The Nexus of Micro Planning and Bionomic Approach: in Reply to Pandemic Resistance Development

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Abstract

Broach a subject on planning, it has entirely shocked by the wide spreading of contagious outbreak. Many more ways have been undertaking in order to avoid worsen health living quality. One of the toughest parts of this is built environment because development involves a huge of factors and tends to generate into degraded-complex city. Therefore, micro planning which is based on bionomic approach is proposed as one of choices to the preventions of unexpected occurrences. It is well that more individual and smaller area coverage such as micro planning for villages. Despite several limitations to implement micro planning, the hope for pandemic resistance development is convincingly a dream for everyone.

Keywords: Bionomic, Built environment, Micro Planning, Pandemic resistance

1.   Introduction

The pandemic outbreak has haunted many countries globally (Azzaoui, et al., 2021). This unexpected occurrence is clearly impacted to human basic life such as safe distance to intercommunicating among people, human quarantine house and supply chain of staple food (Beria & Lunkar, 2021). It seems that forced new behavior could probably be permanent to impacted society (Fu & Zhai, 2021). Even, limited attendance of meetings and gatherings become more popular in numerous cities during a change for the worsen condition (Broo, et al., 2021). On top of that, public or private facilities must be judiciously operated less than a half of its normal capacity in order to reduce potential spread of pandemic disease. Moreover, the inter-distance among tables and chairs of crowd people in building or public space is also strictly arranged with the intention of gradually disorder blowout (Ahmed, et al., 2021).

If we look the impact of current global pandemic much closer, futuristic human bionomic is certainly transformed into less interaction among people, more effective rate of movement and more grounded in information technology (Putra, 2021). Instead, most of city planning is evidently prepared based on group of people for movement and efficient energy consumption (Geraldi, et al., 2021; Alam, et al., 2019) rather than human behavior (Putra, 2021). Shockingly, the contagious disease has woke up our awareness whether urban development remains as it should be or not (Elavarasan, et al., 2021). And so, got down to brass tack, it is appropriately questioned where city planning is started to wander (Batty & Marshall, 2017). Far point of this argument is that any effort should be at stroke in order to safe human life by providing more resilient city (Jenelius, 2010). It can be thoroughly supposed that detailed change of urban development must be rethinking, otherwise it will be gone far astray.

2.   Research Methodology

At this point, the term of bionomic is subject on which people bionomic pattern (Allen, 1906) which is related to road user's mobility in a road network (Bento, et al., 2005) as illustrated in Figure 1 and Figure 2. It was previously prompted a lot of discussion what essential factor which principally drives their movement (Putra, 2021). An instance where environment, adaptive and behavior becomes shift to influence among them is preferred to be named as bionomic. By this diagram, it initiates to knock where the shoe pinches.
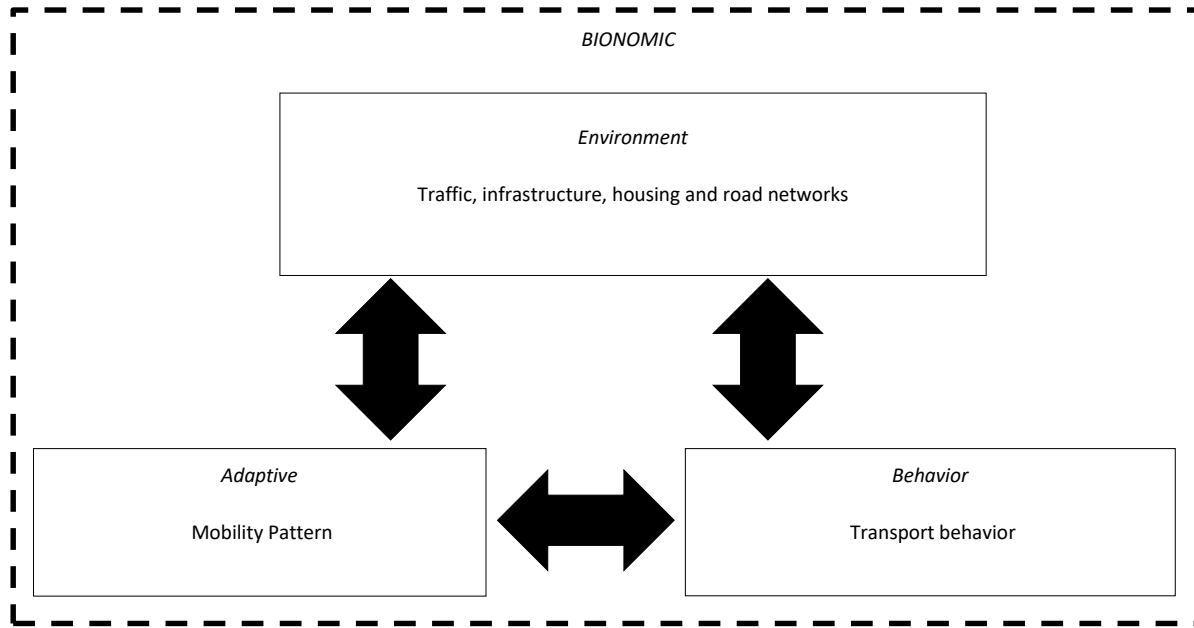
Source: (Putra, 2021)

Figure 1: the view of *bionomic* in this paper

The word adaptive is linked to the definition of bionomic, ecology and ecosystem while bionomic separation is closer to habitat segregation (Ortmann, 1906). Meanwhile, phrase of bionomic separation is clarified as adaptation process and evolution which is influenced by variation of environment, disparity of lineage and bionomic separation itself (Ortmann, 1906). Then, the terminology of ecology and ecosystem are sometime cited to explain several points of meaning in other discipline intelligibly such as economics (Allen, et al., 2010; Pilinkiene & Mačiulis, 2014) and route choice adaptation (Shi, et al., 2011; Muazir & Hsieh, 2016). Also, the sense of adaptation in the framework of ecology and economics is beneficially used to approach biology and social science (Allen, et al., 2010; Hu, et al., 2021). Further, the name of adaptation has advanced to enlighten the ecosystem of economics, business, innovation, digital professional and industry which are now more popular in modern society (Pilinkiene & Mačiulis, 2014). There are much more studies associated to adaptation for instance mobility of social and economic activity (Muazir & Hsieh, 2016; Viezzer & Biondi, 2021), Adaptive Mamdani Fuzzy Rule-Based System in airport terminal (Brownleea, et al., 2018) and urban scaling (Sugar & Kennedy, 2021; Puchol-Salort, et al., 2021).
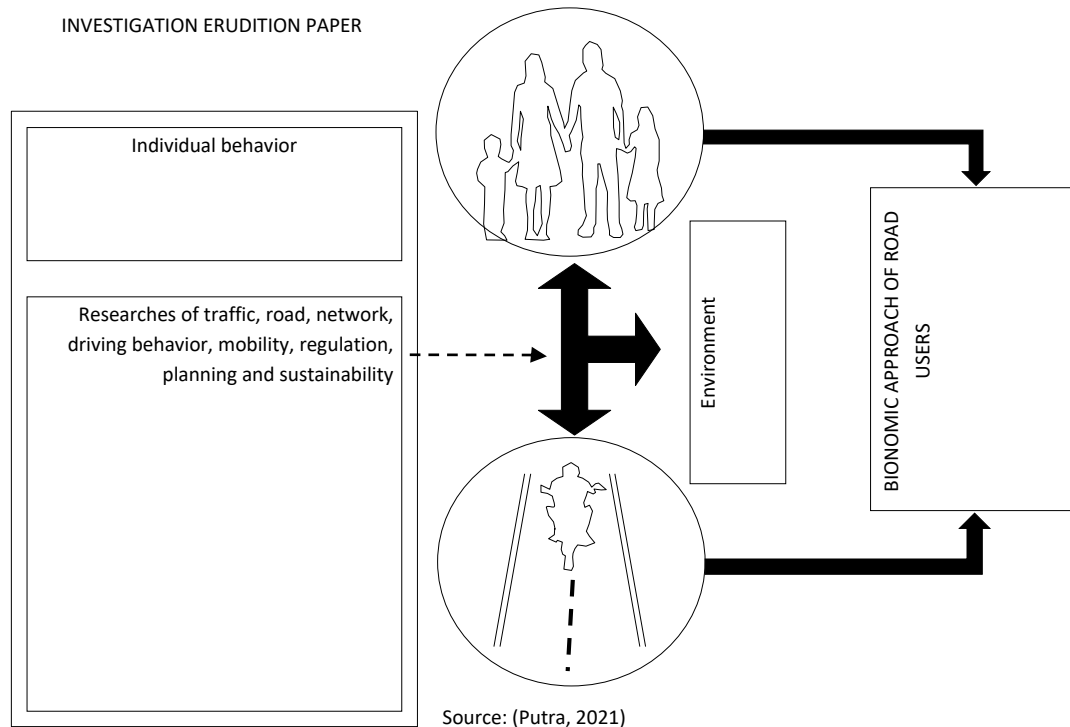
Figure 2:   Illustration of proposed bionomic approach for road users

3.   Results

Whichever pandemic, include coronavirus disease, has obviously affected most of various individual activity pattern and its surrounding (Wang, et al., 2021). Reconsidering of this, there are more than a few inventions advised by several observers in purpose to give a clear picture of contagious impacts. First, physical activities have changed relatively to various urban density (Wang, et al., 2021). Second, planning sustainable city is suggested to adopt pandemic management in order to accommodate effective approach for urban development and smarter healthy city (Elavarasan, et al., 2021; Yang & Chong, 2021; Li, et al., 2021; Abu-Rayash & Dincer, 2021; Azzaoui, et al., 2021; Broo, et al., 2021; Li, et al., 2021). Third, neighborhood-distance scale is evidently influenced by pandemic which is shown by the alteration of spatio-temporal pattern (Lak, et al., 2021; Maiti, et al., 2021). Fourth, designing smart building should be wary of using historical data in era before the global disease attack (Xie, et al., 2021; Wang, 2021; Ghasemi, et al., 2021). Fifth, despite at haphazard spreading of disease, the statement that higher-density district is more hazardous is remain questioned (Khavarian-Garmsir, et al., 2021; Junior, et al., 2021). Sixth, examining spatial and temporal relationship among social vulnerability and stay-at-home behaviors shows that it transforms into limited rate of changes (Fu & Zhai, 2021; Ugail, et al., 2021; Ahmed, et al., 2021; Su, et al., 2021). Seventh, travel behavior of residents is to some level of change (Shakibaei, et al., 2021; Benita, 2021; Shokouhyara, et al., 2021). Eight, transport policy for megacity development is suggested to be wisely evaluated as response to infectious occurrence (Hasselwander, et al., 2021; Shorfuzzaman, et al., 2021; Kutela, et al., 2021; Beria & Lunkar, 2021). Fortunately, air quality in Xi'an pointedly decreases during the

unexpected occasion (Han, et al., 2021). Several type of cities during outbreak proofs that they should be adjusted to shape higher resilience (Chen, et al., 2021).

The golden mean from the above pieces of mind is that the spreading of contagious disease has a tendency to change human behavior. However, almost all of cities in the world are not well prepared to anticipate its impact for many reasons for example unavailable new approaching method (Shahraki, 2017), widespread area to be captured (Zwierzchowska, et al., 2019), complexity of towns (Ding & Lai, 2012), higher rate risk of threatening illness and limited budget. In this paper, it focuses on approaching way which is bionomic method as exemplified in Figure 3.
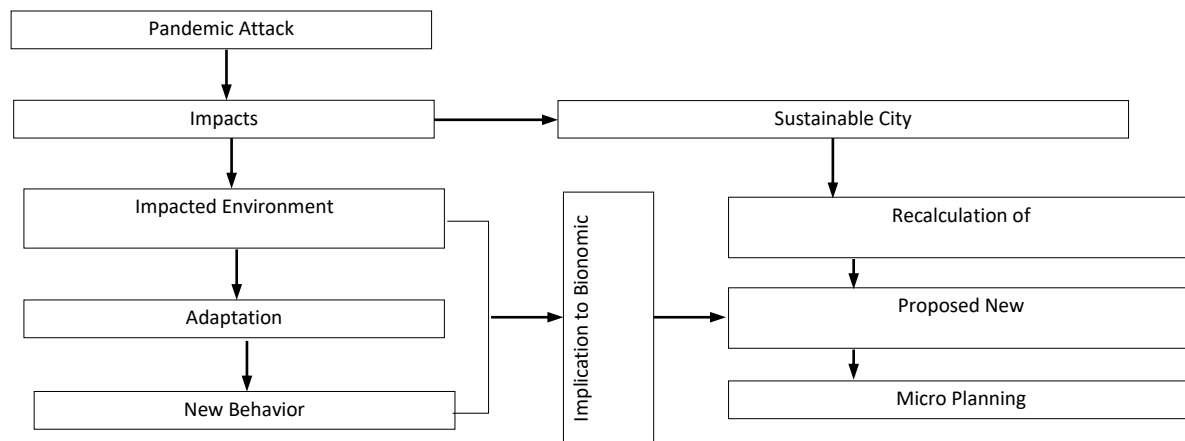

Figure 3: proposed Micro Planning by New Bionomic Approach for pandemic resilient development

The term of micro planning in this context is much more intended to compactly supply the very basic needs for individual in many ways (Shi, et al., 2011) and deliver minimum impact from various hazard (Sara & Carmelo, 2012) and numerous disease attack. Far be it from this that it is single solution, but at least it is envisioned to be something like motivation basis to provide much better planning for pandemic resilient development.

This proposed micro planning is started with recognizing the numerous variants of individuals and home-grown bionomic characteristics as depicted in Figure 4. There is more than noticing local culture but it includes mobility, supply chain of major goods required, available jobs, life style and future expected rate of life quality (Schram-Bijkerk, et al., 2018). As well, infrastructure and policy included all of its linked elements are the main points to be explored. Although all selected ways have the same destination, it is obviously clear that the outcome of micro planning will produce a huge variant of results and more on locally grounded.

Even though the diagram in Figure 4 feels as though that micro planning may fully resolve recently city's problems, yet it still remains some questions. First, what is the conditional prerequisite to run it? This is the hardest item to be answered because most of cities have become very complicated (Albert, et al., 2018) and there are many more impediments rather than supporting issues (Fu & Zhai, 2021). A few scopes for this explanation are adequate land area, nothing short of budget for redeveloping built environment (Schwamborn & Aschenbruck, 2019), sufficient technology (Ayuka, 2017) and quite sure for human

resource development program (Broo, et al., 2021). Second, what is the most challenging factor which may give the biggest influence to realizing micro planning? Whichever elements of environment, it can be acted as favorable variance which hinge on local characteristics and its vicinity. Third, what should be done when there is no other option to way out for the worst condition of a city? An extreme policy is probably suitable for this dilemma such as total land reform, just as strict with rules which is set by law, migration of an entire village, more attractive working time and flexible policy for allotment. However, there is a risky bet to be taken and it needs creative thinking process.
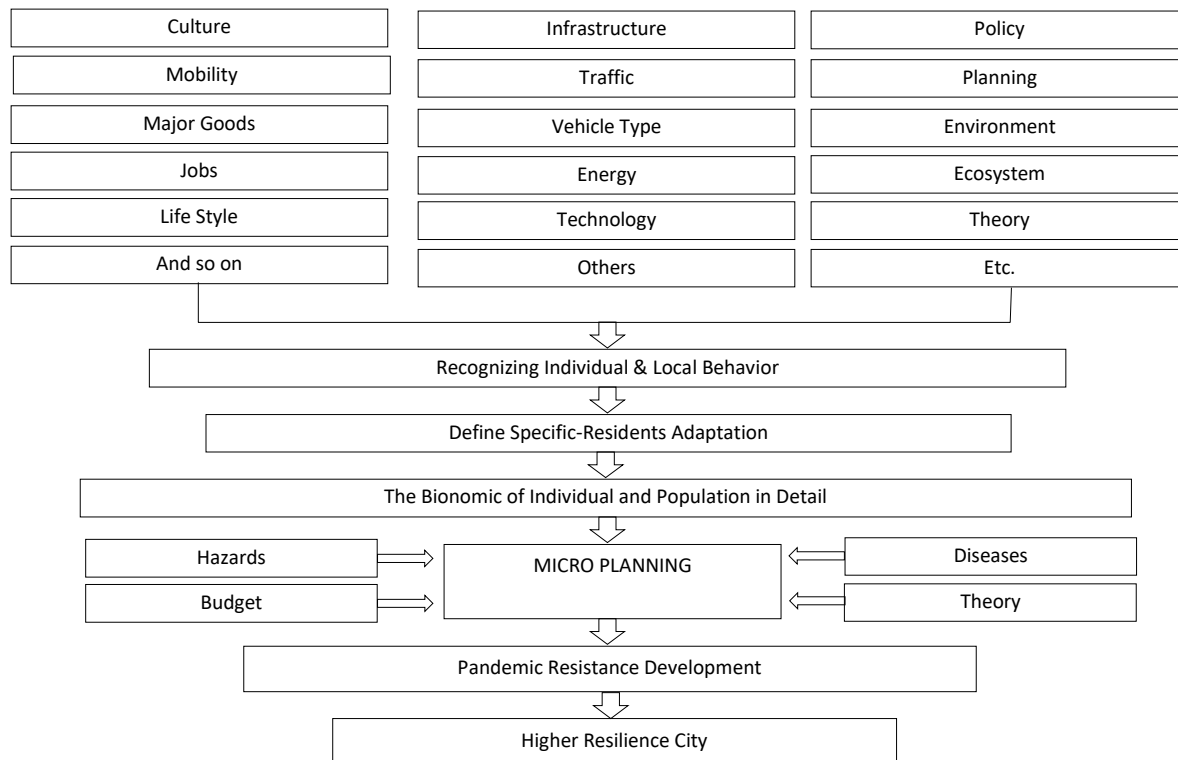

Figure 4: proposed micro planning process

Fourth, how does to sort out important data from numerous types of data? Solution of this is little bit tricky as selection process is somewhat complex. Therefore, the first step of doing this is by picking certain variables in order to decide whether there is important substance to be analyzed further or not as exposed in Figure 5. According to this suggested procedure, a city perhaps has three possibilities to be taken action plan which is termination, taking extreme policy and stay to micro planning process. Firstly, program termination is being forced to be taken because of the city has deteriorated condition. Then, extreme policy is the second option whenever preferred variables is indisputably facing obstacle in a range at which it can be handled by implementing exceptional strategy. Lastly, micro planning is appropriate when subject on which is undoubtedly supported by chosen variables involved. Thus, it can be interpreted from this passage that micro planning requires some prerequisites which is unique for each local. In the meantime, rate at which its distinctiveness has partly collected for other scientific purposes such as job, family structure, local culture, income, and etcetera.
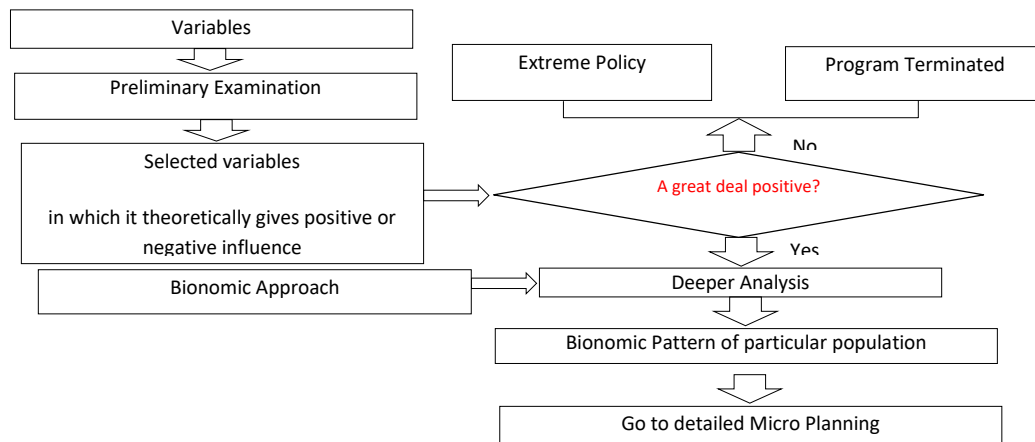
Figure 5: suggested procedure for determining dominant variables beforehand micro planning

One of the examples is the investigation result of bionomic for road users which was conducted in Condongcatur in 2020 (Putra, 2021) as depicted in Figure 6. It determines that the majority of selected inhabitants make journey for food in between 06.00-07.00 a.m., 12.00-13.00 p.m. and 18.00-19.00 p.m. (Putra, 2021). It can be taken a meaning from this diagram that bionomic pattern for finding food period tends to similar with working time. Interpreting this into micro planning which is based on people bionomic is slightly challenging and various point of view such as social, environment, economics, transportation and so on. Primary question of this is what the most exciting element to be selected into planning is. Assume that it has been done and the result of that is traffic jam of surrounding roads as it has been grumbled by locals.
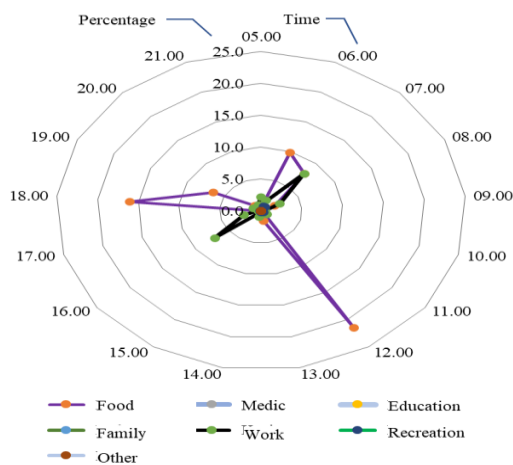
Source: (Putra, 2021)

Figure 6: the percentage distribution of traveling purpose of bionomic pattern for road users in Condongcatur village, Yogyakarta

If the outcome of Figure 6 is overlaid with traffic pattern, then it can be exposed as represented in Figure 7. By this, higher traffic volume outline is somewhat close to the bionomic pattern for getting foods. It seems that both of them are strictly separated because of dissimilar standpoint. However, the interface amid them, which is triggered serious jeremiad, has evidently caused several adaptations and created new behavior (Putra, 2021). Locals become accustomed this unspeakably interface by reducing travel distance,

shopping daily needs inside the village, riding motor bike and much more time for stay at home (Putra, 2021). This implicit point is the great starting clue for the nexus between people bionomic that will be put into micro planning.

Then, micro planning starts at the evidence that crossing point amid bionomic pattern of food and traffic. The example of some policies can be considered at least one of several choices which are redesign network, traffic management, providing sufficient home shop, relocation locals into better living area and built environment reform. It is hoped by this that higher quality of living will surely create better resistance to pandemic attack. And finally, the village or city becomes less vulnerable to disease.

4. Conclusion

It can be conclusively summarized that bionomic approach for micro planning is an essential factor for diagnosing the basic requirement of individuals and its group. Furthermore, micro planning rated at which the masterplan for village or residential area obviously gives a better privileged direction into better living area and more resilience to various contagious. Indirectly evidence, pandemic resistance development can be achieved in the future.

Acknowledgement

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