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A Parking Policy Typology for Clearer Thinking on Parking Reform

by Paul A. Barter

Abstract

This paper contends that the absence of a widely-understood typology of parking policy approaches is causing confusion in an important urban policy arena. This is apparent across the parking policy literature, both academic and practical, and across several regions. Previous typologies are reviewed and found to be either incomplete, overly simplistic, inaccurate, or failing to offer insight beyond merely describing the diversity. None enables much insight into the thinking behind each approach and reform thrust. To remedy this gap, a new approach to classifying parking policies is proposed. It is based on making explicit the contrasting mindsets behind different parking reform directions. A review of geographical diversity (both international and within metropolitan areas) is presented. This allows the value of the taxonomy to be evaluated, as well as enabling some refinements. Three main mindsets are posited, with each defined by answers to two key questions. Each mindset has contrasting assumptions about the nature of parking as an economic good. Further detail in the typology is enabled through a third dimension based on one further question. New clarity provided by the new classification approach should reduce the tendency for parking debates to be confounded by the conflation of distinct reforms, by false dichotomies and by ‘straw man’ portrayals of key alternatives.

Keywords: parking, parking policy, minimum parking requirements, policy problem framing, policy typologies

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1. Introduction

Parking for private motor vehicles presents stark public policy choices. Should parking supply be the responsibility of governments, motorists or real-estate developers and owners? How much parking is the right amount? To what extent should market forces shape the parking system? Policy responses to these questions make a huge difference for transport and for the urban fabric. However, there is much confusion over the policy choices available. Therefore a new typology of local government parking policy approaches is proposed here in order to clarify the nature of the fundamental choices.

1.1. The need for a clear parking policy classification

Unfortunately, most debate over parking proceeds without clarity on the key distinctions between policy alternatives. Protagonists in such debates often seem unaware of alternative framings of the problems and contrasting mindsets on parking itself. This state of confusion matters because parking is important in shaping both transport patterns and the built fabric.

Previous efforts to classify parking policy have been limited. Some impose false dichotomies (several different ones) that only partially or misleadingly capture variations. Local parking politics often involves ‘straw man’ caricature portrayals of alternatives. A single broad approach to parking policy, relying on minimum parking requirements, is so dominant across much of the world that it is taken as the norm. Departures from this conventional approach tend to be conflated and assumed to be essentially similar.

A North American example illustrates. Litman (2006) and Shoup (2005) both advocate significant departures from the standard practice of relying on minimum parking requirements set at cautiously high levels. So many observers tend to assume that Litman’s and Shoup’s ‘new paradigms’ are similar (Section 3). In fact, we will see that their central suggestions and key assumptions are strikingly different.

No widely-used classification of parking policy approaches has so far emerged. This paper answers that need by proposing a new taxonomy of parking policy types. It emphasises contrasting mindsets or framings, each with different assumptions about the nature of parking as a good or service. It uses two key criteria to get at the fundamental distinctions between three main mindsets, then a third dimension allows further sub-divisions within the classification. This also makes clear that there are several contrasting thrusts of parking reform.

1.2. The importance of mindsets and framing in parking policy

A significant literature emphasises the importance of policy narratives and framings for policy debates (Stone, 1988; Fischer, 2003). In urban transport policy, for example, contrasting ‘story lines’ of transport policy thinking have been portrayed (Vigar, 2002; Low and Gleeson, 2001).

Especially relevant here is literature on urban services and their contested portrayals as economic good types, with contrasting possible property rights regimes and regulatory approaches (for example, Webster and Lai, 2003). The intrinsic characteristics of a service rarely fully determine its framing as an economic good. The possibilities are influenced by pre-existing norms, legal constraints, ideology, business practices, and changing technology.

Furthermore, these framings and their associated policy regimes can be fluid, with changes over time and with variations from place to place, according to circumstances. Webster and Lai (2003) highlight fluidity in property regimes even for footways, parks, and local common property within neighbourhoods. We will see that parking exhibits such fluidity and is subject to a range of contrasting framings as an economic good in both theory and practice. This can be seen in the diversity of municipal policy approaches.

Debate participants employ narrative strategies that frame economic goods in their preferred ways, pointing to persuasive story lines and their favoured course of action (Stone, 1997). So mindsets can shape the terms of debate and our very thinking. But note too that mindsets are themselves influenced by discourse, by practice and by

context. We will also see that framings of parking are influenced by actual policy practice, by day-to-day pragmatic responses to conflict, and by diverse contexts and their evolution.

1.3. Organisation of the paper and its scope

The sequence of this paper is as follows:

- Section 2 introduces the new approach to classifying parking policy.
- Section 3 examines previous efforts to classify the range of parking policy approaches, highlighting strengths and shortcomings.
- Section 4 applies the new typology (and others for comparison) to the observable diversity of parking policy and its geographical patterns across metropolitan areas and internationally. It also argues that the new classification captures the existing diversity in parking policy more comprehensively and in a more enlightening way than previous approaches.
- Section 5 presents a more detailed version of the new typology, incorporating additional insights from Sections 3 and 4. It also seeks to demonstrate how the new typology enables clearer thinking on parking policy.

The scope here includes local government activities that plan, manage or regulate the full range of parking facilities for private passenger motor vehicles, including on-street kerbside parking, public-sector off-street parking and private-sector off-street parking, even though in practice these arenas often fall under multiple agencies. Parking for all private passenger purposes is included, including home-based parking and other destinations. The word ‘policy’ is used in a broad sense, referring to the thinking that informs local government practice, not necessarily formally-adopted written statements. Geographically, attention is focused on all parts of metropolitan areas not only on city-centres.

2. A new parking policy taxonomy based on contrasting mindsets

This section introduces a new systematic approach to classifying parking policies. Three main paradigms are identified via the answers to two carefully-chosen questions. A third dimension allows sub-categories within the three main ‘paradigms’.

Together, these three criteria or questions reveal the various mindsets associated with the diversity of parking policy approaches.

2.1. Three mindsets based on two criteria

The first of the two main criteria is based on whether parking is seen as something that should be provided on every site, or as something that can serve many sites within the surrounding area (Table 1).

Interestingly, we will see in Section 3 that this was not a primary basis of any previous classification approach. The empirical basis for this choice is the geographical pattern within many Western metropolitan areas, in which suburban areas rigidly require on-site parking but many inner areas embrace public parking in park-once districts (see Section 4). This geographical pattern highlights the significance of this seemingly mundane criterion. The mindset in which each site must provide all of its own parking supply emerges from auto-dependent, anti-urban, ‘suburban’ assumptions, including: that primarily car-based access to the site is inevitable, as well as predictable; that walking between sites is unlikely; and that spillover parking would be a problem (as opposed to normal and easily managed, as in other mindsets).

The second main criterion in the new typology is whether parking is seen as something to be planned based on ‘engineering’ guidelines (‘infrastructure’ like roads) versus seeing parking as a market good, with prices, supply and demand interacting through market mechanisms (like a real-estate based service, such as restaurants or meeting rooms).

I use the term ‘infrastructure’ here, despite the fact that it is a poorly-defined term, to bring to mind a range of goods and services with economic characteristics (market failures) that prompt them to be provided or heavily regulated by government, so that they are non-market goods. This notion also covers accessory (or ancillary) facilities or common property services within sites, such as plumbing, fire escapes, lifts and restrooms. In ‘infrastructure’ thinking, parking is an intrinsic part of the wider transport system.

This choice between ‘infrastructure’ and ‘market good’ mindsets is used as a key criterion despite the fact that market-oriented thinking on parking is a minority viewpoint (Section 3) that has a practical reality in only a narrow set of places (Section 4). Nevertheless, besides being important conceptually, this question does mark a fault-line in important parking policy debates.

Table 1 Three broad paradigms or mindsets on parking based on two criteria

	Parking facilities serve their district	Every site should be fully served by on-site parking
Parking is a market good (real-estate based service)	‘Responsive’ approaches	<i>no cases</i>
Parking is ‘infrastructure’	‘Area Management’ approaches	‘Conventional site-focused’ approaches

The lower-right cell in Table 1 contains ‘conventional site-focused’ approaches, in which parking is thought of as being on-site infrastructure ideally, like restrooms which are mandated for most buildings in an almost identical way. This view sees parking as necessary for every site in order to avoid unwanted spillover of demand into nearby streets and sites. This framing as on-site infrastructure assumes that private initiative will not supply correctly, so government planning is needed. The word ‘conventional’ in the name reflects that this is the most widely applied and longstanding of the three paradigms.

Relaxing the insistence on on-site provision, while maintaining the view above that parking is ‘infrastructure’, leads to ‘area management’ approaches in the bottom-left cell of Table 1. As we will see in Section 4, context can influence such a shift in mindset. Insisting on on-site parking often becomes unworkable in dense, inner-city areas. Such places often begin to emphasise public parking. They must therefore also manage on-street parking more intensively. These steps are difficult to justify without a change of mindset. So ‘area management’ approaches see parking spaces as serving the whole area, not a specific site. In this thinking, parking is local transport infrastructure, like streets, bus stops and walkways. It must be planned, if not

necessarily provided, by government. Much western parking reform literature (especially in Europe) assumes such a mindset, although often without making these assumptions explicit (Marsden, 2006; Litman, 2006; de Wit, 2006; Rye, 2010).

Moving from the bottom-left to the top-left in Table 1 brings us to ‘responsive’ approaches, which see parking as a market good, rather than ‘infrastructure’. Context can also influence this mindset shift. In many central business districts (CBDs) and across wide areas in Japanese cities, commercial parking with market prices is the norm (see Section 4). In such places it becomes natural to think of parking as a real-estate based service, akin to restaurants or meeting rooms, the supply and pricing of which can largely be left to market processes. The parking reform movements inspired by Shoup (2005) can also be identified with this mindset.

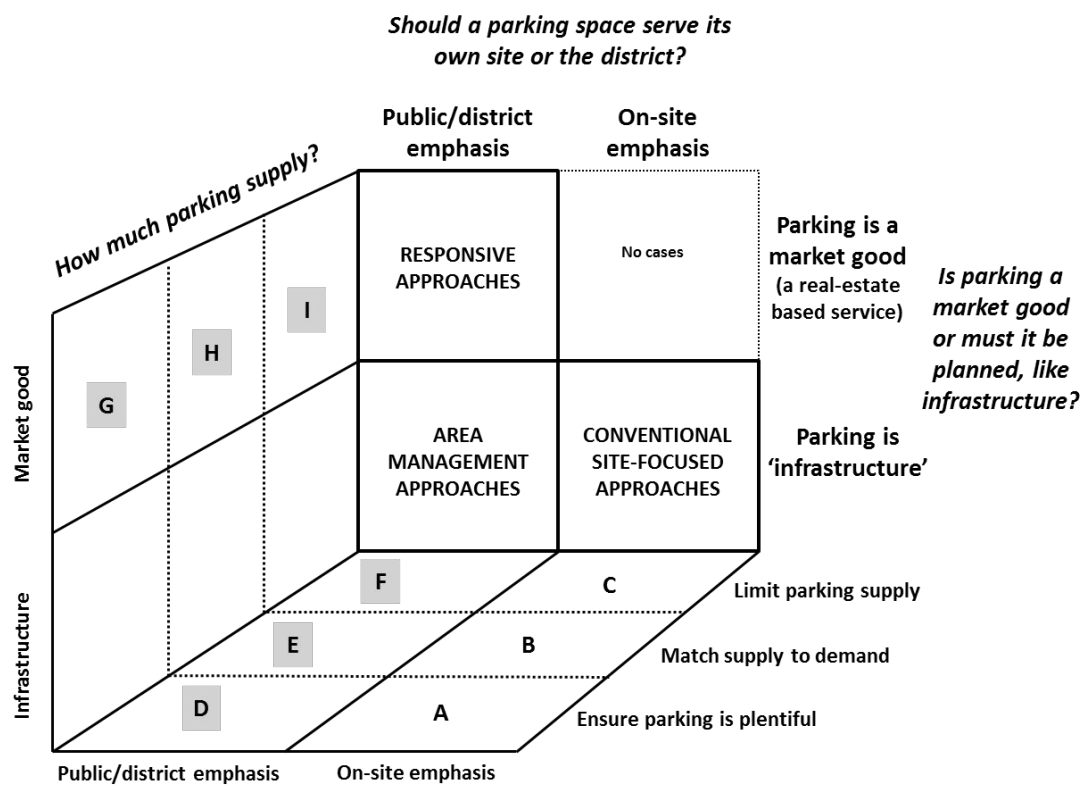
What about the empty upper-right cell in Table 1? In theory, this should involve parking policy that is site-focused yet with parking as a market good. This is, in fact, conceivable as a description of parking practice on isolated sites. However, it cannot be the basis for comprehensive municipal parking policy.

2.2. A third criterion completes the new parking policy taxonomy

A third dimension is needed to capture important variations within each of the three main mindsets above. An obvious criterion, which seems able to capture observed diversity while avoiding confusion, is the attitude to parking supply. In other words, how does each parking policy type answer the question, what is the right amount of parking?

This third criterion is more obviously a continuous spectrum than the other two dimensions. Later in the paper I will further refine the set of possibilities. However, for simplicity here just three possibilities are enough: ensure parking is plentiful; match supply to demand; and limit parking supply, as shown in Figure 1.

Figure 1 Simple version of the new parking policy classification approach



The labels, A to I, in Figure 1 will be used in Sections 3 and 4 in order to refer to the main possibilities identified in this typology.

I will argue that the typology based on the three dimensions shown in Figure 1 can describe observed international parking policy diversity and reveal the mindsets associated with each variation. To be more precise, it captures policy diversity for places where parking has become enough of a problem to merit explicit management and policy effort. Sub-types among all of the three main paradigms are captured, including some that are usually little-noticed or which are possible but not yet observed. Importantly, this typology is also able to clarify important distinctions between sub-types that tend to be confused or conflated together.

This classification approach emphasises mindsets that generally involve normative assertions and reflect beliefs about how parking should be arranged. Unfortunately for classification efforts, such beliefs are often unspoken except sometimes in the context of serious policy conflicts.

3. Parking policy classification efforts: a review

This section discusses various previous attempts to classify parking policy, both systematic and informal. It will highlight the lack of a widely-used coherent framework so far. Few systematic attempts to classify parking policy approaches have been published and none seems to be well known. Nor have informal classifications filled the gap. This underscores the need for an improved approach.

Several of the classifications offer useful partial accounts of parking policy diversity. However, they seem to ‘talk past each other’, causing confusion. Dualistic thinking is a feature of several but with at least three distinct dichotomies or spectrums. Clearly no single-dimension approach is adequate.

3.1. The typology that inspired the new one in this paper

The new typology of this paper is most akin to (and was initially based on) the taxonomy of parking policy approaches that I presented in previous publications (Barter, 2010 and 2011a). The Barter (2011a) version is depicted in Table 2. However, my earlier typology in Table 2 lacks sufficient clarity on its criteria.

For example, in the Barter (2011a) scheme, the ‘conventional’ approach was defined as having a central goal of avoiding scarcity. It would class as ‘conventional’ all places that aim for plentiful supply, even if they also have a focus on public parking. Further, the ‘demand-realistic’ sub-type of the conventional approach is defined by the goal ‘avoid both scarcity and wasteful surplus’. I now see that the approach does not make clear enough the fundamental distinctions between the ‘conventional’ and ‘parking management’ categories.

The ‘parking management’ approach was defined in my earlier scheme as based on a central goal of planning parking to serve wider urban and transport policy objectives. However, the new typology would interpret this as merely a consequence of such a mindset, not as its defining characteristic. Similarly, the ‘market-based’ approach was defined in the earlier scheme based on the goal of ensuring demand, supply and prices are responsive to each other, and with avoiding market failure. The new scheme sees this also as just an outcome, not a definition, of this mindset on parking.

Table 2 Typology from Barter (2011a)

Approaches to parking policy		Central goals
Conventional	Autocentric	Avoid parking scarcity
	Demand-realistic	Avoid both scarcity and wasteful surplus
Parking management	Multi-objective	Plan parking to serve wider urban & transport policy goals
	Constraint-focused	Constraint of car travel (to certain locations)
Market-based		Ensure demand, supply and prices are responsive to each other. Avoid market failure.

Source: Adapted from Barter (2011a, p.7).

Although the new typology has been inspired by my earlier one in Table 2, it adopts slightly different names for the main paradigms. ‘Responsive’ is used rather than ‘market-oriented’ because parking is almost never completely deregulated and on-street parking is inevitably in the public sector, so that market-responsiveness for on-street parking requires government initiative. ‘Area management’ is chosen over ‘parking management’ to emphasise the beyond-site, district-wide focus of this paradigm and to avoid confusion with other uses of the term, parking management. ‘Conventional site-focused’ replaces ‘conventional’ to more strongly emphasise that the focus of this paradigm is on-site parking.

3.2. COST 342: from weak to strong management

The European Union’s COST 342 report, which compared parking practice across Europe and North America, provides a classification of parking policies based on predictable ‘stages’ in the intensity and sophistication of parking management (de Wit, 2006). The focus is parking in town centres.

Stage One involves little management in contexts with little pressure on parking. In Stage Two, as demand exceeds supply in places, on-street regulation begins by creating greater clarity on where parking is permitted. Subsequent stages involve intensifying responses to the growing pressure on the limited supply. Stage Three includes time limits, simple pricing and municipal efforts to build off-street parking. Stage Four extends management from commercial cores to surrounding residential areas, using tools such as residential parking zones or permits. Stage Five involves increasingly sophisticated pricing differentiation. Stage Six sees out-of-town park-

and-ride. Finally, Stage Seven integrates parking management into transport demand management (TDM) strategy.

This classification captures typical ways in which European inner city areas have tended to gradually intensify their parking management (for example, see Marsden, 2006 and Topp, 1993). However, it ignores all parking policy for suburban contexts. It also assumes a linear progression, ignoring the possibility of divergence. For example, small USA city centres that apply a ‘suburban’ approach would be considered stuck at stage two or three, as would Japanese cities, rather than being seen as following distinct alternatives.

With reference to the new typology shown in Figure 1, a possible interpretation of this classification is that it fits entirely within the ‘area management’ approaches. Stage one is the stage before parking policy is necessary and does not appear in Figure 1. COST 342’s other early stages can be seen as corresponding with a supply-focused area management approach (position D in Figure 1) in which on-street management is seen as unnecessary or too difficult, while the late stages have a demand-management focus and an embrace of intensive on-street management (position F).

3.3. Litman’s two paradigms

Todd Litman (2006) paints a stark contrast between an Old Parking Paradigm and a New Parking Paradigm. The former assumes ‘more parking is usually better’, reflects ‘predict-and-provide planning’, assumes demand cannot be reduced, requires plentiful on-site parking with every development, and assumes that a ‘parking problem’ means insufficient free parking within each site (Litman, 2006, pp.3-4). An underlying assumption behind the Old Parking Paradigm is that ‘transportation’ means ‘automobile travel’. This contrasts with the multimodal assumptions of his New Parking Paradigm.

Litman’s New Parking Paradigm ‘strives for *optimal* parking supply and price’, seeks reform of excessive parking minimums, accepts sharing of parking between multiple destinations, sees opportunities to manage parking demand, and sees too much supply

to be potentially as harmful as too little (Litman, 2006, pp.4-7). It perceives various parking problems not merely shortage. His new paradigm includes reforms and practices often found in dense inner city and CBD areas, as contrasted with more auto-oriented suburban practice (see Section 4). He also calls for such efforts to be extended outwards from their inner-city heartland to a wider variety of suitable locations (Litman, 2006, p.23-24).

Litman's Old Paradigm best matches position A in the new typology presented in Figure 1. However, his New Paradigm lumps together various efforts that the new typology sees as distinct approaches. Litman contrasts his old and new paradigms across several distinct policy dimensions at once but all are portrayed as varying in unison so that only two paradigms emerge. Even his Old Paradigm may also lump together approaches that the new typology of Figure 1 would see as distinct. For example, both positions A and D in Figure 1 could fall under Litman's Old Paradigm, since they emphasise plentiful parking supply.

To be fair to Litman, his main purpose was not a systematic categorisation of parking policy but an appeal for readers steeped in the conventional on-site mindset to consider alternatives.

3.4. 'Engineering' thinking versus market thinking

A market-oriented stream in the parking literature suggests a different dichotomy. It is a dimension that is missed by most classifications reviewed here. This literature tends to criticise conventional parking policy, in which supply is a planned outcome of engineering guidelines that result in parking minimums (Button, 2006). Authors in this tradition have instead suggested more market-oriented approaches to parking supply and pricing (Roth, 1965; Shoup, 2005).

Button (2006) highlights an economics literature, often focused on CBD parking markets, in which parking is treated as potentially an ordinary market good. This reflects the existence of commercial and competitive, market-priced parking industries in many CBDs, as we will see in Section 4.

Market-oriented thinkers see parking as working best when treated as a market good to be subjected to market forces. As Shoup says, 'instead of planning without prices, we can let prices do the planning' (2005, p. 602). As shown in Figure 1, such market thinking on parking necessarily involves a shift away from assuming abundant on-site parking as the norm towards parking as mostly a public neighbourhood service.

Shoup (2005) makes a much-discussed proposal for more market-responsive parking. Like Litman, he contrasts his suggestions with an old paradigm based on minimum parking requirements. But Shoup's 'new paradigm' involves a larger role for market forces than for planning. He proposes abolition of minimum parking requirements. Spillover is dealt with by pricing on-street parking in an efficient demand-responsive way to eliminate the search externality (Pierce & Shoup, 2013). Political obstacles are to be eased via 'parking benefit districts', which give local stakeholders a say on the use of the revenue. Shoup's ideas have been built on by others, including Barter (2013).

3.5. Four approaches in Shoup's writings

Together with his old and new paradigms, Donald Shoup also considers two other approaches to local government parking reform which he sees as second best but still worth discussing (Shoup, 2005, Ch.9 and 10). This can be taken to suggest a four-way classification of parking policy approaches:

1. The conventional approach based on minimum parking requirements. This is position A in Figure 1.
2. 'Public parking in lieu of private parking', which accepts that many sites will not meet their own parking demand. Municipalities can require a fee in lieu of the required parking, while encouraging shared and public parking instead. In terms of the new typology in Figure 1, this is a shift from position A (or B) towards position D (or E).
3. 'Reduce demand rather than increase supply', which encourages managing parking demand as an alternative to expanding on-site parking. In Figure 1, this would involve shifts away from position A in the direction of position C.
4. Shoup's 'new paradigm' of responsive prices, deregulated supply and parking benefit districts. This can be taken as position H in Figure 1.

Shoup does not actually make such a classification explicit. But it would capture considerable diversity to be discussed below in Section 4.

3.6. Willson's typology: minimums, maximums and how they are set

A new book by Willson (2013) includes yet another classification of local parking supply policy. It suggests five categories, based on the possibilities for the existence of minimums and the existence of maximums, then further subdividing the minimums-but-no-maximums case according to the aimed-for level of the minimums relative to expected utilization. Note that 'utilization' here seems to mean demand for parking that is free of charge.

Willson's (2013) 'traditional' approach, with minimums set higher than 'utilization' and no maximums, is clearly position A in the new typology. His 'moderate reform' approach has minimums set to match utilization and still no maximums. In terms of Figure 1, this is a shift towards position B from A. It will be discussed in Section 4 as 'right sizing' reform. His 'big city' approach has minimums and maximums set to different proportions of utilization. His 'partial deregulation' approach has no minimums but imposes maximums. In terms of Figure 1, these two approaches likely involve a shift towards position F (and possibly I in some cases) as seen in various CBDs in Section 4. Willson's 'deregulation' approach has neither minimums nor maximums. This is essentially Shoup's 'new paradigm' (position H on Figure 1).

Willson's scheme does not include the possibility of parking policy with no maximums but with minimums set *below* expected utilization. Perhaps there are no such cases in North America. However, we will see in Section 4 that Japanese cities' minimums are indeed set to such a level. We will also see a hint below in Potter's typology that this was a possibility in the UK when minimums were more prevalent there.

Willson's simple criteria capture a good range of diversity. However, when compared with the new typology, Willson's approach is less revealing of the thinking behind parking policy types.

3.7. *Potter's typology of UK approaches to parking standards*

This final classification also focuses on approaches to the setting of parking standards for private-sector non-residential parking, this time from the UK.

Presented by the KonSULT project (2006), drawing on 2001 work by H.S. Potter, it suggests the following taxonomy. The names are from the original and the descriptions are my interpretation:

- *'Demand Standards Approach'*: Parking minimums are set to at least meet all demand. This is position A in Figure 1.
- *'Two-part and Operational Standards Approach'*: Require on-site parking for only 'operational' (or minimal) levels of demand, allowing payments in lieu of the difference. This is a variation of the payments-in-lieu reforms highlighted by Shoup above. It is also reminiscent of the missing possibility in Willson's typology, in which minimums are set below utilization. In Figure 1, this possibility falls between positions B and C within the 'area management' set of options. We will see later, through a discussion of Japan, that this option also raises the possibility of a position between H and I.
- *Capacity Rationing Approach*: Standards for a whole area set as maximums in light of the road capacity available. In the new typology this is roughly position F (or I) in Figure 1.
- *Area Needs Approach*: Weighs up multiple priorities in setting the standards, including management of public spaces, development priorities, environmental quality, traffic planning, site constraints, etc. We will see in Section 4 that parking management and supply choices often aim for a variety of goals in CBDs and some inner city areas. In terms of Figure 1, this could match positions D, E, or F depending on the supply-related priorities in each specific case.
- *Modal Split Target Approach*: Limits parking supply to modify travel behaviour in favour of non-car options. This corresponds roughly with position F (or perhaps I) in Figure 1.
- *Public Transport Accessibility Level Approach*: Set standards in inverse proportion to the ease of access public transport. This is akin to the 'right-sizing' reform mentioned in Section 4. In Figure 1, it is roughly position B.

This approach is apparently based on two main criteria for the setting of parking minimums: a. supply-attitudes; and b. the other objectives to be served by parking policy. This second criterion sheds light on the thinking behind each policy type but is subjective and open-ended.

3.8. Summary comments on these previous classifications

We have seen a surprisingly diverse range of classifications for parking policy, with widely varying bases. The first one, my earlier typology, falls short for several reasons. Several others are too simplistic because of dichotomous thinking. Most cover only part of the diversity. Most offer limited insight into the mindsets associated with parking policy types. By contrast, such insight is a key strength of the new typology. The closer attention to mindsets in the new typology will allow a clearer picture of several contrasting reform thrusts (see Section 5).

4. Observed parking policy diversity as a test of the typologies

This section provides a geography of parking policy. Each sub-section begins with a portrayal of the most salient features of parking policy as found in various places. Each then explores how the classification approaches from Sections 2 and 3 would deal with each case. This provides further material for evaluating the relative merits of the typologies.

Unfortunately, literature that describes parking policies in multiple international cities is difficult to access, being highly fragmented into accounts of specific places, as well as being buried in consultants' reports, unpublished conference presentations and local government documentation. This section draws especially on a number of broad regional or international overviews (particularly, Barter, 2011a; Booz Allen Hamilton, 2006; de Wit, 2006; Jakle & Sculle, 2004; Ríos Flores et al., 2013; Shoup, 2005; Weinberger et al., 2010). An effort has been made to capture a variety of approaches around the world, although the accessible literature is skewed geographically. Fortunately, for the purpose here, diversity is more important than comprehensiveness.

4.1. Suburban New World parking policy

Suburban USA parking policy provides a template for practice on parking supply all over the world, especially beyond urban core areas. This approach is based on

imposing on-site parking requirements (expressed as minimums) on every real estate development. It assumes that the private sector will not supply 'enough' unless forced to. A key aim is to avoid 'spillover', defined as parking outside the destination site.

The suburban version of this is extreme in setting parking requirements at levels that eliminate almost all possibility of on-site shortages by basing them on almost the highest conceivable parking demand situation – the yearly peak demand for free-of-charge parking at isolated sites in automobile oriented locations (Shoup 2005, pp. 75-88). Post World War II suburban areas (and some pre-war districts too) across the Anglophone 'New World' (the USA, Canada, Australia and New Zealand) have been subject to this set of parking policies. Certain other places, such as Mexico, Brazil, Malaysia, Thailand and Delhi in India, also have extreme parking minimums approaching suburban USA levels (Barter, 2011; Ríos Flores et al., 2013; CSE India, 2009).

This approach featured clearly in most of the classification schemes above. It is position A in Figure 1, Willson's 'traditional' approach, Potter's 'demand standards' approach, and the 'old paradigm' for both Litman and Shoup. It frames parking as ideally an ancillary service in development sites with spillover seen as an externality, like pollution. This mindset seems 'natural' in the context of automobile-oriented areas where planning assumes that most people arrive by car and that almost none walk between nearby sites.

4.2. More moderate parking minimums across the globe

Elsewhere in the world, most parts of most metropolitan areas seem subject to a less extreme version of the same approach. Most European municipalities have parking minimums outside their cores but these minimums are generally set at lower levels than in the Anglophone New World (Kodrinsky & Hermann, 2011).

Similar comments apply to cities across Latin America, Southeast Asia, South Asia and much of East Asia, including even some very high-density cities such as Seoul (beyond its business districts).

Does such moderation in minimums represent reform? The answer is often no. Much of this international practice is still aimed at setting minimum requirements at cautiously high levels. Minimums end up lower than those in the USA mainly because local levels of observed parking demand are lower. They are thus often NOT the result of parking reform efforts. However, there are exceptions and these are discussed below.

4.3. Inner city 'right-sizing' of parking requirements

In certain places, especially those where the original urban fabric predates mass motorization or where more transit-oriented development is desired, excessive parking requirements often come to be seen as problematic. The cost of providing on-site parking is significantly higher with higher density development, especially on small sites, when compared with low density development on large sites (see for example, City of Portland, 2012).

The most moderate reform response to this is to 'right-size' parking minimums, making them more context sensitive with a better match for actual demand at each location, thus trying to avoid both shortage and excess (Litman, 2006, pp.86-91; Forinash et al., 2004; Engel-Yan and Passmore, 2010). This reform is becoming common across North America, Australasia and Europe.

In the new typology, this is a shift from position A towards position B in Figure 1, which makes it clear that this is a moderate step, with a small change of mindset in only one of the three dimensions in the scheme. Most of the other classifications also capture this approach but do not always make it obvious that this is just a small reform of the suburban version of the conventional site-focused approach. For example, Litman's dichotomy prompts him to see this modest reform as part of his new paradigm.

4.4. Modest inner-city flexibility in applying parking requirements

A related set of moderate reforms is to enable some flexibility in the application of minimum parking requirements. A common example is to require fewer parking

spaces in return for on-site effort on travel demand management (also called mobility management or travel plans), including offering car-sharing or parking ‘cash-out’ policies or ‘employee mobility budgets’ in place of free-of-charge employee parking (Litman, 2006, p. 41; Shoup, 2005, pp. 251-267).

Less common is allowing some or all required parking to be provided off-site but nearby. Stockholm is a European example (Kodransky & Hermann, 2011). Similarly, some cities allow shared parking agreements among nearby sites or even on-street parking to be partially counted towards required parking in certain circumstances (Litman, 2006, p.67-75).

The reforms mentioned so far have retained the core assumption in conventional parking policy that demand should be met in full and generally on-site. Allowing required parking to be provided off-site is a small step towards a more profoundly different approach, discussed below.

4.5. Inner city shifts from an on-site focus to a public/district emphasis

Parking conditions and policies for inner areas and city centres have long been distinctive relative to elsewhere in metropolitan areas. In particular, public parking often becomes more important.

Commercial public parking emerged on the periphery of American CBDs from the 1920s as car ownership first soared and kerb space became overwhelmed (Jakle and Sculle, 2004, pp. 47-55). The industry then expanded, spurred by perverse property taxes and depression-era demolitions (Jakle and Sculle, 2004, p. 61). From the 1940s, municipal parking lots and garages also emerged (Jakle and Sculle, 2004, Ch. 3). In other countries, similar trends have often been seen.

As parking minimums emerged, first in the USA, then across the globe, they were applied across whole metropolitan areas, including inner areas. However, the results for older densely developed areas were usually disappointing, and often damaging in areas where building sites are often small and built up to their boundaries. Such sites cannot easily accommodate parking, so even relatively low parking minimums can

prompt demolitions and cause missed opportunities for re-use and redevelopment. Such parking policy based on minimums made parking a dominant land use in many urban cores across the United States by the 1970s (Jakle & Sculle, 2004; McCahill & Garrick, 2012).

From the 1970s, renewed interest in public parking emerged in many urban core areas all over the western world. This was inspired by concern over the negative impacts mentioned above, over the weak benefits of parking minimums in dense areas and by noting the efficiency of the public commercial and municipal parking that remained.

This trend was also encouraged by a new mechanism, allowing site owners the option of paying a fee ‘in lieu’ rather than be forced to provide the required parking on site. This helps foster public parking without the need to abolish or even to lower parking minimums (Shoup, 2005, Ch.9). This pragmatic step has been taken by many jurisdictions in North America, Europe and elsewhere.

Some German cities provide a hybrid example with an amusing twist. Until recently, most imposed parking minimums, as mandated by State governments. However, large cities usually allowed payments in lieu of parking. Furthermore, most then disallowed on-site provision in their urban cores. So, strangely, building owners who redeveloped a site were required to pay in lieu of required parking that they were forbidden to build (Topp, 1993).

Allowing payments in lieu of parking may seem a modest change, since it retains parking minimums. However, it decisively shifts the emphasis towards public parking. Off-site parking becomes normal and expected rather than viewed as the problem of ‘spillover’. This shift in mindset occurs whether or not adequacy of supply remains a key goal, as it sometimes does. It is an inherently more ‘urban’ approach. It involves planning for ‘park-once and walk’ neighbourhoods (Tumlin, 2012, pp. 186-189).

This importance is captured in the new typology shown in Figure 1, where these reforms involve shifts from to the left from ‘conventional site-focused’ approaches

(positions A and B) to ‘area management’ approaches (positions D, E and F). This insight is not so obvious in any of the other typologies.

A smaller number of places, especially city centres, went further and abolished or drastically reduced parking minimums. This step also goes with an increased emphasis on public parking. Examples include large CBDs across Australia, Canada and Europe, a few in the USA and, more recently, Seoul.

4.6. On-street parking management

Heavy reliance on on-site parking minimums often goes with a desire to avoid the need for on-street parking management and, sometimes, with hostility to the very existence of on-street parking (Highway Research Board, 1971, p.2). Indeed, post-war developments in the New World often eliminated on-street parking almost completely.

Even in denser, less automobile-oriented districts, a lack of capacity or of will to manage on-street parking can encourage faith in parking minimums, despite their drawbacks for such neighbourhoods. Many newly motorizing cities in Asia and Latin America still see abundant off-street parking as the key to easing on-street problems (Barter, 2011a).

However, as mentioned above, in dense highly-urban districts, site-focused parking policy tends to have disappointing results. Unless redevelopment is rapid, the expansion of required on-site parking lags behind demand so that pressure on kerbside parking remains high, as in various rapidly motorizing cities in Asia recently (Barter, 2011a).

Some North American inner cities were ruthless enough with parking minimums to avoid most on-street parking saturation. However, the cost of this was high. Some, such as Indianapolis or Atlanta, created car-friendly cores, replacing much pre-war inner-urban built fabric with new buildings with attached parking, with garages with and parking on vacant lots (Jakle and Sculle, 2004, pp.153-4). Others become

economically blighted, with parking minimums helping to make development or redevelopment uneconomic.

Conversely, dense urban districts that emphasise public parking and embrace ‘park-once-and-walk’ planning find that they must manage on-street parking intensively. This quickly became obvious in the compact inner cities of post-war western Europe, with subsequent strong efforts to reclaim public space, to favour residents, and to serve mode shift objectives (de Wit, 2006; Kodransky & Hermann, 2011). Asian cities have been slow to follow these trends but Seoul’s business districts are now an exception.

On-street parking management is not explicit in the new typology in Figure 1. How do attitudes to on-street parking relate to the typology’s three mindsets? All three paradigms seem to frame on-street parking as a ‘common-property resource’ (Shoup 2005, pp. 590). However, the mindsets differ in their assumptions about how best to manage this commons, with contrasting implications for framing off-street parking. Conventional site-focused policy goes with a reluctance to ration on-street parking. Area management sees on-street parking as part of the district infrastructure, to be managed by government along with the off-street parking for various purposes. A preference for market-clearing prices as a rationing tool for this commons goes comfortably with seeing all local parking become part of a local real-estate service market. These are, in fact, among the classic responses to commons problems (Shoup, 2005, pp. 596-601).

4.7. Embracing a public/district focus opens wider policy options

An emphasis on public parking opens the possibility of more ambitious use of parking as a policy tool. A public parking emphasis first prompts more intensive management of public parking, especially on-street parking. It then becomes easier to countenance other attitudes to supply besides simply aiming to meet demand. With this newfound freedom on supply and with growing experience with the power of parking management, various parking policy objectives become possible, as in Potter’s ‘Area Needs Approach’ and Litman’s (2006) ‘new paradigm’. In the new typology of Figure 1, using parking as a policy tool is possible within much of the ‘area management’

paradigm, such as positions E and F (and possibly also in ‘responsive’ positions H and I).

In cases where a key objective of area management is traffic limitation, the new typology is more precise in placing them at position F on Figure 1. Parking minimums are often abolished (and usually replaced with maximums) Many prominent examples are in Europe, including Berlin, Amsterdam, Copenhagen’s core, and London. Most large CBDs across Canada and Australia and a small number in the USA also actively restrict parking supply (Booz Allen Hamilton, 2006; Kodransky & Hermann, 2011; Weinberger et al., 2010). Few cities in Asia or Latin America have yet taken this approach, although Seoul has used parking supply limitation as a key TDM tool for its five largest business districts (Barter, 2011a; Ríos Flores et al., 2013).

4.8. Commercial parking and market dynamics in CBDs

Commercial parking in CBDs provide a template for those who argue that parking more generally could be more responsive to market dynamics (Barter, 2010). Such areas often have many of the called-for features, with parking minimums abolished or waived, market pricing, and competition among several operators. These are also walkable park-once environments where on-street parking is intensively regulated.

Surprisingly, few of the previous classifications take existing market-based commercial parking in CBDs seriously as ‘parking policy’. The new typology (Figure 1) includes this under the ‘responsive approaches’ with a market-oriented mindset on parking. Willson also highlights deregulated parking supply.

Even in real CBDs that are dominated by market-priced commercial parking, explicit parking policy rarely focuses on commercial parking or the possibility of fostering a healthy parking market. Sometimes, competition policy by higher levels of government comes into play. But most local governments focus on managing public-sector and on-street parking. In fact, where a strong area management mindset prevails, private-sector commercial parking is often seen as difficult to control and a nuisance (Marsden, 2006).

This blind spot is surprising, since commercial public parking with local competition is a worldwide phenomenon (Barter, 2011a; Jakle and Sculle, 2004). In most countries, such 'parking markets' are limited to CBDs but in certain parts of Asia, Japan especially, it is more widespread. The parking supply used in commercial parking was not necessarily the result of purely commercial decisions. It often reflects a legacy of past parking requirements, property tax incentives (sometimes accidental), zoning incentives, and subsidies of various kinds (Jakle and Sculle, 2004). With that caveat (and with only a few exceptions such as Chinese and Indonesian cities), commercial parking generally has unregulated, market prices.

4.9. Hong Kong and Singapore

Hong Kong and Singapore are interesting cases, difficult to interpret in previous classification systems. Both actively constrain private vehicles and have transit-oriented development patterns. Much parking is priced and open to the public. So we might expect area management approaches and mindsets. Surprisingly then, both cities make vigorous use of parking minimums (Barter, 2011b). High-density, high-rise development patterns may be a factor (ironically). With many developments being on a huge scale, they seem to fear large mismatches in parking demand and supply. Using the terminology of the new typology, their parking policy mindsets have partially shifted from being site-focused to a public/district emphasis. On Figure 1, they might be said to be somewhere between positions B and E.

4.10. The surprising case of Japan's cities

Parking policy in Japanese cities presents a challenge for classification. If judged solely on obvious and explicitly-stated features, their parking policies appear to be conventionally site-focused, with minimums as a central feature, applied even in city centres. There is no sign of parking being used as a TDM tool (Matsumoto, 2009). However, a closer look reveals an unusual case.

First, the parking minimums are set at very low rates throughout metropolitan areas. For example, Tokyo requires 0.3 to 0.4 space per 100 square metres of floor space for office and commercial buildings. They also exempt small buildings up to about 5,000

square metres in floor area. Above this threshold, the minimums gradually phase in and only reach full force at 10,000 square metres of floor area (Barter, 2011c). Second, Japanese cities are unusual in having extremely limited on-street parking, with overnight on-street parking mostly banned completely since the 1950s when parking problems threatened the many extremely narrow minor streets. Third, the Japanese proof-of-parking rule is significant. This rule mandates (for all but tiny cars) that vehicle owners prove access to a near-home parking place (Barter, 2011a).

As a result of these three features, much parking in Japanese cities, even outside the central areas, is public and market priced (Barter, 2011a). Commercial parking is ubiquitous even for residential parking. There is surprisingly little bundled private parking, such as ‘customer only’ parking and parking for employees within business sites. However, large retailers usually offer validation, providing free parking for those making significant purchases (Matsumoto, 2009).

These policies have created a relatively responsive parking market in most urban neighbourhoods across Japan. So, in practice, mindsets on parking in Japan seem to have considerable faith in the flexibility and responsiveness of local parking systems to avoid acute shortage problems. Arguably the more pressing problem is often an overabundance of unregulated small parking operations on vacant land (Matsumoto, 2009). This reflects the innovation of coin operation, the legacy of the real-estate crash, and of tax and planning incentives that perversely encourage this land-use.

These responsive parking arrangements seem to be an accidental outcome, not mentioned as a goal in formal policy documents (Barter, 2011a). Until recently, such documents were preoccupied with an alleged parking shortage in inner areas and many local governments did seek to construct parking (with limited results). Such municipal parking is now generally market priced.

If explicitly-stated policy is used, Japanese cities would seem to fall somewhere near position B on Figure 1 of the new typology. But in actual practice, Japanese parking is probably better seen as fitting a ‘responsive approach’, near position H. Of the other classification schemes, only Potter’s ‘two part and operational standards’ approach comes close to identifying the Japanese situation.

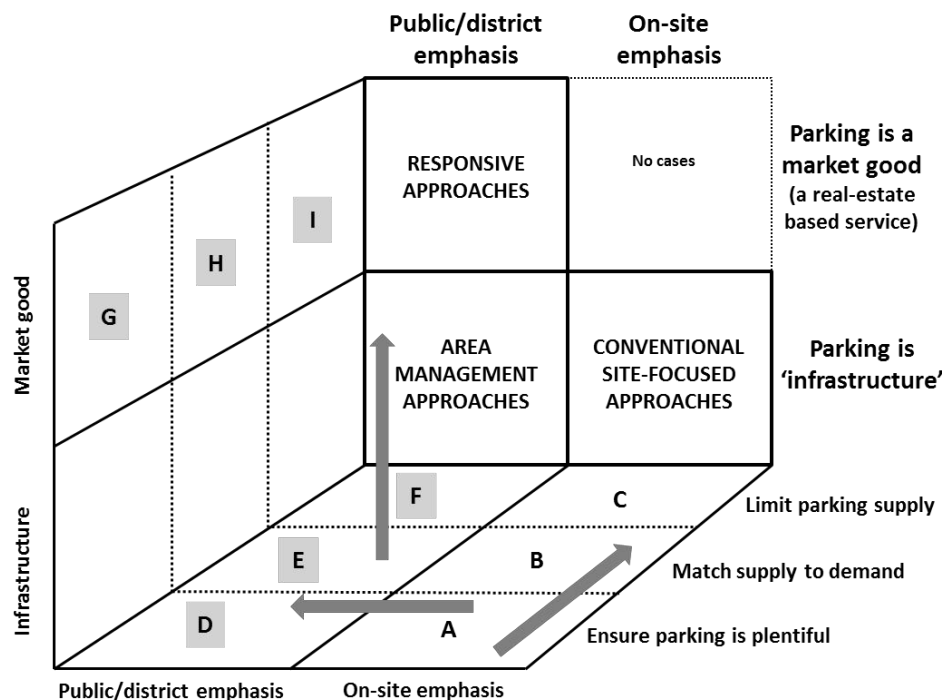
5. The new typology enriched

This section begins by highlighting how the new typology should enable clearer thinking on three distinct reform thrusts that are often confused, conflated or ignored in parking debate. It then presents a more detailed diagram for the new typology, based on insights derived from Sections 3 and 4. Finally, it discusses further ways in which the new classification approach provides useful clarity.

5.1. Three reform thrusts made obvious

The new classification approach for parking policies provides useful insight on the nature of parking reform directions. The new typology highlights at least three distinct dimensions of reform away from conventional practice, as depicted by the arrows in Figure 2.

Figure 2 The new typology with three major reform thrusts highlighted



Right-sizing reforms are represented by shifts backwards on the diagram from position A towards position B. Such reforms usually remain within the site-focused paradigm, changing only the attitude to supply. Notice that similar shifts along the

attitudes-to-supply dimension would also be possible within an area management paradigm or even within the responsive paradigm.

Reforms urged by authors such as Litman (2006), Tumlin (2012) or Rye (2010) also require some right-sizing or limitation of supply (a shift backwards along the attitudes-to-supply dimension). But, more importantly, they involve a shift to the left from site-focused approaches into the area management approaches.

Donald Shoup's suggestions (and others akin to them) can now be seen as a third, highly distinct, agenda corresponding to the upward arrow in Figure 3, which points away from the parking-as-infrastructure row into the parking-as-market good row. If such reform begins with the extreme suburban conventional on-site approach (position A), then we can see that a shift towards position H is more radical than those mentioned above. It requires simultaneous or sequential changes on the adequacy of supply, on the site-focus versus district-emphasis, AND on the infrastructure versus market-good dimensions.

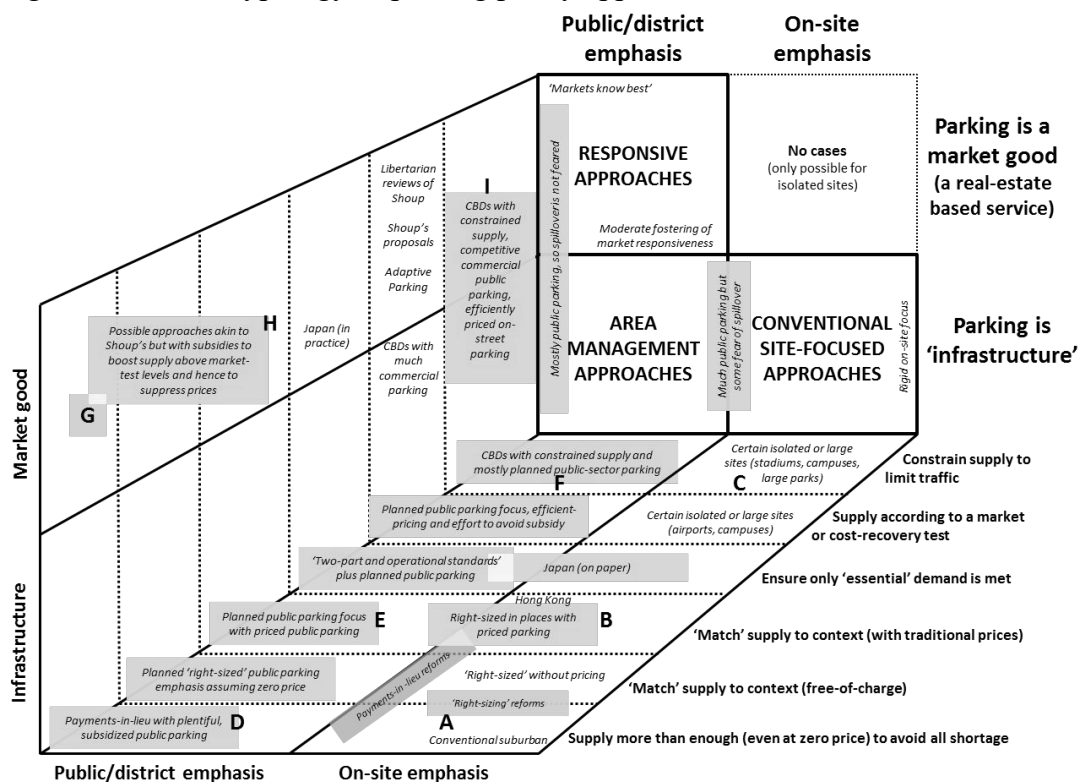
5.2. The new typology in more detail

Insights from Sections 3 and 4 now allow a more detailed elaboration of the new typology diagram. This is depicted in Figure 3 below.

The typologies and policy diversity in previous sections have suggested a need for more than three possibilities along the attitudes-to-supply spectrum. The extreme cases remain the same but 'match supply to demand' can now be divided into several variations. 'Right-sizing' reforms are now shown with two possible supply attitudes, one that seeks supply levels consistent with free-of-charge pricing, and another in which supply matches demand at some 'traditional' price above zero. In addition, the idea behind the 'two-part and operational' and Japanese cases is accommodated with the label 'ensure only "essential" demand is met'. Further, a cost-sensitive approach to parking supply is added, which in practice would result in constrained supply (relative to most status quo approaches) even if restricting supply is not an explicit goal.

The two primary criteria from Figures 1 and 2 are also potentially spectrums (although in a more limited way than for the attitudes-to-supply dimension). Therefore Figure 3 shows intermediate and extreme possibilities on these dimensions, rather than just the two seen in Figures 1 and 2. For example, an on-site emphasis can be rigid and extreme or more relaxed with room for exceptions and for some public parking. A shift to a public/district emphasis can be moderate or thorough. In the latter, on the left edge of that column, the very idea of spillover is rendered meaningless because, when parking is usually public, then off-site parking becomes the norm and is not some externality to be feared. Finally, both moderate and more radical attitudes to market forces are possible.

Figure 3 The new typology of parking policy approaches in more detail



5.3. New clarity on parking policy options and trajectories

We have seen that the new approach to classifying parking policy helpfully highlights three important and distinct reform dimensions. A related contribution is clarity on the differences between 'area management' approaches (such as most of Litman's suggestions) and 'responsive' approaches (which include Shoup's suggestions).

Awareness of mindset differences between these approaches makes their policy differences less puzzling. For example, responsive parking enthusiasts are often sceptical of park-and-ride proposals, an area management favourite. While both paradigms would usually support higher prices on-street than off, a responsive approach would prefer to achieve this via demand-responsive price setting not administrative planning. Area management thinking often prompts suspicion of private sector commercial parking, which is more welcomed in responsive approaches.

The new typology provides improved clarity about not just the differences but also the conceptual boundary between the conventional site-focused and area management approaches. Position D in Figure 3 would be considered ‘conventional’ in my 2010/2011 typology or as part of the ‘old paradigm’ in Litman’s dichotomy. In this paper’s new typology it is within the area-management paradigm, despite its appetite for plentiful supply. This is a useful clarification, suggesting that relatively politically-feasible reforms towards position D (from a starting point at A) might be a helpful stepping stone towards more ambitious reforms towards E or H or beyond.

Indeed, the new typology and Figure 3 provide useful perspectives on trajectories of parking reform more generally. Most accounts of change in Sections 3 and 4 (including ‘right-sizing’, adoption of in-lieu payments, and the imposition of parking maximums in CBDs) can be understood as shifts over a short ‘distance’ on the diagram. This can also be seen in the tendency for trials of Shoup’s ideas so far to be in places, such as inner San Francisco, where the mindset is already near position E (with area-management thinking and a moderate view of supply). This resonates with Willson’s (2013) argument that only incremental parking reform may be realistic.

Note that contrasting approaches and mindsets can occur in close proximity and within a single municipality. Numerous inner-urban main streets have a public/district emphasis, even as the residential areas on either side remain subject to conventional site-focused policy. Stakeholders are apparently able to think about parking in neighbouring locations in quite distinct ways. Of course, parking problems at such boundaries often prompt policy debate in which alternative mindsets play a role.

The new typology also highlights policy possibilities that have been little noted in the past. These include:

- Responsive possibilities that are nevertheless supply-focused (position G or nearby) in which any boosting of supply would need to be by market-friendly tools, such as subsidies, rather than parking minimum regulations;
- More extreme market-based ‘responsive’ options above positions H and I on the diagram. For example, certain reviewers of Shoup, such as Klein (2006), argue for more thorough deregulation, privatisation and ‘free market’ parking;
- Hybrids of responsive and area management approaches (between positions H and E for example), with area management thinking and goals combined with a preference for market-oriented tools;
- Position C provides insight on large campuses, airports and hospitals. These don’t challenge the site-focused perspective even though many of them price parking and some even restrict its supply. The typology highlights their site-focus, although autonomy or isolation (and hence a lack of spillover concern) allows them to exercise parking management choices that often mirror those of CBDs.

6. Conclusion: towards new clarity in parking policy debates

Parking reform is an important issue and clearer thinking should assist policy making. Confusion is currently hindering efforts to debate important reforms.

So it is important that the new typology presented here captures observed diversity well and brings to the fore people’s assumptions about parking. It makes important distinctions, avoiding confusing conflation of different reform agendas. It also reveals commonalities among approaches that are sometimes assumed to have no kinship. It provides insight on how incremental or how radical various reform steps are.

There is also value in focusing attention on framings or mindsets in parking policy. The resilience of the conventional site-focused approaches, despite robust attacks, can be seen as emerging in part from a powerful framing that matches suburban dwellers and local planners experience (Ferguson, 2004). Its grip also reflects a relative absence from debates of powerful framings for the main parking policy alternatives.

Thus, even though this paper has not taken a stance on the merits of reform, it may improve the prospects for reform if the new parking policy typology presented here can aid understanding, reduce confusion and uncertainty, and provide more powerful framings for parking reform efforts.

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