
BUILDING AND DEVELOPING A RESILIENT COMMUNITY THROUGH CO-WORKING SPACE DESIGN: CIRCULAR ECONOMY TO CIRCULAR SPACE

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ABSTRACT

In the face of challenges affecting society, such as the Covid-19 pandemic, there are negative impacts on social and economic infrastructure, including the labor sector. The response to community vulnerability to disruption is a critical concern that requires resolution. This design-based research aims to provide insights to create and enhance resilient communities through the design of co-working spaces, grounded in sustainable economic principles. Using an exploratory study, problems were identified, and solutions were generated through SWOT and PESTEL analysis. The proposed solutions, involving programs, control measures, architectural considerations, and financial models, were tested through an economic feasibility test approach. The results show that it is possible to implement a sustainable economy in the design of co-working spaces, depending on support from the government and private sectors. Three key aspects—research and development, socio-economic empowerment, and environmental waste management—were formulated to implement the concept, tailored to the potential in each location, using the Covid-19 situation as an illustrative example for future learning and preparedness.

KEYWORDS: resilience, community, co-working space, circular economy, research-based design

Dalam menghadapi berbagai tantangan yang memengaruhi masyarakat, contohnya pada pandemi Covid-19, terdapat dampak negatif terhadap infrastruktur sosial dan ekonomi, termasuk sektor ketenagakerjaan. Respons terhadap kerentanan masyarakat terhadap gangguan menjadi perhatian kritis yang membutuhkan penyelesaian. Penelitian berbasis desain ini bertujuan untuk memberikan wawasan guna menciptakan dan meningkatkan komunitas yang tangguh melalui desain ruang kerja bersama, yang berlandaskan pada prinsip ekonomi berkelanjutan. Dengan menggunakan studi eksploratif, permasalahan diidentifikasi, dan solusi dihasilkan melalui analisis SWOT dan PESTEL. Solusi yang diusulkan, melibatkan program, langkah pengendalian, pertimbangan arsitektur, dan model keuangan, diujikan melalui pendekatan uji kelayakan ekonomi. Hasil penelitian menunjukkan bahwa penerapan ekonomi berkelanjutan dalam desain co-working space adalah memungkinkan untuk dilakukan, bergantung pada dukungan dari sektor pemerintah dan swasta. Tiga aspek kunci—riset dan pengembangan, pemberdayaan sosial-ekonomi, dan pengelolaan limbah lingkungan—dirumuskan untuk menerapkan konsep tersebut, disesuaikan dengan potensi di setiap lokasi, dengan menggunakan situasi Covid-19 sebagai contoh ilustratif untuk pembelajaran dan kesiapsiagaan di masa depan.

KATA KUNCI: ketangguhan, komunitas, co-working space, ekonomi sirkular, desain berbasis penelitian

INTRODUCTION

The global crisis has emerged as a major focal point for various stakeholders worldwide, as seen in the recent Covid-19 pandemic situation. The Corona Virus Disease/Covid-19 pandemic has become a significant concern by all parties around the world. Since its initial appearance at the end of December 2019, this virus has spread globally, including in Indonesia, officially announced in March 2020 and continues today (Yuliana, 2020; Sukur et al, 2020). All sectors have been adversely affected by this situation, including social and economic infrastructure, the employment sector. Among 2,175,928 affected workers, most of them are temporarily laid-off workers, which is 53.11%, followed by informal workers who are affected/bankrupt/lost their business by 29.11% and laid-off workers around 17.78% (Kementerian Ketenagakerjaan RI, 2021; Badan Pusat Statistik, 2020). Based on the distribution of regions, West Java Province is the domicile of most workers affected by the Covid-19 pandemic, which is around 16.76% of the total recorded affected workers and is dominated by those who live in urban areas at 75.88% (Kementerian Ketenagakerjaan RI, 2021).

Bandung city is one of the cities in West Java with relatively large unemployment due to the pandemic. Bandung City Government, through the Bandung City Manpower Service (Disnaker), managed to record as many as 3,396 people experiencing layoffs (PHK) and 5,804 people being temporarily laid off, with a total of 9,200 people or 8.16% of the total workforce in Bandung being open unemployment (Dinas Tenaga Kerja (Disnaker) Kota Bandung, 2020). Therefore, the Bandung City Government prepared a social safety net, and there were 389,724 KPM (Beneficiary Families) (Gubernur Jawa Barat, 2020; Humas Kota Bandung, 2020). This number is relatively small compared to population data and actual field data related to the socio-economic impact of the Covid-19 pandemic. This pandemic continues until now in July 2021. The spread is increasingly widespread in the second wave with various new virus variants. Therefore, this social and economic problem needs to be solved.

Although this situation could end soon, other potential disasters are still possible due to the pandemic. The Covid-19 pandemic reminds us that social capital plays an essential role in creating community preparedness and resilience. Towards Adaptation of New Habits, to restore the community's economy and increase social capital that becomes the center of economic empowerment and community creativity requires collaboration spaces. One of these collaboration spaces can be in the form of a co-working space. This co-working should build a resilient

community, improve the creative economy, and respond to the Covid-19 pandemic.

Co-working space has a function to provide and create a workspace that supports collaboration, participation, openness, innovation, flexibility, sharing of tools, knowledge, and experiences (Garrett, Spreitzer, & Bacevice, 2017). According to a study conducted by Gretchen Spreitzer, Peter Bacevice, and Lyndon Garrett of the Harvard Business Review, people who work in co-working spaces have growth rates close to the average of 6 on a 7-point scale (Spreitzer, Bacevice, & Garrett, 2015). This score is one point higher than the average for employees working in a regular office (Advertorial, 2018). Therefore, the co-working space must orient to building and developing a resilient community. When referring to the Sustainable Development Goals (SDGs), social and economic considerations are incomplete without environmental aspects. Environmental aspects also become very important in mutual sustainability in the future (Ramadhan & Alprianti, 2017; Ramadhan et al, 2019). Therefore, it is necessary to have a concept that can accommodate these three aspects in designing a co-working space: the circular economy concept (Marchesi & Tweed, 2021).

The circular economy is an alternative to the traditional linear economy (create, use, dispose of). It keeps resources as long as possible by extracting maximum value from use, then recovering and regenerating products and materials at the end of each service life (Geissdoerfer et al, 2017). A circular economy is a systemic change that builds long-term resilience, generates business and economic opportunities, and delivers environmental and social benefits (Morea, Fortunati, & Martiniello, 2021; Van der Velden, 2021). The European Union Parliament noted that through this system, European companies saved 600 billion euros, equivalent to 8% of their annual profits, and at the same time, they reduced gas emissions by 2.4% (European Commission, 2021). Because the world has only reached 9.1% circularity, new business opportunities to transform 90.9% of the world's economy are still wide open. In Indonesia, it is clear that the proportion of circularity is still far below 9%, so business opportunities are wide open (Circle Economy, 2019). Therefore, applying the circular economy concept in co-working space can be applied to resolve current issues.

This design-based research article will describe the proposed co-working space design that can create a responsible entrepreneurial ecosystem with the spirit of collectivity and collaboration. So that this co-working space can become a forum for the independence and resilience of the local community; support the activation and strengthening of creative economy networks, including SMEs and creative communities, in carrying out their activities related to

EKRAF (creative economy), food security, and community empowerment; as well as shared spaces that are sensitive to pandemics, especially the Covid-19 pandemic. This design will implement the big concept of the circular economy. This design-based research can provide ideas for building and developing a resilient community through co-working space design in the future.

RESEARCH METHODS

This study employs design-based research as its methodology, integrating interdisciplinary elements from fields like architecture, civil engineering, economics, anthropology, and community studies. In addition, an exploratory study is utilized to pinpoint issues and propose design solutions. The initial phase involves preliminary research and community interviews to identify problems, while the subsequent stage formulates solutions in the form of design-based research, encompassing ideas, programs, control plans, visual representations of buildings, and financing schemes.

The identification of issues involves employing both SWOT analysis (focusing on strengths, weaknesses, opportunities, and threats) and PESTEL analysis (examining political, economic, socio-cultural, technological, environmental, and legal factors). Concurrently, an economic feasibility assessment is conducted using metrics such as NPV (Net Present Value), ROI (Return on Investment), Payback Period, and Benefit-Cost Ratio (BCR) to evaluate programs, control plans, buildings, and financing schemes.

The design-based research process encompasses several steps, including: 1) recognizing problems at the location and within the target community through observation and interviews; 2) exploring potential design solutions through theoretical studies and secondary data; 3) analyzing problem data with SWOT and PESTEL analyses; 4) formulating ideas, program plans, financing, and control schemes; 5) synthesizing all findings into a cohesive design; 6) subjecting the project to an economic feasibility test. This stage aligns with the design thinking framework, involving understanding, defining, ideating, prototyping, and testing.

Study Location

This location is on Jl. Terong, Malabar Village, Lengkong Regency, Bandung City, West Java. The location chosen is a green open space area from a reasonably dense settlement in the urban area of Bandung (Figure 1) (Ramadhan et al, 2018). This sub-district is one of the sub-districts that has felt the negative socio-economic impacts, especially the layoffs of workers. Therefore, the selection of this

location is expected to be suitable for areas in the city that have relatively similar conditions.



Figure 1. (a) Site Map; (b) Site Potential

There are various potential sites that will be maintained and further optimized. At this site the various potentials include

1. Open field and greenhouse.
2. Multipurpose Building for communal activities of residents.
3. Potential most interesting point of view.
4. Children's playground in the southeast of the location.

RESULTS AND DISCUSSION

Problems and Potentials: SWOT and PESTEL Analysis

This section will identify in detail and in-depth related problems and development potentials through SWOT and PESTEL analysis on developing locations and issues. This model can be repeated in different contexts with certain adjustments.

1. SWOT Analysis

The following table 1 presents SWOT analyses conducted at the study sites, derived from field observations, examinations of government documents, and interviews:

Table 1. SWOT Analysis

No	SWOT	Analysis
1	Strength	Lengkong District has a pilot village for the implementation of Kang Pisman (Waste Management Program) in RW.05 Kel. Malabar;
		Cijagra District is the best district in West Java that has implemented innovations in government and the environment
		Lengkong District has 225 MSMEs, two of which are well established in implementing a circular economy.
2	Weakness	Lengkong District does not have a Waste Disposal Site (TPS)
		In RW 09, Malabar Village, the location of Taman Terong, there are no youth activities.
3	Opportunities	There is the use of organic waste which is converted into energy by using a biodigester.
		There is an urban farming area managed by a group of women.
		Lengkong District has 225 MSMEs, two of which are well established in implementing a circular economy.
		The development of research and technology related to waste management for business opportunities that are more environmentally responsible.
4	Threat	As a residential neighborhood park, it is not suitable to be used as a Co-Working Space with various functions and is visited by too many people at one time.
		Co-Working activities that exceed the capacity can disrupt the environmental order of RW 09 Kelurahan Malabar
		Potential conflicts of interest in the management of Co-working space.

2. PESTEL Analysis

PESTEL analysis in table below is used to identify external factors that affect a place. PESTEL analysis is include several analysis such as political, economic, socio-cultural, technology, environment, and legal aspects.

Based on political anaysis in Table 2, the development of the Terong Park as a Co-working space is in synergy with the regional development strategy, the Priority Program for the Head of the Bandung City Region contained in the 2018-2023 RPJMD and the vision of the Lengkong District.

Table 2. Political Analysis

No	PESTEL	Analysis
1	Political	The Priority Program for the Head of Bandung City, point 16, is to build Centers for Economic Empowerment and Community Creativity per sub-district in Bandung City Regulation 3/2019 concerning RPJMD 2018-2023 (Wali Kota Bandung, 2019).
		The existence of the Kang Pisman program with a total of 65 waste banks, with 8689 customers in 143 waste-free areas spread over 30 sub-districts (Hafil, 2019).
		The vision of Lengkong District is "SPIRIT" namely, clean, healthy, prosperous, safe, comfortable, active, religious, and orderly (Badan Pusat Statistik, 2019).

Table 3. Economic Analysis

No	PESTEL	Analysis
2	Economic	More than 6.36 million people of working age have been affected by Covid-19. Consists of unemployed (0.70 million people), not the labor force (BAK) (0.16 million people), temporarily not working (0.40 million people), and working with reduced working hours (5.10 million people) in Official Statistical News No. 62/11/32/Th.XXII, 5 November 2020 (BPS Provinsi Jawa Barat, 2020).
		The economic growth rate continued to decline to -4.08 in the 3rd Quarter of 2020 in Official Statistical News No. 62/11/32/Th.XXII, 5 November 2020 (BPS Provinsi Jawa Barat, 2020).
		More than 8.9 million entrepreneurs, 10% need co-working space to run a business (Sitti Nur Haliza, 2019).
		56% of MSMEs are in bad shape during the pandemic (Setyowati, 2020) in Katadata Insight Center (2020) Survey Findings of 206 MSME Entrepreneurs.
		There are 2722 business units in Bandung, consisting of handicrafts (711), food (512), metals and electronics (222), chemicals and building materials (36), and clothing (1237).
		There are 225 MSMEs and 201 Cooperatives in Lengkong District

The second analysis is economic aspect in Table 3. The data illustrates the significant impact of the Covid-19 pandemic on the economy, particularly in West Java Province and the Bandung region. More than 6.36 million working-age individuals are affected, including those unemployed, not in the labor force, temporarily out of work, and those working reduced hours. Economic growth has declined to -4.08 in the third quarter of 2020. Additionally, over 8.9 million entrepreneurs are impacted, with 10% of them needing co-working spaces to operate their businesses. Approximately 56% of MSMEs are struggling during the pandemic. The data also outlines the business profile in Bandung with 2,722 business units, predominantly in crafts, food, metals and electronics, chemicals and building materials, and clothing sectors. In Lengkong District, there are 225 MSMEs and 201 cooperatives. With the existence of a co-working space, it is hoped that it will foster an entrepreneurial climate again, both with the spirit of collaboration and network strengthening.

Table 4. Socio-cultural Analysis

No	PESTEL	Analysis
3	Socio-cultural	The population density in Lengkong District is 11,950 people/km with 64,374 residents (Badan Pusat Statistik, 2019).
		Pay the school can use the trash at SMA Kemala Bhayangkara (websiteykb, 2020).
		Complaints related to debt from moneylenders increased by 20% (Deni, 2020). There were 5000 new divorce cases during the pandemic in the city of Bandung (Septianto, 2020).

Based on socio cultural analysis in Table 4, the development of the Terong Park is not only directed to accommodate the activities of park visitors in general and local residents in particular but also becomes a means of improving social problems in the environment.

Based on technology analysis in Table 5, The development of the Terong Park as an area that utilizes technology (IoT, website, and Wifi) in creating traffic, branding, and an integrated ecosystem.

Table 5. Technology Analysis

No	PESTEL	Analysis
4	Technology	Siloka and SiPat are information systems where people can get online community administration services. The technology has been applied in Cijagra Village, Lengkong District (MC Kota Bandung, 2019). Provision of a free internet cafe for students taking PJJ at Overtime Tohaga Lodaya RW 09 Jalan Turangga Timur,

No	PESTEL	Analysis
		Lingkar Selatan Village, Lengkong District (Tim PRMN 02, 2020). The increase in online shopping activity reached 42% during the pandemic based on 31% of respondents. This phenomenon encourages many local SME brands to create their own websites (Kaukab, 2020). The number of connected IoT devices in Indonesia will reach 25 billion by 2020. The IoT market in Indonesia in 2022, will consist of content and applications, platforms, IoT devices, and networks and gateways (Direktorat Industri Elektronika dan Telematika & Direktorat Jenderal ILMATE - Kementerian Perindustrian R.I., 2019).

Environmental issues resulted from Table 6, especially regarding waste issues, are very crucial. Co-working space needs to respond as a charge in program management in Co-Working. The goal is to solve the waste problem. On the other hand, innovation in waste management is growing quite rapidly so it needs to be accommodated. This also opens up opportunities for new businesses to emerge in waste management.

Table 6. Environment Analysis

No	PESTEL	Analysis
5	Environment	Lengkong sub-district lacks green open space as much as 100.78 ha and requires 118 ha (Dinas Komunikasi dan Informatika Kota Bandung & Universitas Padjadjaran, 2019). The percentage of waste production is dominated by 63% organic waste, 23% recycling, 14% B3 (Istanto, Apsari, & Gutama, 2021).
		The daily waste production of Lengkong sub-district reaches 1500 tons/day or equivalent to 0.6 kg of waste/person. 1200-1400 tons The waste is disposed of at the Srimukti TPA with a transportation cost of Rp.600,000/ton (Diskominfo Kota Bandung, 2016).

The result of legal analysis in Table 7 that various legal instruments are legal certainty related to development plans in accordance with international, national and regional regulations. The development of the Terong Park as an area that accommodates existing problems and utilizes local regulations to empower MSMEs and the environment.

Table 7. Legal Analysis

No	PESTEL	Analysis
		Implementation of SDG points 11 and 12 related to sustainable cities and settlements and responsible consumption and production
		PP RI No. 81/2012 concerning the management of household waste and similar household waste (Presiden Republik Indonesia, 2012).
		LHK Candy NO. P75/2019 Regarding Waste Reduction Roadmap by Producers (Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia, 2019).
		Bandung City Regulation No.09/2011 concerning Waste Management (Walikota Bandung, 2011).
6	Legal	Bandung City Regulation No.17/2012 concerning Reducing the Use of Plastic Bags (Walikota Bandung, 2012).
		Bandung City Regulation No. 10/2015 concerning Detailed Spatial Planning and Zoning Regulations for Bandung City 2015-2023 (Walikota Bandung, 2015).
		Perwal Bandung No. 1394/2016 concerning Position, Organizational Structure, Duties and Functions and Work Procedures of the Office of Cooperatives for Micro, Small and Medium Enterprises in the City of Bandung (Walikota Bandung, 2016).
		Bandung City Regulation No. 3 /2019 concerning RPJMD 2018 – 2023 (Wali Kota Bandung, 2019).

Ideas, Program Plan, and Design

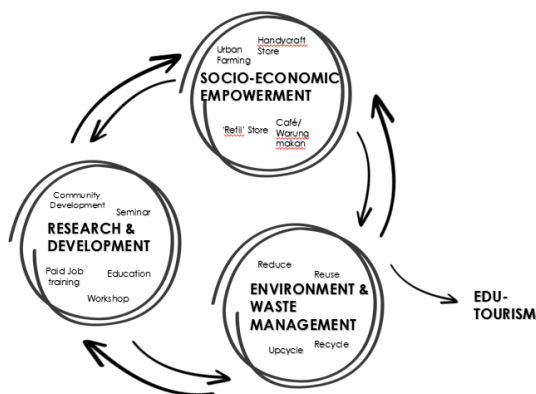


Figure 2. Three Aspect of Circular Economy Ideas from SWOT and PESTEL studies.

Based on the SWOT and PESTEL studies, more in-depth ideas are formulated to solve these problems. The idea formulated combines research and development, economic empowerment, and environmental & waste management. These three aspects are interconnected with each other, like the working process of a circular economy. In addition to these three aspects, gradually implemented, it can become education tourism for the

community. It is helpful as education and extension of the idea itself to the broader community in different contexts. This idea is the basis for the preparation of a more detailed program plan. This idea is also used to develop a space program in a building. This idea is schematically depicted in Figure 2.

In detail, the meaning of the three main focuses and their derivative programs are as follows:

1. Research and Development

Table 8. Research and Development Programs, Aims, and Facilities

No	Program	Aim
1	Seminar on the results of research and innovation in the environmental field	Publish findings to the public at large To record new findings created by the community for the benefit of program development
2	Waste Recycling Workshop	Add value to goods Increase community capacity Opening business opportunities
3	Technology Utilization Workshop	Encouraging the community to use renewable technology in overcoming the waste problem
4	Community development	Facilitating community ideas and creativity to create innovation Encouraging capacity building
5	Workshop on entrepreneurship and the application of circular economy	Encouraging the formation of new entrepreneurs who are more environmentally responsible Learn directly about MSME activities
6	MSME Internship	Understanding the opportunities and challenges in running an MSME business

Facilities:

- Auditorium for seminar and FGD
- Auditorium for workshop research and development
- Co-working space room
- E-conference room
- Rent office
- Meeting Room
- Multipurpose open space
- Display area for product exhibition
- Podcast room
- Photo studio room

The development of research and technology in waste management innovation and alternative energy is considered quite significant. The presence of the Co-working space is expected to build an ecosystem as a medium for publishing findings, exchanging information, education, training, sources of income so that these findings can be utilized as much as possible for mutual welfare and building family resilience. The programs, aims, and facilities of research and development focus are in the following Table 8.

2. Socio-economic Empowerment

Table 9. Socio-economic Empowerment Programs, Aims, and Facilities

No	Program	Aim
	Fostering MSMEs Synergy with regional programs and 10 PKK Pokjas	
	Socialization of the application of the circular economy	Improving the quality of MSME resources and products Building a more responsible and sustainable business climate
1	Digital marketing training	Increasing the capacity of MSME actors Helping the promotion and development of SMEs
	Green packaging training	Reduce the use of single-use plastic packaging
	Production waste management training	Building a more responsible business climate Open up opportunities to increase income
	Product branding training	Strengthen product identity so that it is better known
2	Forming an urban farmer group (urban farming) in synergy with the regional program and Pokja (food) PKK	Meet nutritional needs Reduce expenses and increase income Building urban food security Synergy of municipal and regional government programs
3	Build an eco-friendly Bulk store/grocery store	Reducing plastic packaging waste from household products Meet household needs Facilitate the marketing of environmentally friendly MSME products
	Setting up a food business	
4	Canteen	Meeting the food and drink needs for co-working space users Implementing environmentally friendly cafe management Empowering urban and rural farmer groups in Cekungan Bandung as suppliers Using Biodigester to cook food Educate customers to always spend food by giving rewards

No	Program	Aim
		Distributing food/foodstuffs
	Cloud Kitchen (deposit and delivery of food or groceries)	Efficiency of movement of people and fuel Reduce the use of single-use plastic packaging
5	Citizens' bazaar	Facilitate the marketing of MSME/Urban Farming products Providing basic food/meat at affordable prices obtained directly from suppliers in order to improve family nutrition Social space for citizen interaction and strengthening social capital
6	Friday alms or charity	Collecting donations from the community can be in the form of money, food ingredients and even waste (converted to money) to be managed together into food that is ready to be distributed
7	English Club	Synergy of community programs in RW 09 Malabar
8	Facilitate programs for RW 09 Malabar, TPP PKK, Youth Organizations, LPM, etc	Provide space facilities that can be activated responsibly Program and network assistance
9	Educational Tour	Make educational tour packages by visiting industries/institutions engaged in waste management and environmentally friendly lifestyle Providing alternative travel experiences that can add insight and inspire tourists of all ages and circles Environmentally friendly lifestyle education

Facilities:

- Auditorium for workshop research and development
- Urban farming area
- Canteen for merchandise and book store
- Kitchen
- Canteen
- Juice Bar
- Multi-purpose open space
- Sport field
- Display
- Amphiteater
- Green open space

The principle of this focus is to build a business for the common good managed independently and implement a circular economy. In addition, this business focuses on community empowerment and raises the potential of MSMEs in the surrounding community. Thus, the community becomes the leading actor in running this business. Table 9 show the socio-economic empowerment programs, aims, and facilities.

3. Environment and Waste Management

Table 10. Environment and Waste Management Programs, Aims, and Facilities

No	Program	Aim
1	Socialize the Kang Pisman Program and <i>buruan SAE</i>	Synergy of municipal and regional government programs
		Education for reducing, sorting and utilizing waste
2	Integrated waste management	Reducing waste and sorting from the scale of homes, offices and business units
		Segregated waste transportation
		Collecting garbage at TPS separately
		Distributing waste to waste management companies
3	Workshop on making composter tools	Get cashback in the form of money or recycled goods that can be given back to the community
		Overcoming household-scale food waste
4	Workshop for making household-scale integrated trash cans	The compost can be used for urban farming or sold
		Managing waste sorting from household-scale
		Ensure that the waste that is disposed of is properly segregated
Facilities:		
<ul style="list-style-type: none"> • Auditorium for socialization • Auditorium for workshop research and development • Amphiteater • Multi-purpose open space • Trash rack area 		

A waste management business that offers an integrated system in overcoming waste problems in Lengkong Regency. The management is categorized as a waste cooperative because waste from the community will be collected, managed independently, distributed to waste management companies, and the profits are returned to the community and can be replayed for joint venture capital. Table 10 show the environment and waste management programs, aims, and facilities.

After the programs have been compiled as derivatives of ideas, it is necessary to synthesize all the problems, concepts, and analyses that have been carried out. Synthesis in building and landscape designs that can accommodate these activities becomes the final output of problem-solving. The

required building must be in synergy with the specified objectives.

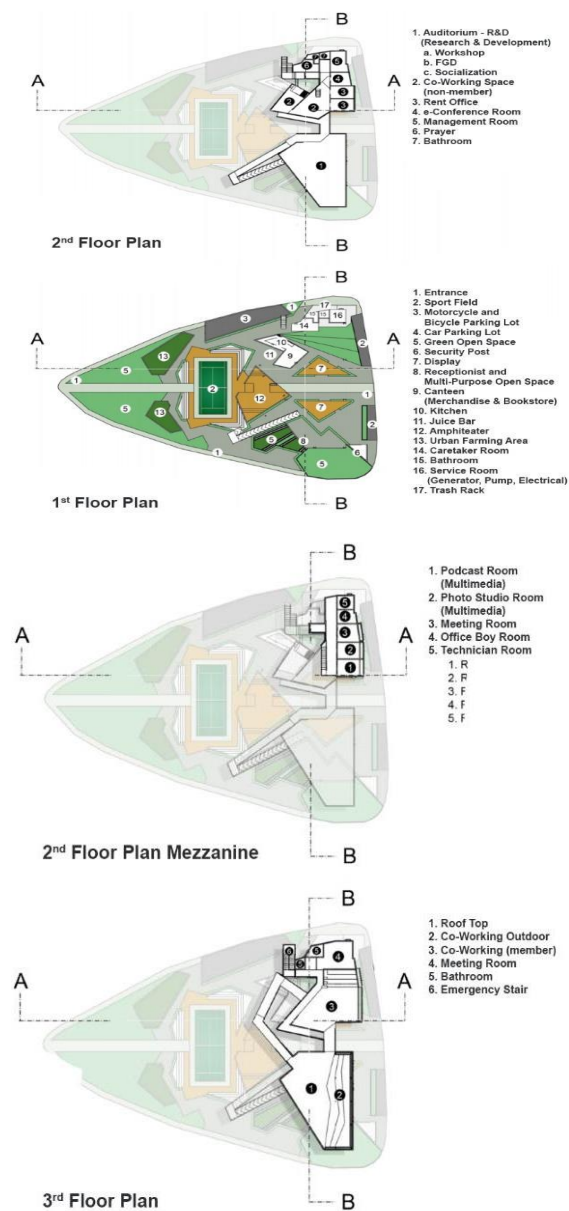


Figure 3. Circular Space Plan

This building consists of three floors (Figure 3). The spaces in the designed building are determined based on social, economic, and environmental needs in the co-working space. In addition, adjustments to space and activities that are relevant to current and future technologies are included. The following are some implementations of space in building and landscape that accommodate functions in achieving circular economic activities, including

1. The first floor is for communal, massive activities that are different and social can be done here. Some of the spaces provided include green open spaces, sports fields, amphiteater, and multipurpose open spaces. There is space for

economic and environmental activities such as urban farming, canteen, juice bar, display, and trash rack on this floor;

2. Main functions such as research and development for workshops, FGD, and socialization are on the second floor. Apart from that, rooms with other main activities include co-working spaces, rent offices, e-conference rooms, management rooms, others. There is a mezzanine on the 2nd floor which provides a podcast room, photo studio, meetings, and more;
3. The third floor is primarily dedicated to co-working activities, offering both indoor and outdoor spaces. Additionally, it features a rooftop area and a meeting room that can be utilized for various purposes such as team meetings, brainstorming sessions, client presentations, and networking events.

Taman terong or eggplant garden is an axis between residential areas which is the focal point of the residents' point of view when leaving the house. There are imaginary areas or planes formed from the human eye's perspective that form the pivot angles. It became the idea of creating the form of the building period with the midsize co-working space typology. By combining four points of view or pivots from each cardinal direction, compulsory fields are created with different spatial functions with different spatial characters.

The presence of the axis also represents the relation of the building to the direction of human view as an unobstructed line and the entrance of the four directions, namely east, west, north, south. This circulation also represents the circular concept in a circular economy that continues to interact with each other in it. Therefore, the big theme in this building is Circular Space (Figure 4).



Figure 4. Circular Space Design

Financial Scheme and Economic Feasibility Study

The financing scheme can be determined based on the level of involvement. Therefore, this scheme is

obtained from various sources with the following assumptions (Table 11):

1. Public-Private Partnership (“PPP”) or Government and Business Entity Cooperation is a public infrastructure provision scheme that involves the role of the private sector.
2. In this project, the method used is the DBF method, where the operation and ownership are with the government.
3. For its operation, a cooperative is formed that involves the participation of citizens in managing the Co-Working Space.

Table 11. Level of Private Involvement

Item	Bid/build	Design/build	Design/build/finance	Design/build/finance/operate/maintain
Research/Study		G	G	G
Project Design	G	P		
Project Funding		G	P	
Construction	P	P		P
Operational/Maintenance	G	G	G	
Owner ship				G

P: Private sector, G: Government

(Source: Sabol & Puentes, 2014)

The structure ratio of investment funding by CSR and the private sector is planned to distribute 90% for CSR and 10% for the private sector (see Figure 5). The costs are divided for physical construction, legality, renovation, facilities, operation for CSR. As for the private sector, the focus is on infrastructure renovation (tenant room interiors). CSR and Private Funding can be directed with the following assumptions:

1. CSR and the private sector are expected to be the main sources of financing;
2. The government plans the development of public infrastructure;
3. The private sector implements the development of public infrastructure through private funds;
4. The cooperative manages public infrastructure for a certain period of time;
5. The tenant who incurs the cost of the interior of the rented space;
6. Income from tenants is obtained from area rental or profit-sharing.

The following is an overview of investment costs, operations, and projected income. The chart shows that the construction of the building accounts for the majority of the investment at 66%. When looking at operational costs, employee salaries make up the largest portion at 49%, while electricity follows closely

behind at 36%. The main source of income, projected in the chart, comes from leasing space, which accounts for 72%. Please refer to Figure 5 for more details.

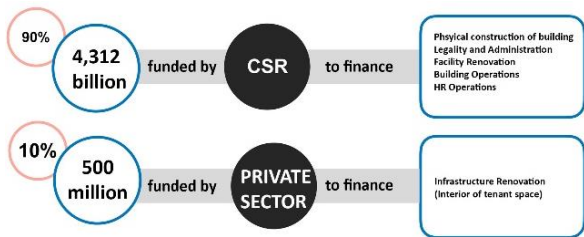


Figure 5. CSR and Private Funding Scenario

Financial ratio :

- 3rd year Net Present Value (NPV)
Income - expenses =
 $4,042,997,820 - 3,147,063,480 = 895,934,340$
- Return on Investment (ROI) 3rd year
 $NPV / \text{investment cost} =$
 $895,934,340 / 4,812,450,000 = 19 \%$
- Benefit-Cost Ratio (BCR) 3rd year
 $\text{Profit} / \text{cost} =$
 $4,042,997,820 / 3,147,063,480 = 1.28$

The investment cost is 4,812,450,000, so the Pay Back Period of this business is 10 years and 11 months after opening. This payback period is the payback assuming a normal calculation.

Table 12. Financial Ratio Calculation

Item	Year 3	Year 11
Expenditure	1.095.519.480	2.348.343.298
Income	1.407.401.820	3.016.890.793
Profit/loss	311.882.340	668.547.494
Cash cumulative	895.934.340	4.819.251.035

Based on the calculation of financial ratios using the NPV, ROI, and BCR, and PP methods with a BI interest rate of 4.5% in 2020, the co-working space development is feasible, with a positive value for the NPV Rp. 895,934,340, ROI 19%, IRR > from BI interest rate 4.5% and PP 10 years and 11 months (Table 12). The duration of this payback period is due to the construction of the building. Even so, the community has received benefits from the early years after the project was built. The community, in this case, received discounts and convenience in carrying out activities and using the facilities. In addition, community income can be sourced from these activities such as sales of innovative products, empowerment of waste banks, urban farming, others.

CONCLUSION

In responding to the pandemic in Bandung city, the circular economy concept can be implemented as an

alternative solution to building resilience and an economically independent community. However, it is not enough to build a circular economy but must be developed continuously until post-pandemic to improve the local and national economy. Implementation of this concept will vary from place to place, but it is possible to apply. Therefore, studying local and global potentials and aspects that influence them, such as political, economic, socio-cultural, technological, environmental, and legal, becomes significant to define the needs and identity of a place to implement this concept.

In this case, the circular economy concept can be implemented spatially (buildings and landscapes) to develop a co-working space that applies three aspects, namely socio-economic empowerment, environmental waste management, and research and development. The research and development aspect becomes an essential part of the development of more sustainable programs. The development of this space needs support from the government and private sectors at the beginning of the investment, especially the construction of facilities. The community received discounts and convenience in carrying out activities and using the facilities. Community income can be sourced from sales of innovative products, empowerment of waste banks, urban farming, others.

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