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Analyzing the Association Between Disaster Risk Preparedness and Environmental Consciousness of Small and Medium-Sized Enterprises: The Case of Sukagawa City, Fukushima Prefecture, Japan

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This study aims to clarify the relation between preparedness status and the local natural resource conservation of small and medium-sized enterprises (SMEs). SMEs are key actors in sustainable development and local disaster risk reduction. To ensure the quick recovery of business, SMEs are expected to formulate a Business Continuity Plan (BCP). However, the rate of formulation has thus far not been very high among SMEs. This study conducted a questionnaire survey in 2017 targeting SMEs in Sukagawa, Fukushima. We analyzed the 240 responses collected through a Multiple Correspondence Analysis and used Cramer's coefficient of association to determine the strength of association. Major findings are as follows: 1) Environment-related indices were associated with both BCP formulation and business size, and these associations indicate the possibility of connecting environmental actions or management to BCP formulation. 2) In the association between BCP formulation status and environmental actions, the environmental management system had a stronger association than business size (capital, number of employees). 3) The group interested in the conservation of regulating services related to local natural resources (reducing CO_2 emission, water quality, aquatic plants and animals) had a higher rate of BCP formulation. 4) This group considers mutual help more important than self-help or public help. 5) Capital and number of employees have a strong association with both BCP formulation status and their interest in participating in local natural resource conservation. Activities with local society and stakeholders may collectively increase SMEs' awareness with neighbor enterprises or the local community. It would help both SMEs and local society to build a seamless attitude toward disaster risk reduction, which would contribute to local sustainability.

Keywords: small and medium-sized enterprises (SMEs), Business Continuity Plan (BCP), local natural resources, Multiple Correspondence Analysis (MCA), Cramér's coefficient of association

1. Introduction

Japan is prone to seismic and meteorological hazards because of its geographical location. These hazards often induce disasters, which can stagnate enterprise activities. The stagnation of business activities affects not only individual enterprises but also the overall economy of the area in which these enterprises are located. The economic damage can affect businesses in other areas through commerce and/or the supply chain. In response to disaster, enterprises are required to secure the safety of their employees and customers regardless of their business size to continue their business activities by returning to a normal status as soon as possible.

In this context, it is vital for enterprises to promote the formulation and implementation of a Business Continuity Plan (BCP) stipulating management strategies in normal time. This would help small and medium-sized enterprises (SMEs) avoid disruption, resume and continue their crucial business activities in a specified goal period after a disaster event. Specifically, it is very important to encourage SMEs to develop BCP, as they play a central role in Japan's economy, comprising 99.7% of all companies and employing 70.1% of the total number of employees in Japan [1].

1.1. Business Continuity Plan and Small and Medium-Sized Enterprises (SMEs)

The BCP is a management strategy "a plan describing the policy, systems, procedures, etc., by which enterprises can avoid suspension of their critical business or can recover the critical business quickly if it is interrupted, even when contingencies arise, including natural disasters such as major earthquakes, communicable disease pandemics, terrorist acts, serious accidents, disruption of supply chains and abrupt changes in business environment, or they can recover business quickly if their business is interrupted" [2]. From 2007 to 2015, the BCP completion rate

increased from 18.9% to 60.4% in large companies and from 13.4% to 29.9% in medium-sized companies [2]. However, recognition of formulating a BCP must still be further promoted among companies, especially SMEs, to ensure they can keep operating their business while coping with unforeseen risks or emerging issues regardless of business size.

The BCP completion rate differs among areas because of the natural hazards in a given area, causing a gap in BCP formulation [3]. Maruya [4] highlights the management of BCP formulation and securing alternatives for logistic infrastructure, the system of command, and earthquake-resistant reinforcement. Likewise, Koyama [5] and Wang et al. [6] suggest an alternative office or stock-place to ensure a continuous supply chain as a risk hedge that enables companies to quickly transport the stock to another location in a disaster response period. Both emphasize building a network and collaboration with their system in relation to alternative strategies. Nishikawa et al. [7] focus on collaboration in the local area in which they are located for the mutual helping and sharing of local resources from the viewpoint of district continuity. Some studies discuss BCP formulation from this collaboration perspective (e.g., [7–9]), mostly targeting large-scale companies in a commercial district in urban areas.

Morikawa and Ikeda [10] focused on SMEs, identifying impeding factors as knowledge, capital, and time, whereas Sullivan-Taylor and Branicki [11] noted resourcefulness, technical, and organizational factors, for which limited evidence exists regarding SMEs' capabilities. In addition, for many SMEs, the cost for BCP formulation can be a trade-off from a short-term view. Thus, SMEs must be encouraged to consider BCP a necessary investment [12]. However, technical and practical difficulties are constraints for the further promotion of BCP formulation in SMEs [13]. Studies on BCP and SMEs including micro-size businesses are few compared to those on BCP in large or medium-size companies, especially in peri-urban or rural areas. The role of enterprises in the event of a disaster and preparation in normal time (ensuring the safety of employees, preventing secondary disasters, maintaining business continuity, contributing to and living in harmony with local communities) is important.

1.2. Business Continuity Plan and Co-Living with Local Society

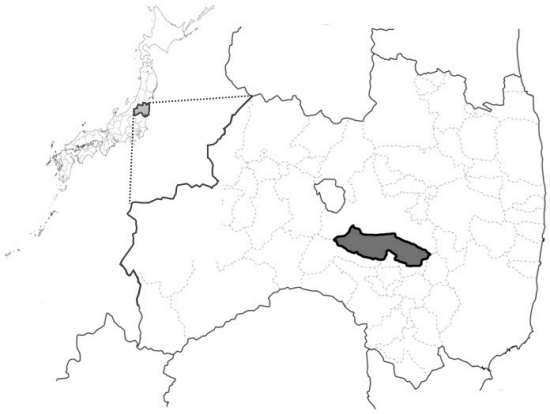
In Japan, considering local society in disaster risk reduction, the Community Disaster Management Plan (CDMP) was added as an amendment of the Basic Disaster Management Plan in 2015. CDMP regards residents and enterprises in a given area as the main actors and tries to promote proactive disaster management activities based on the spirit of self-help and mutual help in a bottom-up manner. It expects residents and enterprises to jointly propose a community disaster management plan so that the municipal disaster management council stipulate it in the municipal disaster management plan [2]. With this trend of collaboration of enterprises and local society toward disaster risk reduction, cases on social responsibility may be referred to. In terms of business continuity and BCP, building a system beyond organizational boundaries based on a sense of co-living with local society, administrative organizations, and citizens is encouraged [2, 14]. Specifically, caring for local natural resources and implementing environment management initiatives from normal time are clearly mentioned in the Business Continuity Guideline by the Cabinet Office of Japan [2]. Regarding the relationship between BCP and environmental management/actions, Natech (risk originating from conjoint natural and technological hazards) has been studied, in which the processing, handling, storage, and/or discharge of hazardous materials in normal time by enterprises are crucial [15]. Okano et al. [16] address three possible models of integrating risk management and environmental actions within business management strategies, and discuss the correlation between the two in a study targeting corporate representatives in a seminar on environmental management. Thus, the relationship between enterprises' business continuity, environmental management, and environmental actions in normal time has been discussed, and attention paid to disaster risk reduction. Contribution to local society and an environment management initiative are not necessarily the most prioritized actions for most enterprises. However, as mentioned, it seems important to pay attention to these aspects in relation to BCP. However, studies on the relation between private sectors' BCP formulation and cooperation for local natural resources are limited, especially in terms of a case of a given local area wherein SMEs comprise the majority.

This study aims to 1) analyze the association between BCP formulation status and perceptions/actions with the local natural environment by SMEs in normal time, and 2) clarify the strength of the associations to determine key points to further promote BCP formulation among SMEs as well as local sustainability.

2. Method

2.1. Research Site

We selected Sukagawa City, Fukushima Prefecture, Japan. Sukagawa City is located in the center of Fukushima Prefecture (**Fig. 1**), with an area of 279.43 km^2 and a population of 76,141 (as of January 1, 2019). The city has two Class-A rivers (the Abukuma River and the Shakado River), and has experienced many floods over the centuries. When the Great East Japan Earthquake (hereinafter GEJE) occurred in March 2011, large quakes (level 6 on the Japanese scale) hit the city and damaged businesses and industries. For example, 748 buildings, 519 facilities and equipment, and 351 cases of product damages were reported [17]. Sukagawa City has been implementing the *Nanohana* (rapeseed flower) Project since 2007 to realize a recycle-based society. Following the gasoline shortage after the GEJE, the city man-



Source: Modified from a base map from Freemap (http://www.freemap.jp/listAllItems.html)

Fig. 1. Location of Sukagawa City.

aged to drive all city garbage collecting cars with the biodiesel fuel produced through the *Nanohana* Project. This meant that the city did not have garbage bags long waiting to be picked up.

Since this study seeks to determine the association between disaster risk preparedness and behaviors of local natural environment conservation by SMEs in a given local area, the authors considered Sukagawa an appropriate site for these purposes.

2.2. Questionnaire Survey and Analysis

In this study, a questionnaire survey was conducted from February 24 to March 10, 2017 under collaboration with the Chamber of Commerce and Industry of Sukagawa (hereinafter CCI). The targeted group comprised 1,156 member enterprises of the CCI. The questionnaires were distributed and collected by post, and 240 valid responses were received (response rate 20.8%). We structured the questions based on the survey by the Cabinet Office [18]. **Table 1** shows the details of the questions.

2.3. Hypothesis and Analysis Framework

As this study aimed to seek elements to promote BCP formulation by SMEs in a given area through analyzing the association between their BCP formulation status, environmental management and actions, and local natural resource conservation, the following six hypotheses were set prior to analysis:

- Hypothesis 1 (H1): A strong association is observed between BCP formulation status and implementing the environmental management system and environmental actions.
- Hypothesis 2 (H2): A strong association is observed between BCP formulation status and participation in local natural resource conservation.
- Hypothesis 3 (H3): A strong association is observed between business size (capital, number of employees) and BCP formulation status.
- Hypothesis 4 (H4): A strong association is observed between business size (capital, employees) and implementation status of an environmental management system.
- Hypothesis 5 (H5): A strong association is observed between BCP formulation status and past disaster experience, especially the amount of direct damage.
- Hypothesis 6 (H6): A strong association is observed between BCP formulation status and emphasizing self-help.

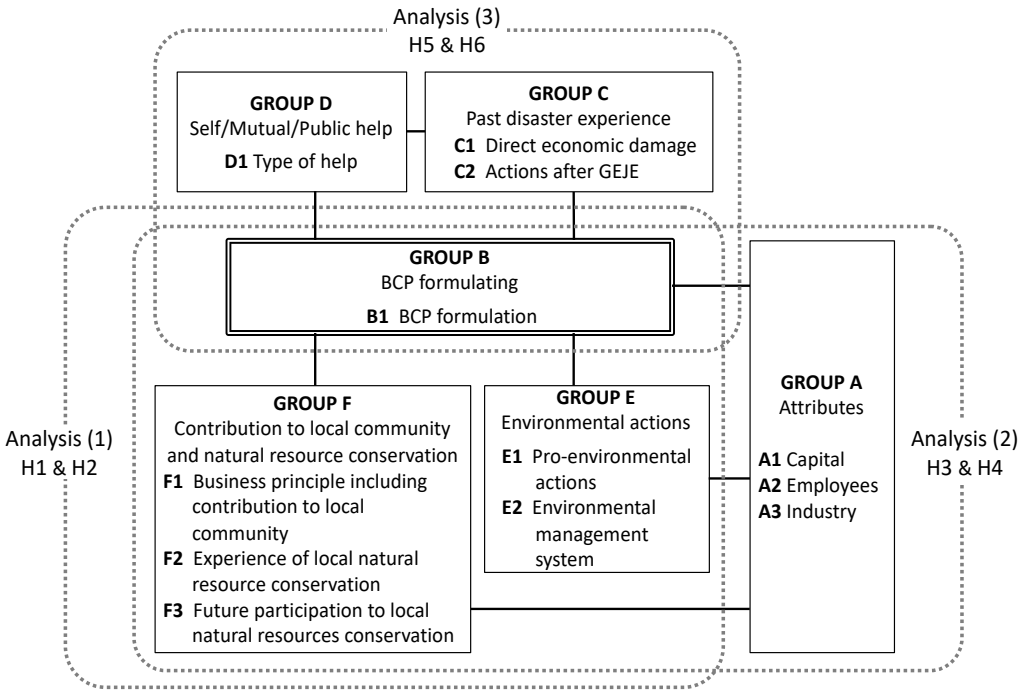
We set up H1 and H2 to determine the relation between BCP formulation status and environmental actions with local natural resource conservation to find key points to promote BCP formulation among SMEs. As noted in Section 1.2, enterprises/companies are now required to co-live and collaborate with local society beyond organizational borders in risk management, and to care for local natural resources and implement environment management initiatives from normal time. Regarding SMEs' local natural resource conservation, we employed the concept of ecosystem services by the Millennium Ecosystem Assessment (MEA) [19] to see which part of local natural resources respondent SMEs were interested in conserving. MEA [19] states that "ecosystem services are the benefits people obtain from ecosystems." We used three ecosystem services, namely provisioning services (e.g., food and water), regulating services (e.g., mitigation of floods, drought, land degradation, and disease), and cultural services (e.g., recreational, educational, cultural, and other non-material benefits).

In addition, we set up H3, H4, H5, and H6. H3 and H4 were to determine whether the association strength differs from that of H1 and H2 and whether the SMEs targeted in this study share the similar tendency of the relation between business size (capital and/or number of employees), environmental actions and/or natural resource conservation, and BCP formulation status, as noted in previous studies (e.g., [10, 15, 20, 21]). By comparing the results of H3 and H4 with those of H1 and H2, we attempted to ascertain which relation is stronger, because we expected to find key points to promote BCP formulation among SMEs with a small business size. H5 and H6 were set considering the CDMP, BCP, and collaboration in the local community, which previous studies addressed (e.g., [2, 7–9]). Sukagawa, the study site, has experienced many floods and the GEJE; therefore, it is vital to determine the relationship with the BCP formulation status among SMEs in the area. For the emphasized type of help, we used a pairwise comparison of self-help, mutual help, and public help. Self-help was defined as "support and preparation done by each enterprise"; mutual help as "support and preparation with neighbors"; and public help as "support, preparation, and emergency rescue by public services such as municipality governments, the police, and the fire department."

To examine these hypotheses, the study employed the analysis framework shown in **Fig. 2**.

Table 1. Question items and groups A–G.

Question Groups and Questions		Alternatives
A1	Capital	Multiple alternatives
A2	Number of employees	
A3	Industry type	
B1	Formulation status of BCP	1. Completed 2. Formulating now 3. Will formulate 4. I know BCP, but, will not formulate 5. Do not know BCP
C1	Past disaster experiences	1. Yes
C2	Support and helping action after GEJE	2. No
D1	The level of emphasis between self-help, mutual help, and public help	Three pairwise comparisons
E1	Pro-Environmental actions/behaviors	1. Yes 2. No
E2	Environmental management system	1. Installed ISO14001 2. Installed another system 3. I know ISO14001, but not installed 4. Do not know ISO14001
F1	Participation and contribution to local society in the business principle	1. Yes
F2	Experience of conservation of local natural resources	2. No
F3	Participation to local natural resource conservation in the future	1. Provisioning services 2. Regulating services 3. Cultural services



Source: Created by the authors

Fig. 2. Analysis framework.

- Analysis (1) is for H1 and H2, which consider the relationship between BCP formulation status (B1) and environmental actions with local natural resource conservation (5 variables: E1, E2 and F1, F2, F3).
- Analysis (2) is for H3 and H4, which consider the relationship between attributes (3 variables: A1, A2, and A3) and BCP formulation (1 variable: B1), as well as the relationship between attributes (A1, A2, A3) and environmental actions and local natural resource conservation (5 variables: E1, E2 and F1, F2, F3).
- Finally, Analysis (3) is for H5 and H6 to check the relationship between BCP formulation status (B1) and past disaster experiences (2 variables: C1, C2) with the level of emphasis on help type (1 variable: D1).

First, we overviewed respondents' answers using simple tabulation and cross-tabulation to determine the relation between attributes, status of BCP formulation, help type, pro-environmental behaviors, and participation in local society, especially natural resource conservation. Next, we conducted a Multiple Correspondence Analysis (MCA) to explore the interrelationships between the given sets of variables and to visualize them. We used Cramér's coefficient of association (Cramér's V) to check the strength of the association.

$$V = \sqrt{\frac{\chi^2}{N(\min(r,l)-1)}} \quad \cdots\cdots\cdots \quad (1)$$

Equation (1) was used to calculate Cramér's V. "N" is the number of samples, "r" and "l" represent the number of rows and columns of the given cross-tabulation, and "χ^2" is the chi-square statistic. We used IBM SPSS Statistics 25 for the analysis and Microsoft Excel 2016 for the figures.

3. Results

We received 240 responses. Regarding business size (capital and the number of employees), 59% had capital of less than 10 million yen and 24% had 11–50 million yen. Furthermore, 70% had fewer than 20 employees (**Fig. 3**). Manufacturing industries comprised 19.2% and non-manufacturing 80.8%.

For BCP formulation, only 8.1% had completed a BCP and 3.4% were in the process of formulating one. Including positive responses (will formulate BCP in the near future), 25.1% of SMEs were positive regarding BCP formulation (**Fig. 4**).

3.1. Analysis (1) for H1 & H2: BCP Formulation and Consciousness with Local Natural Resources

In general, relatively clear relations were observed between the status of BCP formulation and environmental consciousness and actions by respondent SMEs.

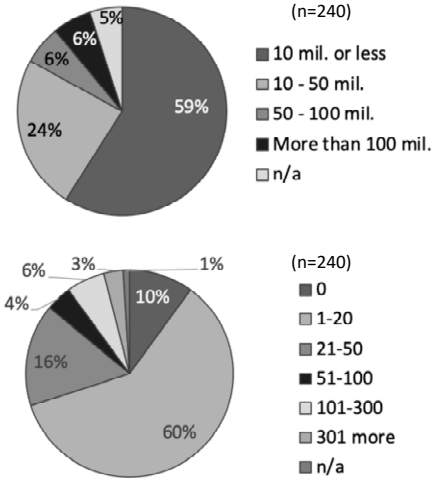


Fig. 3. Capital (in Japanese yen) (top) and number of employees (bottom) of respondent SMEs.

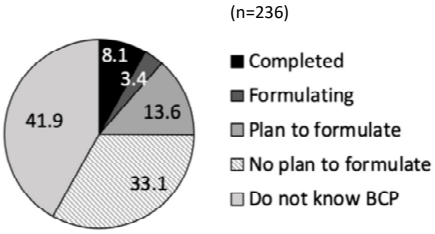


Fig. 4. BCP formulation status.

ISO14001 (the international standard that specifies requirements for an effective environmental management system and actions) has been implemented by 23 respondent SMEs, and 7 respondents implemented other systems (e.g., Eco-Action 21, Eco-Stage). As **Fig. 5** shows, ISO14001 implementation and BCP formulation were clearly associated. BCP formulation was the highest in the group of respondent SMEs that implemented ISO14001 (34.8%). Including respondents with BCP formulation in progress (26.1%), 60.9% of respondent enterprises with ISO14001 implemented have been tangibly taking actions for BCP. SMEs with other environmental management systems followed at 42.9% (completed (28.6%) and formulation in progress (14.3%)). More than half the SMEs that did not know ISO14001 answered that they also do not know about a BCP (55.1%) and have no plan to formulate one, even if they do know about it (31.9%).

Regardless of business size (corporation organization or single proprietor), 66.8% of respondent SMEs included the contribution to local society in their business principles. As a part of their contribution to local society, 40.7% of respondents had participated in conservation activities for local natural resources. The most selected were activities for resources related to cultural services: namely,

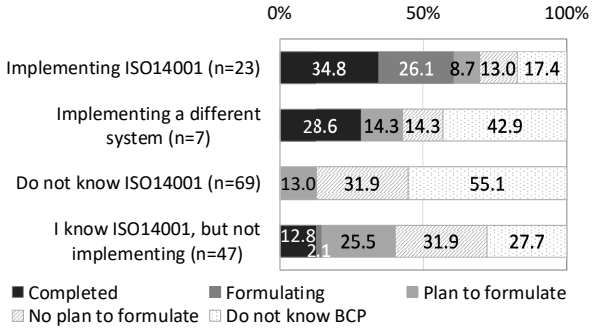


Fig. 5. BCP formulation and ISO14001.

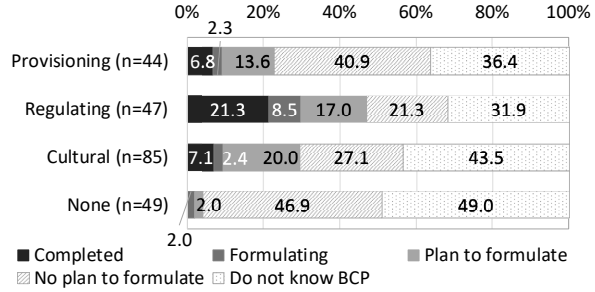


Fig. 6. BCP formulation and future participation in conservation.

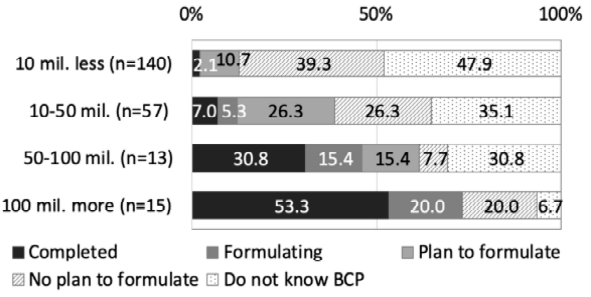


Fig. 7. BCP formulation and capital (in Japanese yen).

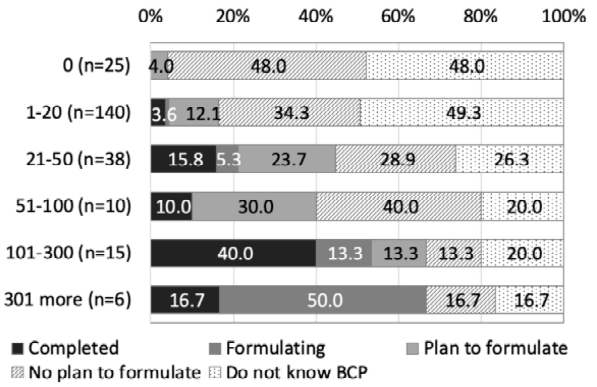


Fig. 8. BCP formulation and employees.

maintaining recreational places, environmental education, landscape, or folk/cultural heritage. **Fig. 6** shows the relation between participation in local natural resource conservation and BCP formulation. The most selected conservation activities ($n = 85$) were those for cultural services. For the relation with BCP formulation, positive answers for BCP formulation ("completed," "formulating," and "plan to formulate") were highest for the group of respondents that selected conserving resources related to regulating services for their future participation. Resources included in regulating services are reducing CO_2 emission and conserving river water quality and aquatic plants/animals. The reasons many respondents gave for this include recognition as a member of local society or using such resources (water, air) to sustain their business. Thus, they feel responsible for treating them appropriately. On the other hand, some responses indicated no interest in participating in local natural conservation in the future. Of this group, 95% responded that they either had "no plan to formulate" or "do not know BCP." This tells us that respondent enterprises that acknowledge and care about local society and natural resources are also aware of disaster risk preparedness.

3.2. Analysis (2) for H3 & H4: Attributes and BCP Formulation and Consciousness with Local Natural Resources

The cross-tabulation between attributes (capital, number of employees) and BCP formulation status indicated a very clear relation. The greater the capital of SMEs, the higher was their BCP formulation rate. More than 70% of respondents with more than 101 million yen of capital had already worked on formulating a BCP (**Fig. 7**). Regarding the number of employees and BCP formulation, the formulation rate at respondent SMEs with more than 100 employees was higher than that of the others. Nearly 70% of these indicated "completed," "formulating in progress," or "will formulate in the near future." However, the BCP formulation rate was only around 10% among small enterprises with less than 50 million yen of capital or fewer than 50 employees. More than 80% of these respondents responded "will not formulate BCP" and "Do not know BCP" (**Fig. 8**).

Furthermore, 70% of respondent enterprises were very small with less than 20 employees, and of these 10% had no employees or were a single proprietorship. The cross-tabulation between corporation organizations and single proprietorships showed a clear gap in BCP formulation. No single proprietorship indicated having "completed BCP" or that they were "formulating a BCP." Manufacturing industries had a relatively higher ratio of BCP formulation status, especially those in electric appliances ("completed" 42.9%, "formulating" 14.3%), oil/rubber/ceramics ("completed" 20.2%, "formulating" 0%), and iron/steel ("completed" 16.7%, "formulating" 16.7%). Actually, financing and insurance had the highest ratio of having "completed" the BCP (50%), although one had not been formulated in other non-manufacturing

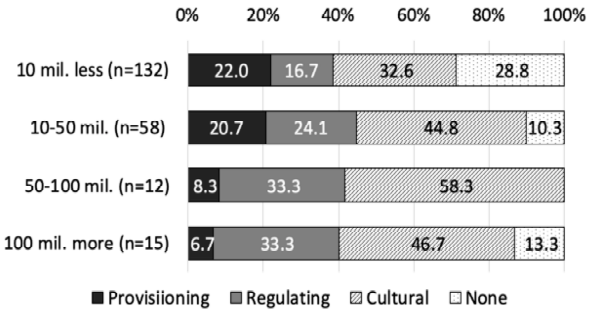


Fig. 9. Capital (in Japanese yen) and local natural resource conservation (ecosystem services).

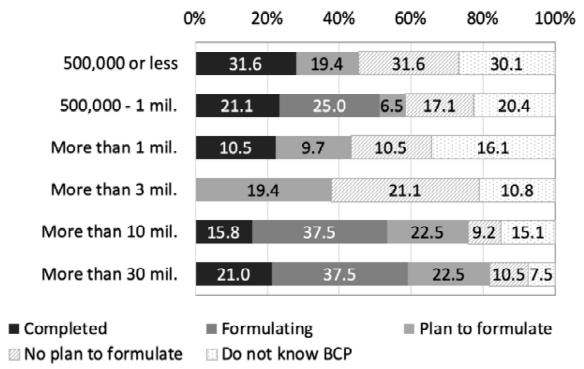


Fig. 10. BCP formulation and direct damage by GEJE (in Japanese yen).

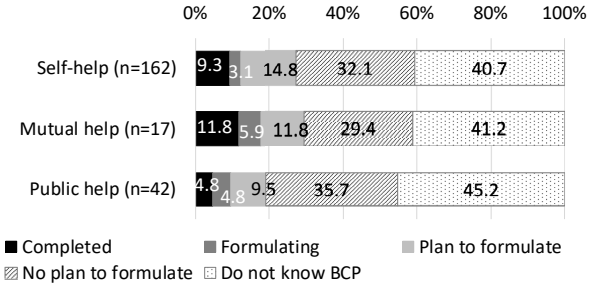


Fig. 11. BCP formulation and type of help.

industries.

As mentioned (Section 2.3), we categorized local natural resources based on the Ecosystem Services (MEA) as follows: provisioning services (e.g., food and water), regulating services (e.g., mitigation of floods, drought, land degradation, and disease), and cultural services (e.g., recreational, educational, spiritual, and other non-material benefits). The survey asked respondents which category of conservation activities they were interested in being involved in in the near future. The most selected activities were cultural services (maintaining recreational places, environmental education, or folk/cultural heritage). The cross-tabulation between capital size and conservation preference showed that the ratio of selecting provisioning services (food, drinking water, woods, and energy) was higher among small enterprises with capital of less than 50 million yen. Regulating services (river water quality, conserving aquatic plants/animals) were selected by larger enterprises with capital of more than 51 million yen. Furthermore, the ratio of enterprises with no interest in the conservation of local natural resources was higher (28.8%) among the group of the smallest enterprises (**Fig. 9**).

3.3. Analysis (3) for H5 & H6: BCP Formulation, Past Disaster Experiences, and Types of Help

Past disasters caused by natural hazards experienced by respondent SMEs were earthquakes (197 enterprises); floods (30); storms (21); and landslides (1), drought (1), and others (1) (multiple choices). Among them, GEJE was the latest and largest disaster that negatively impacted their business: 27.8% received direct damage of up to 500,000 yen and 12.1% responded that they had more than 30 million yen of direct damage. The cross-tabulation with BCP formulation revealed that the answers "completed" and "formulating" were almost equally provided in each direct damage group (**Fig. 10**).

The BCP is a primary set of instructions to be prepared by each enterprise or organization regarding actions to take and responsibilities and roles to perform in an emergency. The authors expected that compared to others, enterprises emphasizing self-help would have completed or be formulating a BCP. In total, 73% (162 respondent SMEs) emphasize self-help over other types of help; however, the cross-tabulation with BCP formulation status showed that the group emphasizing mutual help had the highest ratio of BCP formulation ("completed" 11.8%, "formulating" 5.9%). The ratio of "no plan to formulate" was the lowest in the group emphasizing mutual help as well (**Fig. 11**). In addition, approximately half of the respondent SMEs answered that they were committed to supporting neighbors or volunteer work in the city regardless of the size of capital, number of employees, or type of industry.

3.4. Strength of Associations

We analyzed the results of the cross-tabulation using an MCA and Cramér's V to determine the strength of their association. We used the following variables in the MCA: BCP formulation status, type of help emphasized, ISO14001 implementation status, and participation in local natural resource conservation in the past and future.

Figure 12 shows the results of the MCA. Three groups can be observed: group A (broken line), group B (dotted line), and group C (chain line) (**Fig. 12**).

Group A is respondents that completed or were in the process of formulating the BCP, already implemented ISO14001, and are interested in participating in conserving the local natural resources of regulating services. Based on the results of the cross-tabulation (**Figs. 7**, **8**, and **9**), likely, the size of the business of respondents in

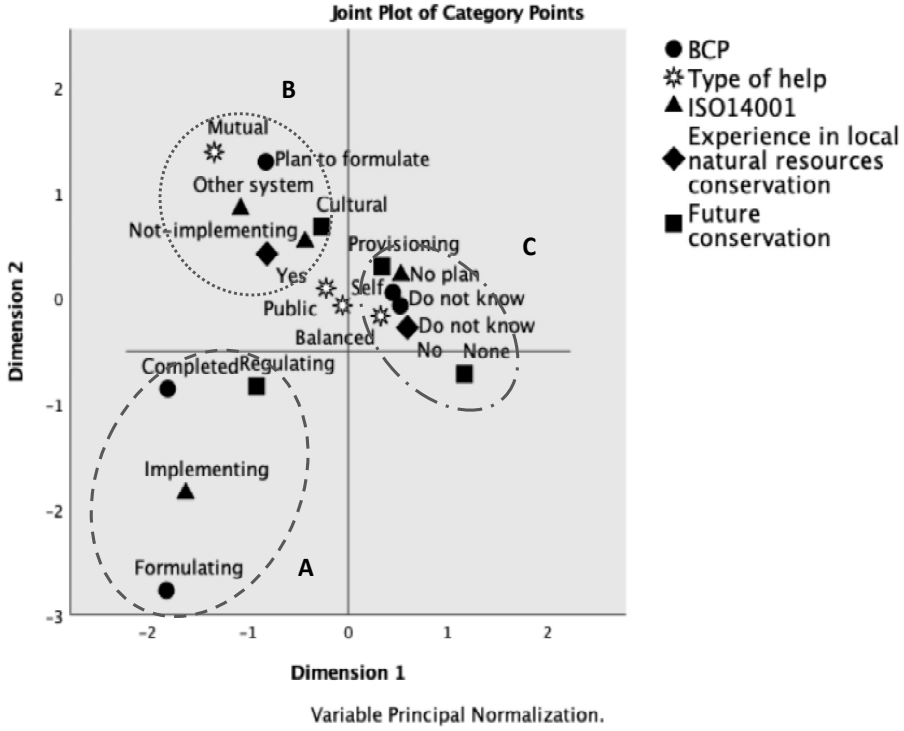


Fig. 12. Multiple Correspondence Analysis between BCP formulation, type of help, ISO14001, and past and future participation in local natural resource conservation.

group A is bigger than the other targeted enterprises. The respondents in Group B have not formulated a BCP yet, but are planning to do so. They have implemented environmental management systems other than ISO14001 or have some knowledge about ISO14001 despite not implementing it yet. They also have experience participating in conservation activities for local natural resources in the past and will do so in the future, preferably for resources related to cultural services. Mutual help is located closest to this group. Group C comprises respondents that are either negative or without knowledge/information on BCP and environmental management systems. They tend to be reluctant (or indicate no interest) in participating in the conservation of local natural resources.

In **Fig. 12**, groups A and B are located in the left half while group C is on the right half. This means that SMEs with a social responsibility mindset or that contribute to local society are more likely to have formulated a BCP. In addition, they have knowledge and information on both BCP and environmental management systems, and have managed to take tangible actions to achieve it. In fact, mutual help is located in the same left half.

Figure 13 provides the results of Cramér's V. We examined the strength of association among the factors. Cramér's V is between 0 and 1. Its calculation results are usually low, and 0.1 can be considered the threshold of association [22]. We set four levels for the coefficient: "strong association" when $V \geq .500$, "association" when $.500 > V \geq .375$, "medium association" when $.375 > V \geq .250$, and "weak association" when $.250 > V \geq .100$ for clearer distinctions.[1] We calculated the two Cramér's V coefficients for indices: one was calculated with all valid samples ($n = 236$), and the other without the "Do not know BCP" respondents ($n = 137$). The first is displayed on the bottom, and the latter on the top in **Fig. 13**. The coefficient of association overall became higher when calculated without the group "Do not know BCP."

As hypothesized in H1, a strong association ($.539^{***}$) was observed between BCP formulation (B1) and environmental actions (E1). This was the strongest association of all. Environmental actions (E1) had an association with capital (A1) ($.401^{***}$), number of employees (A2) ($.441^{***}$), and industry type (A3) ($.419^{***}$), but the strength of these was less than that of environmental actions (E1). Thus, environmental action (E1) has a stronger association with BCP formulation (B1). An environmental management system such as ISO14001 (E2) ($.399^{***}$) also demonstrated a stronger association with B1 than number of employees (A2). Regarding H2, the association between BCP formulation and the experience of participation in local natural resource conservation ($.308^{***}$) was "medium." Furthermore, future participation had a slightly weaker association with B1 ($.276^{***}$).

1. Suga [22] subdivides Cramér's V to clarify the strength of association: $.25 > V \geq .1$ (weak association), $.5 > V \geq .25$ (association), and $V \geq .5$ (strong association). As many results of Cramér's V in this study fall into the middle level ($.5 > V \geq .25$), we further divided the middle level into two: $.5 > V \geq .375$ for association and $.375 > V \geq .25$ for medium association.

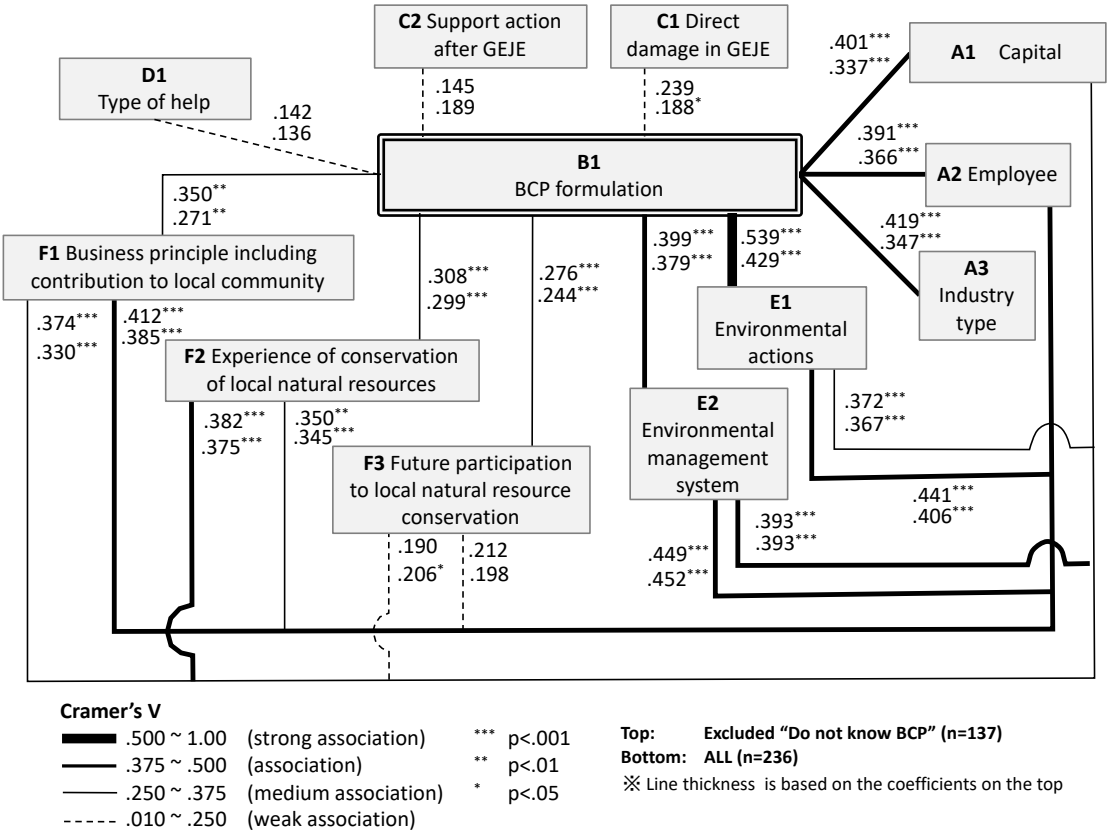


Fig. 13. Strength of association by Cramér's V.

Overall, for H3 and H4, we observed the association between business size (A1, A2) and both BCP formulation (B1) and environmental actions (E1) and environmental management system (E2). Number of employees (A2) demonstrated associations with environmental actions (E1) (.441***), environmental management system (E2) (.449***), experience of conservation of local natural resources (F2) (.382***), and business principles including contribution to the local community (F1) (.374***), which were significant ($p < .001$).

Disaster experiences (C1, C2) and emphasized type of help (D1) demonstrated only weak associations (.239, .142, .145) with BCP formulation (B1), despite H5 and H6, although their coefficients were not statistically significant.

Table 2. Strength of association with BCP formulation status by Cramér's V ($n = 137$).

Strong	▪ Environmental actions (E1)	.539***
↑	▪ Type of industry (A3)	.419***
|	▪ Capital (A1)	.401***
|	▪ Environmental management systems (E2)	.399***
|	▪ Number of employee (A2)	.391***
|	▪ Business principle with contribution to local community (F1)	.350**
|	▪ Experience of conservation of local natural resources (F2)	.308***
|	▪ Future participation to local natural resource conservation (F3)	.276***
↓	▪ Direct damage in GEJE (C1)	.239***
Weak	▪ Support actions after GEJE (C2)	.145***
	▪ Type of help (D1)	.142***

*** p<.001 ** p<.01

4. Discussion

The results of the MCA and Cramer's V showed that BCP formulation status was strongly associated with environmental actions and environmental management systems. A medium association was also observed with participation in local natural resource conservation (**Table 2**). Thus, H1 regarding environmental action was adopted. H2, H3, and H4 were partly (association was observed, but not strong ones as hypothesized) adopted, following previous studies (e.g., [2, 19–21]). For H5 and H6, only weak associations were observed between direct damages in GEJE and BCP, which follows Haraguchi et al. [23], who emphasize the extent of damage and disruption as key factors in BCP implementation and that those do not seem to encourage SMEs to work on autonomous pre-disaster measures. Thus, H5 and H6 were rejected.

Although it was found that environment-related actions have strong or medium associations with BCP formulation status, this does not necessarily mean that taking environmental actions would lead SMEs to autonomously

work on formulating a BCP. This section discusses how these results can be interpreted and how they lead to the key for the further promotion of BCP formulation among SMEs as well as local sustainability.

4.1. Toward Promoting BCP Formulation Among SMEs

4.1.1. Collective Action to Overcome the Limited Number of Staff

Further information dissemination on BCP is a must, as nearly 42% of respondent SMEs indicated that they "Do not know BCP." However, providing information on BCP is not enough, especially for micro and small-size enterprises. In total, 70% of respondent SMEs have less than 20 employees or are single proprietors. It would not be easy for them to formulate a BCP on their own, even if they have information.

This may lead to the option of collective action for formulating a BCP, especially for micro and small-size enterprises. Here, 73% of SMEs emphasize self-help, but three-quarters have not yet formulated a BCP. Most respondent SMEs have recognized that preparations are important, but have not been able to take any tangible actions despite such cognition. With the problem of a limited number of staff, collective action would be a constructive option. For this, information on a simplified version of the BCP [24, 25] as reference should be given to SMEs by organizations such as the CCI.

It is also important to emphasize BCP as a contribution to local society. This finding showed that contribution to local society in their business principles was associated with BCP formulation status, which supports it. To not load the task of BCP formulation onto individual SMEs, especially micro and small-size enterprises, the intentions of SMEs to contribute to local society can be more emphasized. This approach would reinforce cooperation and mutual help among SMEs within the city.

4.1.2. BCP with a Philanthropic Responsibility Viewpoint

BCP formulation status had a strong association with environmental actions. For most enterprises, environmental actions are not the primary objective, but environmental actions would most likely come under enterprises' philanthropic responsibility (be a good corporate citizen, provide for community betterment, or engage in volunteerism) [26]. These environmental actions demonstrated a strong association with the BCP formulation "required and expected" by society.

In fact, most SMEs selected the local natural resources of cultural services (cleaning and maintaining recreational places, environmental education, protecting folk/cultural heritage) as seeming easier for them to work on. In addition, many SMEs with a completed/in progress BCP selected conserving the resources of regulating services (reducing CO_2 emission, water quality, and aquatic habitats), as they use these local natural resources to keep their business running; thus, they feel obliged to take good care of it in the future. The association between BCP formulation and local natural resource conservation was not as strong as for environmental actions or management systems; nevertheless, these imply their spirit of being "good enterprise citizens" and of caring for local society. Thus, it would be more appealing for SMEs to perceive BCP from a philanthropic responsibility viewpoint so that there would be more positive understanding and actions for formulating BCP moving forward.

4.2. Promoting BCP Formulation and Local Sustainability

To summarize the above, the BCP by micro enterprises and SMEs should be formulated through collective actions with a hint of philanthropic responsibility. This would reinforce and provide tangible content to concepts such as the district continuity plan [7, 8, 27], area business continuity planning [28], or business continuity within a public-private partnership [29], all of which have been proposed in the last decade.

When collective actions are taken by micro and SMEs for BCP formulation from a philanthropic viewpoint, they will be recognized within disaster risk reduction in local society as "good enterprise citizens." When BCP is implemented in a vis-à-vis relationship, it should be effective in an emergency case, meaning SMEs would more rapidly recover, helping them secure their crucial business and employment after a disaster occurs. This will ultimately benefit the local economy. As pointed out by previous studies, it is crucial for each enterprise to develop a company culture of having a BCP for quicker recovery [30] and norm of caring for local society from normal times [31]. The findings of this study provide a tangible approach that considers BCP part of mutual help to establish a culture of having a BCP and the notion of caring for the local environment and natural resources based on a sense of being a member of local society from normal times. The findings will also help both SMEs and local society build a seamless attitude toward disaster risk reduction and environmental conservation, which will contribute to local sustainability.

However, further studies on covariance and/or a regression analysis are needed to clarify the causality and occurrence probability of formulating a BCP through environmental actions/consciousness.

5. Conclusions

Based on our analysis, we have drawn the following conclusions:

Collective actions:

- Information on BCP is to be provided more thoroughly to SMEs, especially single proprietors and small-size enterprises.

- Some organizations such as the CCI can play the role of a hub to help SMEs take collective action to formulate a BCP.
- Simplified versions of a BCP can be introduced so that more micro enterprises and SMEs can adapt them to their local circumstances.

BCP with a philanthropic responsibility viewpoint:

- It is key to send the message that BCP is as important and required by society as are environmental actions.
- Use local natural resources such as water, the landscape, and recreational places as key points by which to attract the attention of SMEs to promote a culture of developing pre-disaster measures and strengthen the connection within society. These local resources were those most selected by respondent SMEs as conservation activities in which to participate .

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