J., Luthans, F., May, D.R. and Walumbwa, F. (2005), "Can you see the real me? A self-based model of authentic leader and follower development", *The Leadership Quarterly*, Vol. 16 No. 3, pp. 343-372.
- Heintzelman, S.J. and Bacon, P.L. (2015), "Relational self-construal moderates the effect of social support on life satisfaction", *Personality and Individual Differences*, Vol. 73, pp. 72-77.
- Higgins, E.T. (1987), "Self-discrepancy: a theory relating self and affect", *Psychological Review*, Vol. 94 No. 3, pp. 31-39.
- Jordan, J., Mullen, E. and Murnighan, J.K. (2011), "Striving for the moral self: the effects of recalling past moral actions on future moral behavior", *Personality and Social Psychology Bulletin*, Vol. 37 No. 5, pp. 701-713.
- Jordan, J., Leliveld, M.C. and Tenbrunsel, A.E. (2015), "The moral self-image scale: measuring and understanding the malleability of the moral self", *Frontiers in Psychology*, Vol. 6, p. 1878.
- Kaiser, H.F. (1970), "A second generation little jiffy", *Psychometrika*, Vol. 35 No. 4, pp. 401-415.
- Kaiser, H.F. (1974), "An index of factorial simplicity", *Psychometrika*, Vol. 39 No. 1, pp. 31-36.
- Krylova, K.O., Jolly, P.M. and Phillips, J.S. (2017), "Followers' moral judgments and leaders' integrity-based transgressions: a synthesis of literature", *The Leadership Quarterly*, Vol. 28 No. 1, pp. 195-209.
- Lašáková, A. and Remišová, A. (2017), "On organizational factors that elicit managerial unethical decision-making", *Journal of Economics*, Vol. 65 No. 4, pp. 334-354.
- Liao, Z., Yam, K.C., Johnson, R.E., Liu, W. and Song, Z. (2018), "Cleansing my abuse: a reparative response model of perpetrating abusive supervisor behavior", *Journal of Applied Psychology*, Vol. 103 No. 9, pp. 30-39.
- Lin, S.H.J., Ma, J. and Johnson, R.E. (2016), "When ethical leader behavior breaks bad: how ethical leader behavior can turn abusive via ego depletion and moral licensing", *Journal of Applied Psychology*, Vol. 101 No. 6, p. 815.
- Marsh, H.W. and Hocevar, D. (1985), "Application of confirmatory factor analysis to the study of self-concept: first- and higher order factor models and their invariance across groups", *Psychological Bulletin*, Vol. 97 No. 3, pp. 562-582, doi: 10.1037/0033-2909.97.3.562.
- Mazar, N., Amir, O. and Ariely, D. (2008), "The dishonesty of honest people: a theory of self-concept maintenance", *Journal of Marketing Research*, Vol. 45 No. 6, pp. 633-644.
- Mesdaghinia, S., Rawat, A. and Nadavulakere, S. (2019), "Why moral followers quit: examining the role of leader bottom-line mentality and unethical pro-leader behavior", *Journal of Business Ethics*, Vol. 159 No. 2, pp. 491-505.
- Milosevic, I., Maric, S. and Lončar, D. (2020), "Defeating the toxic boss: the nature of toxic leadership and the role of followers", *Journal of Leadership and Organizational Studies*, Vol. 27 No. 2, pp. 117-137.
- Monin, B. and Jordan, A.H. (2009), "The dynamic moral self: a social psychological perspective", *Personality, Identity, and Character: Explorations in Moral Psychology*, pp. 341-354.

- Monin, B. and Miller, D.T. (2001), "Moral credentials and the expression of prejudice", *Journal of Personality and Social Psychology*, Vol. 81 No. 1, pp. 33-43.
- Naseer, S., Raja, U., Syed, F., Donia, M.B. and Darr, W. (2016), "Perils of being close to a bad leader in a bad environment: exploring the combined effects of despotic leadership, leader member exchange, and perceived organizational politics on behaviors", *The Leadership Quarterly*, Vol. 27 No. 1, pp. 14-33.
- Nisan, M. and Horenczyk, G. (1990), "Moral balance: the effect of prior behavior on decision in moral conflict", *British Journal of Social Psychology*, Vol. 29 No. 1, pp. 29-42.
- Organ, D.W. (1997), "Organizational citizenship behavior: it's construct clean-up time", *Human Performance*, Vol. 10 No. 2, pp. 85-97.
- Ploner, M. and Regner, T. (2013), "Self-image and moral balancing: an experimental analysis", *Journal of Economic Behavior and Organization*, Vol. 93, pp. 374-383.
- Rasool, G., Naseer, S., Syed, F. and Ahmed, I. (2018), "Despotic leadership and employee's outcomes: mediating effect of impression management", *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, Vol. 12 No. 3, pp. 784-806.
- Sachdeva, S., Iliev, R. and Medin, D.L. (2009), "Sinning saints and saintly sinners: the paradox of moral self-regulation", *Psychological Science*, Vol. 20 No. 4, pp. 523-528.
- Schyns, B. and Schilling, J. (2013), "How bad are the effects of bad leaders? A meta-analysis of destructive leadership and its outcomes", *The Leadership Quarterly*, Vol. 24 No. 1, pp. 138-158.
- Shao, P., Li, A. and Mawritz, M. (2018), "Self-protective reactions to peer abusive supervision: the moderating role of prevention focus and the mediating role of performance instrumentality", *Psychological Bulletin*, Vol. 97 No. 3, pp. 562-582, doi: 10.1037/0033-2909.97.3.562.
- Shaw, K.H., Tang, N. and Liao, H.Y. (2020), "Authoritarian-benevolent leadership, moral disengagement, and follower unethical pro-organizational behavior: an investigation of the effects of ambidextrous leadership", *Frontiers in Psychology*, Vol. 11, p. 590.
- Sparks, T.E. (2012), "Ethical and unethical leadership and followers' well-being: exploring psychological processes and boundary conditions", Doctoral dissertation, University of Georgia.
- Syed, F., Naseer, S. and Khan, A.K. (2018), "Interplay of supervisor undermining & rejection sensitivity on FNE & outcomes", *Academy of Management Proceedings*, Vol. 2018, No. 1.
- Thau, S. and Mitchell, M.S. (2010), "Self-gain or self-regulation impairment? Tests of competing explanations of the supervisor abuse and employee deviance relationship through perceptions of distributive justice", *Journal of Applied Psychology*, Vol. 95 No. 6, pp. 1009-1015.
- Ünal, A.F., Warren, D.E. and Chen, C.C. (2012), "The normative foundations of unethical supervision in organizations", *Journal of Business Ethics*, Vol. 107 No. 1, pp. 5-19.
- Van Houwelingenn, G., Van Dijke, M. and De Cremer, D. (2017), "Fairness enactment as response to higher level unfairness: the roles of self-construal and spatial distance", *Journal of Management*, Vol. 43 No. 2, pp. 319-347.
- Van Knippenberg, B., Van Knippenberg, D., De Cremer, D. and Hogg, M.A. (2005), "Research in leadership, self, and identity: a sample of the present and a glimpse of the future", *The Leadership Quarterly*, Vol. 16 No. 4, pp. 495-499.
- Vogel, R.M. and Mitchell, M.S. (2017), "The motivational effects of diminished self-esteem for employees who experience abusive supervision", *Journal of Management*, Vol. 43 No. 7, pp. 2218-2251.
- Vriend, T., Said, R., Janssen, O. and Jordan, J. (2020), "The dark side of relational leadership: positive and negative reciprocity as fundamental drivers of follower's intended pro-leader and pro-self unethical behavior", *Frontiers in Psychology*, Vol. 11, pp. 1468-1473.
- Wang, Y., Xiao, S. and Ren, R. (2021), "A moral cleansing process: how and when does unethical pro-organizational behavior increase prohibitive and promotive voice", *Journal of Business Ethics*, Vol. 176 No. 1, pp. 175-193, doi: 10.1007/s10551-020-04697-w.

- Wee, E.X., Liao, H., Liu, D. and Liu, J. (2017a), "Moving from abuse to reconciliation: a power-dependence perspective on when and how a follower can break the spiral of abuse", *Academy of Management Journal*, Vol. 60 No. 6, pp. 2352-2380.
- Wee, E.X., Liao, H., Liu, D. and Liu, J. (2017b), "Moving from abuse to reconciliation: a power-dependence perspective on when and how a follower can break the spiral of abuse", *Academy of Management Journal*, Vol. 60 No. 6, pp. 2352-2380.
- West, C. and Zhong, C.B. (2015), "Moral cleansing", *Current Opinion in Psychology*, Vol. 6, pp. 221-225.
- Williams, L.J. and Anderson, S.E. (1991), "Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors", *Journal of Management*, Vol. 17 No. 3, pp. 601-617.
- Williams, B., Onsman, A. and Brown, T. (2012), "A Rasch and factor analysis of a paramedic graduate attribute scale", *Evaluation and the Health Professions*, Vol. 35 No. 2, pp. 148-168.

AppendixUnethical
leadership and
employee
behaviors

Item no	Loadings
UL1	0.646
UL2	0.663
UL3	0.747
UL4	0.696
UL5	0.656
UL6	0.748
UL7	0.754
UL8	0.670
UL9	0.688
UL10	0.671
UL11	0.747
UL12	0.684
UL13	0.654
UL14	0.649
UL15	0.711
UL16	0.818
UL17	0.687
UL18	0.681
UL19	0.701
UL20	0.474
UL21	0.299
UL22	0.462
UL23	0.195
UL24	0.433
UL25	0.805
UL26	0.634
UL27	0.808
UL28	0.372
UL29	0.400
UL30	0.182
UL31	0.066
Eigen value	16.93
% of Variance	54.73%

387

Note(s): Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization

Table A1.
EFA results

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