



Title	What contributes to community building and sustainability enhancement in coworking spaces?
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Citation	Discussion Paper, Series A, 329, 1-29
Issue Date	2018-09
Doc URL	http://hdl.handle.net/2115/71531
Type	bulletin (article)
File Information	DPA329.pdf



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Discussion Paper, Series A, No.2018-329

What contributes to community building and
sustainability enhancement in coworking spaces?

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September.2018

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What contributes to community building and sustainability enhancement in coworking spaces?

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Abstract

The purpose of this study is to identify the factors that affect building community and maintaining/enhancing sustainability in coworking spaces, based on an almost complete enumeration which could help us grasp a true measure of the phenomenon. Community and sustainability could be key issues on coworking spaces. However, even empirical research dealing with both issues as well as discussions on the management of them is not hardly found while studies focusing on the spaces have steadily been accumulated mainly from the viewpoint of community such as user interaction. Therefore, we analyze the data obtained from 168 out of 365 spaces that are nearly all the operating coworking spaces in Japan (as of July 2014). As a result of that, we show overall influential relationships on community and sustainability of the spaces, and present three types of the factors influencing those issues, which are named as alternative-oriented, balance-oriented, and trade-off.

Keywords: coworking, coworking space, management, community, sustainability, complete enumeration

1. Introduction

The purpose of this study is to identify the factors that affect building community and maintaining/enhancing sustainability in coworking spaces, based not on sampling survey but on an almost complete enumeration which could help us grasp a true measure of the phenomenon (Williams & May, 1996; Spielman, Folch & Nagle, 2014). It can be said that community and sustainability are key issues on coworking spaces (Spinuzzi, 2015; Bacigalupo, 2016¹). However, even empirical research dealing with both issues as well as discussions on the management of them is not hardly found while studies have steadily been accumulated mainly from the viewpoint of community such as user interaction. Thus, we analyze the data obtained from 168 out of 365 spaces that are thought to be nearly all the operating coworking spaces² in Japan (as of July 2014). Moreover, we show and consider the results in order to clarify the overall influential relationships on those two issues and to present a meaningful way to control them.

The term “coworking” refers to a “way of working in which individual workers gather in a place, share information and wisdom through communication, and create value while cooperating as needed” (Uda, 2013), and “coworking space” refers to a workspace physically shared by individuals practicing coworking. Based on these characteristics, the workspace could be understood as a typical of shared and co-creation workspaces.

Compared to conventional corporate offices, these spaces have drawn attention for their potential to offer greater workstyle flexibility, increase the diversity of interacting members, and create innovation through knowledge/skill sharing and collaboration (Botsman & Rogers, 2010; Uda, 2013; Schmidt, Brinks & Brinkhoff, 2014). In fact, coworking spaces have been established one after another in many countries, running to approximately 12,000³ worldwide and more than 750 in Japan today⁴. Along with that, empirical studies on those spaces are rapidly increasing in diverse theoretical fields such as management, psychology, sociology, anthropology, architecture etc. However, we can point out the above-mentioned limitations related to key issues of coworking spaces.

Thus, based on huge data about coworking spaces in Japan, this study presents the results of analysis regarding both community and sustainability.

2. Literature Review

This section reviews previous research related to coworking spaces.

2.1 What is Coworking?

The term coworking is given various meanings by various agents such as researchers and practitioners.

¹ See <http://blog.coworking.com/en/>.

² This study uses the term “coworking space” in its broad sense. Specifically, it envisions workspaces which provide drop-in services. It therefore includes spaces such as maker spaces and fab labs.

³ See More Than One Million People Will Work in Coworking Spaces in 2017 by deskmag (<http://www.deskmag.com/en/the-complete-2017-coworking-forecast-more-than-one-million-people-work-from-14000-coworking-spaces-s>).

⁴ See Coworking JAPAN (<https://co-co-po.com/>).

Primarily, the meanings of movement, activity and space are included but there is a trend in which the aspect of activity is emphasized (Jones, Sundsted, and Bacigalupo, 2009).

Then, specifically, what kind of conceptual definitions are presented? For example, according to the coworking wiki⁵, the definition is “independent professionals and those with workplace flexibility work better together than they do alone.” In addition, DeGuzman and Tang (2011) stipulates that “Set-up and dynamics of a diverse group of people who don’t necessarily work for the same company or on the same project, working alongside each other, sharing the working space and resources” and Spinuzzi (2012) gives the definition as coworking is “a superclass that encompasses the good-neighbors and good-partners configurations as well as other possible configurations that similarly attempt to network activities within a given space.” Furthermore, according to Uda (2013), coworking means “a way of working in which working individuals gather in a place to create value while sharing information and wisdom by means of communication and cooperating under the conditions of their choices.”

In a comparison of each definition, we can see differences in expression and points of emphasis but we can understand from this that almost all of them include working individuals with other people of different attributes and open places physically shared by working individuals. In other words, the conceptual characteristics of coworking (spaces) are workplace openness and diversity of people participating, and proximity when working, all of which are at a high level in comparing to traditional corporate offices (Uda, 2013). It is for this reason that in coworking spaces, we can expect the sharing of information and wisdom, the interaction and cooperation between users as well as the creation of value or innovation through such activities.

In reality, despite the fact that clear conceptual definitions are not shown, the discussion concerning the values brought by coworking (spaces) has been going on for some time. For example, Reed (2007)⁶ lists collaboration, openness, community and sustainability. Citizen Space,⁷ one of the oldest coworking spaces in the world, points out collaboration, openness, community⁸ and accessibility. Furthermore, Hillman⁹ integrates these and proposes the five values of coworking, such as collaboration, openness, community, accessibility and sustainability.¹⁰

However, these values are not spontaneously generated and developed without restrictions. The amount of value created is influenced by the policies and activities of the coworking space owners and managers. For this reason, core issues when operating coworking spaces, which are not mere rental spaces but also possess the above characteristics, are how to build communities that are desirable (for them), and how to

⁵ Coworking Wiki is a web resource provided for people who are involved or interested in coworking. See <http://wiki.coworking.com/w/page/16583831/FrontPage> for its definition.

⁶ See Co-working: the ultimate in teleworking flexibility by Reed. (<http://www.networkworld.com/article/2287504/computers/co-working--the-ultimate-in-teleworking-flexibility.html>).

⁷ See <http://citizenspace.us/about/our-philosophy/>

⁸ Of these, community has been emphasized by many advocates. For example, Leforestier (2009) states that the important element that characterizes coworking practice is an open source community approach to work. Neuberger wrote “I decided to create a new kind of space to support the community and structure that I hungered for” (See: http://codinginparadise.org/ebooks/html/blog/start_of_coworking.html). Further, Rus and Orel (2015) points out the concept of community is the key characteristic of coworking.

⁹ See: <https://dangerouslyawesome.com/2011/08/coworking-core-values-1-of-5-sustainability/>. It should be noted that coworking.com (<http://coworking.com>) also builds on Hillman’s perspective.

¹⁰ It should be noted that although Spinuzzi (2015) acknowledges the usefulness of these values, he pointed out it was imprecise and we need to understand the actual circumstances of coworking spaces more specifically.

maintain and enhance the sustainability of the spaces.

Therefore, with respect to the operation of coworking spaces, we will review previous studies relating to “(building) community,” and to “(securing) sustainability which is the foundation of the existence of community” in the following section. The reason we are focusing on these two values of coworking is that it is not necessary to be particular about the management of “coworking” spaces if owners and managers do not have interests in community and if there are no certain results or profits from the space businesses, it is difficult to maintain the spaces.¹¹

In reality, for example, from the point that Spinuzzi (2015, p. 75) made: coworking spaces are built around the idea of community-building and sustainability and Bacigalupo’s presentation of the problem: how to balance building great community with managing the facility,¹² it can be said that the community and sustainability are issues to be worthy of attention both theoretically and practically. In addition, from the above-mentioned viewpoints of the values brought by coworking, those four or five values can be considered to be a dimension with high validity as those values can be aggregated into community and sustainability.¹³

2.2 Perspectives on management of coworking spaces

Here we review previous studies concerning factors that could influence both community and sustainability in order.

2.2.1 Community

As mentioned above, “community” is one of the most frequently mentioned terms when discussing coworking. The definition of community has been examined over a long period of time by many researchers including MacIver (1924) and Hillery (1955) but it is difficult to say that there has been any consensus among researchers (Etzioni, 1996).¹⁴ However, for example, community is defined as follows: (1) the quality or characteristics of human relationships (Gusfield, 1975);¹⁵ (2) a group of people who are socially independent, who participate together in discussion and decision making, and who share certain practices that both define community and nurtured by it (Bellah, Madsen, Sullivan, Swidler and Tipton, 1985, p. 333); and, (3) communities are not only aggregates of persons acting as free agents, but also collectives that have identities and purposes of their own and can act as a unit. (Etzioni, 1996, p. 5). Based on these definitions, at the very least, it can be said that community includes the aspects of interaction (relationships between people) and collaboration (activities implemented

¹¹ For example, Hanibuchi (2014) describes the result about how it is easy to open spaces but how difficult it is to operate them through interview surveys with 11 space managers in Tokyo and Nagoya, etc.

¹² See the blog on [coworking.com](http://blog.coworking.com/en/): How to balance building great value with managing the facility (<http://blog.coworking.com/en/>).

¹³ The reasons for this are as follows: openness and accessibility demonstrate the qualities of community in such applicable spaces, community includes collaboration which is one of the activities arising within community as mentioned below, and sustainability is the aspect of continuing and maintaining the place that has built this community.

¹⁴ This study does not review the development of conceptual discussions about community. See, for example, Garrett, Spreitzer and Bacevice (2017) for details of such discussions.

¹⁵ According to Gusfield, there are two major usages of community: the territorial and the relational. On top of this, due to the fact that there is an extremely strong influence on many fields relating to sociology and social policy, there is particular focus on and discuss the latter usage.

between people based on some sort of shared intention).¹⁶ Therefore, here we will review previous studies concerning community in coworking spaces from the perspectives of interaction and collaboration.

It should be noted that §2.1 described conceptual discussions relating to the value of community in coworking but the significance of community is also demonstrated empirically. For example, according to the 1st GCS, almost all users (96%) responded that an important value among members in their coworking spaces was community. Specifically, 81% of respondents preferred a strong community¹⁷ and in the 2nd GCS, three quarters of all respondents also looked for strong community and knowledge-sharing with other members.

Interaction¹⁸

Here, we focus on findings concerning interaction within spaces. According to the 1st GCS, the ratio of respondents who regarded interaction with others as the most important thing in the spaces was at 84%.¹⁹ In addition, 88% of users responded that they have better interaction with other users.²⁰ However, the larger the space size, the less the likelihood of working in teams or engaging in good interaction with others. As for age groups, young coworkers have made an average of six valuable new connections since they started to use the spaces.²¹ The 2nd GCS showed that there were effects such as “Users’ social circle had increased a lot through the use of the space” (92%), “Their isolation was decreased” (86%), “Their business network had grown” (80%). The 3rd GCS reported that the changes on users’ ideas related to business (74%), and on users’ creativity (71%) have been perceived since they started to use the spaces.

In addition, based on a qualitative survey²² of spaces in Shanghai, Wan and Loo (2017) demonstrated as follows: users wished to share personal connections and build investment-related relationships, they communicated face-to-face in order to develop trust between members and a sense of belonging, and cooperation between groups of entrepreneurs is promoted in order to build an innovative environment. This indicates that in Asia, as well as in the West, direct interactions between users are occurring.

Collaboration

Following on from the above, we will review findings concerning collaboration in spaces. According to

¹⁶ For example, based on the responses of 69 coworkers, Gerdenitsch, Scheel, Andorfer, and Korunka (2016) found four categories of social interaction in coworking space. These are informal social interaction, exchange of information, instrumental support and collaboration.

¹⁷ In the case of users in European coworking spaces, the ratio of preferring a strong community is 55%, less than the case of all respondents.

¹⁸ For example, Arimoto et al. (2012) points out the requirements of communication as follows: something users have in common between them, an appropriate sense of distance, user diversity, and user fluidity.

¹⁹ Meanwhile, according to a qualitative survey (99 samples) conducted on five spaces in Tokyo and Nagoya, etc. by Hanibuchi (2014), the highest number of responses concerning purpose of use was for work (37.2%) (multiple responses accepted) and the response for sociability and interaction could not be said to be high at 18%, showing a different trend from that of the GCS results.

²⁰ According to the 3rd GCS, users said they have the following interactions with other users: casual small talk (77%), enjoying others company (72%), and sharing knowledge and advice (62%).

²¹ In a related item, the 2nd GCS shows that on average, users had 3.6 useful new acquaintances in the past two months.

²² Specifically, they conducted a two-week observation survey on 15 spaces operated by 4 companies in Shanghai and a semi-structured interview survey on 29 users in those spaces.

the 1st GCS, 57% of all users responded that they worked in teams more often.²³ In terms of age groups, users prefer team activities to individual activities; in particular, the younger users tend to want to be involved in each project over a long period of time. In terms of space size, 74% of those who use small spaces and 53% of those who use large spaces responded they work more often in teams.

In addition, Capdevila (2014) conducted a qualitative study²⁴ of coworking spaces in Barcelona and proposed three collaboration types: (1) cost-related, (2) resource-based, and (3) relational.

Collaboration took place in all, with different objectives: operation cost reduction for type (1), study and access to knowledge and new resources for type (2), and synergy and community building for type (3). Additionally, the study found a correlation between space size and community size: (1) spaces with a size of 70-200 m² have small-scale communities, (2) spaces with a size of 150-400 m² have mid-scale communities, and (3) spaces with a size of more than 1000 m² have large-scale communities.

2.2.2 Sustainability

Here, we review specific findings relating to sustainability.

According to the 6th GCS, it cannot be said that there is not necessarily a strong relationship between for-profit and profitability. 76% of spaces for profit and 67% of non-profit spaces reach break even or make a profit. However, it found some likelihood that cooperation such as participation in coworking visa programs or cooperation with coworking associations, contributed to profitability.

Looking at spaces by scale, while the majority (56%) of spaces with fewer than 10 seats are incurring a loss and profitable spaces are the minority (25%), most (70%) spaces with 50 seats or more are making a profit, and only some (20%) of the spaces are operating at a loss (2nd GCS). The 6th GCS shows a correlation between space size and profitability.²⁵ There is a significant decrease in the amount of spaces in the red when their sizes are 150 m² or more and more than half of all spaces of 1,000 m² or more are in profit. A correlation between the ratio of private offices occupying the layout of space and profitability was also shown. 53% of spaces in the red do not provide private offices. Meanwhile, it was found that there is not a strong correlation between open spaces and profitability.

According to the 2nd GCS, in terms of the entity that operates a space, 80% are private companies, 13% are NPO (Non-profit Organization)s, and the remaining are either government institutions or some other company form. Due to this fact, the majority of spaces are operated by profit organizations and if they don't achieve certain results or profits, it can be difficult for them to sustain their businesses. From the 2nd to the 6th GCS, while the ratios of spaces which made profits remained within almost the same percentage range (39%, 32%, 33%, 36% and 40%), the ratios of spaces that did not make profits experienced a trend of declining (38%, 36%, 33%, 23% and 26%). It cannot be said that there is a strong correlation between space managers' time commitments and profitability either.²⁶

²³ However, according to the 2nd GCS, the majority (53%) was satisfied with working mostly alone.

²⁴ Specifically, semi-structured interviews and non-participative observation (approx. 30 hours of official observation and a several hours of unofficial observation) were conducted on two groups; (1) a total of 28 people who are managers and members in 21 spaces in Barcelona, (2) 4 space managers in various European cities and 9 Barcelona professionals (with an understanding of the evolution of applicable spaces in Barcelona).

²⁵ It is estimated that, in particular, this affects the reduction of deficit more than the increase of profits.

²⁶ However, it was shown that trends differ depending on the employment status of staff members. 49% of spaces run by full-time staff make a profit and 18% are in the red as opposed to 33% and 30% respectively for spaces run

With respect to initiatives by managers within spaces, although SEO activities could contribute to profitability, there is no correlation between profitability and community-building,²⁷ or events for potential members, online PR activities such as social networking services. Specifically, it is suggested that activities such as advertising, and events with other spaces could have a negative effect on profitability.

Deskmag carrying out the GCSs showed that the most influential factor on profitability is the number of members.²⁸ Once there are 50 or more members, more than half of spaces make a profit and if there are 200 or more members, three quarters of them generate profits. In addition, just 3% of spaces that are in operation for a year or more as for-profit enterprises are in the red. However, it was shown that there is no correlation between the ratio of new members within a year and profitability.

With respect to space operation period, as of the 2nd GCS, the average period was 18 months and it was reported in the 6th GCS that there is a correlation between operation period and profitability. Over half of spaces operating for three or more years after opening are making a profit. This trend is consistent with the 2nd GCS results that show most (72%) spaces exceed the breakeven point within two years after opening and become profitable.²⁹

With regard to space environment, no significant relationship was observed between the number of spaces within the same municipality and profitability. In addition, it was reported that there was not a strong correlation between the nighttime population of the municipality where the space is located and profitability, or the perception³⁰ of managers concerning degree of saturation of spaces at the location, and profitability (6th GCS).

2.2.3 Influential Factors on Community and Sustainability

Here we will review previous research on the factors that may influence both community and sustainability rather than the research concerning community and sustainability themselves.

With respect to space management policy, the 2nd GCS reported that while the majority (83%) of spaces interacted and had exchanges with other spaces on regional or local levels, few spaces (10%) did not interact at all.

Concerning space location and environment, for example, according to Wan and Loo (2017), there is a trend among the 15 spaces in Shanghai to be located in the center of the city (but outside of the commercial area with the highest fixed costs). The reasons for this are cited as the convergence of capital, human resources and information and the convenience of public transportation. In addition, it was shown that it is extremely important that offices are close to subway stations for both owners and users. Further, according to the 2nd GCS, there are approximately 5.3 coworking spaces in the same city.

by part-time staff.

²⁷ It is pointed out that community-building can potentially contribute to profitability only in the case that the space is located in a city with a population of over 1 million people.

²⁸ See the deskmag article: How Profitable Are Coworking Spaces Today? (<http://www.deskmag.com/en/how-profitable-are-coworking-spaces-profitability-business-stats-statistics-make-money-965>).

²⁹ Rises to 87% if limited to spaces operated by private companies.

³⁰ It was reported that there was no linear relationship between the number of spaces within a certain area and profitability.

According to the 1st to 3rd GCS, the average number of seats shows an increase from 38 to 40 and then to 41. It should be noted that 51% of respondents requested comparatively small-scale spaces with less than 20 people (1st GCS). With respect to the types of seats, only 7% of all spaces provide private rooms as main offerings and it can be said that cases in which open space seats are provided are predominant (2nd GCS).

The average number of staff members at the time of opening a space was 2.8. In addition, 74% of space managers have second jobs. While one third of small spaces with less than 10 members were opened alone, 2.2 people were involved on average. For spaces that offer more than 50 seats, four individuals are involved in opening. The survey also indicated that the number of space managers tends not to increase as the number of members increase (2nd GCS).

Concerning activities in spaces, for example, the average number of events held is 4.5 per month. However, while 21% held two events, 15% held ten or more. Further, as for scale, it is reported that the event participation rate is high among spaces with a capacity of 50 people or more.³¹

Moreover, according to Garrett et al. (2017), members of a coworking space work together to co-construct a sense of community through their day-to-day interactions in the space. Specifically, they identified the three types of collective actions; endorsing (maintaining a shared vision of the community), encountering (encountering community criteria and practice through activities) and engaging (engaging in community activities).³²

2.3 Research Gap

As the result of reviewing previous studies, it can be said that research that attempts to describe and explain this phenomenon on a global scale is being accumulated gradually. In particular, much qualitative research with space users as the starting point has been accumulated and the specific phenomena in each region are gradually identified.

However, the following limitations can be pointed out. First, except for the GCS, which is an annual global survey, almost all surveys are small scale and have a narrow focus. Therefore, the overall situation on management and usage of the spaces has yet to be well understood. This is believed to be due to the fact that the phenomena involved are still in their embryonic/emergent phases. On that account, individual researchers are simply focusing on the phenomena based on their own interests. Besides, the limited number of accessible spaces could make it difficult to carry out a large-scale quantitative research.

Additionally, while the findings of the GCSs are useful, they are essentially unified data for the entire world. Although the investigations partially reported the regional differences of the results, geographical characteristics, the structures of industries and employment, and the attitudes and behaviour of working people may vary from country to country. For this reason, we believe that it is necessary to comprehensively comprehend the phenomena surrounding coworking in each country in parallel with

³¹ *Ibid.*

³² This result was derived from an ethnographic observation study conducted for over 120 hours, 6 months in spaces in the Midwestern United States as well as semi-structured interviews with 19 users and mail data of the survey period (an average of over 300 per month).

meaningful initiatives such as the GCS.

Most importantly, as mentioned above, there is comparatively little knowledge about the management of the spaces³³ and there has been almost no discussion of the factors that influence central issues such as community and sustainability.³⁴ Coworking spaces can be expected as social devices different to conventional corporate offices. Thus, an examination on the overall picture of the space management and on the performance is considered to contribute to various related bodies including not only managers and users, but also related municipalities and partner/support companies.

Hence, this research will empirically clarify the mechanisms of community building and sustainability maintenance/enhancement in Japanese coworking spaces.

3. Methods

3.1 Survey Method

In order to resolve the research issues, we created our own original questionnaire forms. Our questionnaire was composed of six viewpoints for comprehensively examining the characteristics of coworking spaces. These viewpoints were strategy, facilities, management organization, activities, users, and performance. The reasons why we created our own questions based on the perspectives were as follows. First, we were unable to discover any existing scales of measurements that we could directly and comprehensively utilize. Second, as a result of reviewing previous studies, most findings were able to be understood from the above six viewpoints. We used the services of an internet research company to implement it. The implementation period was 38 days from 28th July to 3rd September, 2014.

Respondents were selected using the following procedure. First, we used the dataset publicly released by Coworking JP.³⁵ Specifically, we used the file dated January 28, 2014, which was the latest file as of the June 2014 when we began preparing for the survey. We also used other websites to update and enrich the dataset for conducting an almost complete enumeration on Japanese coworking spaces.³⁶

The reasons why we challenged to conduct complete enumeration were as follows. First, since the phenomenon on coworking (spaces) is still in embryonic/emergent phase, the data variance of that is assumed to be large. Thus, it would be difficult for us to understand the current state and whole picture of the phenomenon appropriately when using sample survey which could involve a sampling error and whose results are nothing but estimated value unlike complete enumeration (Australian Bureau of Statistics³⁷). In addition, it was a great opportunity for carrying out the method because the number of the spaces in this phase is not enormous.

As a result, we obtained responses from 191 spaces out of 365 spaces that are thought to make up all of the operational facilities in Japan as of July 2014 (response rate: 52.3%). This study limits the targets of discussion to spaces where allowed drop-in use (valid responses: 168). This is because, as Uda (2013)

³³ For example, Bouncken, Clauß and Reuschl (2016) pointed out that there is almost no clarification of how space providers design business models in response to different user demands and business models.

³⁴ As stated in section 2, for example, although the relationships between variables concerning applicable spaces are becoming clearer by the 6th GCS, they are just correlations.

³⁵ Coworking JP (<https://www.facebook.com/groups/cowjap/>).

³⁶ Used coworking space JP (<http://coworking-space.jp/>) and Coworking.com (<http://co-work-ing.com/>) as references.

³⁷ See <http://www.abs.gov.au/websitedbs/a3121120.nsf/home/statistical+language++census+and+sample>.

has shown, spaces which have high potential for openness and member diversity conceptually best embody the characteristics of coworking.

3.2 Analysis Method

The items that this study specifically analyses are shown in Table 1.³⁸ In order to clarify the relationship between each variable in Table 1, we conducted regression analysis. This is because it is a general and efficient method to grasp and explain relationships between variables (Pedhazur, 1997; Wooldridge, 2015).

Specifically, the variables on community (user interaction, user collaboration) and sustainability (sales, profits) as the results of coworking spaces were treated as dependent variables. They correspond namely to the community and sustainability pointed out by Spinuzzi (2015). We requested responses to a five-point scale for both degree of user interaction and user collaboration. We requested responses for sales (10,000-yen units) and profits ensured with workspace business (5-point scale) concerning sustainability.

The following were used as independent variables: Strategy (focus on profitability, focus on community formation, competition with nearby spaces, cooperation with nearby spaces, cooperation with local community), facilities (number of partitioned seats and open space seats), management organization (number of staff, number of business hours, number of working hours, period of involvement), activities (number of events, number of event types, promotion of user interaction by managers), users (number of users, drop-in user ratio, heavy user ratio, number of member usage time, number of non-member usage time), and performance (sales, user interaction, user collaboration, individual results of users, operation period).

Control variables were as follows: macro level (nighttime population of the area³⁹ in which the space is located, number of spaces in the same area, number of stations within walking distance), organization level (number of businesses), space level (space size, diversity of occupations and age groups⁴⁰).

Because there exists no research targeting all coworking spaces in a nation, this exploratory analysis was performed using the following procedure. First, all the variables which were supposed to affect dependent variables were made independent variables (or control variables). Regression analysis was then successively performed, and independent variables with low explanatory power were eliminated.⁴¹ Below, we show the relationship between variables that were obtained in the end with respect to each dependent variable.

³⁸ See Abe and Uda (2016) for specific question items.

³⁹ Uses nighttime population from urban employment area data created by the result of national census survey in 2010 as reference. See <https://www.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=74cb904dd7b04f0fa4a48952320d83ab> for details.

⁴⁰ We questioned the composition ratios of items prepared in advance concerning users' occupations and users' age groups. For each composition ratio, we calculated the Herfindahl-Hirschman Index and chose it as a variable. In other words, these variables show the extent of deviation of users' occupation and age group.

⁴¹ After conducting regression analysis, we focused on standardised residual (more than 3.0), Cook's Distance (more than 1.0), leverage ((the number of independent variables +1) /N, more than 2.5) in order to check outliers. If even one of them exceeded the standard value, the data was regarded as outliers (Yamagiwa and Hattori, 2016).

Table 1 Analysis Items

Viewpoint	Variable	Description	Main Empirical Research
Strategy	Focus on profitability*	Whether or not managers focus on profitability in space operation	GCS
	Focus on community formation*	Whether or not managers focus on community formation within the space	GCS, Spinuzzi (2012)
	Competition with nearby spaces*	Whether or not there is a competition with nearby spaces in space operation	GCS
	Cooperation with nearby spaces*	Whether there are cooperations with nearby spaces in space operation	GCS
	Cooperation with local community*	Whether there are cooperations with the surrounding local community in space operation	GCS
Facilities	Number of partitioned seats	Number of seats separated by partitions, etc.	GCS
	Number of open space seats	Number of open space seats	GCS
	Number of staff	Total of full-time staff, part-time staff, interns, user volunteers	GCS
	Number of business hours (week)	Total business hours in a week calculated based on space business hours and number of working days	GCS
Operation Structure	Number of working hours (week)	Total working hours of manager (the product of average number of daily working hours and average number of working days per week)	GCS
	Period of involvement (month)	Period of manager's involvement in space operations (calculated in monthly units)	GCS
Activities	Number of events (month)	Average number of events in one month	GCS
	Number of event types (month)	Average number of event types in one month	GCS
	Promotion of user interaction by manager*	Whether or not the manager promotes user interaction	GCS
	Number of users (month)	Number of users in one month	GCS
Users	Drop-in user ratio	Ratio of drop-in users to total users (0-100%)	GCS
	Heavy user ratio	Ratio of heavy user ratio to total users (0-100%)	GCS
	Number of member usage time (day)	Average member usage time in a day	GCS
	Number of non-member usage time (day)	Average non-member usage time in a day	GCS
	Sales (month)	Sales in one month (10,000 yen)	GCS (breakdown only)
Results	Profits*	Whether or not profits are secured in space business units	GCS
	User interaction*	Whether or not users interact with other users	GCS, Spinuzzi (2012), Gerdentsch et al. (2016), Garrett et al. (2017), Wang & Loo (2017)
	User collaboration*	Whether or not new products/services are created through cooperation between users	Spinuzzi (2012), Capdevila (2014), Gerdentsch et al. (2016)
	Individual results of users*	Whether or not new products/services are created independently by users	GCS
	Operation period (month)	The period from the opening of the space to the implementation of the survey (August, 2014) (calculated in monthly units)	GCS
	Nighttime population (Ln)	Nighttime population based on urban employment area in which the space is located (lgarithm)	GCS, Spinuzzi (2012), Wang & Loo (2017)
	Number of spaces in the same area	Number of spaces located in the same area (same first three numbers of postal code)	GCS
Control Variable	Number of stations within walking distance	Number of stations (railway/subway) within a radius of 800m (as the crow flies) from the location of the space	Spinuzzi (2012), Wang & Loo (2017)
	Number of businesses	Number of businesses in operation apart from the space business	GCS
	Space size (sq. m)	Space size	GCS, Capdevila (2014)
	Diversity of occupation (Herfindahl)	Sum of squares of user occupation ratios (total of 100%, made up of 5 categories: organization employees, freelancers, students, homemakers, and others). Users are biased towards specific occupations the closer the value is to 1.	GCS, Spinuzzi (2012)
Diversity of age group (Herfindahl)	Sum of squares of user age group ratios (total of 100%, made up of 6 categories: under 20, 20s, 30s, 40s, 50s, 60 and over). Users are biased towards specific age ranges the closer the value is to 1.	GCS, Wang & Loo (2017)	

An asterisk (*) is placed beside the names of variables that use the five point scale response.

4. Results

Here we show the results of regression analysis setting community and sustainability as dependent variables.

4.1 Community

As shown in Table 1, this study focuses on the two variables of user interaction and user collaboration. These variables show the degree of community building within spaces

4.1.1 User Interaction

Table 2 shows the results of regression analysis with user interaction as the dependent variable. There are three factors that influence user interaction: the number of open spaces seats, promotion of user interaction by managers, and user collaboration.

The degree of promotion of user interaction by managers ($\beta = .325$, $p < .001$) and user collaboration ($\beta = .415$, $p < .001$) have positive effects on the degree of user interaction. Meanwhile, the number of open space seats ($\beta = -.217$, $p < .05$) has a negative effect on the degree of user interaction.

4.1.2 User Collaboration

The results of regression analysis with the user collaboration as the dependent variable are shown in Table 2. The four independent variables that show significant relationships are focus on community formation, the number of non-member usage time, user interaction and individual results of users.

The degree of focusing on community formation ($\beta = .128$, $p < .05$), the number of usage time by drop-in users ($\beta = .107$, $p < .05$), the degree of user interaction ($\beta = .254$, $p < .001$), and individual results of users ($\beta = .602$, $p < .001$) have positive effects on the degree of user collaboration.

Table 2 Results of Analysis (Community)

		Dependent Variable					
		Community					
		User Interaction			User Collaboration		
Viewpoint	Variable	Standardized Coefficients	t	Sig.	Standardized Coefficients	t	Sig.
Strategy	Focus on profitability						
	Focus on community formation				.128 *	2.411	.017
	Competition with nearby spaces						
	Cooperation with nearby spaces						
	Cooperation with local community						
Facilities	Number of partitioned seats						
	Number of open space seats	-.217 *	-2.491	.014			
Operation Structure	Number of staff						
	Number of business hours (week)						
	Number of working hours (week)						
Activities	Period of involvement (month)						
	Number of events (month)	.124 †	1.698	.092			
	Number of event types (month)						
Users	Promotion of user interaction by manager	.325 ***	4.141	.000			
	Number of users (month)						
	Drop-in user ratio						
Results	Heavy user ratio						
	Number of member usage time (day)						
	Number of non-member usage time (day)				.107 *	2.109	.037
Results	Sales (month)						
	User interaction				.254 ***	4.334	.000
	User collaboration	.415 ***	5.667	.000			
	Individual results of users				.602 ***	10.552	.000
Control Variable	Operation period (month)						
	Nighttime population (Ln)	-.103	-1.427	.156	.133 *	2.477	.015
	Number of spaces in the same area	-.057	-.766	.445	-.082	-1.489	.139
	Number of stations within walking distance	-.039	-.523	.602	.049	0.841	.402
	Number of businesses	.008	.124	.902	-.015	-.308	.758
	Space size (sq. m)	.070	.802	.424	-.018	-0.347	.729
	Diversity of occupation (Herfindahl)	.108	1.364	.175	-.091	-1.571	.119
Diversity of age group (Herfindahl)	-.058	-.744	.458	.088	1.531	.128	
	N	138			139		
	R Square	.497			.701		
	Adjusted R Square	.453 ***			.675 ***		

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2 Sustainability

As shown in Table 1, the two variables of sales and profits secured in space business units (5-point scale) were used in this study as variables that show sustainability of spaces. The results of regression analysis are shown in Table 3.

4.2.1 Sales

The more competition there is with nearby spaces, the higher the sales ($\beta = .198$, $p < .01$). Meanwhile, the more cooperation there is with local community, the lower the sales ($\beta = -.211$, $p < .01$).

The higher the increase in the number of open space seats, the higher the sales ($\beta = .421$, $p < .001$). There is a trend in which the higher the number of staff ($\beta = .193$, $p < .05$), the higher the sales are.

The higher the number of users, the higher the sales ($\beta = .237$, $p < .01$). User group and the number of usage time also influence sales. Specifically, the trend is that as the drop-in user ratio increases, sales

decrease ($\beta = -.205, p < .05$) or as the number of member usage time increases, ($\beta = -.259, p < .01$), sales decrease.

Operation period ($\beta = .251, p < .001$) has a positive relationship to sales. In other words, the longer the operation period, the higher the sales.

4.2.2 Profits

With respect to space management policy, one factor affects securing profits. Specifically, the more space managers focus on profitability in space operation, the more they tend to recognize the space business units can secure profits ($\beta = .311, p < .001$).

It is recognized that the longer managers are engaged in space operation, the more profit is secured in space business unit ($\beta = .424, p < .001$).

With respect to events, the number of events and the number of event types have different influences. It is recognized by managers that the more the number of events increases, the less profits secured in space business units ($\beta = -.338, p < .01$). In contrast, managers tend to recognize that the higher the increase in the number of event types, the more profit is secured ($\beta = .241, p < .05$).

It is recognized by managers that the more users interact mutually, the more profit is secured in space business unit ($\beta = .244, p < .01$).

Table 3 Results of Analysis (Sustainability)

Viewpoint	Variable	Dependent Variable					
		Sustainability			Profits		
		Standardized Coefficients	t	Sig.	Standardized Coefficients	t	Sig.
Strategy	Focus on profitability				.311 ***	4.439	.000
	Focus on community formation						
	Competition with nearby spaces	.198 **	2.900	.005			
	Cooperation with nearby spaces				-.114 †	-1.671	.097
Facilities	Cooperation with local community	-.211 **	-3.163	.002			
	Number of partitioned seats						
	Number of open space seats	.421 ***	3.626	.001			
Operation Structure	Number of staff	.193 *	2.391	.020			
	Number of business hours (week)						
	Number of working hours (week)						
Activities	Period of involvement (month)				.424 ***	6.408	.000
	Number of events (month)				-.338 **	-2.924	.004
	Number of event types (month)				.241 *	2.039	.044
	Promotion of user interaction by manager						
Users	Number of users (month)	.237 **	2.842	.006			
	Drop-in user ratio	-.205 *	-2.636	.011			
	Heavy user ratio						
	Number of member usage time (day)	-.259 **	-3.224	.002			
Results	Number of non-member usage time (day)						
	Sales (month)						
	User interaction				.244 **	3.433	.001
	User collaboration						
Control Variable	Individual results of users						
	Operation period (month)	.251 ***	3.766	.000			
	Nighttime population (Ln)	-.016	-.231	.818	.103	1.401	.164
	Number of spaces in the same area	.070	.974	.334	.088	1.162	.247
	Number of stations within walking distance	.187 *	2.606	.011	.094	1.278	.204
	Number of businesses	-.051	-.791	.432	-.251 ***	-3.682	.000
	Space size (sq. m)	.155	1.465	.148	.121 †	1.824	.071
	Diversity of occupation (Herfindahl)	.001	.014	.989	-.103	-1.322	.189
Diversity of age group (Herfindahl)	.077	1.026	.309	-.003	-.042	.966	
	N	77			139		
	R Square	.788			.506		
	Adjusted R Square	.736 ***			.455 ***		

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Discussion

5.1 Community

5.1.1 User Interaction

There were three influential factors concerning user interaction, which are the number of seats in open spaces, promotion of user interaction by managers and user collaboration.

It is recognized by managers that the more they work on promoting user interaction, the more user interaction actually progresses. Namely, it was suggested that the promotion of user interaction by managers creates user interaction. In addition, the more the users collaborate, the more the user interaction progresses. Here, we focus on the trend that the user collaboration ($\beta = .415$) stimulates user interaction more than the promotion of user interaction by managers ($\beta = .325$). In other words, it is suggested that user interaction cannot be promoted by managers but can be promoted by user collaboration that is not necessarily affected by managers.

Meanwhile, we obtained results different from previous research and conceptual assumptions. The policy of focusing on community formation within a space does not influence user interaction. This variable is estimated to be directly related to community which is considered to be one of the core issues of coworking spaces. However, it is suggested that attempts to build community-building by managers do not influence actual user interaction.⁴² While direct action by managers such as promoting interaction by managers encourages interaction, it may indicate that only showing management policy does not promote interaction sufficiently.

With respect to facilities, we can see that partitioned seats do not influence user interaction. However, it is considered that it is possible for users to interact within spaces (for example, open spaces, etc.) even if they usually use partitioned seats. Additionally, it is considered that it is possible for users to interact with small numbers of people (for example, teams) in private offices. For this reason, even if there is an increase in partitioned seats, this does not necessarily mean that interaction is impeded and it may not be possible to confirm a significant relationship between the two variables. There is a trend in which managers recognize that user interaction decreases as the number of open space seats increases. However, it is estimated that it is easier for users to interact as open spaces increase. There are two explanations for the reason why we obtained results contrary to assumptions. In open spaces used by many people, user interaction may be difficult due to conversation being disturbed by voices or noises or because it is difficult to secure privacy and therefore difficult to talk about highly confidential subjects. In addition, particularly in the case of drop-in users, it may be difficult to enhance a sense of belonging or commitment to places such as coworking spaces.

Though the relationship between the number of events and degree of user interaction is significant, the level of that is at the 10%. Thus, it cannot be said that the level of interaction increases in keeping with an increase in the number of events ($\beta = .124$).⁴³ It is difficult to imagine events in which users do not participate at all and it may be possible to regard the number of events as a proxy variable for level of participation in activities in spaces. For this reason, this may show the difference with the statement by Garrett et al. (2017), where it is pointed that the more people participate in activities at spaces, the more the users' sense of community is enhanced. Furthermore, even if the number of event types is increased, it could not be said to influence user interaction. Events are not an opportunity to create interaction and may be recognized by users as an opportunity to acquire information and knowledge. Or, it may be that it is difficult to interact between users as the attributes of event participants and ordinary users of the space differ.

It is suggested that interaction is promoted by user diversity in previous research. For example, Arimoto et al. (2012) mentions user diversity as one requirement for communication between users. However, in this study, drop-in user ratio, which is considered as a proxy variable of user diversity, does not influence user interaction.⁴⁴ Users may be looking for interaction with specific users such as those

⁴² The correlation coefficient between community formation and interaction is 0.339 (significant at 1% level). However, from the results of regression analysis no significant relationship was found between them.

⁴³ The correlation coefficient between the number of events and interaction is 0.135 (significance at 10% level). In other words, regardless of whether correlation analysis or regression analysis is used, it is consistently confirmed that the number of events is considered not to contribute to interaction.

⁴⁴ A negative correlation (-0.154, 5% level) was observed between drop-in user ratio and interaction. However,

with similar attributes rather than interaction with users with different backgrounds to themselves.

However, it was suggested that users did not seek interaction with specific users either. Specifically, the number of member usage time did not influence user interaction.⁴⁵ It is estimated that the longer the number of usage time, the higher the probability of interaction between members and other members or drop-in users. However, the results of this study suggest that this kind of trend was not observed. In addition, heavy user ratio does not influence on the degree of user interaction. It is assumed that the higher the heavy user ratio, the more contact there is between specific users and the deeper the interaction.⁴⁶ However, it was suggested that this kind of relationship was not established. Due to these results, it is difficult to say that there is a trend in using spaces to look for interaction with other users.

The result that user diversity and the number of member usage time do not significantly influence interaction means that users do not interact with diverse or specific users. Users may be using spaces as places to make progress with their own work independently.

It is supposed that the more the scale of a space is, the less user interaction is, because space size is regarded as the proxy variable of scale of a space. In fact, comparing spaces with less than 10 seats to spaces with more than 10 seats, the trend is that the number of people with whom they friendly interact is less in the latter, according to the result of the 1st GCS. However, this study shows that even if space size is increased, it cannot be said that user interaction either decreases or increases. The operation rate of spaces may be important for user interaction. Regardless of the space size, it is estimated that if the operation rate is too high, noise increases and it becomes difficult to interact because not all information may be heard and if it is too low, there is no one to interact with. For this reason, we may obtain the result that increase in space size itself do not influence user interaction.

As with the discussion on drop-in user ratio, it is considered that diversity of occupation and age group are proxy variables of user diversity mentioned in Arimoto et al. (2012). However, it was suggested that even if occupations and age groups are diverse, users do not necessarily interact.

5.1.2 User Collaboration

Managers tend to recognize that the more non-members (drop-in users) use spaces for a long period of time, the more users collaborate. This may mean that the more non-members use spaces for a long time, more connections occur between users (members and non-members/non-members and non-members), and as a result, collaboration progresses.

User interaction promotes user collaboration. In addition, the more users produce results individually, the more user collaboration progresses. This may show that collaboration is promoted by individual results of users rather than user interaction.

However, even with respect to user collaboration, we found trends that differ from those in previous research or conceptual assumptions. Managers tend to recognize that the more they focus on community

regression analysis did not result in the same trend.

⁴⁵ A positive correlation (0.214, 1% level) was observed between the number of member usage time and interaction.

⁴⁶ Or, it is also possible to interpret this as follows: As a result of being formed groups together by specific users, they come to stop communication with other groups and the level of overall interaction in the space is not enhanced. However, this interpretation does not hold as no significant relationship can be observed.

formation within spaces, the more users collaborate. It may be that the trend which this kind of management policy promotes not user interaction but user collaboration reflects the fact that users use spaces as places to, at least, progress with work rather than with the aim of interaction.

It is assumed that the higher the number of seats in open spaces, the more user collaboration there is. However, this study did not find any significant differences. In other words, it is suggested that the design of the space itself does not influence user collaboration. This may mean that, although there are users who feel that it is easy to collaborate on the one hand, as contents of conversations can be heard by others in the space, there are also users who feel that it is difficult to collaborate.

It is assumed that the higher the drop-in user ratio, the more diverse the users will be. As with user interaction, it is expected that sharing knowledge and information with diverse users bring user collaboration. However, the results of this study suggested that user diversity does not necessarily produce user collaboration.⁴⁷

It can be expected that the more frequently the users use a space, or the longer their usage time is in that, the more increase contact between users, and as a result, collaboration progresses. This study used the two variables of heavy user ratio and the number of member usage time to show the ratio of high-frequency users and usage time of a certain user group. However, it was suggested that neither of these variables influenced user collaboration.⁴⁸ These two relationships can be interpreted as with the case that user diversity and the number of usage time do not have significant relationships with interaction. In other words, this may mean that users use spaces as places to progress with their own work.

Capdevila (2014) pointed out that there is a correlation between space size and community size and that there are differences in types of collaboration depending on the space size. In other words, it was suggested that the larger the space size, the larger the size of the community and the more users collaborate with other users. In the case of large-scale communities, characteristics such as getting synergy and investing in community-building were observed. However, this study did not find a significant relationship between space size and user collaboration. Capdevila states that, as large-scale spaces tend to be operated by well-financed organizations and, in addition, are most used by legal entities rather than individuals, the ratio of users that intend to collaborate may increase. However, this kind of phenomenon may not occur in the spaces that this study targeted.

5.1.3 Influential Factors in Community

Analysis on the two variables of user interaction and user collaboration suggested that interaction and collaboration influence each other. In other words, it is confirmed that user interaction promotes user collaboration and vice versa.

Although it could be suggested that as the number of events is increased, user interaction is

⁴⁷ If the similarity of background of drop-in users is high, this can be expected to create results from sharing knowledge and information between users. It can be expected that sharing knowledge and information between users lead to creating results. However, based on this study, it was suggested that this relationship is not also established.

⁴⁸ A positive correlation (0.198, 5% level) between the number of member usage time and user collaboration has been established. However, this kind of relationship was not observed in the regression analysis.

encouraged, the level of significance is at 10% and it cannot be said to be a strong trend. A tendency different from the conceptual assumptions that the number of events promotes interaction and collaboration was confirmed.

In addition, it was suggested that management initiatives such as space facilities (space size and the number of seats), management strategy and activities have almost no influence on user interaction and collaboration. In other words, it is suggested that it is not easy for managers to intentionally create interaction and collaboration. It is also suggested that the number of users and usage situations do not necessarily promote or restrict user interaction and collaboration, except for the number of non-member usage time.

5.2 Sustainability

5.2.1 Sales

The more competition there is with nearby spaces, the higher the sales and the more cooperation there are with the local community, the lower the sales. Being in competition with nearby spaces, for example, trying to reduce prices or differentiate the (space) business, may contribute to improvements in sales. In addition, in order to progress in cooperation with other bodies, sales may decrease as it is necessary to allocate time efforts and capital to normal operations and co-sponsored event at the same time.

The higher the number of seats in open spaces, the higher the sales. A very interesting point is that it is not the number of seats but the number of seats in open spaces. It is considered that the more of these kinds of seats there are, the more users (in particular, drop-in users) can expect a higher level of freedom in communication during the usage time. If users want to interact with someone, they can use the seat next to that person and if they want to concentrate on their own individual work, they can choose a seat away from others. For this reason, there is a possibility that users judge the applicable space is easy to use. As a result, it may be that the higher the number of open space seats there are rather than just simply by the number of seats overall, the higher the sales.⁴⁹

The trend is that the higher the number of staff, the higher the sales. We can also suppose the reverse causality, which is as the sales is higher, the number of staff members can be increased. However, it may be possible to interpret the trend as follows: The more the number of staff members increases, the more services which comply with diverse users can be provided, and as a result, sales is enhanced.

The higher the number of users, the higher the sales. It is thought that this relationship is comparatively evident. However, this study also suggests that user groups and the number of usage time are important. Specifically, the higher the drop-in user ratio, the lower the sales. In addition, there is a trend in which sales decrease as the number of member usage time increases. It is possible to explain these two relationships through the coworking space usage fee structure. In other words, in the case of drop-in usage, many spaces use, for example, a fee structure that as the usage time is long, the sales per seat time unit would be lower (e.g. 1 hour: 500 yen, 2 hours or more: 1,000 yen, 1 day: 2,000 yen). In addition, it can be considered that members are users with monthly or yearly contracts. In these cases, it is also considered that the longer the number of member usage time, comparatively, the fewer

⁴⁹ However, the drop-in user ratio does not positively influence sales. It is considered that it is necessary to conduct more analysis on the number of drop-in users rather than ratio.

opportunities for drop-in use or event use and the less the sales.

The longer the operation period, the higher the sales. The reason for this can be explained by assuming that operation period is a proxy variable regarding the experience of managers or the awareness of the space.⁵⁰ In other words, it may be that the more management experience that is accumulated, the more it may be possible to increase sales.

The trend is that the higher the number of stations there are within walking distance, the higher the sales ($\beta = .187, p < .05$). It is expected that the higher the number of stations, the closer the space will be to the city center. As Wan and Loo (2017) points out, the better the space accessibility is, the easier it is to attract users and, as a result, it may be possible to improve sales.

However, in sales, a different trend from the knowledge of previous research or conceptual assumptions of coworking was confirmed. It is expected that the longer the business hours, the higher the sales.⁵¹ However, a significant relationship between them has not been established. The reason for this is thought to be that, as explained above, the usage fees of many coworking spaces do not increase in a preliminary functional manner in keeping with the number of usage time. In addition, even if business hours are extended, there may be time periods when there are few users (such as early morning or late night). Heavy user ratio does not significantly relate to sales either. It is thought that the reason for this is the same as that of the relationship between business hours and sales. Or, this may suggest that, as it can be expected that high frequency users are monthly members or drop-in users with long usage times, based on the above-mentioned fee structure, usage by these users does not necessarily contribute to sales.

It can also be considered that the number of events contributes to sales but this study did not find a significant relationship between them. When considering space scale, there is a possibility that holding events limit usage by other users (potential users). In addition, as event participation rates are set low or as the majority of event participants are members, they may not contribute to sales even though, comparatively, they occupy a space for a certain period of time.⁵²

The GCS is basically a combination of the responses of all spaces that participated in the survey and it is difficult to identify influences arising from the characteristics of the countries or regions. For this reason, among GCSs we focused on the actual circumstances of spaces in the U.S. for which data is collected at the national level and compared this with the results of analysis obtained in this study.⁵³

The results of the 5th GCS targeting spaces in the U.S. (hereinafter referred to as 5th GCS (U.S.)) suggested that the scale of sales in spaces with 30 or more members is about double that of spaces with less than 30 members. In the case of spaces in Japan targeted in this study, the trend in which the higher the number of users there are, the higher the sales are was shown. Measurement methods between them

⁵⁰ It is necessary to pay attention to the possibility of reverse causality. Specifically, increasing sales may enable a space to sustain. As operation period is thought to be a variable correspond to sustainability, it is necessary to analyse the variable as a dependent variable.

⁵¹ A positive correlation (0.313, 1% level) is established between business hours and sales.

⁵² The correlation coefficient between the number of events and sales is 0.266 (significant at 5% level). However, as a result of regression analysis, the fact being no significant relationship between them is notable.

⁵³ However, as the number of responses is not clear, the possibility that it is not data that guarantees representativeness of the applicable country. For this reason, it is necessary to pay attention to the interpretation of the data. In addition, items that are possible to compare with this study are influential factors on sales and securing profits at most.

are different but it was suggested that the number of users is important to the space business.

In the U.S., spaces located in areas with a surrounding population of 1 million or more have more than twice the amount of sales compared to those in locations with populations of between 100,000 and 1 million. As this study uses urban employment area data as surrounding population, we need to be careful with interpretation, but no significant relationship was observed between the population of the location of space and sales. Most of the Japanese spaces targeted by this study are in the center of large cities. Thus, this study may not find a significant relationship between location and sales.

5.2.2 Profits

Regarding the items of management strategy, a comparatively evident relationship is confirmed. In other words, the more the managers focus on profitability, the more managers tend to perceive their own spaces secure profits in space business units.⁵⁴ Meanwhile, the formation of community within spaces did not contribute to the securing of profits for space operation.

Managers tend to acknowledge that the longer the managers are engaged in space operation, the more profits are secured in space business units. If we consider that period of involvement is a proxy variable for space operation experience, it may be that the longer the space operation, the easier the operation to increase profits gets to be.⁵⁵

It was suggested that for events, the number of times and the number of types have different effects on securing profit.⁵⁶ The higher the number of events, the more managers think it difficult to secure profits in space business units. On the other hand, managers tend to recognize that the higher the number of event types, the more profits are secured. In comparison to holding the same event multiple times, by securing the number of types, it may be possible to secure profits more easily as it could not be necessary to discount the participation fee for each event. In addition, it is considered that the higher the number of types, the higher the number of events held by bodies other than managers. In other words, this means that the number of events that management side does not require additional time or costs increases. For this reason, it may be easier to secure profits in comparison to events held by the management side.

In addition, the more the users mutually interact, the more it is possible to secure profits in space business units. The more the users interact, the more the spaces are used continuously and therefore it

⁵⁴ There is no significant relationship between focusing on profitability and sales. Due to these facts, the strategy of focusing on profit does not increase sales but contribute to securing profits for space business, which it can be interpreted as obtaining comparatively highly valid knowledge.

⁵⁵ The data handled in this study is thought to be collected during the embryonic/emergent phases of coworking in Japan. Thus, it is estimated that period of involvement and operation period would be similar, and it is possible to regard period of involvement as a proxy variable of operation period. The average of period of involvement is 19.99 months. According to the 2nd GCS, the break-even point can be exceeded within two years after opening a space. For this reason, period of involvement and securing profits have a positive relationship because it can be interpreted to be easier to make a profit after exceeding the break-even point.

⁵⁶ In the 6th GCS, the joint-holding of events with other bodies was shown to have a negative influence on securing profit. It is difficult to directly compare the results as this study asked about the number of events and event types but it is considered that the joint-holding of events is equivalent to the number of events. If considered this way, the facts uncovered by the 6th GCS and this study have something in common. However, the point that the number of types has a positive influence on securing profit can be thought to be a fact that was uncovered by this study independently.

may be easier to secure profits from space operation.⁵⁷ Here, the reason that user interaction contributes to securing profits rather than sales can be interpreted as the fact that it is possible to reduce costs if the number of usage time of users is longer and there is more interaction among them. For example, reducing services that users do not really need or space operation through user volunteers, etc. are applicable.

We also obtained notable results on control variables. The trend is that the more the number of businesses other than space operation there are, the more difficult it is to secure profits ($\beta = -.251$, $p < .01$). It is assumed that the reason for this is that the wider the range of business is, the more input resources are dispersed, and as a result, it is difficult to build a system to increase profits.

According to the result of the 6th GCS, there is no significant relationship between space profitability and the number of rival spaces within the same area. This study also confirmed the same trend. It suggested that profitability does not necessarily increase or decrease even if there are many rival spaces within the same area. It is assumed that spaces within the same area were not in a state of existing to excess in comparison to the number of users at that time. For this reason, it may be that as rival spaces increase, profits do not reduce. Meanwhile, it is also possible to consider that there are improvements in level of business awareness for coworking spaces due to the increase in rival spaces. It is assumed that the higher the level of awareness the higher the increase in users and therefore it is easier to secure profits but this kind of relationship may not be established.

As for securing profits, we confirmed trends that differ from previous research and conceptual assumptions. The 6th GCS asserts that the more cooperation there are with other spaces, the more profits are secured. The GCS includes cooperation such as coworking visa programs. The number of users increases through mutual usage by people who join the programs. This may be connected to securing profit. However, this study did not find a significant relationship between cooperation with other spaces and securing profits. As there are not only mutual usage but also cooperation such as events that require additional inputs of resources, cooperation may not lead to securing profits.

If other conditions are equal it is assumed that the more the number of staff, the more difficult it is to secure profits. The reason for this is because the ratio of expenditure for labor costs increases. However, the results of this study suggested that increases or decreases in the number of staff did not influence profitability. This result can be explained by the structure of operation staff. The average number of staff in spaces targeted by this study was 5.45. The breakdown was: full time: 2.65, part-time: 1.33, user volunteers: 1.11 and interns: 0.35. In other words, around half of the staff members are part-time or unsalaried. In addition, as most of the spaces targeted by the survey in this study regard the space business as their side businesses, it is assumed that labor costs for space operation do not necessarily increase in keeping with an increase in the number of full-time staff members. For example, it can be assumed that the staff members are only assigned for operation when the space operation rate is high. For that reason, it may be that the relationship that as space size expands, labor costs for space operation linearly increase was not confirmed.

In addition, there was no significant relationship between variables assumed to have a positive

⁵⁷ This can also be interpreted as follows: Users interaction lead to the continuous use of a space, the space duration is longer and profits are secured.

relationship in items relating to users. Specifically, these are the number of users and the ratio of heavy users.⁵⁸ The 6th GCS shows the trend that spaces that have high numbers of members secure profits. Despite the differences in that the GCS uses the number of members and this study uses the number of users, this study indicates that the number of users does not influence securing profits. When there are drop-in users who stay for a long period of time and many member users, as the trend is that the higher the increase in users, the lower the profitability of each seat, securing profits becomes difficult. On the other hand, it is assumed that securing profits in line with an increase in users is easy in such spaces where the number of such kind of users is not high. It may be for this reason that no significant relationship was observed between the number of users and profits.

It is also assumed that the ratio of heavy users contributes to securing profits. The reason for this is that income and expenditure plans could be made taking groups who consistently use spaces into consideration. However, this study could not confirm a significant relationship between these two variables. This is where it is possible to explain the result based on the coworking space usage fee structure in Japan. In other words, daily usage fee structure and individual member monthly rates are considered to have a trend of being set comparatively low when considering operation costs. For this reason, it may not necessarily be easy to secure profits even if the ratio of heavy users increases.

The provision of a drop-in service was shown to positively influence profits in the 6th GCS. It is difficult to make a direct comparison as the GCS asked about whether or not there was a drop-in service and this study asked about ratios. However, it may be that differences in seat availability (seat turnover) and fee structure created the difference in results of both of them.

There is no significant relationship between operation period and securing profits.⁵⁹ The 6th GCS showed that operation period and profits were correlated but this is different to the result that this study obtained. When interpreting these results, we focus on the point that, the GCS shows that, in the case of a space being open more than one year and less than two, 63% of spaces do not make a profit. As mentioned previously, average operation period of spaces targeted in this study is around a year and a half.⁶⁰ It is perhaps for this reason that a system to secure profits is not well enough established.

The 6th GCS showed a relationship in which space size contributes to profit. However, even though a positive relationship was observed in this study, the significance level of that was just 10%. For this reason, it cannot be said that a strong tendency was observed.⁶¹ Behind the fact that a strong trend is not observed, there is a possibility that operation rate of the space and turnover rate of users are not high.

Regardless of limits in the number of items for profits, it is also possible to compare with the 5th GCS (U.S.) which implemented a comparison of spaces with 50 or more members and spaces with 25 or less members. From these results, it is possible to estimate that the higher the number of members, the higher the ratio of spaces that secure profits. It was difficult to make a direct comparison with this study as it analyses the relationship between user numbers and profitability but no significant relationship was

⁵⁸ A positive correlation (0.295, 1% level) was observed between the number of users and securing profits.

⁵⁹ However, as for correlations, there is a significant positive relationship between them (0.336, 1% level).

⁶⁰ Specifically, the average operation period for spaces targeting in this study is 19.10 months. In addition, 94 spaces (56.0%) had not reached the break-even point. In other words, it is considered that average operation period was around one and a half years and that this did not enough fulfil the condition which the majority of spaces reach break-even point within two years after opening, as pointed out in the 2nd GCS.

⁶¹ When the correlation coefficient was checked, it turned out to be 0.233 (significant at the 1% level).

observed between the two variables. In other words, it is assumed that there is some kind of difference between spaces in the U.S. where a trend in which an increase in the number of users contributing to profitability is observed and spaces in Japan. The reason for these differences may be that Japanese coworking space usage fee ranges are lower in comparison to those in America.⁶²

In the case of spaces being operated for three years or more, 57% of those spaces in the U.S. secured profits. Meanwhile, this study did not find a significant relationship between operation period and profitability. As discussed above, the average operation of spaces targeted in this study was one and a half years and it may be that they did not secure profits as this is a shorter period than American spaces. However, a significant positive relationship was observed between the period of involvement and securing profits at the 1% level. It is possible that the longer a manager is engaged in the space business, the higher the degree of awareness of the space or it becomes easier to secure profits as a result of accumulated know-how about the management. When compared to operation period, it is assumed that period of involvement is a more direct proxy variable of management experience. In other words, it is considered that this suggests that the more experience the manager has, the easier it is to secure profits.

In the 5th GCS (U.S.), it was estimated that there was a correlation between surrounding population and profitability. With respect to the ratio of spaces that are securing profits, there were 51% of spaces located in areas with a population of 1 million or over, 30% of spaces located in areas with a population of between 100,000 and 1 million and 32% of spaces located in areas with a population of less than 100,000. As this study uses population data based on urban employment area, it is difficult to compare the results directly but no significant relationship was observed between surrounding population and profitability. As stated previously, this may also be influenced by the space usage fee structure.

5.2.3 Influential Factors on Sustainability

The results of the above analysis did not show factors that influence both sales and profits. In other words, it was suggested that it is difficult to achieve space management that not only improves sales but also secures profits.

In order to increase sales, competing with nearby spaces, increasing the number of staff, increasing user numbers and extending operation period are important. In order to increase profits, it is necessary to operate a space based on policies that focus on profitability, extend period of involvement of managers, increase the number of event types and promote user interaction.

In addition, among variables regarding facilities (space size and the number of seats), a positive relationship was only observed between the numbers of seats in open spaces and sales. In other words, it suggests that, even if a large-scale space is opened, sales will not necessarily increase and it will not necessarily be easy to secure profits. It is difficult to directly compare the results as this study only asked about the number of seats in open spaces and the number of partitioned seats. However, the result in this study may be different from the trend that profitability increases in conjunction with expansion of private offices and team offices as shown in 6th GCS.

⁶² It may be that the ratio of monthly members and drop-in users in overall users are different. For example, it can be assumed that it is difficult to contribute to profitability even if the number of users increases in cases where there is a high drop-in user ratio.

Table 4 summarizes the major findings of this paper, which has presented the results of analysis, comparing to previous research or conceptual assumptions.

Table 4 Major findings of this paper

Viewpoint	Variable	Dependent Variable						
		Community		Sustainability		Profits		
		Conceptual Assumptions Previous Studies	User Interaction	Conceptual Assumptions Previous Studies	User Collaboration	Conceptual Assumptions Previous Studies	Sales	Conceptual Assumptions Previous Studies
	Focus on profitability						(+)	(+) ^{***}
	Focus on community formation	(+)			(+)*			
Strategy	Competition with nearby spaces					(+) ^{**}		
	Cooperation with nearby spaces						(+) GCS (2017)	(-) [†]
	Cooperation with local community					(-) ^{**}		
Facilities	Number of partitioned seats	(-)		(-)				
	Number of open space seats	(+)	(-)*	(+)		(+) ^{***}		
	Number of staff					(+)*	(-)	
Operation Structure	Number of business hours (week)				(+)			
	Number of working hours (week)							
	Period of involvement (month)							(+) ^{***}
Independent Variable	Number of events (month)	(+)	(+) [†]		(+)		(-) GCS (2017) cosponsored event	(-) ^{**}
	Number of event types (month)	(+)						(+)*
	Promotion of user interaction by manager	(+)	(+) ^{***}					
Users	Number of users (month)				(+) GCS (U.S.) (2016)	(+) ^{**}	(+) GCS (U.S.) (2016), GCS (2017)	
	Drop-in user ratio	(+) (+) Arimoto et al. (2012)		(+)		(-)*	(+) GCS (2017)	
	Heavy user ratio	(+)		(+)	(+)		(+)	
	Number of member usage time (day)	(+)		(+)		(-) ^{**}		
	Number of non-member usage time (day)				(+)*			
Results	Sales (month)							
	User interaction			(+)	(+) ^{***}			(+) ^{**}
	User collaboration		(+) ^{***}					
	Individual results of users				(+) ^{***}			
	Operation period (month)					(+) ^{***}	(+) GCS (U.S.) (2016), GCS (2017)	
Control Variable	Nighttime population (Ln)				(+)*	GCS (U.S.) (2016)	GCS (U.S.) (2016), (+) GCS (2017)	
	Macro level						(n.s.) GCS (2017)	
	Number of spaces in the same area							
	Number of stations within walking distance					(+)*		
	Organization level							(-) ^{***}
Space level	Space size (sq. m)			(+) Capdevila (2014)			(+) GCS (2017)	(+) [†]
	Diversity of occupation (Herfindahl)	(-) GCS (2011)		(+)				
	Diversity of age group (Herfindahl)	(+) Arimoto et al. (2012)		(+)				
		(+) Arimoto et al. (2012)		(+)				
	N	138		139		77		139
	R Square	.497		.701		.788		.506
	Adjusted R Square	.453 ^{***}		.675 ^{***}		.736 ^{***}		.455 ^{***}

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.3 Relationship between Community and Sustainability

As Spinuzzi and Bacigalupo point out, community and sustainability are core issues for coworking spaces. The results of analysis in this study suggested three types of factors affecting on community and sustainability. Firstly, it is a type of the factors that influence either community or sustainability: from the viewpoint of management of coworking spaces, these are factors for building community (community-oriented) or for maintaining/enhancing sustainability (sustainability-oriented). Secondly, it is a type of the factor that influences community and sustainability simultaneously: from the viewpoint of management of coworking spaces, this is a factor to achieve both building community and maintaining/enhancing sustainability to some extent (balance-oriented). Lastly, it is a type of the factors that cause a trade-off between community and sustainability. These relationships are shown in Figure 1.

Figure 1 suggests that, if spaces are operated with emphasis on community-building by managers, it is important for managers to work on forming community, promoting user interaction, and increasing the number of non-member usage time. In addition, while creating individual results of users or user collaboration could not totally be controlled by managers, they lead to user interaction and collaboration. Furthermore, it was suggested that individual results of users or user collaboration produces interaction and collaboration.

It is suggested that, if spaces are operated with emphasis on sustainability by managers, it is important to focus on profitability and to be competitive with nearby spaces. In addition, it is possible that decreasing drop-in user ratio and the number of member usage time may contribute, at the very least, to increased sales. It is more important to increase the number of event types rather than that of events.

Despite the only one factor, it is suggested that user interaction could contribute to both community building and sustainability enhancement in coworking spaces. Specifically, user interaction had a positive influence on user collaboration and securing profits in space business units. In addition, user interaction can be encouraged by managers. Due to these findings, it is suggested that situations in which user interaction is easy to achieve are created through promotion of user interaction by managers and this may contribute to sustainability. However, the promotion of user interaction by managers may not have a strong influence the user collaboration. It can be assumed that interaction contributes to collaboration and sustainability but there are almost no factors (facilities, events, activities, users) that managers could control in order to create collaboration.

It was also demonstrated that a trade-off exists. Increasing the number of open space seats hinders user interaction on the one hand, but on the other, it contributes to improving sales. While it is possible to promote user interaction by increasing the number of events, it is difficult to secure profits. These two relationships suggested that there was a conflicting trend. Achieving the optimal situation that coworking space managers want to implement, in particular initiatives to create collaboration was implied to be comparatively difficult from these findings.

As a result of these discussions, it can be said that it is comparatively difficult for owners/managers to achieve the favourable results of coworking such as building community and maintaining/enhancing sustainability and especially to take initiatives for creating user collaboration at least in Japan.

As one reason for this, for example, as mentioned above, it is considered that there is a possibility that users regard coworking space as a place where they can make progress with their own work

independently rather than interacting/collaborating with others. Because this study was conducted during the embryonic/emergent phases of coworking (spaces) in Japan, it is possible that users may not understand and exploit the characteristics of the coworking spaces, or that the space managers' experience is not sufficient. However, in order to more socially utilize coworking spaces where everyone basically could access, it is necessary to investigate the institutional factors surrounding users in addition to the phases of markets and internal factors of coworking spaces. For example, in Japan, while vertical division of labor surrounding freelancers, and personnel systems such as career development system led by companies encourage individual workers to establish local and fixed (long-term) relationships, these institutional factors may be restricting the necessity which people actively interact with (diverse) others in open spaces such as coworking spaces.

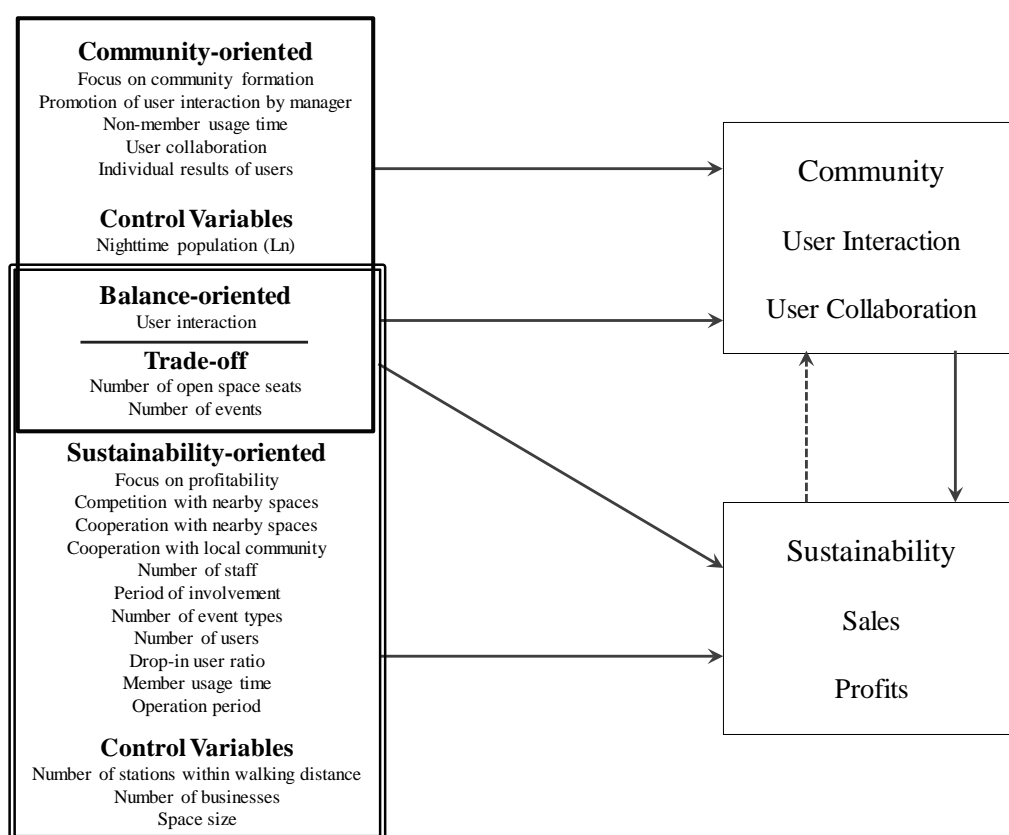


Figure 1 Influential Factors on Community and Sustainability

6. Conclusion

This study focused on factors affecting key issues of management of coworking spaces. As research that gives the basic and comprehensive picture of this phenomenon is particularly sparse, our findings based on an almost complete enumeration of Japanese spaces is considered to have a certain significance.

However, several issues still remain. One of these is that this study only goes as far as regression analysis and that it does not clarify detailed causal relationships regarding community and sustainability. It is necessary to clarify the relationships that could exist between variables that can be used simultaneously in the multiple regression analysis.

By overcoming them, we can obtain a more comprehensive and detailed understanding of coworking space management and contribute to the discussion on shared and co-creation workspaces.

Acknowledgments

Space managers of coworking spaces across the nation allocated their valuable time to participate in the questionnaire. The results in this paper form part of research supported by Grant-in-Aid for Scientific Research (B; JSPS KAKENHI Grant Number 25285110) and Grant-in-Aid for Scientific Research (C; JSPS KAKENHI Grant Numbers 26380450 and 15K03596). We would like to take this opportunity to express our gratitude.

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