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## Interrelationships between Public Open Space, Common Pool Resources, Publicness Levels and Commons Dilemmas: A Different Perspective in Urban Planning

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### ABSTRACT

Public open space (POS) is central to the environment, and oftentimes spatial and architectural designs are emphasised in urban planning as part of creating quality POS. However, such initial design and planning of POS may not adequately encapsulate the sustainability dimensions of the complex social-ecological behavioural patterns of POS consumption and management, hence resulting in space mismanagement, underinvestment, and quality degradation. This phenomenon is particularly true and relevant in the context of government/state-owned POS. Therefore, an objective of this perspective paper, coupled with the concepts of the publicness levels, is to provide a different understanding of exclusivity and subtractibility natures of POS, primarily using the theory of common pool resources (CPRs), which subsequently helps explain and rationalise the perennial, adversarial POS management, quality and sustainability status quo. This paper reveals that, instead of being considered as pure public goods, scarce POS owns two inherent attributes of CPR, namely non-excludable and subtractive (rivalrous) that are ultimately susceptible to social/commons dilemmas, covering the Tragedy of the commons (overexploitation), management shirking, free-riding, underuse, disuse, and moral hazard, which lead to degraded, unsustainable POS. The commons or CPR theory can indeed offer a new paradigm shift, making urban planners and landscape managers to embrace that the unexclusive natures of CPR-based POS are truly finite and depletable and thus vulnerable to POS dilemmas. Hence, to achieve quality, sustainable POS commons, effective governance in terms of consumption and consistent management is vital. For future research, urban design as a necessary societal role is suggested, which has established the need for effective allocation of POS management via an adaptive institutional property rights design.

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### 1. Introduction

Local governments are mandated, through the collection of taxes, to provide and manage various public/civic goods, which are essential to serve as a public purpose, and one of them is

public open spaces (POS) (Tiebout, 1956). POS can be defined in wide arrays of definitions, categories, and functions (types of activities and facilities), e.g., recreational park, sidewalk, playground, green space, community garden, semi-active space: basketball court, promenade, revitalised brownfield land, active

and passive spaces (Onwuanyi & Ndinwa, 2017; Ling and Pung, 2019). In recent years, research on equitable, sustainable management and provision of POS has grown tremendously as it has evidently rendered various ecosystem services and portrayed significant roles in achieving sustainability and the quality of life, mainly contributing to the 11th and the 12th Sustainable Development Goals and the New Urban Agenda.

There are many studies undertaken on the protection and preservation of POS quality and sustainability, encompassing perception and socioeconomic features: attitudes (preferences) of stakeholders towards POS protection (Broussard et al., 2008; Maruani and Amit-Cohen, 2011), public participation in planning policy (Steelman and Hess, 2009), spatial and architectural POS design and planning models (Maruani and Amit-Cohen, 2007; Colding et al., 2013), and “conventional” state planning policies with edict (Koomen et al., 2008) and critical planning policy implementation and enforcement (Bengston et al., 2004). However, the issues of notably state-owned POS quality with respect to over-exploitation, misuse, underinvestment, and mismanagement, including vandalism (broken POS facilities), graffiti, inaccessible spaces, exclusion, illegal land and space (POS) conversion (e.g., to commercial spaces), insecure and unsafe spaces, cleanliness, congestion, poor landscaping and squatters settlement encroachment issues, are growing and prevalent, especially in developing countries of Southeast Asia including Malaysia, thereby causing POS negative externalities and market failures (World Bank, 2015; Ling et al., 2016, 2018; Foster and Laione, 2016; Ling and Leng, 2018). Thus, a question is posed, i.e., why are POS issues still rampant and occurring, despite the above research undertaken?

The posed problems of such domestic Tieboutian modelled or government-owned POS are closely associated with governance, consumption and management issues (i.e., post-design stage), rather than ab initio design-based issues. Many urban and rural POS in terms of its spatiality (e.g., location, shape, and size) and architecture have been strategically planned at the beginning of the design stage, and the provision of facilities and amenities is sufficient, which overall give quality, inviting spaces. However, such good condition and quality of scarce POS may not sustain due to asymmetric and heterogeneous consumption and management behaviour issues of individuals (Poklembovai et al., 2013; Ling et al., 2016). That is the following questions should be identified and reflected on: What will happen after the spatial and architectural design stage of POS? Is there any efficient enforcement and mechanism used to govern the space, particularly on its consumption and management? Certainly, the design stage (pre-condition) is important as part of provisioning good quality of POS, but what makes POS quality sustained? This post-design and planning issue is more critical and imperative as this involves long-term and complex social-ecological process and interaction, which are often uncertain and conflicting in nature. As Poklembovai et al., (2013) asserted, “Successful physical spaces are dependent on the performance and legitimacy of spatial management processes and practices... Planning and implementation are the initial phases, but public spaces are continually co-created by their users.”. As such, to answer the above questions, a transdisciplinary approach is necessary.

Methodologically, the institutional-social-ecological system by Ostrom (2009), the theory of commons or common pool resources (CPRs) (Ostrom, 1990), and the concepts of social dilemmas (Kollock, 1998) and negative externalities were reviewed and adopted in this perspective paper as analytical frameworks to shed light on the current POS governance issues. By looking into the natures of publicness (exclusivity) and rivalrousness (subtractibility/contestability) of POS, the objective of this paper is to establish causal mechanisms, linking types of economic goods (CPR), governance (consumption and management), with resources quality and sustainability outcomes. In other words, this study can be of significance and practical because it essentially showcases how the above CPR theory and its associated concepts (social dilemmas and the social-ecological system) explain and rationalise the status quo of perennial, adversarial POS management and quality issues. More precisely, the main arguments and findings suggested at the end of this study are that via the unexclusive and rivalrous CPR natures discovered in POS with different publicness levels such spaces are argued to be prone to various commons dilemmas and negative externalities. The above theoretical underpinning (via political-microeconomic perspective) by Nobel laureate Elinor Ostrom was chosen because it has proven to be robust and influential in addressing the above POS negative externalities, which are related to consumption and management issues. Based on the literature review, it is, however, found that human-nature (POS) interaction issues to be analysed within the lens of the social-ecological framework have been considerably overlooked in the planning theory (see Elmquist, 2014; Lai, 2014).

More precisely, the knowledge and application of the commons or CPR in the context POS planning and management (called new commons) are still limited (Colding et al., 2013; Nagendra and Ostrom, 2014; Brown, 2015; Foster and Laione, 2016; Ling et al., 2016; Ling and Leng, 2018). Although the literature on natural resources (old) commons and CPRs (e.g., agriculture and fishery) is copious, it remains a challenge to transpose CPR insights into the urban and neighbourhood-residential resources context in a way that captures the complexity of the urban-neighbourhood, the way that density of an land area, the proximity of its inhabitants, and the diversity of users interact with a host of tangible and intangible resources in neighbourhood-city areas (see Borch and Kornberger, 2015). As such, there is a need to diversify the current mainstream environmental planning system; it is crucial to embrace the idea of ‘planning POS with commons in mind’.

The remainder of the paper is structured as follows: (i) Commons/CPR in the POS context, in which, aside from the definitions of POS and conceptualisation of CPR in POS, the typology of economic goods is also employed to explain differences among the goods; (ii) The publicness (sharedness) and exclusivity concepts of POS (i.e., public realm versus public domain versus local public goods); (iii) Implications of CPR-based POS using the social-ecological system and social dilemmas perspectives; and lastly (iv) Conclusion consisting of lessons learnt from the institutional-economic field in POS planning, and of future recommendations.

## 2. Public Open Space (POS) as a Commons/CPR

First, we need to define what ‘commons’ is. The concept of commons is multidisciplinary as it attracts various scholars from different schools of thought (especially economists, property theorists, and commons theorists), whom have diverse definitions and understanding of commons. The term commons can either be deemed or interpreted as common-property resources (as a property right regime that belongs to one group/community, specifically- known as common property regime) or common resources (as a resource domain/system) (Hess and Ostrom, 2006). However, it seems that the latter is more widely accepted and applied even by institutionalists and property theorists in their scholarly works. As asserted by Bromley (1992), “...there is no such thing as a common property resources...”.

Thus, commons are a general term that refer to the resources shared (collectively consumed) by a group of people, in which each of them has equal interest. Campbell and Wiesen (2009, p. 11) stated that commons are “publically accessible, nonexcludable, and managed through shared governance”. In a simpler word, commons are a shared resources system (Hess and Ostrom, 2006), or they are a “shared heritage of us all” (Hess, 2008), governed by any form of a property rights regime/system (Ostrom, 2002). Once again Ostrom’s argument has drawn a clear, distinctive line between a resource system and a resource (property) regime. This is vital and worth noted because some confusion and misconception occurred over the sharedness (publicness) of commons, which can be discovered in the notable illustration of the seminal theory “Tragedy of the Commons” which erroneously considered commons as total ungoverned, unrestricted, open-access grazing land (as a type of property regime), rather than a resource system (Ciriacy-Wantrup and Bishop, 1975).

Thus, since POS is a collectively consumed resource, it is conceptualised as a commons, more specifically, as an urban commons or neighbourhood (hometown) commons, depending on the settings, which both are part of new commons (Hess, 2008). Such neighbourhood commons or urban commons encompass various civic spaces, including playground, streets, recreation areas, parking space, community parks, gardens, urban public spaces, streets, public roads, recreation areas, football field and basketball court, etc. (Colding et al., 2013), and they can be regarded as POS. Thus, the two terms (POS and commons) are used interchangeably in the paper.

Most of the collectively consumed goods (e.g., forests, roads, pastures, air, river, and sea) are scarce goods, like POS in this context. Based on the typology of goods theory (Ostrom and Ostrom, 1977; see Webster, 2007) (Table 1), the majority of natural resources/commons including POS can be categorised as common-pool resources (CPR), instead of fictitious pure public goods (e.g., non-rivalrous and non-excludable lighthouse and fireworks- see Webster, 2002 on existence value).

**Table 1** Excludability and Rivalry Levels of Four Different Economic Goods

|                  |      | Exclusion  |  |
|------------------|------|--|--|
|                  |      | Difficult or costly  | easy   |
| Consumer rivalry | high | Common-pool resources (e.g., forest, pasture, ground-water aquifers)     | Private goods (e.g., timber, Christmas trees)                                |
|                  | low  | Public goods (e.g., biological diversity, protection against avalanches) | Club or toll goods (e.g., forest road, recreational facility, national park) |

Source: Gluck (2000)

With different types of goods, including pure public goods, club goods, and private goods, and their respective examples, the above table provides clearer understanding on the notions and levels of subtractibility (rivalry) and excludability characteristics of CPRs. As Nobel Laureate Lin Ostrom posited, regardless of the property rights structure, a CPR is frequently denoted as a resource domain, featuring two inherent attributes, namely excludability — the obstacle of restricting (regulating), whether physically or institutionally, individuals from accessing and using resource units from the resource; and subtractibility — once an individual harvested the profit (benefits and enjoyment) of resources, they are not useable anymore by other users (Ostrom, 2005). Although Table 1 shows that a recreational facility and national parks are entrepreneurial club goods (with low-cost exclusion and low rivalry), due to the payment system resulting in exclusion, such POS goods can also transition into CPRs, owing to institutional (property-rights) and spatial factors which are partly discussed in the next section (see Webster, 2002; Webster’s 2007 on the transition fluidity of economic goods). Regardless, focusing on the CPRs system and conceptualising the concept of the CPR within a complex social-POS system, it entails that CPR-based POS requires high cost and is difficult to exclude or control users (either residents or non-residents/non-citizens) from accessing and consuming POS and its units, including POS conditions and quality that involve the availability of POS facilities and amenities, functionality, landscape, and cleanliness and safety and security of POS surrounding. Secondly, such scarce POS units in terms of quality and quantity/provision can be fugitive and are diminishable, because once POS conditions are not well-maintained or overused by an individual, and its provision is not replenished, only poor POS quality (e.g., cleanliness and safety issues) and unusable POS facilities (e.g., unavailable basketball court and loss of POS) are available to others (see more in social dilemmas in the later section).

## 3. ‘Publicness’ of POS: Public Domain, Public Realm and Local Public Goods

Since the non-excludable attribute of CPR- or commons-based POS is synonymous with the general concept of publicness/sharedness, it would be helpful for this paper to deconstruct and theorise about the vague and unspecified concept of unexclusiveness (publicness) of urban and

neighbourhood commons/CPR, using Webster's (2002) theoretical literature of public domain, public realm, and local public goods. By providing the definitions and importance of each publicness concept below, in this paper, we explain how those economic publicness concepts are interrelated, and how they are conceptualised into the urban and neighbourhood commons (POS) planning context. Such publicness analysis is indeed essential because, without the identification of publicness forms and levels, one cannot accurately distinguish to what extent, and what form of, the publicness (unexcludability) of the CPR-based POS is. Different publicness levels and forms may, in essence, and arguably lead to different rivalrousness or congestion levels of POS (Webster, 2002; Webster, 2007), which may consequently contribute to different implications on the behavioural consumption patterns of users, and may therefore account for and result in the aforesaid CPR-POS quality issues (Colding et al., 2013; Ling et al., 2016). Having said this, we, however, have not attempted to causatively and precisely determine which publicness of commons will always have greater contestability and rivalrousness, nor have we identified which publicness level is more prone to, or ensues in, severe overuse and other commons dilemmas. In light of the above, we did, however, provide evidence and arguments to the claims on the interrelationships between CPR publicness levels and vulnerability of commons dilemmas in more indicative and deductive manners. Regardless, what is more important is that the effort of identifying the forms and levels of publicness is consistent with Colding's et al., (2013) position that it is erroneously fallacious and deceptive always to equate commons or CPR with open public space.

Public domain is, as defined by property theorists and economists, "...a sphere of resource consumption within which consumption rights remain unallocated" (Alchian and Demsetz, 1973; Barzel, 1997). See also Allen (2002) that public domain is equivalent to having open access to the resource. Webster (2002), similarly, in his own words, maintains that public domain is "Attributes to which rights are not assigned by formal or informal contract are said to be in the public domain, and are potentially the subject of competition. The public domain is therefore the domain (spatial or otherwise defined) within which competition occurs in the consumption of attributes...Because it is too costly to establish property rights over every attribute of a good, some will inevitably be left in the public domain." Webster continues by implying that public-domain POS means the rights to consume a benefit of the POS are unassigned, whereby a general public (or outsiders/non-contributing users/non-citizen) may have access to it. See Ling et al., 2016 for Sabah's public-domain POS that even Filipinos as a non-citizen can have access to the urban park, as transaction costs for rights assignment and enforcement are high. In the absence of allocated use rights, more resources entailing high transaction costs (e.g., monitoring and physical barricade) are required to protect and manage scarce public-domain POS, and this is assumed to be inefficient because POS is likely to be degraded and its dissipation costs (e.g., queuing, conflict, adopting an inconvenient trip manner, and inaccessible POS) are accruing to no one.

While, public realm is a "spatial domain within which de facto or de jure economic or legal consumption rights over a local public good attribute are shared by all individuals within a city...there exists a group of consumers-noncitizens-to whom property rights over the public good attribute are denied" (Webster, 2002). Similar to public domain, although public-realm POS facilities (e.g., sidewalks, benches, green spaces, and pavements) consumption right is assigned to specific groups of individuals within a city or a neighbourhood, within the very same groups of consumers, they usually cannot prevent the inclusion and seclusion issue; thus, such public commons are also subject to rampant competition. As such, to control public realm and public domain overcrowding issue, they exclude other individuals using a rationing approach, i.e., by costs, the money or time costs of travel, or by congestion (itself a form of cost) (Webster, 2007). Except for few urban/civic POS located in a city centre, which may cater uniform benefits of facilities and services to a large number of urban folks, most spaces give greater levels of enjoyment (use) and access to those living nearer. This type of resources is similar to the case of Tieboutian local public goods, such as urban parks for some city dwellers and neighbourhood community parks in housing estates. The neighbourhood and urban commons are considered as the resources with distance-attenuated attributes and benefits; such POS provides greater levels of enjoyment and consumption to those residents living closer. In respect of a congestion issue, since Tieboutian local neighbourhood POS access and use, espousing local planning standards, are only catered to a community who lives nearby the neighbourhood, the provision (supply of space quantity), in principle, is sufficient, unless the particular local community park is unique compared to other local parks that attract other neighbourhood residents to use and over-occupy it, which then creates a congestion (overuse) issue.

From the publicness definitions, there are interrelationships among the 'publics'. Most of state-owned CPR resources like urban spaces, street walk, and public parks are considered public domain (unassigned consumption right), from the property rights perspective, but due to the cost of spatial extent involving distance, travelling, congestion (a form of exclusion), only certain individuals have greater access to the resources, such public-domain space is a form of local public goods to them. This entails that local public goods can always co-exist and are benefitting certain groups of users with closer proximity. Similarly, due to distance and travelling costs (proximity), the local POS with the distance-attenuated attributes are found in a public realm. The public-domain POS (e.g., community park, neighbourhood playground, and urban park) is de facto fragmented/transitioned into public-realm local goods, when the economic use right is assigned by distance and is reinforced by informal institutions (e.g., practice within a community). Also, it is worth noted that a public realm may de facto become a public domain, once the assigned consumption right of the former is not enforced effectively.

To sum, the publicness concepts of CPR-POS are various and are considered as a continuum (i.e., public domain may transition into public realm and vice versa) (Webster, 2002), due to the spatial concern and institutional factors (rights

assignment and rights enforcement). Also, due to spatial/distance factors and exclusion costs, spaces either within public domain or public realm are considered as local public goods to some users who are closer to them. It appears that a public-domain space may exert a greater congestion level facing severe resource degradation compared to local public goods in public realm as the former is subject to a larger population and therefore greater competition among them for quality POS facilities and amenities (Webster 2002, 2007). However, this assumption is served as instrumental for the quantity aspect of POS provision or level of contestability measurement, instead of POS quality and individuals' consumption behaviour, and the claim by Webster may not always be generalisable and true in reality, if some circumstances are met. In Webster's (2002) study, he argued that public-domain spaces (e.g., on-street parking space as local public goods) can be efficient, so long as it is below the congestion level (i.e., consumption demand for POS is lower than supply).

Moreover, despite consumption right assignment for public-realm space and the distance-attenuated benefits of a local neighbourhood park, since both are having a difficulty in excluding other individuals' use, both spaces are also vulnerable to a certain extent of congestion and degradation (quality) (Webster, 2007; Foster and Laione, 2016; Ling et al., 2016). More interestingly, according to Ling's, (2017) finding, local residential community parks (public realm-local public good) are more prone to congestion and other forms of quality degradation, compared to public-domain civic spaces in the city centre. Irrespective of any levels and forms of publicness of urban and neighbourhood commons (be it public-realm or public-domain local POS), it is discovered that those 'publics', to certain extent, are subject to their respective issues of congestion (undersupply of POS and its units in terms of its quantity) and other negative externalities. The questions of vulnerability/susceptibility and the severity of congestion, competition and other forms of negative externalities among public realm, public goods, and public domain still remain inadequately answered, using only the publicness analysis above.

That is, aside from POS congestion issues that can be well-explained by the publicness levels of CPR (i.e., more of quantity provision rather than quality aspect of POS), to offer more holistic analysis and explain better the above POS quality (post-design) issues (e.g., vandalism, illegal conversion, broken facilities and amenities, and poor cleanliness), one should look into the publicness issues of commons, based on a case-by-case basis. We argue that those issues are fundamentally boiled down to CPR rivalrous/depletable and non-exclusionary (publicness) attributes, which are associated with a selfish and opportunistic behaviour within a social-ecological interaction. Hence, we employ the social dilemmas theory below to explicate the CPR issues.

#### 4. Social Dilemmas and Negative Externalities of CPR-POS

Within a complex, large social-POS system, involving multiple interests and stakeholders (e.g., local authority, land officers, and residents/users) and conflicting decision making, it is challenging and difficult to govern and manage the shared commons (i.e., CPR-POS). Rested on the neoclassical economic premises and theories of self-interestedness (rationality maximisation), opportunism (Williamson, 2002) and social dilemmas, we showcase what are possible commons dilemmas involved in the CPR-POS context, and how CPR-POS is vulnerable to numerous social (commons) dilemmas and negative externalities (i.e., how selfish and opportunistic individuals are depicted in a social-POS system). Prior to the detailed discussion of the above questions, the definitions and background of self-interest, opportunism and social dilemmas are provided foremost.

Self-interest (selfishness), a sole intention of human behaviour from an economic lens, refers to individuals who inevitably behave rationally to maximise their advantages (welfare and utility). This concept is relevant to a social-ecological system, where defective self-interested individuals may cause unrestrained pollution and commons degradation (Musole, 2009). Building on the self-interest concept, opportunism provides more accurate understanding with respect to social-ecological behaviour and their decision-making (Williamson, 1975). As Williamson averred, opportunism entails "...self-interest seeking with guile...", in which opportunistic individuals (residents or POS users) tend to pursue their personal interests, whereas breaking their covenant (promises), e.g., neglecting their POS management and maintenance duties and attempting to go against the policies/regulations of POS via vandalism and illegal land use change.

There is a connection between social dilemmas and self-interest based opportunism; the former (self-interestedness and opportunism) are inherent in social dilemmas (latter). A social dilemma is an interdependent decision-making situation where "individually reasonable behaviour leads to a situation in which everyone is worse off than they might have been otherwise" (Kollock, 1998, p. 183). An interaction in social dilemmas is characterised by a conflict between an individual's desire to maximise personal (selfish) interests and his or her motive to maximise collective interests (Rapoport, 1998). Inclination to prioritise and maximise one's interest and advantages is seen as a defective self-interest choice (a dominant strategy), while predisposition to maximise the advantage of the collective interest is considered as a cooperative choice (a less preferred strategy). Individuals always receive a higher return, at least in the short run, when they act opportunistically by making a defecting choice. However, if all individual involved make a defecting decision, all will suffer in the end, and this is called Pareto inefficiency. This phenomenon is illustrated in the game theory/prisoner's dilemma analogy. For the sake of own benefits, a prisoner is likely to act selfishly by defending themselves to get acquitted and start accusing the other prisoner, whether it is done deceptively (opportunistically),

which such choice will compromise the other individuals (collective interest). As such, conceptualising the social dilemma theory and the game theory in the commons or POS context, below are some examples of CPR dilemmas faced with respect to POS management (give-some dilemmas) and overconsumption (take-some dilemmas) issues, whereby the aforesaid prisoners can be analogous to POS users and managers (Ling, 2017).

CPR-based POS is vulnerable to overexploitation; open-access/public-domain POS are “classic sites for tragedy” (Ellickson, 1996). Ignoring resources carrying capacity and quality, selfish POS users may maximise their use right for their personal enjoyment and satisfaction or for profit generating. For instance, by occupying POS longer, or via the improper use of POS (misuse) and illegal POS conversion to commercial land use (Ling et al., 2016), all these consumption behaviours ultimately cause the spaces inaccessible and unusable by others, and these negative effects are a form of exclusion — whether temporarily or permanently. Overexploitation can also be exemplified in the Tragedy of the urban and neighbourhood commons metaphor (see Hardin, 1968). Hardin (1968) illustrated the consequences of overuse that can be resulted when rational and self-interest individuals share access and consumption to a common resource (POS). He further analogised and argued that “...freedom in commons brings ruins to all... Therein, lies the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited”. In short, it is a circumstance where, due to the incomplete or ill-defined property rights of open-access or public domain POS, individuals are granted with inexhaustible use and access rights (freedom) to POS without any cost-effective mechanism to monitor, manage and regulate others' uses; thus, the rivalrous POS is doomed to overexploitation, ensuing in resource degradation.

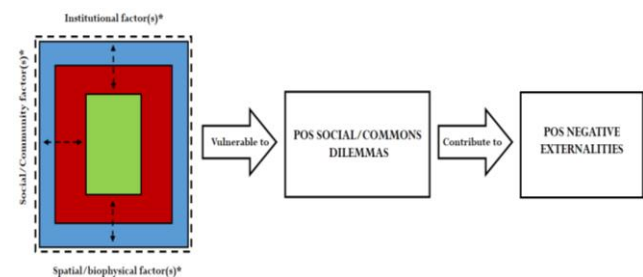
Besides, public domain/public realm CPR-POS is also susceptible to a free-riding issue, which is also a form of overexploitation. Paying tax to the local government for POS management is necessary; however, there are individuals, e.g., squatters and outsiders who benefit from POS facilities consumption do not contribute any or equivalent tax and fees. More vitally, they are not prohibited to use POS, subsequently externalising congestion and other social costs that cause other contributors (legal users) to unlikely contribute. The phenomenon is considered as shirking (or a give-some dilemma), where individuals are more often to under-contribute because they fear that others will free-ride on their contributions (McCarter et al., 2014; Ling et al., 2016). At the same time, from the local authority's angle, who has the legal POS management duty, such POS is also vulnerable to shirking and underinvestment (give-some dilemma), due to limited resources (e.g., time and workforce). They (managers) may behave opportunistically or selfishly by neglecting the non-pecuniary POS management maintenance and monitoring duty. Ultimately, such CPR-based POS which normally subjects to overuse may likely to face disuse and underuse issues (Miyana and Shimada, 2018). It is not surprising that, compared to income-generating businesses, they may deprioritise






environmental goods and provide less maintenance for such non-pecuniary CPRs.

Last but not least, associated with overexploitation and shirking issues, moral hazard is also discovered in state-owned public domain CPR. Since public domain POS ownership and management rights are both held by the local government, self-interest POS users and residents are not incentivised to manage risks or care of their own defective consumption behaviour nor do they help monitor and watch over the improper use of POS by other users. As the above tasks may require some forms of costs (e.g., extra effort, attention and time investment), and most notably, the commons are not belonged to the users, hence they could care less of the POS condition and quality.

The above POS dilemmas will be worsened and more pronounced if more opportunistic behaviours posed and the number of users (competition) escalate; they may lead to other dilemmas, and more negative externalities and social costs will ensue (e.g., vandalism, poor landscaping and cleanliness issues, paper park, misuse or illegal conversion of POS uses, congestion, conflicts among residents, dissatisfaction and discomfort) (McCarter et al., 2014). This situation can be illustrated in Wilson and Kelling's (1982) broken windows theory. Their theory associates the small issues and dilemmas of a neighbourhood community/city with more serious co-occurring dilemmas. For instance, the shirking of POS management and maintenance that cause poor cleanliness, landscaping and total disuse and underuse (space abandonment) issues may lead to severe forms of overexploitation, such as free-riding, which then contributes to safety and security issues (criminal activities, e.g., loitering and panhandling issues) and private physical exclusion that cause de facto inaccessible private spaces (Ling and Leng, 2018; Ling et al., 2016). Whether it is self-interested or opportunism triggered CPR POS dilemmas, this does not entail that CPR (resource) is always a problem per se; instead, it is essential to identify the factors (e.g., institutional design or physical characteristics) that are possible to cause and aggravate the present commons issues (Ostrom, 2005; Webster, 2007).

To recapitulate the above new institutional economics theories and concepts in the POS setting, covering the social ecological system, CPRs, social dilemmas, and negative externalities, and their interconnections (i.e., how and why CPR-based POS are vulnerable to POS commons dilemmas that subsequently lead to degraded and unsustainable POS), a graphical illustration (i.e., a conceptual framework) is presented below (Figure 1).



| Indicators  | Descriptions   |
|---|--|
|  | <b>CPR-based POS</b> encompassing three different levels of publicness, which are <b>vulnerable to</b> various POS commons dilemmas (e.g., overexploitation, free-riding, moral hazard, shirking, underuse, and exclusion). These CPR-triggered POS dilemmas <b>contribute to</b> negative externalities (poor quality, unkempt, inaccessible, degraded, unsustainable POS). |
| *   | The natures of CPR and publicness of POS are influenced by institutional (e.g., property rights), social and spatial/biophysical (e.g., location and proximity) factors.   |
|  | <b>Public-domain POS</b> (for anyone, with large and undefined population) covering public realm and local public goods.   |
|  | <b>Public-realm POS</b> (for citizens/residents with smaller and more defined population) covering local public good of POS.   |
|  | <b>Local public goods</b> can co-exist under both public domain and public realm and such POS is for certain citizens/noncitizens who particularly have closer proximity to local urban-neighbourhood POS.   |
|  | Transitions of publicness levels between public domain and public realm, due to institutional social-ecological factors.   |

**Figure 1** A conceptual framework linking CPR-based POS with commons dilemmas that contribute to POS negative externalities

## 5. Conclusion

To conclude, the objective set in this study has been achieved, arguing that urban and neighbourhood state-owned POS is a type of common resources (commons), more accurately as a common pool resource (CPR) which possesses two inherent natures. POS is being rivalrous (i.e., subtractible and exhaustible in both POS quantity and quality aspects) and non-excludable (i.e., being open-access to the public for access and consumption). The publicness and sharedness of POS can encompass public domain, public realm and local public goods, which all have various implications of the congestion levels. Regardless of any publicness (unexcludability) level of a CPR, as a result of the inherent rivalrousness and non-excludable attributes, as well as self-interest and opportunistic natures in a human behaviour, such POS is found to be subject to numerous commons dilemmas, including commons overexploitation and mismanagement (shirking) issues that result in POS negative externalities. Aside from offering key lessons of CPR conceptualisation and its implications to other commons settings, especially global commons (e.g., climate change and ocean pollution) and bridging the knowledge gap, integrating the social-ecological system and new institutional economics (i.e., commons, publicness analysis, and social dilemma theories) into the fields of urban and landscape planning and resource management, one can eventually understand better and have pragmatic answers why the aforementioned POS negative externalities pertaining to management, consumption, and quality issues are still occurring, despite the fact that POS has been spatially and architecturally well designed in the early planning phase. As such, the narrative synthesis of this concept/perspective paper may suffice to offer policy and management insights to policymakers (urban planners and landscapers), practitioners and consumers to re-think that common resources (POS) are truly finite, depletable and are having difficulties to exclude access and use of the (self-interest and opportunistic) public, and thus highly subject to commons dilemmas. Therefore, to achieve sustainable commons, effective governance/control in terms of POS consumption and

consistent management is vital. For future research, a rationale of urban design as a necessary societal role is further proposed, which has established the need for proper and effective allocation and governance of POS via an adaptive institutional design (i.e., distribution of property rights and transaction costs). More accurately, since state-owned CPR-based POS governance is inefficient, this demands re-alignment of the property right regime to the common-property (self-organising) regime which is believed to be more effective in managing scarce resources (Ostrom, 1990; Ling et al., 2014). By doing the latter, it provides community club goods, which have non-rivalrous and exclusionary properties. Club-POS can be more efficient and sustainable; it is less congested and provides an opportunity for better control and commercialisation (membership fees), which incentivise better management.

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