

# **SUSTAINABLE TRANSIT-ORIENTED DEVELOPMENT: A 'TARGET VALUE' PLANNING & DEVELOPMENT STRATEGY**

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## **ABSTRACT**

The positive social, economic and environmental impact of transit-oriented development (TOD) in Malaysia is rather limited. This paper proposes a design and development methodology for achieving sustainable TOD in town and country planning, as part of a wider constructive research on sustainable benefits realization management within TODs.

Content analysis of interview data with key stakeholders of TOD implementation in Malaysia indicates that there are three major constraints in the planning and development phase of town and country planning affecting TOD. They are: lack of multi-model planning approaches, lack of a planning coordination mobilization structure and disjunction regarding ontological categories of 'substance', 'process' and 'value'.

A Benefits Realization Management Set-based Systems (BRM-SBS) planning and development methodology aimed at minimizing the said constraints is proposed. This methodology is centered on having an integrated planning practice that is less hierarchical, that also accommodates diverse planning models. Wherein TOD sustainability benefits are enhanced by using Target Value Design (TVD) and Set-based Design (SBD) approaches based on a transformation, flow, value complementary view of planning and development of TODs. This BRM-SBS methodology is to be validated as part of an extended action research project with the Malaysian National Structure Plan organization.

## **KEYWORDS**

Transit-oriented development (TOD), target value design, set-based design, town and country planning, benefits realization management.

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## INTRODUCTION

In Malaysia, the National Physical Plan (NPP), the Five-Year Malaysia Plans and other sectoral policies provide the guidelines for development planning in Malaysia. The stated goal of the 2<sup>nd</sup> Malaysian National Physical Plan (NPP-2) is the establishment of an efficient, equitable and sustainable national spatial framework to guide the overall development of the country towards achieving developed and high income nation status by 2020. The NPP-2 is supposed to be aligned to the 17 UNDP Sustainability Development Goals, with local authorities being the final level at which planning conditions are imposed to ensure sustainable development. However, the sustainability initiatives often end up latching on to the ‘low hanging fruits’, often driven by reductionist policies.

There are a wide variety of issues and challenges related to delivering urban sustainable development. Non-resilient stakeholders tend to end up resorting to weak sustainability practice. This is compounded with the trend of focusing on sustainability outcomes (indicators to assess what is relatively more attainable and amenable to “measurement”). It is argued in this paper that this phenomena is very much the result of the traditional transformational view of production (in terms of planning and development) amongst town and country (T&C) planners. Hence, in most instances the rationale of starting on the journey towards higher sustainability performance is often “hijacked”; ending up with mainly tackling “the low hanging fruits” - a form of “greenwash”.

Another phenomena regarding sustainability that seems reductionist is the preference by researchers for more readily attainable simplistic sustainability research outcomes that are mainly explanatory, such as identification of “sustainable construction barriers” etc. There is a lack of overarching solution based research. These twin practices amongst majority of industry practitioners and the research community does little to provide for systemic progression to forge strong sustainability practice. It is noted by Du Plessis (2007) that in order to create an enabling environment for sustainable construction, institutions such as the different levels of government, development agencies etc. need to adopt sustainable development and its principles as a seminal aspect of their operations. In addition to creating an enabling environment, it is important that the research community too has to focus more on solution-based research.

This paper is an outcome of the initial phase of a wider research focused on investigating issues related to weak sustainability practice in transit-oriented development (TOD), and also aimed at developing methodologies for embedding better practice. TODs by virtue of being part of integrated transport infrastructure and human habitat development is adjudged to be intrinsically aligned towards sustainability characteristics that needs to be understood in intersubjective terms. The dominant research on T&C planning and development for sustainability is often undertaken based on traditional positivist concepts of value. The term ‘sustainable development’ is considered to be an “essentially contested concept” (ECC). As noted by Ehrenfeld (2008), basically ECCs cannot be managed in a deterministic and positivist sense. Additionally, value as a construct that is viewed solely as a subjective term can be problematic. However, following Rooke (2010), the notion of value is treated here as being intersubjective or socialised, not exclusively objective or subjective but more like points on a continuum.

It is acknowledged by key respondents from the T&C planning community in Malaysia that TOD is a “new” development trend. The phenomena of resorting to weak sustainability practice in TOD escapes serious scrutiny as it is framed as “new” and requiring an ‘experimental’ approach. Thus the issue of T&C planning and development of sustainable TOD seems unproblematic. There seems to be a taken for granted view that the implementation of the TOD concept, in itself, is a major societal good; and it is mainly proffered as a solution to reducing private automobile dependency and reducing road traffic. Currently the “buck” seems to stop at walkability, accessibility and affordability - leading to a form of greenwash for sustainable TODs. Hence, there is a strange disconnect between TOD and sustainable construction, wherein sustainable planning and development of TODs is lagging. In order to stress the point, the authors of this paper, would like to invite the research community to liken the current sustainability considerations of Sustainable TOD akin (in an adapted sense) to that of the Green Campus context, calling for a whole-of-TOD approach (see Gomez and Ng 2019).

TOD is rapidly becoming a popular and influential T&C planning concept in Malaysia. Cervero and Sullivan (2011) note that TOD has gained popularity worldwide as a sustainable form of urbanism. However, in Malaysia there seems to be “one-size fits all” approach to implementation of the TOD concept with a singular focus on only developing existing train stations into TODs based on performance of the existing built environment (Kamruzzaman et al. 2014). A number of researchers are increasingly recognizing that TODs can take a variety of forms (Belzer and Autler, 2002; Atkinson-Palombo and Kuby 2011). They emphasize the point that individual TODs can serve different but complementary functions within a system. Following Kamaruzzaman et al. (2014), the view taken here is that the practice of solely developing existing train stations into TODs is not to be recommended, as it does not allow for developing TOD sites based on proper assessment that can lead to achieving wider sustainability outcomes.

The implementation of TOD in Malaysia comes under the purview of a number of authorities; and is caught-up in a multi-directional spiral of loose guidelines, policies and initiatives. This state of affairs is rationalized as being “acceptable” and unproblematic due to TOD being a “new” development trend, and its implementation being in a “state of transition”. In a top-down “over the wall” hierarchical planning process, the implementation of TOD finally ends up under the remit of the local authority that often takes it on as an ‘experimental’ challenge. In essence, TOD planning and development in Malaysia ultimately comes under the purview of the Town and Country Planning Department of the local authority, and the sustainability aspect is encapsulated within multi-disciplinary fields of responsibility (e.g. sustainable township, low carbon city framework etc., lacking coordination at inter and intra levels). In a nutshell, there seems to be a tendency to focus on ‘substance’, lacking a process and value perspective; affecting the opportunities for more adaptive and integrated planning and development.

It is argued here that TOD must deal not only with the tension between node and place, but address development in the context of being constitutive of larger adaptive organic systems that can contribute significantly to sustainable development. The authors of this paper are convinced that there is a need to open up control-oriented planning practices to more adaptive approaches to planning. Rauws and De Roo (2016), they explore how

Organic Development Strategies (ODS) can be more responsive in tackling the wide variety of uncertainties which challenge spatial planners and decision makers. The current approach in Malaysia of using assessment tools and scoring methods to enable local and state governments to optimise land use and transport integration, as well as approve TOD applications for development is questionable. One such tool is the Land Use & Public Transport Accessibility Index (LUPTAI) decision making tool that measures accessibility performance as a product of land use and public transport. Zainuddin (2013) cautions that regardless of the established benefits and potential of TODs, it is crucial to be realistic in analyzing the actual outcome of TOD initiatives. He reiterates that several cases of implementation of the transit community concept have not achieved the primary planning target in providing sufficient community benefit to the local people.

The theoretical basis of this paper is founded on design science (constructive research), T&C planning theory and lean construction theory. The many definitions of design science informs that design science is about producing knowledge through the creation and implementation of a solution aimed at altering a specific phenomenon to a preferred one (see Vaishnavi and Kuechler 2007; Simon 1996). Amongst the key practice principles of design science is the creation of an artefact (a method, in this case) to address the research problem (see Havner et al. 2004). Although design science research (DSR) is recognized as an important and legitimate Information Systems (IS) research paradigm (Gregor and Havner 2013), it is only of recent that DSR started to gain ground within construction management research. However not to the extent proposed by Koskela (2008).

## **CONTEXTUALIZATION OF RESEARCH**

The Malaysian government introduced the Town and Country Planning Act 1976 (Act 172), which was enacted pursuant to Article 76 (4) of the Federal Constitution, for the purpose of ensuring uniformity of law and policy to make a law for the proper control and regulation of T&C planning in Peninsular Malaysia. T&C planning takes place in Malaysia as a top-down hierarchical approach; federal to state to local authority, culminating in Special Area Plans. TODs are incorporated within the local authorities Special Area Plan, and currently left to the purview of the local authorities based on a very broad national policy. The Malaysian National Physical Plan (Policy NPP27 in 2005, and Policy NPP32 in 2010) clearly states that “Transit Oriented Development shall be promoted as the basis for urban land use planning to ensure viability of public transport”. It is evident that the state structure plans and local plans, for example the Selangor Structure Plan 2020, and KL City Plan 2020, as well as in regional plans, for example Iskandar Region’s (a local authority) Comprehensive Development Plan (CDP) promotes the TOD concept mainly as a contributor to an effective and viable mode of public transport. What about sustainable development?

Currently the progression towards more adaptive and integrated town and country (T&C) planning methodologies that are more aligned towards ecologically sustainable planning and development is lacking. There are attempts at incorporating theoretical planning perspectives of collaborative, new urbanism and just society alongside the dominant rational planning model. However this is done in instances, and as alternatives, rather than complementary. Similarly there is a tendency to understand planning and

development as either a transformation, flow or value (using disjunctive ontological descriptions within the planning and development environment); and not as transformation, flow and value. Thus limiting the potential for achieving better planning and development. This paper reports on the initial phases of a constructive research endeavour to advance current planning of TODs with respect to prioritisation of considerations for sustainable development. Not much previous research has significantly addressed the constraints identified in this paper and also there is lack of 'constructive' content within much of the research. Literature review on T&C planning and findings from 1<sup>st</sup> round of interviews with key stakeholders of T&C planning in Malaysia was instrumental in identifying the constraints limiting the ability to attain stronger sustainability outcomes for TODs.

In this paper, the T&C planning and development practice is considered as being a form of production that is understood based on Koskela's (2000) integrated transformation, flow, value (TFV), allowing for the incorporation of complementary planning theories. The more thorough complementary TFV perspective towards T&C planning and development allows planners to work with the four T&C theoretical planning models as described by Fainstein (2000). The four planning theories or models are: the traditional-rational, collaborative, just society and new urbanism models. In order to optimize the sustainability benefits that can be accrued in TODs, a systemic 'planning and development production space' of engagement for delivering optimized benefits (framed here as an integrated benefits maximization framework, is formulated). This is viewed as an intervention mobilization structure that is constitutive of a method.

## **PLANNING THEORY AND TOD**

The research problem of 'planning, design and development of TODs with respect to sustainability characteristics is investigated here at the planning stage - as the first phase of a three phased research programme. Here, relevant urban planning theoretical modelling typologies provide the analytical frame of reference that forms the basis in formulating a benefits maximization methodology for value delivery that is able to deal with attainment of intersubjective value-based targets - as is with the complex concept of sustainability. This paper draws on the work of Zuziak (2015), to address the contrasting characteristics of urban planning practice. According to Zuziak (2015) sustainable development, public good and social justice feature as three doctrinal foundations of contemporary urban planning theories. Additionally, following Fainstein (2000), the approaches to planning can be typified and identified in a broad sense to consist of four models, namely: the traditional rational model, the communicative model, the new urbanism and the just city model. The communicative model in planning draws on two philosophical approaches, that of American pragmatism and the theory of communicative rationality. This is exemplified in the democratic process involved, searching for instances of 'best practice' and arriving at a 'consensus' towards a final plan. Wherein the planner takes on a mediating role amongst the various stakeholders within the planning domain. "The new urbanism" refers to a design-oriented approach to planned urban development. Great emphasis is placed on public space, as well as emphasis is placed on the relationship between work and living and takes a strong stance toward environmental quality. The new urbanism stresses the substance of plans rather than the method of achieving them. Whilst the theory of the just

city values both participation in decision making by relatively powerless groups and equity of outcomes (Sandercock 1998).

In reviewing extant literature on T&C planning in Malaysia, it is evident that the continued reliance the dominant rational planning approach is not seen as being problematic by researchers and practitioners, not even in the lack of considerations for sustainable development. There seems to be an unquestionable acceptance, and even attempts to “improve” on the existing rational planning approach, relegating importance of all the other planning approaches. For instance, Ahmad et al. (2013) subscribe to the view that building the competency level of T&C planners can contribute to better T&C planning in Malaysia based on rational planning theory. Analysis of interview data with key TOD stakeholders, indicates that current planning for TODs is being undertaken in silos and in a piece-meal manner. The hierarchical layers of national, regional/state, and finally local and special area planning is undertaken within a non-integrative structure. The proposed sustainable TOD maximization framework is structured as a planning space with a membership drawn from all three levels, forming a TOD town planning and development (P&D) matrix organization, referred to here as a TOD MATRIX P&D SPACE.

## **METHODOLOGY**

The epistemological basis of this paper is based on constructivist understanding of knowledge as being socially constructed. The planning process is viewed as being a social phenomenon undertaken through the process of active social engagement. The interpretive understanding of the data communicated, both primary and secondary (as provided by the respondents), is undertaken by the authors who are involved with the respondents based on a commitment to communicative understanding. Whilst, the additional secondary data made freely available by the respective public authority agencies as hardcopy documents as well as softcopies on their websites are viewed in the same light.

It is observed that besides the general state-of-transition of sustainability practice, there is a current state-of-tension with regards to T&C planning practice in Peninsular Malaysia. This state of tension, arising out of prevalent constraints is identified through desk study and 2<sup>nd</sup> party practice insights on the implementation of sustainable TOD. The three prevalent constraints are: over-reliance on the rational planning model, lack of an intervening mobilization structure for ensuring emphasis on optimized delivery of sustainable benefits; and there being a disjunction between ontological categories of ‘substance’, ‘process’ and ‘value’ affecting the understanding of planning and development as an integrated TFV phenomena.

Based on a constructive research methodology, it is proposed that the above constraints can be overcome as follows:

Through the practice of planning to be undertaken as a design science initiative, allowing for the presence of a ‘flexible and adaptive planning and development space for knowledge construction and sharing’ at all levels, and between levels of T&C planning in Malaysia (see Figure 1). This being the context for a dynamic inter and intra level iterative planning practice that can accommodate multi-model planning practice, such as New Urbanism Model and the Collaborative Model.

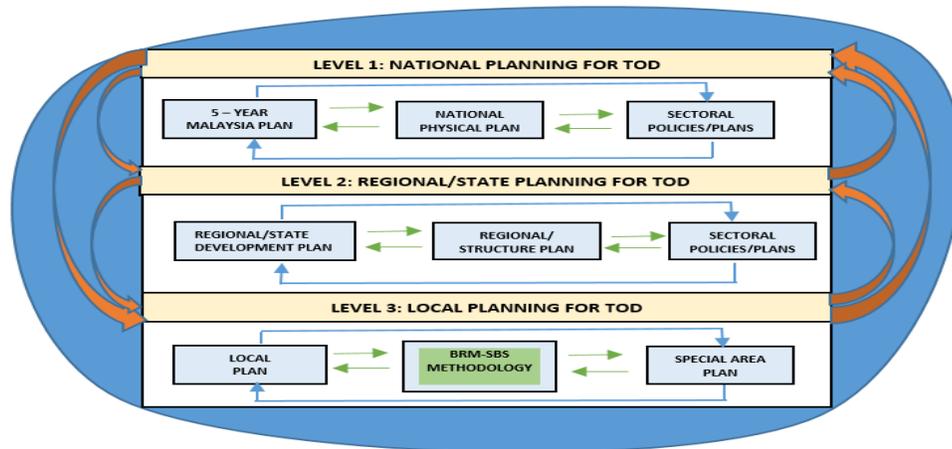


Figure 1: The Bottom-up Integrated BRM-SBS Planning & Development Model

Within this proposed space, TOD planning is to be optimized based on utilizing the principle of Target Value Design (TVD) and Set-based Design (SBD), mobilized through a Benefits Realization Management (BRM) structuration programme that supports sustainability system design that can maximize benefits for better delivery of TODs. Although this paper focuses on T&C planning with respect to TODs, this constructive design science approach can be implemented as a BRM Set-based Systems (BRM-SBS) planning methodology for T&C planning, in general (see Figure 2).

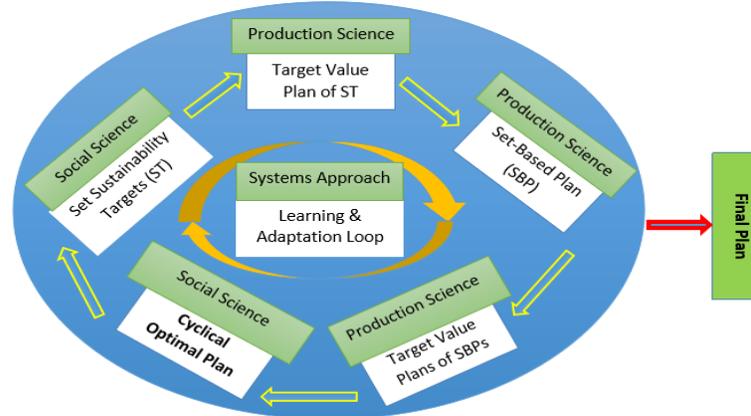


Figure 2: The BRM-SBS Methodology

## A DESIGN SCIENCE METHODOLOGY

The work of Tillmann et al. (2010) forms the basis of the mobilization frame with respect of planning to be undertaken within a Benefits Realization Management Programme that is based on the fundamental Plan-Do-Check-Act cycle. However, here the emphasis is on Benefits Maximization. Following Tillmann et al. (2010), the three theoretical perspectives offered under a design science approach to BRM for construction projects is proffered as a mobilisation frame. The three perspectives of social science, production science and systems thinking form the action frame underpinned by the concept of setting targets based on Target Value Planning and Development (TVPD) approach (see Figure 2). The concept

of TVPD that is applied here is similar to that of Target Value Design (TVD). For planning of TODs, infrastructure is the critical component and the focus is on land transport; primarily that of rail transport. This planning model for value delivery is based on a bottom-up approach that is to be undertaken by the local authority, wherein cost targets (one of the main barriers to sustainable planning, design and construction) are planned for. Following Macomber et al. (2012), in their reference to TVD, the aim here is similarly to have TVPD that transforms the current planning and development practice of TOD upside down, wherein the costs determine the plan and development instead of vice versa.

According to Miron et al. (2015) the TVD approach enables a project environment with favourable characteristics to generate value. Following Tillman et al. (2010), the proposal here is to take a similar TVPD approach, making the key stakeholders as important participants of the process, and enhance the stakeholder-planner/developer relationship through a structured Benefits Realization Management Process (BRMP). BRMP will enable the attainment of value maximization from planning through to development. This planning and development space is to be realized as a matrix organization, conceptualised in Figure 2 within the BRM-SBS methodology. For this to happen, the process of planning and development needs to be undertaken based on applying complementary planning theories rather than relying on the dominant rational planning model. Thus for optimal value delivery, the planning and development of TODs has to be complemented with a collaborative, new urbanism and just society theoretical grounding. Ideally, this should be undertaken at a regional level, as TOD within just a 4 mile radius does not allow for continuity. Currently, the focus of the local authorities in Malaysia is just a 1km radius. It is proposed here that the BRM-SBS planning model, needs to be introduced and practised at the lowest special area detail planning level before being undertaken at a regional level, as a bottom-up approach, based on wider metropolitan areas.

The rationale of resorting to the Set-based Systems approach is based on the current failings of having a singular TOD plan that limits the opportunity to leverage on best value alternatives. The SBS approach follows the principle of Set-based design (SBD). SBD is a lean design management strategy to promote delaying design (and development) decisions until necessary (in this case for TODs) in order to allow time for a team to explore and evaluate as many feasible design solutions as possible (Lee et al. 2010).

## **DATA INTERPRETATION AND DISCUSSION ON PLANNING OF SUSTAINABLE TODS**

The primary data to construct solution-based knowledge on planning and development practice with regards to TOD is based on content analysis of transcribed interview data from four respondents. R1: deputy director in the department of town and country planning; R2: planning officer of a major transit agency; R3: the R&D officer at the National Structure Plan organization and R4: the senior staff of Stakeholder Management & Communication Iskandar Malaysia Bus Rapid Transit. Whilst verification of TOD sustainability benefits was undertaken based on analysis of questionnaire survey data obtained from the transit community. Based on analysis of the data on agreement as to the sustainability benefits to the transit community at KL Sentral TOD (from a personal and

general perspective), there was agreement to over 90% of the listed benefits collated from extant literature. This indicates that TODs are intrinsically aligned to sustainability. However, it is clear that TOD planning is rather a “new” development strategy that is being explored by T&C planners and urban designers, rather cautiously undertaken in a rather ‘experimental’ manner. There are no clear targets, such as strong sustainability targets, except a checklist to demonstrate sufficient compliance to the 9 principles of TOD. Hence, TOD planning is often subsumed under the wider, mainstream T&C planning practice, that is driven by the dominant rational planning model.

Based on analysis of data provided by R1 (additionally, scrutinized based on printed reports), it is evident that TOD is a “new” feature of development planning in Peninsular Malaysia. The description of T&C planning by the research respondents R1 and R2 fit with that of a rational planning approach, which is perceived as being the dominant practice by the public authorities in Malaysia. R1 and R2 agree that predominantly, the approach to planning in Malaysia has been to integrate land use mainly with road networks. This traditional form of transport planning and land use practice has mainly contributed to urban sprawl. Historically, road transport planning seems to have had a prime influence in terms of plot density ratios, contributing to urban sprawl with lower population density. Currently, in Malaysia, road transport planning and development plans as well are very much focused on the hierarchical approach of masterplan, regional, then district and eventually area planning based on the rational planning model.

This form of public authority-oriented urban planning, which is predominantly a top-down rational planning approach, was initiated in the 1950s and is considered as one of the major traditions in Planning Theory (Fainstein 2000). The rational model approach features strongly in the development of the Malaysian national physical masterplan, although some elements of the collaborative model, in terms of a less inclusive stakeholder participation is favoured on a discrete and not so continuous basis. This model does allow for the possibility of having a more integrated planning approach. Elements of the collaborative model are progressively being subscribed to alongside the rational model as evidenced in tackling the much more complex planning scenarios and those that involve ‘novel’ development concepts. An example of such a development is that of the Iskandar Regional Development (IRD) in the South of Johor state in Malaysia; which is relatively complex development and hinges on a more integrated land transport and development planning strategy (as described by R4) within a larger metropolitan area.

The main considerations for proposing and planning for TODs is the population density within the catchment area. The area can have a maximum plot ratio of 8:1 (revised from 4:1) and the land area for the transit station identified as TOD potential to be more than 2 acres. The prime attraction for involvement in TOD development from a private sector perspective is currently that of profit maximization, as it allows for higher population density development. The private developer’s application for approval of proposals within TOD designated transit-station area for development is currently based on a rating mechanism, that prioritizes reduced parking provision, green buildings and requirement of 60% open area. The state of Selangor in Malaysia has prepared a report that identifies potential TODs. Based on the report, 88 areas with existing rail and bus transit nodes have been identified as having potential to be developed as TODs based on the Land Use &

Public Transport Accessibility Index (LUPTAI) technique. This approach tends to lead to a singular TOD plan, arising mainly out of a rational theoretical modelling technique that is focused on standard benchmarks, lacking a customized systems-based adaptive plan that can realize potential for optimizing sustainability benefits.

It is noted by Ahmad et al. (2013) that town planners in Malaysia need to have stronger collaborations with players that can contribute to sustainable development. It is clear from content analysis of primary interview data and secondary data sourced from national, regional structure plans, state and local authority plans that Malaysian T&C planning practice is based on a very specific hierarchical rational or logical theoretical planning perspective that is constrained by classical economics principles of exacting wholly outcome-based measurables that are short-term. This approach intrinsically does not allow for incorporating considerations on integrative and adaptive planning that needs to be considered under the banner of tackling complex and dynamic development systems and complex sustainability concepts, as is observed in the case of TOD implementation. Although the TOD concept is essentially founded on key sustainable development principles, currently the approach to TOD in Malaysia, at its best, is more aligned to weak sustainability practice. The fundamental problem of using a “one size fits all” approach to planning and development of TODs (both in terms of the theoretical planning model and also type of TOD) in Malaysia has put a strangle-hold on sustainable TOD planning and development, resulting in a black box planning environment.

The conceptualization of a solution to overcome the above mentioned problem is based on a constructive research design methodology, focused on overcoming the three major constraints in current T&C planning and development practice affecting TOD. It is thus proposed that value delivery and attainment of the wider sustainability benefits in the planning and design/development of TODs can be secured by applying the principle of Target Value Planning and Design/Development (TVPD) approach within a Set-based Systems (SBS) planning strategy, mobilized through a benefits realization management model, termed here as the BRM-SBS methodology.

## CONCLUSION

The current approach to town and country planning is seen as an overly-institutionalized endeavour that more readily caters for satisfying weak sustainability targets. The proposed Benefits Realization Management Set-based Systems (BRM-SBS) planning and development methodology can pave the way for, not only maximizing TOD sustainability benefits, but to also unlock the potential for addressing other systemic inefficiencies within T&C planning and development space.

This conceptual BRM-SBS methodology that is centred on a TFV target value design and development strategy is the research outcome of the initial phase of a wider constructive research to be undertaken with the R&D section of the National Structure Plan. The extended action research project will be piloted with a particular local authority in Malaysia as a bottom-up approach. The final phase of the constructive research process aims to test the BRM-SBS methodology and assess the results of the implementation.

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