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Do First-Movers in Marketing Sustainable Products Enjoy Sustainable Advantages? A Seven-Country Comparative Study

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Abstract: The literature suggests that first-movers enjoy sustainable competitive advantages but suffer some disadvantages. The timing of new product introduction is a major decision for executives who are concerned about sustainability issues. These executives must simultaneously strive for environmental protection, social welfare, the timing of product introduction, and the economic viability of decisions. However, few academic studies have examined how executives balance sustainable first-mover advantages and sustainable development goals in order to achieve sustainable organizational growth and performance. This study develops nine research hypotheses to examine what sustainable advantages first-movers gain by being first to market sustainable products in five industries that are important for advancing sustainable development goals. Using data collected from 1437 executives who are concerned about sustainability issues in seven countries, this study uses Duncan multiple-range tests to examine cross-national similarities and differences between Asian and Western countries. The study results reveal some interesting cross-national similarities and differences. The cross-national differences suggest some competing and signaling strategies for sustainable enterprise development. This study contributes to the existing cross-national research on first-mover advantages, provides a richer understanding of how executives who are concerned about sustainability issues perceive sustainability first-mover advantages and disadvantages, and further expands the theory of sustainable innovation and entrepreneurship.

Keywords: sustainable first-mover advantages; cross-national study; sustainable innovation; sustainable entrepreneurship

1. Introduction

Sustainability first-movers refer to enterprises that are among the first to introduce sustainable products with sustainable materials or sustainable technologies into the marketplace. Successfully launching new products, first-mover or otherwise, is critical to the sustainability of any enterprise development, including new and established enterprises. It is also the most important decision for sustainable enterprises. The literature suggests that executives who are concerned about sustainability issues spend most of their time and resources developing their first product and making market-entry decisions. Kuhlman and Farrington described sustainability as being “concerned with the well-being of future generations and, in particular, with irreplaceable natural resources—as opposed to the gratification of present needs which we call well-being” [1]. Therefore, sustainable enterprises not only have to strive economic viability of their product choice decisions, they also have to simultaneously strive for environmental protection, social welfare, and the timing of product introduction.

Managerial mindfulness in decision making enhances innovation, impacting sustainability and sustainable development. In their study, Li and Zhao [2] “provided evidence for the First-Mover

Advantage theory from the information spreading point of view.” Developing first-mover new market opportunities in a rapidly changing market environment is an important strategy for sustainable business development. In a comprehensive review of sustainability business models in the literature, it was found that firms that pursue first-mover advantages can gain sustainable competitive advantages that enhance the sustainable development goals of the firm [3–10]. Indeed, firms that pursue sustainability first-mover strategies have gained competitive advantages in many industries [11], such as in e-commerce platforms and social commerce contexts [2]. However, more research is needed to identify the advantages and disadvantages that are experienced by sustainability first-movers. Therefore, the first two research questions can be developed.

RQ1: What sustainable advantages do sustainability first-movers enjoy?

RQ2: What sustainable disadvantages do sustainability first-movers suffer?

The organizational imprinting theory suggests that the structure, characteristics and decision-making of start-ups are difficult to change. Based on their prior experience and perceptions of the environments, executives prefer certain specific structures, behaviors and characteristics. This imprinting effect is difficult to change even when the environment changes [12–14]. Previous empirical research has demonstrated that effects of imprinting theory on sustainable organizational development has empirical validity. Studies have found that the start-up conditions shape the characteristics of managerial actions, strategy, structure [15–17], and performance [18,19]. Start-up conditions also have lasting influences on the future development track and survival of enterprises. Similarly, first-mover advantages in launching sustainable products have imprinting effects on the sustainable development of new and existing enterprises.

Cross-national studies have found that some first-mover advantages may universally be considered important, others may be perceived differently in different countries, and still others may be seen as applicable only in some countries [8]. These studies have found that executives make first-mover entry decisions based on their personal knowledge and beliefs [10,20]. Scholars have called for more large-scale empirical studies to further examine cross-national similarities and differences in these first-mover advantages [8,20–23]. However, to date, few studies have provided empirical evidence on how executives who are concerned about sustainability issues in different countries perceive sustainability first-mover advantages and disadvantages due to the difficulties of collecting large-scale multiple-country data (see [11] for a study of “sustainability pioneers” in the information technology (IT) hardware industry). Therefore, we developed third research question for this study.

RQ3: What are the cross-national similarities and differences in sustainable advantages and disadvantages between Asian countries and Western countries?

Why is it important to study perceptions of sustainability first-mover advantages and disadvantages in different countries? First, the literature on mental modeling suggests that executives make important decisions based on their own perceptions of reality, regardless of whether their perceptions have external validity [20–23]. Second, literature in management and marketing suggests that executives make first-mover decisions by simplified mental models of the perceived advantages and disadvantages of being a market pioneer [8,9,20–24]. Third, executives in different countries may perceive their relative first-mover advantages differently depending on the mental model they use [20,21,23,24]. Fourth, cross-national studies have also suggested that executives from different countries differ on how they process information [22,25–27] and how they make first-mover decisions based on their mental models [10,20]. Therefore, to understand managerial actions and gain insights into likely future sustainability first-mover strategies, it is important to investigate the particular mental models that are used by executives from different countries and to understand the way their perceptions of reality are formed [21]. This understanding will advance the literature on sustainable entrepreneurship.

In this study, we aim to fill these gaps in the literature by proposing seven hypotheses regarding a cross-national comparison of sustainability first-mover advantages and disadvantages and by testing

them by using data collected from 1437 senior executives from seven countries (the United States, the United Kingdom, Germany, China, Japan, South Korea, and Singapore). To advance the theory of sustainable development, the chosen empirical contexts are five key industries that advance the sustainable development goals: food, beverage, and consumer goods; healthcare and life sciences; industrial manufacturing; transportation; and energy, natural resources, and chemicals. This study uses Duncan multiple-range tests examine cross-national similarities and differences.

This study contributes to the sustainability and management literature in several ways. First, it answers the call for cross-national research to investigate whether executives who are concerned about sustainability issues in different countries perceive sustainability first-mover advantages and disadvantages differently. Second, the empirical findings suggest that executives who are concerned about sustainability issues from these seven countries employ different mental models of sustainability first-mover advantages and disadvantages; therefore, they make different sustainability first-mover decisions. Third, executives who are concerned about sustainability issues from the United States, the United Kingdom, Germany, and Japan assign different levels of importance to sustainability advantages and disadvantages than executives from China, South Korea, and Singapore do.

2. Literature and Research Hypotheses

2.1. Sustainable First-Mover Advantages and Disadvantages

Previous research on first-movers in the marketing and management literatures has described various advantages and disadvantages of first-mover activities [6–8,10,20,24,28]. First, first-movers can achieve sustainable development by continually focusing on new product development. First-movers in a given market have the opportunity to gain brand recognition, grab market share, build customer loyalty, and so on, ultimately leading to sustainable sales and profitability [21,23]. However, first-movers also face challenges from having to make substantial investments in the research and development of new products, marketing efforts to introduce new products to consumers, the building of a customer base, and so on [21,23]. We expect that sustainability first-movers experience similar advantages and disadvantages.

Though research has found that later market entrants can also achieve successful performance outcomes [29], we expect that sustainability first-movers are particularly advantaged by their first-mover activities. Sustainability first-movers have a greater opportunity than later entrants to increase sales, market share, and profitability. We therefore hypothesize:

Hypothesize 1 (H1). *Sustainability first-movers enjoy a performance outcome advantage.*

Sustainability first-movers heavily invest in new product development and are thus in position to create and set standards for the product category [11]. As a result, early adopters of sustainability first-mover brands perceive them as being of high quality [10,20,23]. Sustainability first-movers also heavily invest in market development, the introduction of new products to customers, and the building of brand recognition. Particularly when technological uncertainty is high [11], instilling brand preference establishes customer loyalty and builds market share. Early adopters of sustainability brands are often opinion leaders that spread the word about the superior quality of these products over those of later market entrants [21,23]. This makes it difficult and expensive for later entrants to overcome the established quality image and brand recognition of sustainability first-movers [10,20,21]. We therefore hypothesize:

Hypothesize 2 (H2). *Sustainability first-movers enjoy a quality image perception advantage.*

As market pioneers, sustainability first-movers have wide access to geographic locations, suppliers, production resources, skilled personnel, and market opportunities [6,8–10,21,23,30–32]. As a result, sustainability first-movers can make pre-emptive investments in securing these resources and developing production capabilities [10,20,23,32,33]. Such factor input pre-emption signals to

other firms that enter the market may be difficult and costly, thereby inuring an advantage to sustainability first-movers.

Hypothesize 3 (H3). *Sustainability first-movers enjoys a factor input pre-emption advantage.*

Sustainability first-movers introduce new and innovative products to the market, which can result in a steep sustainability technology learning curve [11]. Song et al. [23] suggested that a first-mover “can take advantage of learning curve effects and further sustain its technological lead through pre-emptive patenting” [23]. Sustainability first-movers can also embed innovative technologies in their organizational systems and product development processes [21,23]. By spearheading technological innovations, sustainability first-movers are able to capture market opportunities, resulting in competitive advantages from high production volumes and price leadership. Therefore, we hypothesize:

Hypothesize 4 (H4). *Sustainability first-movers enjoy an innovation leadership advantage.*

Following the above, sustainability first-movers have established manufacturing processes and high production volumes. Thus, they have relatively low per-unit costs as a result of economies of scale [10,20]. By contrast, later market entrants face high production costs and must contend with the factor input pre-emption of sustainability first-movers in building their production capabilities [21,23]. To thwart later market entrants, sustainability first-movers may even further increase their investment in technology and expand their production capacity, enhancing their competitive advantages and forcing new market entrants to focus on niche markets to attain performance success [21,23]. Therefore, we hypothesize:

Hypothesize 5 (H5). *Sustainability first-movers enjoy a scale economy advantage.*

Though sustainability first-movers may experience many market advantages, they also face challenges in both their first-mover activities and maintaining their first-mover advantages [21,23]. Changes in resource availability, technological development, market demand, and customer preferences all create uncertainty for sustainability first-movers [34]. To deal with such uncertainty, sustainability first-movers need to heavily invest in research and development to ensure that they have multiple options available to meet shifts in customer demands and adapt to changes in technological development [21,23]. Having invested in a particular area, sustainability first-movers may not be as nimble in their response to market changes as later entrants may be. Late entrants follow the lead of sustainability first-movers, learning from their experiences and mistakes, and recruiting their skilled and knowledgeable staff. Late entrants can build on the innovations and market development of first-movers and thereby have lower production costs that translate into lower product prices for consumers [21,23]. Thus, late entrants are able to adeptly react to market shifts and market share, causing sustainability first-movers to lose some of their early competitive advantages [8–10,28]. We therefore hypothesize:

Hypothesize 6 (H6). *Sustainability first-movers face an uncertainty disadvantage related to technological changes, market development, and competition.*

Hypothesize 7 (H7). *Sustainability first-movers face challenges in maintaining their first-mover advantages.*

2.2. Cross-Country Hypotheses

Market entry decisions are made by executives whose perceptions of the market environment, competition, and first-mover advantages and disadvantages are filtered through their unique mental model [10,20,23,24]. Research has shown that the mental model of decision makers is directly affected by cultural factors [10,20–23,25–27,35]. For example, cross-cultural differences in market time orientation (long term vs. short term), risk tolerance (risk averse vs. risk seeking), government regulation, market entry barriers, and intellectual property protection may all substantially affect decision making

in sustainability firms. Recent work has demonstrated cross-cultural differences between U.S. and Chinese executives in perceptions of first-mover advantages and disadvantages and the number of first-mover decisions they made [10,20–23].

Asian cultures such as those in China, Japan, South Korea, and Singapore tend to have long-term market orientation, low risk tolerance, and high levels of government regulation. Firms in these countries thus may tend to implement sustainability strategies to produce long-term sustainable growth and focus less on achieving short-term profitability [22,25,26,36,37]. Sustainable growth for many firms in these countries is based on manufacturing exports and thus maintaining long-term relationships with suppliers and buyers [10,20,21,38], establishing a reputation for high quality and reliability, and building customer loyalty, all of which are high priorities. The economies of scale that are derived by sustainability first-movers in these countries are particularly important [10,20–23]. Market entry barriers are already very high in these countries [23], and, thus, building competitive entry barriers to establish sustainability first-mover advantage would not be as important. Firms in these countries would also regard the risks that are associated with market uncertainty to be particularly disadvantageous for sustainability first-movers.

Sustainability firms operating in the cultural context of Western countries such as the United States, the United Kingdom, and Germany are more short-term oriented, have more adversarial relationships with suppliers and customers [26,39], and face greater threats from outside competitors due to low barriers to market entry. These firms pay more attention to potential competitors and place greater emphasis on implementing pre-emptive competitive strategies and gaining first-mover advantages [10,20–23]. Though it is more difficult to be a technological leader in the current global economy, the business environment in Western countries offers more incentives and protections for technological development, and, thus, sustainability first-movers and innovation leaders in these countries gain greater competitive advantages [10,20–23]. Though Western firms also face great uncertainties in market entry, they are less daunted by these risks and regard these disadvantages as being outweighed by the first-mover advantages.

In light of these expected cross-cultural differences in perceptions of the business context for sustainability first-movers, we hypothesize:

Hypothesize 8 (H8). *For sustainability first-movers, executives from the United States, the United Kingdom, and Germany perceive higher levels of the five advantages (sustainability first-mover performance outcomes, quality image perception, factor input pre-emption, sustainability innovation leadership, and scale economy) than executives from China, Japan, South Korea, and Singapore do.*

Hypothesize 9 (H9). *For sustainability first-movers, executives from China, Japan, South Korea, and Singapore perceive higher levels of the two disadvantages (uncertainty and difficulty maintaining first-mover advantages) than executives from the United States, the United Kingdom, and Germany do.*

3. Methodology

3.1. Research Design

In this study, we followed the cross-cultural research design extended by Song et al. [23]. We first adopted the measures for first-mover advantages and disadvantages from Song et al. [23]. The measures are presented in the Appendix A. To evaluate how these measures can be changed to study sustainability first-mover advantages, we conducted 42 face-to-face interviews with 42 executives who are concerned about sustainability issues over 13 months. We also used these interviews to validate our research methodologies and the cross-national equivalence of our constructs, measures, and samples, as suggested by Song et al. [23]. We prepared the final English version of the study survey and translated into four other languages by using the parallel-translation and double-translation method. We pretested the surveys for clarity and appropriateness with 42 senior executives with extensive experience in the development of sustainable products. All measures were adapted from Song et al. [23] to apply to

sustainability first-movers [10,20]. We defined “sustainability first-movers” as firms that are among the first to introduce a new sustainable product/brand with new sustainability features (sustainable materials and/or sustainable technologies) into their primary markets. Participants rated each survey item on an 11-point scale ranging from 0 (strongly disagree) to 10 (strongly agree). We provide the final scale measures in the Appendix A.

3.2. Data Collection

For the U.S. sample, we randomly selected 500 firms from Manufacturing USA and the Directory of High Technology Industry. For the Japanese sample, we randomly selected 500 firms listed on the Tokyo, Osaka, and Nagoya stock exchanges. For the samples from the United Kingdom, Germany, China, South Korea, and Singapore, we randomly selected 500 firms from each country from the World Business Directory. We evaluated the selected firms to ensure comparability across the seven countries. We replaced any unsuited firms with a new randomly selected firm from the same source.

The data were collected by following the survey research methodology [40]. We administered a presurvey to secure participation agreements and to identify senior executives who are concerned about sustainability issues. We asked the contact person to distribute the survey to a senior executive who is responsible for development of sustainable products in the organization (executives who are concerned about sustainability issues). We also included multiple research reports with the survey to increase the participation rate [23].

After up to four follow-up letters and, in some cases, multiple phone calls and facsimiles, we received completed surveys from 1437 executives who are concerned about sustainability issues across the seven countries. The number of executives who responded to the survey for each country was: 285 for the United States, 159 for the United Kingdom, 133 for Germany, 333 for Japan, 236 for China, 187 for South Korea, and 104 for Singapore.

Table 1 presents the demographic information about the senior executives who are concerned about sustainability issues for each country. The average age of the executives in the sample was between 40 years old (China) and 48 years old (Japan and Germany). The average work experience ranged from 12 years (United Kingdom) to 24 years (Japan). In the last three years, these executives made, on average, between 14 (Germany) and 23 (Japan) major sustainability decisions. These results suggest that our final sample included executives who were very experienced in making sustainability market-entry decisions.

Table 1. Information about senior executives who are concerned about sustainability issues.

	Japan	U.S.	U.K.	Germany	China	South Korea	Singapore
Number of Participating Firms	333	285	159	133	236	187	104
Age	48	42	46	47	40	41	40
Years of Working Experience	24	14	12	19	18	19	18
Major Decisions about Sustainability Issues Made	23	16	18	14	17	19	16

4. Results

4.1. Data Analyses

We performed principal component factor analysis by using the combined data from all seven countries. We deleted any measures with double loading, cross-loading, loading to the wrong factor, or low item-to-construct loadings. Seven factors emerged from the factor analysis that corresponded to the five types of sustainability first-mover advantages and two types of sustainability first-mover disadvantages.

The first research objective was to test whether sustainability first-movers enjoy five sustainable advantages but suffer from two types of disadvantages (i.e., research hypotheses H1–H7). For each sustainability first-mover advantage and disadvantage, we calculated a score for each multiple-item scale as the simple average of all items for that scale. Following the procedure suggested by Song et al. [23], we centered all scales so that zero indicates “neither agree nor disagree,” and, thus, (1) a positive score indicates that there is a sustainability first-mover advantage, (2) zero indicates no sustainability first-mover advantage or disadvantage, and (3) a negative score suggests that there is lack of perceived sustainability first-mover advantage [10,20,23].

The second research objective was to examine cross-national similarities and differences between Asian countries and Western countries among the seven countries. We conducted multivariate analysis of variance (MANOVA) by using the MEANS statement of the “Proc GLM” in SAS software version 9.4. We fit the seven dependent variables (sustainable advantages and disadvantages) to the same effects (seven countries). We used Duncan’s multiple range test to separate the means for the seven countries and to test whether or not the means were significantly different.

4.2. Results from Testing Research Hypotheses H1–H7

We present our results in Table 2 and a summary in Table 3. H1 predicts that there is a sustainability first-mover performance advantage. As shown in column 2 of Table 2a, the means across all seven countries were significantly greater than zero ($p < 0.05$). Thus, our data support H1.

Table 2. Duncan multiple-range test results.

(a) Sustainability First-mover Performance Outcomes (H1 and H8).							
Country	Construct Mean	U.S.	U.K.	Japan	Sing.	S. Korea	Germany
U.S.	2.258	–					
U.K.	2.233	NS	–				
Japan	1.89	S	S	–			
Sing.	1.964	S	S	NS	–		
S. Korea	1.674	S	S	NS	NS	–	
Germany	1.682	S	S	NS	NS	NS	–
China	1.194	S	S	S	S	S	S
(b) Quality Image Perception Advantages in Sustainability (H2 and H8).							
Country	Construct Mean	Japan	Sing.	S. Korea	China	Germany	U.K.
Japan	2.674	–					
Sing.	2.111	S	–				
S. Korea	1.948	S	NS	–			
China	1.734	S	NS	NS	–		
Germany	0.15	S	S	S	S	–	
U.K.	–1.116	S	S	S	S	S	–
U.S.	–1.204	S	S	S	S	S	NS
(c) Factor Input Pre-emption Advantages in Sustainability (H3 and H8).							
Country	Construct Mean	Germany	U.S.	U.K.	S. Korea	Japan	Sing.
Germany	3.182	–					
U.S.	2.825	NS	–				
U.K.	2.823	NS	NS	–			
S. Korea	0.371	S	S	S	–		
Japan	0.098	S	S	S	NS	–	
Sing.	0.088	S	S	S	NS	NS	–
China	–0.497	S	S	S	S	S	S

Table 2. Cont.

(d) Sustainability Innovation Leadership Advantages (H4 and H8).							
Country	Construct Mean	U.K.	U.S.	Japan	Germany	China	Sing.
U.K.	1.48	–					
U.S.	1.47	NS	–				
Japan	1.135	NS	NS	–			
Germany	1.02	NS	NS	NS	–		
China	1.123	NS	NS	NS	NS	–	
Sing.	0.385	S	S	S	S	S	–
S. Korea	0.175	S	S	S	S	S	NS
(e) Sustainability First-mover Uncertainty Disadvantages (H6 and H9).							
Country	Construct Mean	U.K.	U.S.	Japan	Germany	Sing.	China
U.K.	1.572	–					
U.S.	1.436	NS	–				
Japan	1.385	NS	NS	–			
Germany	1.343	S	NS	NS	–		
Sing.	0.885	S	S	S	S	–	
China	0.555	S	S	S	S	NS	–
S. Korea	0.201	S	S	S	S	S	NS
(f) Sustainability First-mover Nonsustainable Disadvantages (H7 and H9).							
Country	Construct Mean	Sing.	Japan	Germany	S. Korea	China	U.K.
Sing.	2.09	–					
Japan	1.876	NS	–				
Germany	1.83	NS	NS	–			
S. Korea	1.811	NS	NS	NS	–		
China	1.784	NS	NS	NS	NS	–	
U.K.	1.499	NS	NS	NS	NS	NS	–
U.S.	1.421	S	NS	NS	NS	NS	NS

Notes: In these tables, NS = not significantly different at $p < 0.05$ and S = significantly different at $p < 0.05$. All multivariate analyses of variance are significant at the 0.01 level.

Table 3. Summary of cross-national differences.

Types of Sustainability First-Mover Advantages and Disadvantages	Empirical Findings
Sustainability first-mover firms outperform later entrants.	All means significantly greater than zero; U.S. and U.K. means are significantly higher; China mean is significantly lower.
Quality image perception advantages.	Japan, China, S. Korea and Singapore means are significantly higher than those of U.S., U.K. and Germany.
Factor input pre-emption advantages.	Means for U.S., U.K., and Germany are significantly higher than those of Japan, China, S. Korea and Singapore; China has a negative mean value.
Innovation leadership advantages.	Mean for China is as high as that of Japan, U.S., U.K., and Germany.
Scale of economy advantages.	All means are significantly greater than zero, but no significant differences between means were found among countries.
Uncertainty disadvantages of sustainability first-mover.	China, S. Korea and Singapore means are significantly lower than those of Western countries.
Nonsustainable disadvantages of sustainability first-mover cultures.	Japan, China and Singapore means are significantly higher than that of U.S.; most other differences are not significant.

H2 posits that there is a quality image perception advantage for sustainability first-movers. As shown in Table 2b, the means for Japan, Singapore, South Korea, and China were significant and positive ($p < 0.05$), but the means for Germany, the United Kingdom, and the United States were significant and negative ($p < 0.05$). Therefore, H2 is supported only for the Asian countries.

H3 predicts that there is a factor input pre-emption advantage for sustainability first-movers. The results in Table 2c reveal significantly positive mean values for all countries except China ($p < 0.05$). Therefore, the data from all countries except China support H3.

The values shown in Table 2d provide support for H4 for all seven countries ($p < 0.05$), indicating that the executives in our sample perceived that sustainability first-movers enjoy an innovation leadership advantage ($p < 0.05$). Our data also indicate that sustainability first-movers suffer from uncertainty disadvantages, supporting both H6 and H7 for all seven countries ($p < 0.05$; see Table 2e,f, respectively).

Though our data suggest that executives from all seven countries perceived that sustainability first-movers enjoy a scale economy advantage, none of the mean values were significant, and, thus, we cannot confirm H5. Accordingly, we did not include these results in Table 2.

4.3. Results from Testing H8 and H9

We conducted multivariate analyses of variance to assess H8 and H9. We tested each pair of cross-national differences for each type of sustainability first-mover advantage and disadvantage, the results of which are displayed in Table 2 and summarized in Table 3.

The results shown in Table 2a reveal that Chinese executives' perceptions of sustainability first-mover performance outcomes were significantly lower than those of executives from the other six countries. Though China is moving toward a market system, centralized economic planning by the Chinese government is still the norm in many industries and may mitigate the relative performance outcomes of first-movers. U.S. and U.K. executives reported the highest levels of perceived sustainability first-mover performance advantages. The mean values for German executives were not significantly higher than those of the Asian countries; therefore, our results support H8 only in regard to the differences between the other six countries. However, contrary to our prediction in H8, the expectations of sustainability first-movers who enjoy a quality image perception advantage for executives in Japan, China, South Korea, and Singapore were all significantly higher than those for U.S., U.K., and German executives ($p < 0.05$; Table 2b).

As shown in Table 2c, H8 is fully supported in regard to the factor input pre-emption advantage, as executives in China, Japan, South Korea and Singapore rated this advantage significantly lower than executives from the United States, United Kingdom, and Germany ($p < 0.05$). The results displayed in Table 2d indicate that executives from the most industrialized countries (the Western countries and Japan) perceived greater sustainability innovation leadership advantages for sustainability first-movers than executives from Singapore and South Korea did (see Table 2d). Surprisingly, the perceptions of this advantage of executives in China were not significantly different from those of the industrialized countries, suggesting that Chinese executives also believed that sustainability first-movers have better advantages as a result of organizational innovation, patent protection, and proprietary information.

None of the means for the scale economy advantage across the seven countries were significantly different from one another ($p < 0.05$). Thus, our results cannot confirm H8 for this advantage.

Our results as displayed in Table 2e do not support H9 ($p < 0.05$). Contrary to our expectations, executives from China, South Korea, and Singapore perceived significantly lower levels of disadvantage for sustainability first-movers from technological, competitor, and market uncertainties than executives from countries with more risk-tolerant cultures did (the United States, the United Kingdom, and Germany). It is interesting to note that Japanese executives' perceptions of this disadvantage were not significantly different from those of the Western countries ($p > 0.05$).

For the non-sustainable disadvantage for sustainability first-movers, our empirical results, as shown in Table 2f, indicate a significant difference ($p > 0.05$) only between the perceptions of executives in Singapore and the United States, with the former perceiving significantly greater levels of this disadvantage. No other significant cross-national differences emerged.

5. Discussion

Previous research has suggested that organizational aspiration should be taken into account in sustainable development processes [34]. This study answers three research questions:

RQ1: What sustainable advantages do sustainability first-movers enjoy?

RQ2: What sustainable disadvantages do sustainability first-movers suffer?

RQ3: What are cross-national similarities and differences in sustainable advantages and disadvantages between Asian countries and Western countries?

Our findings, summarized in Table 3, suggest that executives from the seven countries we studied employed different mental models of sustainability first-mover advantages and disadvantages and will therefore make different sustainability first-mover decisions. The data generally support H1–H9, revealing cross-national similarities and differences that offer some theoretical insights and managerial implications.

5.1. Theoretical Implications

The findings from this study enrich first-mover theory and the theory of sustainable development in several ways. First, most prior research on first-mover advantages has examined outcomes experienced by first-mover within a single country, whereas we assessed executives' perceptions of sustainability first-mover advantages across seven countries. We found that executives in all seven countries expected a performance outcome advantage for sustainability first-movers. This result provides additional empirical evidence that supports prior first-mover research findings [8–10,23,41–44]. Executives from the United States and the United Kingdom perceived performance benefits to sustainability first-movers to be significantly greater than the level perceived by executives from the other countries, particularly Germany and China. These results extend the existing cross-national research on first-mover advantages [10,20,28] and our understanding of how executives perceive sustainability first-mover advantages and disadvantages in the sustainability literature.

Second, in terms of quality image perception advantages, consistent with previous studies [10,20–23], the empirical findings suggest that sustainability quality image perception advantages do exist in the seven countries. However, executives from China, South Korea, and Singapore assigned higher importance to sustainability quality image perception advantages. It is interesting to note that Japan was not as high on sustainability quality image perception advantages. However, executives from U.S., U.K., Germany, and Japan gave more importance to sustainability competitive pre-emption advantages. Di Benedetto and Song [21] and Zhao et al. [10,20] suggested that the degree of quality image perception advantages is higher in the U.S. than in South Korea and China. This study expands their conclusions to examine the sustainability advantages in U.K., Germany, Japan, and Singapore. The findings provide additional insights into which countries may or may not have the sustainability quality image perception advantage for first-movers.

Third, contrary to our hypothesis, but similar to previous studies [10,20–23], executives from Japan perceived innovation leadership sustainability first-mover advantages to be much more important than executives from South Korea and Singapore did. It is also surprising to find that the perceptions of this advantage of executives from China were not significantly different from those of executives from the United States, the United Kingdom, Germany, and Japan. This finding may suggest that Chinese executives perceive that there is some protection of sustainability innovations provided by the central government [10,20,28]. It may also reflect the perception that the Chinese government is encouraging sustainability innovations (domestic or foreign) to stimulate economic growth and encourage greater industrialization [22,25,26].

5.2. Practical Implications

The results of this study were based on the perceptions of 1437 experienced senior executives from seven countries. These perceived sustainability first-mover advantages and disadvantages offer

important insights into the mental models of those executives. Executives who are responsible for market-entry decisions may benefit from a detailed examination of the research findings to estimate the likelihood that their rivals will make sustainability first-mover decisions [10,20–23]. In addition, sustainability first-movers can use the results to consider how they should send signals to deter future potential sustainability entrants [10,20–23]. The significantly different findings reported in this study can serve as an initial guide for developing sustainability market entry strategy decisions or sustainability market entry deterrence strategies [10,20–23]. For late sustainability entrants, executives can infer insights about sustainability first-movers' mental models when assessing the environment and thus develop more effective sustainability strategies for competing and signaling [10,20–23].

For example, a U.K. firm is considering entering the market in China, Japan, South Korea, or Singapore. Should the firm be among the first to enter the specific sustainability market? Our results suggest that they should. However, it is important for this U.K. firm to recognize that the sustainability first-mover advantages are different in the United Kingdom than in these Asian countries [10,20–23]. Based on our findings, the U.K. company can expect that if firms in those Asian countries feel threatened by the sustainability market entry, they will respond by protecting and strengthening their sustainability market positions with suppliers and customers to gain cost advantages [10,20–23].

5.3. Study Limitations

This study has some limitations. We collected data on executives' perceptions of sustainability first-movers generally, but we did not do so specifically in regard to actual sustainability first-mover decisions. Though prior research has shown that perceptions of sustainability first-mover advantages and disadvantages significantly affect sustainability first-mover decisions in the United States and South Korea, there is no empirical evidence that this holds in the other five countries. Thus, consistent with previous studies [10,20–23], we must caution against inferring any causal relationships between perceptions and sustainability decisions. In addition, although our study expands the breadth of analysis of these issues across seven countries, the generalizability of our findings remains limited to our sample group. Future research should collect additional data to validate the empirical results reported here and extend the literature by collecting longitudinal data to examine how changes in perceptions affect sustainability first-mover decisions over time.

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Appendix A Study Measures

The following measures were taken from [20–23]. Minor modifications were made based on the pretests.

Factor Input Pre-emption Advantage

First-movers can pre-empt raw material supplies. Later entrants often get lower quality and higher priced raw materials.

First-movers will obtain better access to superior labor.

First-movers can pre-empt equipment and locations. Later entrants will have to compete with more inferior equipment and in unfavorable locations.

First-movers will enjoy lower production costs.

First-movers can secure more experienced managers.

Quality Image Perception Advantage

To successfully compete with first-movers, late entrants will have to offer higher product quality.

Late entrants must spend more on advertising and promotion to overcome first-mover's advantages.

Late entrants into a market must offer higher levels of value (quality for the price) to achieve high profitability.

First-movers will have better brand images with buyers. Consumers often purchase pioneer products simply because they know them first and are used to them.

Uncertainty Disadvantages

First-movers will have higher levels of competitive uncertainty than late entrants do.

First-movers will have higher levels of market uncertainty than late entrants do.

First-Mover Performance Outcomes

First-movers will have higher levels of market share.

First-mover's products are perceived to have higher quality by consumers.

First-movers will have higher levels of return on investment.

First-movers can charge a premium for the same products.

Innovation Leadership Advantage

Because of "learning curve effects," first-movers keep proprietary information from diffusing for a longer time period.

First-movers will gain a competitive advantage from patent protection.

First-movers' management styles are often model for this industry. These styles are recognized for their effectiveness.

Sustainability Disadvantages

First-movers lose market share over time because of a deterioration of their product quality.

First-movers lose market share over time because of declining absolute cost advantages.

Late entrants are able to "free-ride" on first-mover's development of the market.

Scale Economy Advantage

First-movers will enjoy lower direct costs due to scale economy advantage.

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