The Distribution Pattern of Co-working Space in Jakarta and Determinant Factors of Consumers’ Preferences on Location Decision

Dianovita¹, Khoirunurrofik¹²
¹Urban Development Studies: School of Strategic and Global, Universitas Indonesia
²Department of Economics, Faculty of Economics and Business, Universitas Indonesia
Email: khoirunurrofik@ui.ac.id

Abstract. The growth of the creative economy and advances in information and communication technologies have led to a significant change in how space is both produced and consumed. Nowadays, people can work in a variety of locations, regardless of the space or time. This change has brought with it the need for new and flexible workspaces that allows people to collaborate, thus increasing the phenomenon of co-working space in urban areas. The purpose of this study is to identify the distribution of co-working space locations and determine the factors that influence user preferences in choosing such locations in DKI Jakarta. This study employed the nearest neighbour method and principal component analysis. The research concludes that the distribution patterns of co-working space in DKI Jakarta are clustered. The densest locations of co-working space are distributed in the central area of offices, trades, and services. Meanwhile, the factors influencing consumer preferences in choosing co-working space are location and fare factors. There is a strong relationship between the co-working space locations frequently visited and the choice of transportation types. Thus, co-working spaces that do not provide large parking areas tend to set lower rates, while their users tend to use public transportation. This implies that the government can facilitate collaboration and thus, has a strategic role to play in the development of the creative economy in the city while building strong networks with other development stakeholders in the Penta-helix.

1. Introduction
Advances in information and communication technologies as well as a shift towards different, more flexible ways of working make up the needs of modern-day workspaces, which differ from conventional offices. This need is driving the emergence of co-working space. The development of co-working space is a phenomenon occurring in major cities of the world, including Jakarta. It shows that economic activities that run based on knowledge and information and communication technology have led to significant changes in the way space is both produced and consumed [1]. One such impact has been on the way of working, especially for creative workers, who are no longer compelled to have an office but can move around more freely. The results of a study by Jones Lang LaSalle (JLL) [2], a consulting agency in the property field, indicate that there has been relatively significant growth in the amount of co-working space in DKI Jakarta. The JLL study shows a large increase in the demand for occupancy by co-working space operators located on Jalan Sudirman-Thamrin, Jalan Gatot Subroto, and Jl. HR Rasuna Said in the Central Business District (CBD) between 2017 and 2018. Even in 2017, more than 50 per cent of the office unit inventory in the CBD was occupied by two business types,
namely the technology sector (e-commerce companies and financial technology) and providers of co-working space.

Gandini [3] defined working space as a shared workspace used by various types of knowledge-based professionals, mostly freelancers, working at multiple levels of specialisation in the broad domain of the knowledge industry. Co-working space, as a forum for knowledge sharing and networks, also involves entrepreneurs and professionals. Through their involvement, it is hoped that any members of a co-working space who are launching a start-up business can be motivated and obtain help to develop their business. The emergence of co-working space as places that can facilitate collaboration between workers and start-ups can be a strategic point for spurring growth in the creative economy in DKI Jakarta. Therefore, the DKI Jakarta Government needs to formulate policies relating to co-working space as a vital arena within the framework of innovative economic development in DKI Jakarta.

DKI Jakarta, as an economic centre with availability of human resources and infrastructure, has the potential to further enhance growth in the creative economy. As a shared workspace that offers flexibility and collaboration for creative workers, co-working space can be a strategic space, working as a catalyst for the growth of the creative economy. However, research on co-working space in DKI Jakarta remains very limited as the availability of information and data on co-working space in DKI Jakarta is still low. This research is based on descriptive exploratory analysis as a starting point for further investigation. The purpose of the study is to examine the location distribution patterns of co-working space in DKI Jakarta, the characteristics of its users, and what factors influence user preferences in choosing co-working space.

2. Theoretical review

2.1. Co-working space

Creativity in the urban economy has become a widely discussed topic. Since the beginning of the twenty-first century, culture and creativity have come to be considered as the primary economic sources in urban development [4]. Research by Higgs et al [5] also shows that the creative economy contributes to increasing employment. One factor contributing to the growth of the creative economy in urban areas is the advancement of information and communication technology. Moriset [1] pointed out that the creative economy and economic digitalisation encourage major changes in the production and consumption of space and places, especially for creative work. Furthermore, it is these two elements that have led to the phenomenon of co-working space.

Potts and Waters-Lynch [6] defined co-working space as a paid-for system of shared office space that contains heterogeneous groups of workers and that is used as a workplace as well as a place to engage in social interaction and to sometimes collaborate on the achievement of common goals. Meanwhile, according to Gandini [3], co-working space is a shared workspace used by various types of professional workers, mostly casual workers, who work at various levels of specialisation in the broad domain of the knowledge industry. Thus, it can be concluded that co-working space is not only limited to office space, along with its physical facilities, but is also a space in which social interaction and collaboration can be created to encourage the productivity of its users.

Although many kinds of research have been undertaken in the context of co-working space, studies looking at its pattern of distribution remain very limited. One study that does examine the distribution patterns of co-working space is by Mariotti, Pacchi, and Di Vita [7], in the form of a journal article entitled Co-working spaces in Milan: location patterns and urban effects. From their secondary data results, Mariotti et al [7] revealed that there were 68 co-working space locations in Milan, Italy. Based on their spatial distribution and the results of interviews conducted with the owners, it was shown that the determinant factors in choosing a co-working space location in Milan were areas with a high density of business activities, proximity to universities or research centres, and the availability of functional public transportation networks. Some co-working spaces are located further away from the city centre due to the availability of more space at lower rental rates.
Two studies related to the profiles of co-working space users were by Brown [8], entitled Curating the ‘Third Place’: Co-working and the mediation of creativity, and Aempoo [9], namely Purchasing decision process for co-working spaces in Thailand. Brown’s study, which was conducted in the United Kingdom, found that the majority of co-working space users were women and university graduates. Most classified themselves as individuals, start-ups, or partnerships, and none employed other workers. The business sectors were fine arts, crafts (textile and jewellery design), graphic design, music, video, film, software, and architecture. Meanwhile, the users were motivated to use co-working space in an effort to feel more productive, professional, and to meet people who shared their ideas.

Furthermore, Aempoo’s research [9], conducted in Bangkok, Thailand, looked at the characteristics of co-working space users. The age of the co-working space users was found to be in the range of 25–34 years, and they were from private companies. The users had different incomes depending on their reason for using the co-working space, typically because they felt uncomfortable working in cafes or at home. Users initially used search engines such as Google when looking for information. The most important criteria when choosing a co-working space were identified as working atmosphere, security, internet access, and price.

2.2. Consumer preference theory

Kotler states that consumer preferences are based on whether or not they like a variety of product choices. Consumer preferences are influenced by both internal and external factors [10]. The external stimuli are product, price, location, and promotion. A product is anything that can be offered to the market to get attention and that can be bought, used, or consumed in order to satisfy wants or needs. Before designing a product, marketers must determine the benefits that it offers [11]. The benefits offered by co-working space are workspace, work support facilities, and opportunities for user collaboration.

Price is the amount of money charged to obtain products and services. Pricing usually depends on the target market for the good or service in question, the prevailing economic conditions, and the level of competition [11]. Differing slightly from products in the form of goods, service products are closely related to facilities. Promotion is the activity of communicating information from the seller to consumers or other parties with the aim of influencing attitudes and behaviour [10]. In addition to these four elements of Kotler’s marketing mix, since the provision of co-working space is a service business, then, aspects of the atmosphere or physical appearance may also play an important role. Several journals have identified various factors that influence user preferences when choosing co-working space. These include its space, design, professionalism, flexibility, location, and the benefits received by each user [12]. Meanwhile, according to Capdevila [13], the criteria to be considered are the community, location, and budget. Aempoo [9], in his thesis entitled Purchasing decision process for co-working spaces in Thailand, concludes that of the reasons for using co-working space (i.e. education, business and entertainment), security, transportation, internet, and price are considered important factors, along with the working atmosphere.

3. Research Methods

This study uses descriptive exploratory analysis to analyse and present data. A quantitative approach was employed featuring closest neighbour analysis to determine the distribution pattern of co-working space locations, combined with factor analysis to determine the factors that influence consumer/user preferences in choosing co-working space. The research locations were five administrative cities in DKI Jakarta. The location data were obtained between July and August 2018 from searches on Google Maps, websites and by phoning the co-working spaces in DKI Jakarta. A total of 105 co-working space locations were examined, 64 of which were run by a manager.

The secondary data used in this study comprise the locations of co-working space in DKI Jakarta. The data were obtained through searches on Google Maps, Instagram, and Facebook using the keyword Co-working Space. The data were subsequently checked using the websites and relevant telephone numbers on the co-working space websites. The data on the co-working space locations
were gathered until September 2018. The primary data source comprised the users of co-working space in DKI Jakarta. We gathered the user profile data and preferences from the respondents via questionnaires constructed using Google Forms and through in-depth interviews conducted directly in various co-working spaces in DKI Jakarta. The primary data collection took place between July and October 2018.

Based on the returned and completed questionnaires, it was determined that the sample used in this study comprised 120 people.

Table 1. Variables, operational definitions and measurement of variables

| No | Variable | Operational Definition | Measurement |
|----|----------|------------------------|-------------|
| 1  | Atmosphere (X1) | Physical aspects such as building design, room area and parking | X1.1 Attractive interior design  
X1.2 Attractive exterior design  
X1.3 Co-working architecture space has its own unique character/identity (has a specific theme)  
X1.4 Spacious room  
X1.5 Large parking area |
| 2  | Services (X2) | Display and quality of services provided by employees or managers | X2.1 The neat physical appearance of employees  
X2.2 Friendly employees  
X2.3 Fast service  
X2.4 Employees are willing to respond to consumer complaints  
X2.5 Employees give personal attention to each customer  
X2.6 Managers help collaborate or create networks between members and communities |
| 3  | Price (X3) | The price users must pay to obtain services | X3.1 Affordable tariff/rate  
X3.2 The rate is in line with the quality of the facilities  
X3.3 Rate is competitive with other co-working spaces |
| 4  | Products (X4) | Room facilities, work support facilities and opportunities to interact and collaborate offered to users | X4.1 There are various membership options (daily/weekly/monthly/annually)  
X4.2 There is the choice of a shared and dedicated desk  
X4.3 Routine activities to gather members and communities  
X4.4 Clean rooms and toilets  
X4.5 There are free drinks/snacks  
X4.6 There is a pantry  
X4.7 There are meeting rooms  
X4.8 There are printers/scanners  
X4.9 Incubator available for start-up businesses  
X4.10 Length of service hours (later than 7.00 PM) |
| 5  | Location (X5) | Where the co-working space is located | X5.1 Convenient location  
X5.2 Strategic location (near restaurants, supermarkets, salons)  
X5.3 Location close to residence/office/school |
| 6  | Promotion (X6) | Activity is carried out by the owners of the co-working space to attract users | X6.1 Giving an attractive price  
X6.2 Attractive discounts advertised  
X6.3 Sponsorship of activities related to the co-working community  
X6.4 Free trial |

3.1. Spatial analysis of neighbours

The co-working space distribution pattern data were processed using Nearest neighbour data analysis. According to Bintarto and Hadisumarno [14], the parameters of the nearest neighbour, or the index of the distribution of the nearest neighbour, measure the degree of similarity in reference point to random

---

1 The sample size was calculated using the Lemeshow formula, with the minimum sample defined as 96 at a 10% sampling error.
patterns. The following steps were carried out when conducting the nearest neighbour analysis. First, the boundaries of the area to be examined were determined. Second, the unit distribution pattern in the topographic map was changed to a point distribution pattern. Third, each point was accorded a serial number to make it easier to analyse. Fourth, measurement was taken of the closest distance in a straight line between one point and another; that is, to the nearest neighbour. Fifth and finally, the magnitude of the nearest neighbour parameter (T) was calculated. The average of the distances, measured between a point and its nearest neighbour, was obtained by summing all of the nearest neighbours distances and then dividing by the number of points. ArcGIS 10.3 software was used in the calculation of the nearest neighbour parameters, along with the processes of integrating graphical data (digital maps) and attributing data (location of co-working space in DKI Jakarta).

3.2. Principal component analysis

Data on the factors affecting the preferences of co-working space users were processed using the statistical method of Principal Component Analysis (PCA). PCA belongs to a class of procedures used to reduce and summarise data. Each variable is expressed as a linear combination of its underlying factors. The number of variants contributed by a variable, along with the other variables included in the analysis, is called the communality. The variations between the variables described are expressed as a few common factors, plus the unique factors for each variable [15].

Bartlett’s test of sphericity and Kaiser-Meyer-Olkin (KMO) values were used to determine the feasibility of PCA for the variables. Bartlett’s test of sphericity was used to ascertain the significant correlation between variables. The KMO index compares the degree of the observed correlation coefficient with the degree of the partial correlation coefficient. A low KMO value indicates that the correlation between pairs of variables cannot be explained by other variables and that it is not possible to undertake factor analysis. An important output of component analysis is the factor pattern matrix, which contains the coefficients used to express the standardised variables, given in factors. The factor load containing these coefficients is called the factor loading and this represents the correlation between the factors and variables. The variation between the coefficient values indicates the level of relationship between the factors or variables. The coefficient of the factor matrix can be used to interpret the factors. To facilitate the interpretation of factors, factor rotation was used as a means of facilitating the interpretation of complex factor matrices. Factor interpretation was performed subsequent to this.

4. Results and discussion

4.1. Distribution patterns of co-working space in DKI Jakarta

From the results of searches for information on location points undertaken on Google Maps, search engines, and various social media sites, including Facebook, Instagram, and Twitter, a total of 106 co-working space locations were identified in Jakarta up to September 2018. The distribution comprised 23 locations in Central Jakarta, 7 in North Jakarta, 10 in West Jakarta, 64 in South Jakarta, and 2 in East Jakarta. The co-working space locations in Central and South Jakarta were predominantly central offices, trades, and services. This finding reflects that of Mariotti et al [7] in their study on the distribution of co-working space in Milan, wherein the majority of co-working space locations are in crowded business centres with good access to a local public transportation network. Figure 1 shows the distribution of the areas with the most co-working space locations in South Jakarta and Jakarta. The most populous locations in South Jakarta are the areas of Kuningan, Sudirman, and Kebayoran Baru. As for Central Jakarta, the most populous locations are the Thamrin and Menteng areas. This shows that the number of co-working space locations is not directly proportional to the population of city administration in DKI Jakarta but rather is related to the amount of tertiary GRDP based on city administration.

Based on the nearest neighbour analysis results obtained using ArcGIS 10.3 software, the distribution of co-working space in Jakarta is in a clumped pattern (clustered), as shown by the p-value
of 0.0000, the Z-score of -8.186578, and the Nearest Neighbour Ratio (T) equal to 0.590119, thus close to 0. The distribution pattern of co-working spaces reveals that they are in groups, and those in the city centre displayed a similar pattern to conventional office spaces. However, from the interviews with the owners of co-working spaces, they admitted that proximity between co-working space and other offices is not a consideration when choosing a location; indeed, proximity to co-working space or other offices does not affect them and they make neither a profit nor a loss from such proximity. Even the owners of co-working spaces located outside South Jakarta and Central Jakarta admit that they deliberately avoid locations that already contain a lot of co-working space because they feel the competition is tougher.

![Figure 1. Distribution of co-working space locations in DKI Jakarta](image)

The co-working space locations in Central and South Jakarta were predominantly for central offices, trades and, services. This is in line with the finding from Mariotti et al [7], where the majority of co-working spaces were located in a crowded business centre with good access to the local public transportation network. A pattern of distribution that reveals a clustering in the city centre or CBD closely reflects that of Mun and Hutchinson [16] from their study in Toronto. Offices tend to cluster in groups or form agglomerations in the city centre because of the need for face-to-face interaction and communication between companies. The closer to the city centre, the greater the effect in terms of increasing productivity. As a point of difference between the results of this study and those of Mariotti et al [7], the proximity of co-working space to a campus or research institute is not a consideration for owners of co-working space in Jakarta when selecting a location. Based on interviews with 17 owners and representatives, only two owners viewed a campus as a potential market for business co-working space; the remainder argued otherwise. They did not consider proximity to a campus or educational institution to be important because they saw existing campuses as providing space and Wi-Fi facilities for their students, combined with the fact that the students did not yet understand co-working space. This came despite the fact that many of the co-working spaces in DKI Jakarta provide special rates for students. However, some co-working spaces were found to be targeting campuses as a potential market as students were beginning to demonstrate an interest in having a business.

4.2. Characteristics and preferences of co-working space users in DKI Jakarta

Based on the survey data, the 120 co-working space user respondents had the following characteristics. The co-working space users in the 15–24 age range were dominated by students. Meanwhile, individuals aged 25–34 were dominant among the respondents who worked as freelancers and novice business owners. Statistically, there is statistically associative relationship between the work status and age of the respondents. Meanwhile, based on level of income, students or college
students were the dominant group among the respondents with an income of less than Rp 3,000,000. While start-up business owners and employees comprised the dominant group among respondents with an income of more than Rp7,000,000; in addition, there is a statistically associative relationship between the type of work and the level of income of the co-working space user respondents. The majority of the respondents using co-working space will most frequently visit co-working spaces that are located in the same area as their residence, which was the case for respondents living in South, Central, and West Jakarta. Furthermore, a statistically associative relationship was found between the locations of frequently visited co-working spaces and the choice of transportation type. The co-working space user respondents who did not have access to large parking areas and low rates tended to use public transportation.

Based on scrutiny of the main component analysis comprising 31 variables that affect user preferences for co-working space, a total of 9 new factors were generated, as seen in the values of the loading factors that were rotated using the varimax method. These factors contain variables that have a strong correlation. The loading factor value selected is more than 0.5 as this is considered capable of explaining the variables that affect user preferences in choosing co-working space. The new factors developed later were labelled or named according to their eigenvalue as follows:

1. Location and fare consist of a location close to the home/school/office, a tariff in line with the service, strategic location, discounted, affordable rates, location within easy reach, and a clean room and toilets. Location and fare factors are related to the operational costs incurred by workers in the co-working space. According to Landry and Bianchini [17], in order to support the creative economy, affordable places (e.g. rooms or buildings) need to be close to public facilities and act as a base for creative workers. Affordable places reduce the financial burden on novice business people.
2. Facilities that support work comprise an available pantry, the availability of meeting rooms, availability of a printer/scaner, and long service hours.
3. Employee services consist of employee responsiveness to consumer complaints, quick service from employees, and friendly employees.
4. Promotion consists of co-working sponsorship activities, free trials, ad attractiveness, the provision of a business incubator, and competitive rates. As a method of communication used by the owner, promotion is still needed, especially with the increase in the number of co-working spaces in DKI Jakarta. Promotion enables potential customers to find out about the uniqueness of each co-working space and the facilities offered.
5. Design consists of the exterior design, interior design, and unique architecture. The design of co-working space is very important because it can affect the work atmosphere, which in turn affects productivity.
6. Social interaction and collaboration consist of a manager to aid collaboration between members, employees giving their personal attention, and their routine activities. The elements of social interaction and collaboration serve to differentiate co-working space from conventional offices.
7. Choice of facilities consists of membership options and the choices of table. Creative workers and novice business people choose to work in a co-working space partly due to the flexible rental periods on offer and also because of the desks available for work.
8. Neatness comprises neatly dressed employees.
9. Parking area: Based on the data profiles of the co-working space user respondents, some use private vehicles to travel to the co-working space and thus, parking areas are essential.

5. Conclusions and recommendations
The location of the densest distribution of co-working space in DKI Jakarta is in the central offices, trade and services in South and Central Jakarta, namely in Kuningan, Sudirman, Thamrin, Kebayoran Baru, and Menteng. Based on the calculations using nearest neighbour analysis, the location of co-working space in DKI Jakarta displays a cluster distribution pattern, especially in crowded business centres with good local public transportation networks. However, this grouping occurred
unintentionally as an agglomeration process, although it is more attributable to the availability of space in the location, in addition to considering easy access to public transportation and approaching consumers in the business area. This study identifies nine factors that influence user preferences in choosing a co-working space according to their level of preference, namely location and fare, work support facilities, employee services, promotion, design, social interaction, choice of facilities, neatness, and large parking areas. Location and fare are the most influential and may serve as the main considerations for owners in choosing a co-working space location.

Given the fact that co-working space can facilitate collaboration and it plays a strategic role in the development of the creative economy, the DKI Jakarta Government can strengthen the rapidly growing network of co-working space in DKI Jakarta. Indeed, it would be possible for the government to work together with the owners of co-working space and campuses to run entrepreneurship programmes without having to create their own co-working space. The DKI Jakarta Government can also involve the private sector which can support the funding of start-ups, media, and civil society organisations, as part of what is more commonly referred to as the Penta-helix.

References
[1] Moriset B 2014, January Building new places of the creative economy. The rise of coworking spaces (Paper presented at the 2nd Geography of Innovation International Conference 2014, Utrecht University, Utrecht)
[2] Jones Lang LaSalle 2018 Jakarta Property Market Review Quarter 1 sampai Quarter 3 Tahun 2018
[3] Gandini A 2015 The rise of coworking spaces: A literature review Ephemera: Theory and Politics in Organization 15(1) 193-205
[4] Merkel J 2015 Coworking in the city Journal Ephemera 15(1) 121-139
[5] Higgs L P, Cunningham S D and Bakhshi H 2008 Beyond the creative industries: Mapping the creative economy in the United Kingdom (London: NESTA)
[6] Potts J and Waters-Lynch J 2016 The social economy of coworking spaces: A focal point model of coordination Review of Social Economy 75(4) 1-17
[7] Mariotti I, Pacchi C and Di Vita S 2017 Coworking spaces in Milan: Location patterns and urban effects Journal of Urban Technology 24 47-66
[8] Brown J 2017 Curating the “Third Place”? Coworking and the mediation of creativity Geoforum 82 112-126
[9] Aempoo M U 2016 Purchasing Decision Process For Co-Working Spaces In Thailand (Doctoral Dissertation, Thammasat University, Thailand)
[10] Kotler P 2000 Manajemen pemasaran: Analisis, perencanaan, implementasi, dan kontrol (New Jersey: Prentice-Hall International, Inc)
[11] Kotler P and Armstrong G 1997 Dasar-Dasar Pemasaran Jilid 1, translated by Alexander Sindoro (Jakarta: Prenhallindo)
[12] Spinuzzi C 2012 Working alone together: Coworking as emergent collaborative activity Journal of Business and Technical Communication 26(4) 399-441
[13] Capdevila I 2015 Co-working Spaces and The Localized Dynamics of Innovation in Barcelona. International Journal of Innovation Management 19(3)
[14] Bintarto R and Hadisumarno S 1991 Metode Analisa Geografi (Jakarta: Penerbit LP3ES)
[15] Hair J F, Black W C, Babin B J, Anderson R E and Tatham R L 2009 Multivariate data analysis (New Jersey: Pearson, Prentice-Hall)
[16] Mun S and Hutchinson B G 1995 Empirical Analysis of Office Rent and Agglomeration Economies: A Case Study of Toronto Journal of Regional Science 35(3) 437–456
[17] Landry C and Bianchini F 1995 The creative city (London: DEMOS)