

An Empirical Examination of Formal and Informal Institutional Factors' Influence on Global Food Industry Sustainability Engagement

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ABSTRACT

We propose six hypotheses to be tested for formal and informal institutional factors' influence on sustainability engagement by employing linear regression and correlation analyses to examine the relationship between sustainability engagement and individual countries' institutional factors. Furthermore, we propose an additional hypothesis to compare the mean sustainability engagement levels of the four global industry classification standard (GICS) food industries (restaurants, food retailing, beverages, and food products) using one-way ANOVA and post-hoc analyses. We found statistically significant associations between three institutional factors (national sustainable agriculture policy implementation levels, national culture's long-term orientation levels, and national culture's uncertainty avoidance levels) and the food industry sustainability engagement levels. Additionally, we found statistically significant differences in the sustainability engagement levels among the four GICS food industries.

Keywords: Formal institutions; Informal institutions; National culture; Sustainability engagement.

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1. INTRODUCTION

This study investigates the sustainability engagement of the food industry to address the need for global food industry corporate social responsibility (CSR). As reported by Hartman (2011), Heyder and Theuvsen (2009), Pullman, Maloni, and Carter (2009), and Roth, Tsay, Pullman, and Gray (2008), agricultural production and food processing are the chief sources of environmental damage originating from the food industry (Baldwin, 2015; BCFN Foundation, 2019; Wilde, 2018). Furthermore, high food miles resulting from food distribution also impose negative externalities to global societies and the natural environment (Jones, 2001; Nestle, 2002; Pretty, Ball, Lang, and Morison, 2005; Pullman, Maloni, and Carter, 2009; Roth, Tsay, Pullman, and Gray (2008); Smith, 2008). Changes in climate, pollution of land and water, and loss of biodiversity have led to long-term agriculture and food production concerns (BCFN Foundation, 2019; Hartman, 2011; Nestle, 2002; Smith, 2008).

This global food industry CSR study focuses on the influences of both formal (government regulations and laws) and informal (national cultures) institutional factors on its level of CSR engagement. Agriculture production and food operation occur around the globe, involving institutional factors such as governments of various nations and national cultures (Baldwin, 2015; BCFN Foundation, 2019; Hartman, 2011; Peng, Dashdeleg, and Chih, 2012).

Recently in the sustainability literature, the CSR theory and the corporate sustainability (CS) theory merged to signify the triple bottom line (3BL) objectives of the firms — economic, social, and environmental goals — be incorporated in strategic and operational corporate decision-making (Carroll and Shabna, 2010; Elkington, 1998; Faller and Knyphausen-Aufsef, 2018). Thus, in this study, CSR refers to these three types of corporate sustainability engagement goals in the global food industry.

This study's goal is to investigate the influences of both formal and informal institutional factors on the level of global food industry CSR engagement. Specifically, the study investigates national government policies relating to agricultural, food and environmental sustainability (formal institutional factors), and national cultures' (informal institutional factors) influences on global food industry CSR engagement. These research objectives lead to the following research question:

How do formal and informal institutional factors influence the level of global food industry sustainability engagement?

This study seeks to fill the gaps in the global food industry CSR literature with contributions as follows. There is a growing need to research the effects of national culture on CSR engagement levels with the institution-based view (IBV) theoretical framework (Cai, Jo, and Pan, 2012; Gomez, 2008; Hou, Liu, Fan, and Wei, 2016; Jamali, 2008; Jamali and Mirshak, 2006; Peng, Sun, Pinkham, and Chen, 2009, 2012). IBV is a strategic management theory used to understand corporate behavior and global strategy formulation (Peng, Sun, Pinkham, and Chen, 2009, 2012). As such, we believe that the theory is particularly compatible with an investigation into institutional factors that impact CSR efforts.

2. THEORETICAL FRAMEWORK

In the 1990s and beyond, the strategic management literature has been dominated by two theoretical paradigms: the industrial view (Porter, 1980) in the 1980s and the resource-based view (RBV) (Barney, 1991; Wernerfelt, 1984) of the firm. Researchers using these two theories searched for the answers to better understand the fundamentals of strategic management (Hoskisson, Hitt, Wan, and Yiu, 1999). As a response to this collective inquiry, a new theory has emerged which points to a third strategic management paradigm: the institution-based view (IBV) (Garrido, Gomez, Maicas, and Orcos, 2014; Peng *et al.*, 2012, 2009). The IBV theoretical framework has its foundations in both sociological institutional theory (DiMaggio and Powell, 1983; Scott, 1995) and institutional economics (North, 1990; Williamson, 1985, 1998).

The industrial view literature suggests that industry-specific effects such as industry characteristics, multiple stakeholder interactions, and context of processes and operations need to be carefully studied to understand each industry-specific effect (Cruz and Boehe, 2010; Decker, 2004; Ho, Wang, and Vitell, 2011). Baz *et al.* (2016) suggest the need for further exploration to address how sustainability practices are applied in the food industry as well as how food industry sustainability efforts differ from other industries. Chkanikova and Mont (2015) suggest the food supply chain management in various countries and contexts needs to be studied to understand their complexities.

The RBV framework has been used to study how internal resources that are challenging to be imitated by competitors lead to a firm's long-term competitive advantage (Barney, 1991; Wernerfelt, 1984). Pullman *et al.* (2009) suggest applying Hart's (1995, 1997) *natural* RBV (NRBV) in food supply chain management research to understand the firm's competitive advantage in relationship to the natural environment. Additionally, the authors suggest applying the NRBV in this context in order to prevent pollution, minimize emissions and waste, and reduce environmental burden of firm development. From the standpoint of food industry supply chain sustainability, Pagell, Wu, and Wasserman (2008) state that firms have triple-bottom-line (3BL) objectives and should not solely focus on the economic objective.

Aguilera and Jackson (2003) derived a theoretical model to assess differences in corporate governance approaches in advanced economies. Authors identified institutional and social interactions within organizations that influence corporations to address stakeholder interests. The authors also used three institutional factors in their comparative institutional analysis—management, capital, and labor—derived from institutional theory (Aguilera and Jackson, 2003; North, 1990). Traditionally, agency theory was used to analyze corporate governance interrelationships between risk-accepting shareholders and agent managers within corporations, which can cause agency problems due to differences in their interests (Aguilera and Jackson, 2003; Berle and Means, 1932; Eisenhardt, 1989; Fama and Jensen, 1983).

The paradigm of comparative corporate governance is developed as a response to minimize agency problems in various corporate governance structures in national economies (Aguilera and Jackson, 2003). In the U.S. and the U.K., ownership typically involves corporate control, regulations, and contracts; in the E.U. and Japan, financial institutions and families control governance, thus, they operate in context rather than by explicit rules (Aguilera and Jackson, 2003).

Aguilera and Jackson (2003) report that the comparative national institutional analysis model facilitates the understanding of diversity in corporate governance practices among nations. The authors argue that because financial systems established separately in different nations in the 1930s (for instance, in the U.S., market liquidity and diluted ownership were favored, whereas, in Germany and Italy, their ownership structure was maintained due to dense cooperative networks), national institutions are still diverse today (Aguilera and Jackson, 2003).

Chkanikova and Mont (2015) suggest that a more comparative institutional analysis of food supply chain sustainability is needed. A number of authors argue that there are multiple sustainability issues in the food supply chain deserving further exploration, both within nations and across institutional contexts (Baldwin, 2015; Chkanikova and Mont, 2015; Pullman and Wikoff, 2017). Thus, this study uses the IBV theoretical framework to study formal and informal institutional factors to empirically test their influences on global food industry CSR engagement. Formal (explicit rules in society) institutional factors are laws and regulations of economic markets and political discipline (Garrido *et al.*, 2014; North, 1990; Peng *et al.*, 2012; Peng *et al.*, 2009). Informal (social customs and values) institutional factors are national cultures and norms (Garrido *et al.*, 2014; Hofstede Insights, 2019; Peng *et al.*, 2009).

This study empirically tests the relationship between formal and informal institutional factors' measurement instruments (BCFN Foundation, 2019; Hofstede Insights, 2019; World Economic Forum, 2019) and global food industry CSR engagement measurements (Bloomberg Finance L.P., 2019) to address a gap in the

global food industry CSR literature. These findings can assist agri-food policymakers in enhancing existing food policies related to global food industry CSR performance to meet the demands of multiple stakeholders from diverse national cultures and to improve global food industry sustainability engagement to preserve natural environment, increase food security, and reduce food waste (Baldwin, 2015; BCFN Foundation, 2019; Hartman, 2011; Jones, 2001; Smith, 2008; Nestle, 2002; Pretty *et al.*, 2005; Wade, 2001; World Economic Forum, 2019).

3. LITERATURE REVIEW

This study examines the influences of national government policies related to environmental performance and food sustainability (formal institutional factors) and national cultures (informal institutional factors) on the level of global food industry corporate social responsibility (CSR) engagement. This section reviews three streams of literature to reveal the gaps to which this study can contribute: 1) sustainability engagement and institutional factors, 2) global food industry sustainability and institutional factors, and 3) the institution-based view (IBV) and firms' sustainability engagement.

Environmental CSR (ECSR) Engagement and Comparative Institutional Factors

ECSR is an essential part and a distinct concept of CSR (Rahman and Post, 2012). ECSR plays an important role in this study because stakeholders in both the global West and East express growing concern about the environmental ramification of the food industry as well as other industries' operations (Hartman, 2011; Heikkurinen and Forsman-Hugg, 2011; Lerro, Raimondo, Stanco, Nazzaro, and Marotta, 2019; Lim, Kang, and Kim, 2017; Kim, 2017; Michaud, Llerena, and Joly, 2012). High CSR engagement does not necessarily equate to high ECSR engagement (Rahman and Post, 2012). ECSR represents environmentally sensitive corporate behavior beyond legal compliance (Lloyd, 2018; Portney, 2008). ECSR aims to limit the adverse consequences on the environment by corporations (Rahman and Post, 2012).

ECSR emphasizes firm-specific CSR engagement—preventative and compliance—will reduce harmful environmental effect by the corporations (Rahman, and Post, 2012). Kolk and Mauser (2002) report that ECSR has now evolved into measuring environmental performance involving complex quantitative analysis, which enables comparing firms across industries. However, Ilinitch, Soderstorm, and Thomas (1998) state that the criteria for measuring ECSR scores can be unclear (Caritte, Acha, and Shah, 2015). Scholars have expressed concerns regarding those proprietary ECSR databases such as CEP, Fortune, FRDC, and KLD, which have unclear data collection methods and often do not report reliability or validity (Rahman and Post, 2012). Transparency of these ECSR databases are also unclear (Rahman and Post, 2012). Thus, Rahman and Post (2012) suggest that ECSR measurements need to become more transparent, reliable, and valid since ECSR scores are used to determine environmental performance, governance, and credibility of corporations (Caritte *et al.*, 2015).

Institution-Based View (IBV) and Sustainability Engagement

The IBV framework has foundations in institutional economics (North, 1990; Williamson, 1985) and sociological institutional theory (DiMaggio and Powell, 1983; Scott, 1995) which explore the complex interrelationships among corporations and formal and informal institutional factors in the global business environment (Garrido *et al.*, 2014). By studying the role of institutional factors concerning corporate behavior, this theory seeks to understand the reasons for firms' competitive advantage (Peng *et al.*, 2012; Peng *et al.*, 2009).

The IBV seminal work by Peng *et al.* (2009) questioned how institutional factors influence strategic decisions and firm performance.

Based on the IBV framework, Garrido *et al.* (2014) suggest further formal and informal institutional measurement analysis for scholars to understand the role of institutional factors in international business. Contextual factors, such as various institutional elements, are increasingly gaining attention in global business research (Garrido *et al.*, 2014), and the IBV framework adds to management strategy theory-building by studying how formal and informal institutional factors influence organizations within nations, as well as in the global business environment. The IBV framework contributes to strategy management research in diverse ways. For instance, the measurement of corporate social performance (CSP) is unclear and ambiguous. Future studies need to use institutional benchmarks to develop clearer CSP standards. Similar to the IBV framework, Aguilera and Jackson (2003) derived comparative institutional analysis from North's (1990) institutional theory to study institutional factors in CSR and corporate governance of advanced economies. The comparative corporate governance model is developed as a response to minimizing agency problems (Aguilera and Jackson, 2003). The comparative institutional analysis model promotes understanding of diversity in CSR and corporate governance practices among nations (Aguilera and Jackson, 2003). Agency theory is based on an Anglo-American model, which was viewed as the best practice to explain corporate governance interaction in the global West; regarding their CSR engagement, however, the IBV framework suggests that national cultures will continuously evolve relative to their dynamic institutional contexts around the globe (Aguilera and Jackson, 2003; Garrido *et al.*, 2014; Peng *et al.*, 2009). This study uses the IBV as a theoretical framework to view how institutional factors influence global food industry CSR engagement to further the knowledge in the CSR literature.

Informal Institutional Factors

This section reviews the relationship between informal institutional factors and CSR. Nemetz (2014, 2015) suggests that even in a local community in Oregon, individuals are influenced by globalization and experience the interaction among various national cultures and national social norms. Nemetz (2014, 2015) reports that varying levels of sustainability engagement across industry sectors could be due to norms and expectations within each industry. Nemetz (2014, 2015) suggests further study to examine industry-specific factors that influence sustainability engagement levels. Nemetz (2014, 2015) suggests more investigation of each industry's public industry scandals, high-profile accidents, unique industry operation structures, and other industry-specific factors needs to understand how various industries engage in sustainability on differing levels, which can be influenced by social norms within industries.

Some past CSR studies have explored the influences of formal institutional factors such as national governments and laws (Campbell, 2007; Chih, Chih, and Chen, 2010; Moon, 2004; Peng *et al.*, 2012), but close consideration has not been paid to the influence of informal institutional factors such as national culture on CSR (Maignan, 2001; Peng *et al.*, 2012; Waldman *et al.*, 2006). Peng *et al.* (2012) used Hofstede's national cultural factors to study the influences of national cultures on firms' sustainability engagement levels. Peng *et al.* (2012) report that uncertainty avoidance and individualism showed positive influences on firms' sustainability engagement levels when masculinity and power distance showed negative influences on firms'

sustainability engagement levels. Ho *et al.* (2011) and Peng *et al.* (2012)'s studies on national cultural influences on firms' sustainability engagement levels are partly consistent, yet three studies' findings show inconsistencies.

Formal Institutional Factors

Assessing the findings by Nemetz (2014, 2015), this study further examines the formal (national) institutional factor influence on sustainability engagement levels specifically in the food industry. According to Nemetz (2014, 2015), businesses operate in the globalized environment. Nemetz (2014, 2015) observes that even small businesses in Oregon create a globalized community from various nations. Nemetz (2014, 2015) reports that global interest among scholars toward sustainability research increased due to social and environmental issues such as harsh employee treatment, social conflicts, and changes in climate. Nemetz (2014, 2015) suggests that such sustainability issues transcend national borders. However, Nemetz (2014, 2015) found that firms' sustainability engagement levels varied widely depending on the headquarter locations. Nemetz (2014, 2015) found that nation-specific factors are attributed to such country sustainability engagement level variations. Nemetz (2014, 2015) reports that firm sustainability engagement levels are significantly influenced by governmental effectiveness, social norms, levels of economic development, technological readiness, and fossil fuel energy use.

Additionally, evidence suggests that CSR is becoming institutionalized within the Western society (Bondy, Moom, and Matten, 2012). Mayer and Rowan (1977) suggest that institutionalization of CSR can be observed from public opinion, markets, and laws. Research suggests there is a link between CSR and institutions, which is developed by multiple stakeholders in Western society (Bondy *et al.*, 2012). Bondy *et al.* (2012) report that based on institutional theory, the U.S. uses explicit CSR, while European nations use implicit CSR. On the contrary, East Asian society does not appear to share the same institutionalized CSR concept within their countries, but East Asian corporations actively preserve the environment because East Asian stakeholders expect corporate commitment to ECSR (Hou *et al.*, 2016). As reviewed above, there are wide gaps in the global sustainability literature. Thus, this study addresses this gap by examining the formal institutional factors' influences on CSR engagement on a global scale with an empirical design.

4. METHODOLOGY

We derived six hypotheses from the research question and proposed theoretical constructs. Hypotheses are proposed to test the formal and informal institutional factors' (six independent variables) influences on global food industry corporate social responsibility (CSR) engagement (one dependent variable) with their proxy measurements (BCFN Foundation, 2019; Bloomberg Finance L.P., 2019; Garrido *et al.*, 2014; Hartman, 2011; Hofstede Insights, 2019; Nemetz, 2014, 2015; North, 1990; Peng *et al.*, 2012; Peng *et al.*, 2009; World Economic Forum, 2019).

It is important to note that the institutional indices are proxy measures of the effectiveness of a national government's policies (formal institutional factor) and national cultures (informal institutional factor). The BCFN Foundation, Bloomberg Finance L.P., Hofstede Insights, and Yale's World Economic Forum scale their institutional indices from 0 to 100 by countries (BCFN Foundation, 2019; Bloomberg Finance L.P., 2019; Hofstede Insights, 2019; World Economic Forum, 2019).

The influences of the six institutional factors are analyzed by simple and multiple regression analyses, respectively. Pullman *et al.* (2009) report that one measure of food supply

chain environmental performance is resource conservation, including energy and water. Food supply chain sustainability studies have found that firms that are committed to environmental best practices experience improved environmental performance (Melnik, Sroufe, and Calantone, 2003; Pullman *et al.*, 2009). These previous studies lead to the first hypothesis.

Hypothesis. H1. *National environmental performance is positively related to food industry firms' sustainability engagement.*

The World Commission of Environment and Development proposed that the sustainable food systems should meet the needs of the present generation without hindering the needs of the future generations (Pullman *et al.*, 2009). In the last few decades, food businesses are increasingly pressured to pay close attention to efficient use of resources to process their products (Pullman *et al.*, 2009). Therefore, this study hypothesizes that national food policy responsiveness to food loss and waste is positively related to the food businesses' sustainability engagement, which leads to the following hypothesis.

Hypothesis. H2. *The level of national food policy responsiveness to food loss and food waste is positively related to food industry firms' sustainability engagement.*

Sustainability researchers state that food businesses' supply chain performance needs to be measured by their influences on environmental, social, and economic objectives (Pullman *et al.*, 2009; Shrivastava, 1994). Sustainability practices of the food supply chains necessitate heightened consideration because decisions in food production involve the survival of vegetation and animals (Burkhardt, 1986; Pullman *et al.*, 2009). Large food manufacturers are expected to pay attentive to the depletion of productive arable land and increasing growth in world population, which leads to increased control of the sustainable agricultural inputs for environmental, social, and economic performance (Hamprecht, Corsten, Noll, and Meier, 2005; Pullman *et al.*, 2009). Thus, this study hypothesizes that national food policy responsiveness to sustainable agriculture is positively related to the food businesses' sustainability engagement, which leads to the following hypothesis.

Hypothesis. H3. *The level of national sustainable agriculture policies and implementations is positively related to food industry firms' sustainability engagement.*

Silver and Bassett (2008) suggest that to make the global food supply more wholesome and healthful, governments need to reduce ingredients such as added sugar and artificial trans fatty acids — known to be harmful in excess — either by regulation or coordinated voluntary action of food businesses and governments. Marks (2017) suggests sharing responsibility for human health within the global food industry, mainly the large food corporations who are often not willing to collaborate with policymakers and stakeholders to improve public health. The United Nations' Sustainable Development Goals suggest multiple stakeholder collaboration, diversity inclusion, and states the need for global food corporations to be part of the solution rather than the problem (Marks, 2017; Temples, Verweij, and Block, 2017).

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(Pullman *et al.*, 2009; Shrivastava, 1994). Sustainability practices of the food supply chain require heightened attention because decisions in food production involve the survival of vegetation and animals (Burkhardt, 1986; Pullman *et al.*, 2009). Large food manufacturers are expected to be attentive to the depletion of productive arable land and increasing growth in world population, which leads to increased control on the sustainable agricultural inputs for environmental, social, and economic performance (Hamprecht *et al.*, 2005; Pullman *et al.*, 2009). Consumption of unhealthful food products such as processed foods, which leads to health conditions such as diabetes and obesity is nothing new (Marks, 2017; Silver and Bassett, 2008). Addressing the nutrition challenges of world population by providing wholesome and healthful food along with being mindful of environmental damages from food production by businesses in recent years is becoming growingly important. Thus, this study hypothesizes that national food policy responsiveness to *nutrition challenges* is positively related to the food businesses' sustainability engagement, which leads to the following hypothesis.

Hypothesis. H4. *The level of national food policy for responding to nutritional challenges is positively related to food industry firms' sustainability engagement.*

National uncertainty avoidance of the national culture and food industry sustainability engagement are tested as follows. Hofstede's national culture concept has six factors (Hofstede Insights, 2019), and this study only tests two of Hofstede's national culture factors. Studies suggest that uncertainty avoidance national culture factor is correlated with sustainability engagement in multiple business industries (Ho *et al.*, 2012; Peng *et al.*, 2012; Petruzzella *et al.*, 2017). The national culture factors represent the country's independent collective preferences (rather than individuals) over another country. The national scores on the factors are comparative and relative to each national culture (Hofstede Insights, 2019).

The uncertainty avoidance index (UAI) signifies the degree of uncertainty shared collectively within a society (Hofstede Insights, 2019; Petruzzella *et al.*, 2017). A country with high values of UAI tends to avoid uncertain and ambiguous situations. Explicit and implicit codes of conduct—such as laws and regulations, as well as collectively accepted cultural norms—are commonly used to lessen the uncertainty in societies demonstrated by a high degree of uncertainty avoidance. On the other hand, countries with low UAI tend to have flexible attitudes about taking risks and chances (Hofstede, 1980, 2011; Hofstede Insights, 2019; Petruzzella *et al.*, 2017). Rallapalli, Vitell, Wiebe, and Barnes (1994) report that high risk-taking behaviors are associated with unethical decision-making. Moreover, according to the sustainability literature, there is a positive relationship between the level of uncertainty avoidance and the level of sustainability engagement (Ho *et al.*, 2012; Peng *et al.*, 2012; Petruzzella *et al.*, 2017). Thus, this study hypothesizes that food industry firms operating in an uncertainty avoidance national culture, where laws, regulations, and cultural norms are in place to avoid risks, demonstrate a higher level of sustainability engagement.

Hypothesis. H5. *The level of national culture's uncertainty avoidance is positively related to food industry firms' sustainability engagement.*

Long-term orientation of the national culture and food industry sustainability engagement are tested as follows. A national culture with high scores in the long-term orientation (LTO) index signifies thriftiness, perseverance, and ordering relationships by status (Hofstede Insights, 2019). Conversely, a national culture with high short-term orientation (STO) index tends to have reciprocal social interactions and protection of personal

reputation (Hofstede, 2011; Hofstede and Bond, 1988; Hofstede Insights, 2019; Petruzzella *et al.*, 2017).

A national culture with LTO is associated with nations that are flexible to adopt practices used by other cultures to improve themselves. Additionally, societies with high LTO are characterized by a higher likelihood of increased savings for future investments (Hofstede, 2011; Hofstede and Bond, 1988; Hofstede Insights, 2019; Petruzzella *et al.*, 2017). Therefore, based on previous studies, the study expects the food industry firms which originate from nations with high LTO are more committed to sustainability engagement. Previous studies' findings on the LTO influence on sustainability leads to the following hypothesis.

Hypothesis. H6. *The level of national culture's long-term orientation is positively related to food industry firms' sustainability engagement.*

This study tests whether or not the four GICS food industries: 1) restaurants, 2) food retailing, 3) beverages, and 4) food products have significantly different sustainability engagement levels.

Hypothesis. H7. *The sustainability engagement levels of the four GICS food industries differ significantly.*

Sample

This study utilizes a sample of the four global industry classification standard (GICS) food industries (that are also the nine GICS food *sub*-industries) which represents a portion of the population pool. The sample of the four GICS food industries (the nine GICS food *sub*-industries) selected from the global food industry firms should match as closely as possible to the characteristics of the population represented so that this study is conducted with a sample that can be generalized to the global food industry firm population (Creswell and Creswell, 2018; Field, 2017; Roberts, 2010). Four GICS food industries are 1) restaurants, 2) food retailing, 3) beverages, and 4) food products. These four GICS food industries are further classified by GICS system into nine GICS food sub-industries as follows: 1) restaurants, 2) food retailing, 3) food distributions, 4) hypermarkets and super centers, 5) brewers, 6) distillers and vintners, 7) soft drinks, 8) agricultural products, and 9) packaged foods and meats.

Data collection for this study come from Bloomberg environmental, social, and governance (ESG) archival database. This study uses ESG data and institutional measurement instruments to investigate global food industry sustainability engagement. As discussed earlier, this study is motivated by Garrido *et al.*'s (2014) suggestion to incorporate institutional factors into empirical studies using Peng *et al.*'s (2012, 2009) institution-based view (IBV) theoretical framework. Based on our extensive literature review, six institutional factors (four formal and two informal) are selected in order to test their influences on global food industry sustainability engagement.

Bloomberg L. P. analyzes and reports public multinational corporations' levels of sustainability efforts as composite ESG disclosure scores. ESG refers to three distinct areas of corporate sustainability engagement (environmental, social, and governance categories), which serves as the dependent variable in this study. Bloomberg L. P. classifies ESG indices of public companies by firm size, financial

performance, market capitalization and so on in order to support sustainable investors in making sustainable investment decisions (Bloomberg L. P., 2019).

To test the study's seven hypotheses, the study uses firm sustainability engagement (Bloomberg ESG) and industry (four GICS food industries, which are nine GICS food *sub*-industries) data from the Bloomberg Finance L. P. database (2019). The food industry is classified by global industry classification standard (GICS) (MSCI, 2019a).

5. DATA ANALYSIS

This study uses simple and multiple regression models to test the relationship between six institutional factors (6 IVs) and food industry sustainability engagement (1 DV). Six institutional factors are used to predict the regression equation with the firm sustainability as the criterion. An independent variable is the predictor (six institutional factor indices), and the dependent variable is the criterion (ESG) (Creswell and Creswell, 2018; Field, 2017; Nemetz, 2014; Roberts, 2010).

This study also uses the linear correlation model embedded within regression analyses. To study the relationship between six institutional factors and food industry sustainability engagement, the study examines the relationship between these variables by measuring their correlation and test the strength of their relationship. Correlation analysis measures the relationship between six independent variables (six institutional factors) and one dependent variable (ESG).

Regression Analysis and ANOVA

To compare the means of ESG disclosure scores of the four GICS food industry firms in 1) restaurants industry, 2) food retailing industry, 3) beverages industry, and 4) food products industry, one-way ANOVA post-hoc tests such as Tukey and Games-Howell are used.

The Environmental Performance Index (EPI) by Yale's World Economic Forum (2019) is used to measure the national environmental performance levels of the food industry firms where their headquarters are located in their countries (**H1**). Simple and multiple regression analysis are used to determine the relationship between the levels of national environmental performance levels and the food industry firms' sustainability engagement levels.

One of the Food Sustainability Indices (FSIs) out of the three, the *food loss and food waste index* by BCFN Foundation (2019) is used to measure the *food loss and food waste* levels of the food industry firms where their headquarters are located in their countries (**H2**). Simple and multiple regression analysis are used to determine the relationship between the levels of national food policy responsiveness to *food loss and food waste* levels and the food industry firms' sustainability engagement levels.

One of the Food Sustainability Indices (FSIs) out of the three, the *sustainable agriculture index* by BCFN Foundation (2019) is used to measure the *sustainable agriculture policies implementation* levels of the food industry firms where their headquarters are located in their countries (**H3**). Simple and multiple regression analyses are used to determine the relationship between the levels of national responsiveness for *sustainable agriculture policies implementation* and the food industry firms' sustainability engagement levels.

One of the Food Sustainability Indices (FSIs) out of the three, the *nutritional challenge index* by BCFN Foundation (2019) is used to measure the levels of *food policy responsiveness to nutritional challenge* of the food industry firms where their headquarters are located in their countries (**H4**). Simple and multiple regression analyses are used to determine the relationship

between the levels of national responsiveness levels for *nutritional challenges* and the food industry firms' sustainability engagement levels.

Hofstede's uncertainty avoidance index (2019) is used to measure the levels of national culture's uncertainty avoidance of the food industry firms where their headquarters are located in their countries (**H5**). Simple and multiple regression analyses are used to determine the relationship between the levels of national culture's uncertainty avoidance and the food industry firms' sustainability engagement levels.

Hofstede's long-term orientation index (2019) is used to measure the levels of national culture's long-term orientation of the food industry firms where their headquarters are located in their countries (**H6**). Simple and multiple regression analyses are used to determine the relationship between the levels of national culture's long-term orientation and the food industry firms' sustainability engagement levels.

One-way ANOVA post-hoc analysis (Tukey and Games-Howell tests) are used to measure the differences among the means of sustainability engagement levels in the four GICS food industry firms (**H7**).

6. RESULTS

This section is organized as follows: 1) relationship analyses (correlation and regression) of the six individual institutional factors and the food industry firms' level of sustainability engagement, and 2) discussion of the multiple regression analysis of the six institutional factors and the food firm sustainability engagement levels, and 3) ANOVA statistical analysis of the sample.

The simple and multiple regression analyses of independent variables are reported. This includes the six institutional factors: 1) national environmental effort levels, 2) national food loss and food waste responsiveness levels, 3) national sustainable agriculture implementation levels, 4) national nutrition challenge efforts levels, 5) national culture's uncertainty avoidance levels, and 6) national culture's long-term orientation levels on the dependent variable (food industry firms' sustainability engagement levels).

This study proposed that the high levels of national environmental efforts are positively related to the food firm sustainability engagement levels (**H1**). A simple regression analysis indicated that national environmental performance was not a significant factor in food industry sustainability engagement ($B = 0.009$, $SE = 0.050$, $\beta = 0.008$, $p = 0.864$), which suggested that hypothesis one is not supported.

This study proposed that the high levels of national food loss and food waste responsiveness are positively related to the food firm sustainability engagement levels (**H2**). A simple regression analysis suggested that national responsiveness to food loss and food waste was not a significant factor in the food industry sustainability engagement ($B = -0.027$, $SE = 0.086$, $\beta = -0.014$, $p = 0.754$), which indicated that hypothesis two is not supported.

This study proposed that the high levels of national agriculture sustainability efforts are positively related to the food firm sustainability engagement levels (**H3**). A regression analysis of national agricultural sustainability efforts of the food industry firms indicated significant association to firm sustainability engagement ($B = -0.582$, $SE = 0.095$, $\beta = -0.263$, $p = 0.000$), which indicated that hypothesis three is supported. There was a positive correlation between national agricultural sustainability and the food industry firm sustainability engagement ($R^2 = 0.069$, $F(1, 503) = 37.38$, $p = 0.000$). Approximately 6.9 percent of the variation in firm sustainability engagement

levels could be explained by the levels of national agriculture sustainability efforts when other factors are not controlled.

This study proposed that the high levels of national nutrition challenge efforts are positively related to the food firm sustainability engagement levels (**H4**). A regression analysis of national nutritional challenge efforts of the food industry firms indicated significant association to firm sustainability engagement ($B = -0.316$, $SE = 0.075$, $\beta = -0.184$, $p = 0.000$), which indicated hypothesis four is supported. There was a positive correlation between national nutritional challenge efforts and the food industry firm sustainability engagement ($R^2 = 0.034$, $F(1, 503) = 17.54$, $p = 0.000$). Approximately 3.4 percent of the variation in firm sustainability engagement levels could be explained by the levels of national nutrition challenge efforts when other factors are not controlled.

This study proposed that the high levels of national uncertainty avoidance culture are positively related to the food firm sustainability engagement levels (**H5**). A simple regression analysis suggested that national uncertainty avoidance is not a significant factor in the food industry sustainability engagement ($B = -0.021$, $SE = 0.022$, $\beta = -0.043$, $p = 0.336$), which indicated that hypothesis five is not supported.

This study proposed that the high levels of national long-term orientation culture are positively related to the food firm sustainability engagement levels (**H6**). A regression analysis of national long-term orientation culture of the food industry firms indicated significant association to firm sustainability engagement ($B = -0.054$, $SE = 0.020$, $\beta = -0.121$, $p = 0.006$), which indicated hypothesis six is supported. There was a positive correlation between national long-term orientation culture and the food industry firm sustainability engagement ($R^2 = 0.015$, $F(1, 503) = 7.521$, $p = 0.003$). Approximately 1.5 percent of the variation in firm sustainability engagement levels could be explained by the levels of national long-term orientation culture when other factors are not controlled.

This study proposed that the high levels of national environmental performance (**H1**), national food waste and food loss responsiveness (**H2**), national sustainability agriculture implementation (**H3**), national nutrition challenge responsiveness (**H4**), national uncertainty avoidance culture (**H5**), and national long-term orientation culture (**H6**) have a positive influence on the food industry firm's sustainability engagement levels.

As shown in Table 1, multiple regression analyses of national environmental performance level ($B = 0.178$, $SE = 0.098$, $\beta = 0.160$, $p = 0.069$), national food waste and food loss responsiveness level ($B = 0.143$, $SE = 0.133$, $\beta = 0.074$, $p = 0.282$), national sustainable agriculture implementation levels ($B = -1.604$, $SE = 0.181$, $\beta = -0.726$, $p = 0.000$), national nutrition challenge responsiveness levels ($B = -0.054$, $SE = 0.234$, $\beta = -0.032$, $p = 0.816$), national uncertainty avoidance levels ($B = 0.288$, $SE = 0.056$, $\beta = 0.583$, $p = 0.000$), national long-term orientation levels ($B = -0.137$, $SE = 0.059$, $\beta = -0.305$, $p = 0.022$), and food industry firm sustainability levels were performed.

Results indicate that the levels of national sustainable agriculture efforts, national uncertainty avoidance culture, and national long-term orientation culture have statistically significant influences on the food industry firm's sustainability engagement levels.

Combined, six institutional factors tested showed a positive correlation with the food industry sustainability engagement ($R^2 = 0.209$, $F(6, 497) = 21.899$, $p = 0.000$), indicating that approximately 20.9 percent of the variation in the food firm's sustainability engagement levels could be accounted for by the combined influence of the institutional factors examined, when other factors are not controlled.

Table 1:
Multiple Regression Statistics of Institutional Factors Influence on Food Firm Sustainability Engagement Levels in the Fiscal Year 2017 (Max = 1.00)

	Unstandardized B	Coefficients Standard Error	Standardized Coefficients β	P-value
Formal Institutional Factors				
National Environmental Performance Levels	0.178	0.098	0.16	0.065
Levels of National Food Waste and Food Loss Responsiveness	0.143	0.133	0.074	0.282
Levels of National Sustainable Agriculture Implementation	-1.604	0.181	-0.726	0
Levels of National Nutrition Challenge Responsiveness	-0.054	0.234	-0.032	0.816
Informal Institutional Factors				
National Uncertainty Avoidance Levels	0.288	0.056	0.583	0
National Long-Term Orientation Levels	-0.137	0.059	-0.305	0.022
Number of Cases	504			

As shown in Table 2, one-way ANOVA test was used to examine the differences among the four GICS food industries. Sustainability engagement levels differed significantly across these four industries. $F(3, 500) = 11.29, p = 0.000$.

Tukey and Games-Howell post-hoc comparison tests showed significant differences between the restaurants industry ($M = 21.66$) and the beverages industry ($M = 28.99$), $p = 0.001$ suggesting that the beverages firms have higher sustainability engagement than the restaurants firms. The restaurants industry ($M = 21.66$) and the food products industry ($M = 28.95$), $p = 0.000$ showed significant differences suggesting that the food products firms have higher sustainability engagement than the restaurants firms. The food retailing industry ($M = 24.04$) and the food products ($M = 28.95$), $p = 0.003$ showed significant differences indicating that the food products firms have higher sustainability engagement than the food retailing industry. Findings from Tukey and Games-Howell post-hoc comparison tests support hypothesis seven (H7).

7. DISCUSSION

The global food industry's production, distribution, and processing have considerable environmental and social consequences. As the interest in sustainability investment has risen in recent years with increasing momentum, developing a greater understanding of how the food industry firms engage or do not engage in sustainability efforts becomes gradually more important (Amel-Zadeh, and Serafeim, 2018). Changes in climate, inequalities in access to food for survival, changing biodiversity of animals and plants for consumption, and increasing depletion of arable land for agriculture production are a few of the main issues that the food industry operations and processes pose on the long-term sustainability of the planet (Baldwin, 2015; Pullman *et al.*, 2009).

We contribute to the theory or the research stream on sustainability by investigating the institutional factors' influences on the food firm sustainability engagement levels on a global scale. We aim to inform scholars and practitioners by

illustrating the food industry firm management implications. Country level sustainability policy and cultural context on sustainability performance in the food industry are discussed. Also, another important goal of this study is to add to the theory development of the Institution-Based View (IBV) with empirical data analysis of the global food firm sustainability engagement.

Table 2:

ANOVA Statistics of the Four Food Industries by Global Industry Classification Standards (GICS) and Firm Sustainability Engagement Levels in the Fiscal Year 2017 (Max = 100)

Four Food Industry Classifications by GICS (Nine Food GICS <i>Sub</i> -Industries)	Food Firm Sus		
	M	SD	N
1) Restaurants	21.66	9.25	106
2) Food Retailing (food retail, food distributions, and hypermarkets & super centers)	24.04	10.87	103
3) Beverages (brewers, distillers & vintners, and soft drinks)	28.99	14.19	61
4) Food Products (agricultural products, and packaged foods & meats)	28.95	12.94	234
Sample Set	26.41	12.38	504

Though the literature reports that more sustainability efforts are needed in the food industry, we did not expect to discover that firm sustainability engagement levels are relatively low and rare. It is surprising to note that for the fiscal year 2017, only 29 percent of catering firms, 32 percent of food retailing firms, 22 percent of beverages firms, and 16 percent of food products firms in the Bloomberg database were analyzed for Environmental, Social, and Governance (ESG) disclosure scores.

Another surprising finding is from the ANOVA statistics from Table 2. It illustrates that comparatively little food industry sustainability engagement efforts exist throughout the global food industry in all four sectors: 1) restaurants, 2) food retailing, 3) beverages, and 4) food products. The mean fiscal year 2017 ESG scores of the four food industries were 21.66 for catering firms, 24.04 for food retailing firms, 28.99 for beverages firms, and 28.95 for food products firms.

As shown in Table 2, sustainability engagement levels of the food industry firms per ANOVA statistics, Nemetz (2014, 2015) used Bloomberg ESG data for a global firm sustainability engagement study and reported a mean ESG score of 30.95 for a total of 400 firms by examining various industry sectors including automobile, finance, chemicals, construction, food, healthcare, household goods, industrial goods, insurance, basic materials, media, oil, gas, real estate, technology, telecommunications, travel, leisure, and utilities public firms. In Nemetz's (2014, 2015) sustainability study, 33 food and beverages firms' Bloomberg ESG scores with a mean value of 28.41 from the fiscal year 2011 were used.

From comparing this study's food firms' mean ESG score in 2017 of 26.41 and Nemetz's (2014, 2015) food firms' mean ESG score of 28.41 in 2011, it could mean that the food industry's sustainability engagement levels have decreased from 2011 to 2017. Also, Nemetz (2014, 2015) did not study the entire food industry firms' Bloomberg ESG reporting, so the actual 2011 food industry sustainability engagement levels could have been lower than 28.41. Additionally, Bloomberg ESG scores may be becoming more precise and are measuring more ESG areas or indicators. In any case, this study shed light on the realities of the entire food industry's sustainability engagement levels in 2017 to fill the gaps in the sustainability literature.

The food supply chain is globalized, contextual, region-specific, and diverse. This study helps the management practice, particularly in the food industry, to understand the status quo of the food industry sustainability engagement levels and the effects of relevant institutional factors. As suggested by Aguilera and Jackson (2003) and Chkanikova and Mont (2015), there is a need to study institutional influences within a specific industry. Thus, this study focused on the institutional factors within the food industry. The food industry typically is able to maximize profits from using the mass-food production model, which has negative environmental and social consequences (Pullman *et al.*, 2009). This study offers a starting point to developing a more sustainable food system by informing managers in the food industry and the policymakers who develop food policies. This study also provides information for consumer stakeholders who demand for more sustainable business behavior.

Food supply depends on raw ingredients and food from animals, fish, and seafood, such as fresh meat and dairy. The demand on the global food industry increases as the standard of living of the world population continues to rise because more and more people demand for food items that fit their lifestyle (Wilde, 2018). There are sustainability concerns unique to the food industry. Production of food by the industrialized food system influences the wellbeing of agriculture and animals, and it has a significant consequence on the environment (Pullman, 2011). Governments, public and private policymakers, and management need to further examine the food needs of consumer stakeholders and align the food industry sustainability issues. The food industry constituents — farmers, suppliers, manufacturers, marketers, consumers, and so forth — need to collaborate to develop a more sustainable food system.

To encourage more sustainability engagement by the food industry, management could examine the food industry sustainability issues from multiple perspectives such as consumer, government, and business. Each stakeholder has a role in improving the food supply chain sustainability. Naturally, every consumer needs to consume food to survive. This means that every consumer stakeholder interfaces with the global food supply chain regularly. Consumers are increasingly educated about the environmental, social, and economic consequences the industrialized food system has on the planet. In order to encourage more sustainability efforts by various players within the food supply chain, we recommend the following to the management practice. The management practice could use, for instance, cause-related marketing campaigns and educational events to encourage sustainable consumption habits by consumer stakeholders. The management practice can also take advantage of cost-saving opportunities offered by sustainability support programs to produce more with less resources. This can be accomplished by investing in more sustainable food production methods, engaging in more recycling of resources, and searching for energy-saving and resource-saving food production methods. The management practice can also work with policymakers and NGOs to promote sustainable food

production, sustainable food consumption, and fair treatment of food industry employees.

Limitations

This project has some limitations. To begin, the quantitative nature of and use of archival data limits its generalizability. This study involved six institutional factors' website resources such as BCFN Foundation (2019), Yale's World Economic Forum (2019), and Hofstede's Insight (2019) which focus on specific factors within the industry, but not a comprehensive list of possible factors. Moreover, limitations stem from the Bloomberg financial database (2019). The use of generalized composite index scores in this study could lead to issues with the generalizability of the study's findings or misrepresentation of results.

The second major limitation is relatively small sample size of the food industry firms which were analyzed for their sustainability engagement levels (by their ESG disclosure scores in the Bloomberg finance database). This limitation poses the generalizability of this study's findings. Scholars are advised to understand that relatively few food industry firms report or are analyzed for their sustainability engagement efforts.

The third major limitation stems from how the study uses only the headquarter location for the national environment, national food policy, and national culture measurements. Hofstede (1980, 1991) reported that generally multiple national cultures can be observed in large multinational companies (MNCs) operating in multiple countries. This study does not account for multiple national cultures' influences on firm sustainability engagement levels within an organization.

The fourth major limitation is that this study does not examine the interaction between informal and formal institutional factors. There may be an interaction between informal and formal institutional factors, but that is beyond the scope of this study.

The fifth major limitation is that this project examined only national-level institutional factors. Thus, firm sustainability engagement is based on national-level institutional factors.

The sixth major limitation is that this study only examines the relationship between composite scores (ESG scores, formal institutional factors, and informal institutional factors) that are indexed from 0 to 100. A more sophisticated statistical analysis requiring additional measurements is beyond the scope of this project.

8. CONCLUSION

Food supply chain relationships are diverse and complex, which involve many institutional factors. Such complex interrelationships can be influenced positively by educating the public about the benefits of sustainability efforts by the food industry and members involved in the food supply chain. Food is an essential need of everyone, and nearly all consumers interact with the global food supply chain. The food supply chain involves numerous food industry players and members.

Hence, the food supply chain involves and influences nearly all individuals on the planet because consumer stakeholders need to consume food. Rather than isolating the low sustainability engagement levels of the food industry and blaming the food industry management alone, further examination to understand what led to the current state of low sustainability engagement by the food industry worldwide is needed to fill the gaps in the sustainability literature.

Additionally, future studies on the complexities and contexts of the global food industry sustainability through the lens of the Institution-Based View (IBV) framework [developed by Peng *et al.* (2009)] will continue to add new knowledge to the food industry sustainability literature. Further research on how to encourage sustainability efforts

throughout the global food supply chain with sustainable food supply chain practices as well as other environmental management practice mechanisms will benefit the future food industry.

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