

# Integrating Human Ecology into Sustainable Development to Address Potencies and Challenges of the City of Batam as a Port City

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**Abstract**—Social development is frequently marginalized in infrastructure and technology-based development. This paper attempts to portray the importance of the study of human ecology in a social environment to mediate the transformation efforts in social environment development that increase aspects of social-cultural life quality. An observation and mixed method analysis within the context of a case study is used to show the interaction between human ecology and sustainable development with respect to the potential and changes during a disruption in the City of Batam as a port city. The results show that innovation and transformation related to human development are still more favorable in strategic human development despite the need for modern smart port city development.

**Keywords**—human ecology, sustainable development, port city, social-cultural life quality

## I. INTRODUCTION

Social development is frequently marginalized in infrastructure and technology-based development. Moreover, development approaches tend to favor enhancements of social sectors over development that improves the conditions of society (Wirutomo, 2014). Although social development is acknowledged as an essential aspect of improving progress, human beings are recurrently treated only as objects of development, whereas social aspirations toward the quality of socio-cultural life are frequently forgotten.

Such a situation is also occurring in established port cities such as the City of Batam. The materialistic orientation of development has turned the city into one of the most progressive in Indonesia but leaves unanswered questions related to social aspirations, mainly if disruptions occur. The City of Batam has faced many disruptions, primarily resulting from economic downturns and the dynamics in local politics. Given the geographic position as a border city, the challenges of international economic and political conditions should also be considered.

In recent years, social development has created some interest. Addressing social development can be done in many ways. This paper attempts to portray the importance

of human ecology in social development to mediate efforts at the transformation in a social environment, hence, increasing social-cultural life quality aspects.

## II. THEORETICAL REVIEW

Generally, human ecology addresses human interactions with the environment through which they can be influenced by nature or can force changes to that environment. Undoubtedly, the real value of human ecology lies in helping humans see previously unrecognized relationships between what people do and the environment in which they do it (Rambo, 1983). Selection and adaptation in the social system and ecosystem interactions will develop the conditions in both social and ecological environments.

Social development usually covers the provision of essential social services, people participation, equity, sustainability, social integration, human rights (United Nations Development Program, 1997), and individual improvements, such as self-actualization, entrepreneurship, and capacity building (Midgley, 2008). Social development should emphasize building what is called human societal capabilities as human capital, social capital, and cultural capital (Aspalter, 2006). In this case, the dynamics of people welfare is believed to be correlated with economic development (Midgley, 1995) and social development as a whole (Midgley, 2008).

Generally, sustainable development can be said to primarily create a balance between environmental, social, and economic sustainability. Sustainable development is a form of “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development in Cunningham & Cunningham, 2012). However, environmental sustainability and sustainable development are often perceived as two sides of a coin—two separate entities with different interests. Some effort has been made to connect those two entities for the sake of welfare and sustainable development—an effort that also requires strong political will. In this case, even though economic power is considered a valuable tool to improve

sustainable development, and the economic condition has become the primary indicator of development, the cost of environmental degradation given unwise anthropocentric behavior should receive attention (Soerjani, 1987). In that case, social environment development should be used to counter this notion to strengthen social resilience.

This article uses the conceptual framework in which human ecology makes some contribution to social development, and social development is part of sustainable development. Potencies and challenges should be addressed in development planning in both sustainable development and, specifically, social development. A human ecology approach will enable a better understanding of boost potencies and addressing the challenges.

### III. METHODOLOGY

The mixed method analysis with a case study approach is used in this research. A purposive sampling survey is mainly used to obtain a sample of the demographics of the City of Batam. The quantitative analysis is used to understand the current development condition in reference to the residents' welfare or fulfillment of basic needs that consists of food, water, energy, shelter, health services, and education. The Likert scale of 1-5—where 1 is bad, 2 is acceptable, 3 is good, 4 is very good, and 5 is excellent—is applied, and the qualitative analysis is conducted to dig the resident's opinions on their understanding of the potential of the City of Batam as a port city and the challenges to be faced. In addition to that, the case study approach is based on observation and both quantitative and qualitative analyses and is used to observe the interaction among human ecology, social development, and sustainable development in The City of Batam.

### IV. FINDINGS

The current development condition shows that health and health-related services are considered the most satisfying development results that the residents of the City of Batam believe affecting their lives. The availability of hospitals, clinics, and other health services is considered the best and marked as excellent (94% of the respondents), followed by medical plans and environmental health (93% of the respondents), general health services (89% of the respondents), emergency services (84% of the respondents), and the availability of medical practitioners (80% of the respondents). Although most respondents have some complaints about the currently available BPJS Kesehatan (The Indonesian Health Insurance System) program, they are still able to receive and afford good health services. The respondents also indicate that they are satisfied with their housing conditions and the availability of water and energy. They also consider that they still have good welfare conditions (75% of the respondents) but have some concerns about the quality of education and training (56% of the respondents) that lead to the current state of employment and livelihood.

The qualitative analysis shows that the residents of the City of Batam still have good opinions of the potential of The City of Batam as a port city, indicated by 79% of the informants. However, some challenges are to be faced, mainly as a result of national and regional economic competition and government political will to engage in better sustainable planning for The City of Batam as a port

city. The main concerns are over border management (91% of the informants), island-based human development (86% of the informants), social inclusion in development (83% of the informants), and social development (82% of the informants). Integrated long-term planning has raised some questions as well because most respondents expressed curiosity over the current strategic city plan, significant sector planning, and projects that are expected to realize the port city vision.

### V. DISCUSSION

The survey findings show that a strategic human development plan is needed to support the realization of The City of Batam as a sustainable port city. The general realization is that the current good welfare condition should not be taken for granted but should also be reinforced by sustainable economic development and the fluctuations that affect it.

The availability of high-quality health services is perceived as declining with current BPJS programs. Although top hospitals, clinics, and other health services exist (94% of the respondents), some areas are beyond health service coverage. Employment benefits for the majority of residences provide a sufficient medical plan (93% of the informants); however, many employers switch health plans to the less expensive BPJS Kesehatan program, but in reality, long queues at health service providers are expected. Many residents also question the continuity of local health services programs that cover urban area environmental health. Medical emergency services are considered very good (84% of the respondents) and ambulance services are available. However, these services may not cover large-scale crisis situations, such as natural disasters or human-made environmental catastrophes. The availability of general medical practitioners is considered very good and is appreciated by 80% of informants. The complaints are on the lack of specialist medical practitioners, and the long queue is expected at these practices. Some companies choose to let their employees go to Singapore and Malaysia to gain access to get specialist medical services as it is considered less time-consuming. Nevertheless, although most informants have some complaints about the currently available BPJS Kesehatan program, they are able to obtain and can afford good health services because they can pay for services not covered by BPJS Kesehatan.

Generally, the supply of basic items, such as food, water, energy, and housing facilities, is considered to be very good. However, fluctuations in terms of individuals and the population, as well as environmental conditions, are highly influential (Ulijaszek & Strickland, 1993). In the City of Batam, this situation is observed in the unstable quality of water and energy, especially electricity supplies, food (except for seafood) that highly depend on other areas, and expensive housing. In this case, respondents also show that they are satisfied with the housing condition and the availability of water and energy. They also consider that they still have a good welfare condition (75% of the respondents). However, they have some concerns over the quality of education and training (56% of the informants) that affects the current state of employment and livelihood. Citizen involvement in the development and the empowerment of women are viewed as not facing

hindrances because of the low gender bias in development (opinions from 87% and 83% of respondents, respectively). However, industrial developments do affect available employment for women after the deindustrialization of the garment industry that absorbed a lot of women employees and the increase of the shipbuilding and shipyard industry that prefers men employees.

Regarding human potencies, primary education is considered to be excellent (85% of the respondents), but some problems exist in accessing and furthering one's education (68% of the informants). With 70% of City of The City of Batam's residents only reaching the high school education level, the city faces the problem of upgrading its human resource capital. The city council in collaboration with local tertiary institutions and industry associations have given and implemented some training programs to fill in the gaps and have been applauded. However, to be in line with the current maritime-focused development, in that case, appropriate education and training are focusing more on providing the skills demanded by port city development requirements and available jobs in port-related industries, such as shipyard and shipbuilding industries, port-related financial industries, tourism and hospitality industries, and other supporting industries.

The results show some concerns over the current quality of education (56% of the respondents). The majority of respondents state that the current level of education and training in the City of Batam cannot guarantee the sustainability of the state of employment and livelihood, or win the regional competition with Singapore and Malaysia. In this case, coastal and urban management is considering the mandatory use of a database for coastal and port city dwellers (Liu, Zhang, Xiaoli, & Lo, 2013; Starc & Stubbs, 2014) to maintain sustainable development (Carvalho, Alves, Azeiteiro, & Meira-Cartea, 2012; Kumar, Saravanan, & Jayaraman, 2014). Coastal zone management that covers the industrial zone, urban areas, land rights, and livelihood opportunities is crucial to human development and to developing social capital (Liu, Zhang, Xiaoli, & Lo, 2013; Kumar, Saravanan, & Jayaraman, 2014; Cheong, Edwards, Goulbourne, & Solomos, 2007). The rise of the tourism industry in The City of Batam also calls for synergy in education, training, and the support of the local people to increase local eco-tourism and economic welfare but maintain the island environment (Buultjens, Gale, & White, 2010). In the City of Batam, we can say that policies for social-ecological processes (Krasny, Russ, Tidball, & Elmqvist, 2014) still seek the right format. However, the people demand that more considerable attention being paid to island-specific development that can be applicable to the local archipelagic condition that covers both the potential—geographical conditions and the economic advantages from a free trade zone—and the limitations, such as scarcity of fresh water and limited land availability.

The dynamics of regional politics also raise concerns over border management, including not only security matters such as illegal trade, human trafficking, and drug transport but also potential conflicts in the South China Sea (Routledge, 2015) that might affect The City of Batam and its surrounding area. The existence of The City of Batam as a crisis center needs to be evaluated because recent developments may disregard such a notion. Although the City of Batam's residents is willing to participate in

innovations and other efforts to make their city a more qualified port city, better government policies are needed to address the local condition—more specifically, island sustainability and island-based human development—and win national and regional economic competitions. Social inclusion in development should be better reinforced in smart city approaches using technology-based communication and networks. The residents of The City of Batam have also highlighted their concerns over smart city programs and the use of social media and Internet-based communication to provide more information and updates on the current conditions; only 60% of respondents are satisfied with the current situation. It is due to the existence of the internet backbone of Indonesia located in Batam Island; therefore, the communication and technology infrastructure actually is superior to that of other cities but has not been fully developed to achieve its potential.

Social development is also considered secondary because the government regards the City of Batam as a place to pass through and not a location for permanent residence that should be maintained. The local people of the City of Batam questioned the integrated long-term development plan and waited for a future development plan after the central government established some designated part of the City of Batam as a special economic zone. The position of The City of Batam as a port city in the national maritime program is also being questioned, as is its position as one of the economic hubs in western Indonesia. In this case, sustainable development should depend on a database for social inclusive innovation resources (Moezzi, Janda, & Rotmann, 2017) that is currently in its development process in The City of Batam. In this case, minimal social environment development efforts have been sensed (53% of the respondents) as well as low public inclusion in development (only 50% of respondents state that public inclusion and public participation in the local development is occurring).

Clearly, a vast population with generally low skills and education places limits on the physical and social environment of The City of Batam as both a city and an island. This condition is worsened given the coastal and island environmental condition that requires more attention. There are only 47% of the respondents who state that coastal management is good and 48% state that coastal protection management for Batam Island is good, however, they also question the coastal environmental protections in the rest of islands. Similar to other parts of Indonesia, The City of Batam has also attempted to reconcile its strength and internal diversity by constructing a triangular balance among identity construction, hegemonic governance, and economic development (Dressel & Wesley, 2014). A need exists to overcome the limits of the physical and social environment—generally referred to as social resilience (Carvalho, Alves, Azeiteiro, & Meira-Cartea, 2012)—and, hence, to transform those limitations into sustainability as a port city and an island city.

In order to address the need for better development, strategic human development is demanded as is the need for modern smart port city development. Based on the survey, the people of The City of Batam still prefer innovation and transformation related to strategic human development through education and training for smart port city development (89% of the respondents) rather than

infrastructure development for modern smart port city development (65% of the respondents). Nevertheless, the use of communication networks and the Internet is considered a must to address the pace of dynamics. Given many development interests, a combined effort is necessary that leads to a strong political will needed to interconnect social development and economic development. The research has shown that the likability of interconnections between environmental sustainability and sustainable development is on the human dimension, such as education, skills, and innovation. An integrated social system to overcome the complexity faced in the capital and social relationships in certain areas or regions can help ensure the success of development (Wirutomo, 2012).

Strategic transformative development should be sincere and have a clear vision, an understanding of the situation and conditions, clarity of and control over the situation, and the ability to be agile. Such development should be contained in a strategic plan for the city that provides tactics for measuring and evaluating the development plan, including social inclusiveness and participation in it. Although the survey finds that most people are willing to participate in the development, they also question the central and local governments' vision and strategic planning. They even raise questions about the availability of a city strategic plan and voice their concerns over the future of The City of Batam as a port city. In transformative development, the interdependencies among physical environment, social environment, and constructed environment are the keys to ensuring successful sustainable development that provides adaptable and a panarchy condition (Holling, Gunderson, & Peterson, 2002). In this case, some sporadic collaborative actions can be viewed as the public's efforts to create a better situation for port city development in the current economic downturn.

Given its location in the border area, The City of Batam is significantly affected by its neighboring countries. Adaptation and mitigation must also be based on the dynamics of the environment (Ghorai & Sen, 2015), the impacts of globalization on the local condition (Hay, 2013), and social limitations, even though some interventions might be conducted through technological advancements and economic development supported by good communication, transportation, and logistics (Carvalho, Alves, Azeiteiro, & Meira-Carrea, 2012). Many professional associations in the industry and education sectors in The City of Batam are willing to collaborate with the government on policy making and with community groups to ensure public participation in development. Clearly, the majority of the stakeholders agree that development cannot be separated from direct and indirect environmental impacts; in other words, a human face must be put on policy making and development (Salim, 2015). Hence, development needs to include economic, social, and environmental issues together, simultaneously, and collaboratively through measurable actions. Such synergy can be observed in the collaboration between education and training providers and shipbuilding and shipyard industry associations to provide up-to-date training to provide job seekers with sufficient skills.

Besides, new solutions and insights that refocus urban areas and their problems should become the center of eco-politics activities (Swyngedow, 2009) in a port city. The

right solutions and insights based on best practices may overcome unsustainable situations and environmental limits (Blühdorn & Welsh, 2007) and is how human ecology enters the reality of physical and social environments in island areas. Such an approach leads to establishing development plans and systems that may overcome the limits in the physical and social environments to improve the ability to transform those limitations into sustainability and to ensure social justice, public welfare, and public well-being in reference to sustainable development goals (United Nations Department of Public Information Sustainable Development Goals, 2017). Only given that condition could the integrated social system have the capability to overcome the complexity faced in the capital and social relationships and to assist in transforming development into success (Wirutomo, 2012). Synergy in integrated long-term planning can be viewed as still in the process of transformation, which may seem like slow progress relative to the neighboring areas of Singapore and Malaysia. A lot of work remains for a port city such as The City of Batam, which should maintain its roles at the national and international levels.

## VI. CONCLUSION

The sustainability of a port city might be jeopardized if the social aspects of the development are not addressed. The development plan should overcome the limits of the physical and social environment and should transform those limitations into sustainability to ensure social justice, public welfare, and public well-being.

To enhance progress, port city planners should address not only infrastructure and technology-based development but also social development by creating social aspiration channels. Interactions among social infrastructures in the urban technology base should monitor specific and temporal distributions of human activities and should address changes in ecological conditions that might become very susceptible given climate changes and other dynamic conditions.

Incorporating human ecology in the input to the City of Batam's local social development planning may mediate transformational efforts in the social environment because interactions among port city dwellers may have some variances that differ from national development planning, particularly in regional dynamics in reference to border management and island sustainability.

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