Using SNAMUTS to Plan for Change: The Place for Accessibility Modelling in Strategic Planning for Urban Transitions

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Abstract: Accessibility Instruments based on big data, such as SNAMUTS (Spatial Network Analysis for Multi-Modal Urban Transport Systems), show great potential in facilitating strategic planning for mobility transitions, by providing useful and usable information on accessibility outcomes of public transport infrastructure scenarios. However, how should accessibility instruments best be used in existing strategic planning processes? This study used an experiential case study methodology to insert SNAMUTS into a real-life process of strategic planning for the Monash 'national employment and innovation cluster' in Greater Melbourne. It asked how, when and where accessibility modelling should best be introduced to improve accessibility outcomes in a long-term strategic planning process for urban transitions. The results demonstrate the significant problems with introducing accessibility data into the planning process in the context of politicised planning, weak sustainability vision and insufficient role definition between various stakeholders. In this context, the use of data and analysis in planning was limited to 'evidence-based lobbying'.

Keywords: urban governance, mobility transitions, the politics of transformation

Introduction

Unlike land use and even economic planning, transport planning is uniquely centred around infrastructure provision, requiring decision-makers to act for the greater good while making complex engineering decisions. As such, major decisions in this field typically occur at the intersection of complex technical and political processes (Stone *et al.* 2014:2). Not infrequently, transport planning is shaped by political conflict over goals towards which resources should be directed. In this process of managing technical processes against political outcomes, crucial role is played by measuring and modelling instruments, which can quantify infrastructure outcomes and translate them into non-expert language.

With advances in data collection and computing, the past decade has seen a new generation of accessibility instruments (AIs) emerge in transport planning research (Curtis *et al*. 2016). Unlike the simpler and more conventionally used 'agent-based models', accessibility indicators arise out of quantifying the interplay between land use, transport infrastructure, public transport service levels, demographics and the distribution of jobs and services. Accessibility measures not the gross supply of transport infrastructure, but its usability: it quantifies the outcomes that infrastructure has for the end-user, the citizen of the urban region. Accessibility Instruments have the potential to translate complex

correlations between land use and transport infrastructure into a single metric; at best, a simple accessibility map can be used as a basis for dialogue between transport and land-use planning authorities, as well as non-professional stakeholders (Moniruzzaman *et al*. 2017).

Historically, accessibility metrics were plagued by complexity, combining the measurements of distance, time, transport transfers, cost, and various opportunities at origins and destinations: the more complex (therefore accurate) calculations have been harder to communicate to policy-makers and stakeholders (Moniruzzaman *et al*. 2017). However, the new generation of AIs has been characterised by greater precision and technical capability, the ability to integrate 'big data' sets, with an ease of use and simplicity of output (colour-coded maps etc), as well as a holistic understanding of transport options (te Brommelstroet et al. 2016:1176). The visually expressed outputs (such as colour-coded maps) can communicate accessibility calculations to non-experts. For the first time, it is a viable proposition to implement accessibility modelling within the normal planning process.

The Instruments developed in recent years include TRACE (Retail Cluster Accessibility) developed at the University of Antwerp, ABICA (Activity-based indicators of connections and access needs) at Aalborg University and Technical University of Denmark, HIMMELI (Heuristic three-level Instrument comining urban Morphology, Mobility, service Environments and Locational Information) from Tampere University of Technology, and the German Guidelines for Integrated Network Design (RIN). Among the more interesting of these accessibility instruments or AIs (COST 2012) is the Australian SNAMUTS, or Spatial Network Analysis for Multimodal Transport Systems.

Broader in scope than most AIs, SNAMUTS allows not only for detailed, multi-modal public transport network analysis, but was developed specifically to fill the gap between transport and strategic use planning by incorporating measurements of activity clustering, identifying activity centres at district, regional and neighbourhood level (COST 2012; Curtis *et al*. 2016). Developed at Curtin University in Western Australia by Carey Curtis and Jan Scheurer, SNAMUTS uses publicly available public transport service data, combined with data for population, employment and road speeds, sourced from public agencies and census data (COST 2012). Starting from the perspective of the individual, it defines usable public transport nodes and segments and ranks them according to seven indicators of accessibility. The seven indicators of SNAMUTS were broadly inspired (Curtis *et al.* 2016) by the Space Syntax theory (see Hillier and Hanson 1984), and consist of:

- service intensity, or the amount of rolling stock (vehicles in simultaneous operation) required to operate the network at a SNAMUTS standard
- closeness centrality, or ease of movement to and from a transport node, in terms of speed and service frequency (an index rather than a real number)
- degree centrality, or the average minimum number of transfers from a node to get anywhere else in the network (a real number)
- nodal betweenness centrality, or the number of transport segments passing through a node weighted by catchment size and travel impediment (closeness), and shows concentrations of 'movement energy' in the network (also not a real number)
- 30-minute contour catchments, or the percentage of people and jobs accessible within 30-minute travel from the node in all directions (a real number)

- nodal connectivity, or number of services departming from the nodes and lines intersecting – i.e. whether the node is a good transfer point in the network (its TOD potential)

- network resilience, or the relationship between a node's significance in the system (betweenness) and its actual service levels (connectivity), indicating latent demand and overcrowding.

The composite map brings these indicators together into a 'semaphor' map of red, yellow and green regions, and provides a visual shortcut to understanding accessibility within the metropolitan region, which can also be used to compare cities. The simple visual representations of the seven individual indicators and the composite enable transport practitioners, but also other planners and non-experts, to easily focus on trouble spots and areas of opportunity, in group discussions (COST 2012).

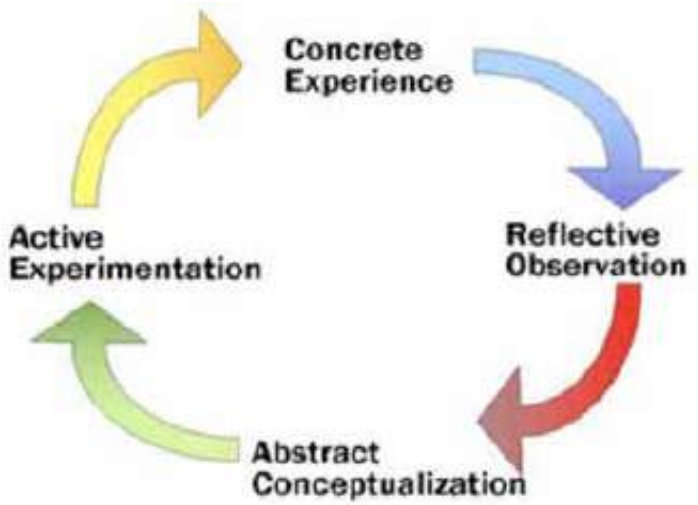
In practice, various kinds of accessibility analysis form part of pre-feasibility modelling that is part of transport corridor studies, alongside other types of modelling. However, few AIs are used with any consistency or regularity in urban planning practices and even fewer have been assessed for performance. The most important study to date has been COST 2012, a dedicated study of 22 Ais through workshops with practitioners, which confirmed that AIs are overall useful and user-friendly (see Papa *et al.* 2017, Silva *et al.* 2017). However, the uptake remains poor (te Brommelstroet *et al.* 2016, Silva *et al.* 2017, Papa *et al.* 2017). Both instrument developers (predominantly academic and professional actors) and planning practitioners (predominantly public servants) identify conflicts in department policies, lack of incentives for cooperation between agencies, and separation of land use and transport institutions, as the most salient barriers to the wider uptake of AIs (Silva *et al*. 2017). Te Brommelstroet *et al*. (2016) note that the disconnect appears to be of a practical sort: the developers develop instruments based on an abstract idea of the needs and demands of specific planning contexts, while planners hold unrealistic expectations of what technology can offer.

Analysing the workshops conducted as part of the COST 2012 study, Silva *et al.* (2017:142) note that the workshops themselves help bridge the implementation gap: post-workshop surveys indicated that 70%^of the participants stated they would use the insights created by the session in their daily practice, and additional 50% would select the AI for other planning decisions. Building on such insights, te Brommelstroet *et al*. (2016) advocate greater use of practical research methods, in which AIs are inserted into realistic professional situations, noting that, while honing the technological attributes of AIs is important, refining their usability by offering them to planning practice may be more effective (2016:1178).

2 Research Approach

2.1 Methodology

The experiential case study has been proposed by a number of urban planning policy researchers in recent years – particularly in transport planning (see Straatemeier, *et al.* 2010) as particularly apt for testing approaches in a ‘real world’ policy setting. In an experiential case study design, the researcher does not only observe, but actively intervenes in planning practice. Backed by a theoretical understanding on how practice can be improved, the researcher develops an intervention, applies it in a real-life situation, reflects on its effectiveness and (if needed) improves both the theoretical understanding and the intervention itself.



1. The experiential learning cycle. Source: Straatemeier et al. (2010), adapted from Kolb and Fry (1975).

Departing from the existing body of knowledge on accessibility modelling, our study sought to progress the research on AIs towards greater understanding of their practical application in the context of strategic planning, by identifying the uses of SNAMUTS within an existing, ongoing strategic planning process. The research design of choice was experiential case study (see Figure 1). Previous SNAMUTS workshops had focused on generating transport infrastructure recommendations for planners. In this study, rather than focusing on the outputs that AIs provide, the aim was to observe how the planning system responds to and integrates those outputs. The scope of the research would be in identifying how the abilities of this AI to provide a metric of the reciprocal influence of land use and transport infrastructure could help push forward the process of strategic planning. The focus would be on the on-the-ground processes, rather than planning theory; and the study would seek to understand and elucidate the needs of planners within the strategic planning processes – and match them to the capabilities of the AI.

After identifying a study area that is currently undergoing a strategic land-use/transport planning process, and reviewing the planning process through a desktop review of literature and preliminary interviews with planners and stakeholders, the researchers developed accessibility models for the area using the SNAMUTS AI. The models were introduced to the study participants in the context of a structured workshop. The workshop protocol had a structure that mirrors a typical planning procedure in Victoria, designed with close reference to recent literature on experiential learning in Accessibility Instruments, particularly Straatemeier *et al.* (2010), Curtis (2011), and Silva *et al.* (2017). In order to remain as grounded in the existing planning process as possible, the workshop asked of the participants to work on real questions arising in the planning process. The first part of the workshop involved observation of this process without any input from SNAMUTS. The second part of the workshop focused on the same question, but the process was complemented by the introduction of SNAMUTS models and visualisation, to allow for comparison of two work processes. Specific activities mirrored the typical SNAMUTS workshop, as described in Curtis (2011). Carey Curtis, the leader of SNAMUTS development team, was present at the workshop: this decision was guided by the observation by Silva *et al.* (2017) that the role of the workshop leader is to 'narrate' the process of using the AI tool. The workshop was fully recorded and analysed using thematic analysis.

A second set of interviews after the workshop completed the data collection, with the purpose of offering planners and stakeholders the opportunity to reflect on the workshop. A critical and reflective recounting of the experience was solicited, looking for answer as to how SNAMUTS maps filled the gaps in the knowledge around the outcomes of the strategic plans, how the AI met the needs of the planners, and how the long-term planning process was affected by the introduction of the visualisations.

2.2 Case Study: Monash NEIC

Monash National Employment and Innovation Cluster (NEIC) was chosen at the case study. Located some 30km southeast of the Central Business District (CBD) of the Australian city of Melbourne, Monash NEIC is Melbourne's largest established employment cluster outside the CBD, with 58,500 jobs. It is one of the six NEICs identified in Plan Melbourne as areas with the potential to provide high job concentration in suburban areas (VPA 2017). It has a critical mass of education, health, research and commercialisation facilities, including: Monash University, the Australian Synchotron, Monash Medical Centre, CSIRO's largest site in Victoria, Monash Business Incubator, Melbourne Centre for Nanofabrication, Monash Enterprise Centre, and the soon-to-becompleted Monash Children's Hospital. The Eastern and South-Eastern sub-regions (of which Monash NEIC is part) are expected to grow by 550,000 to 700,000 residents between 2011 and 2031. The Monash NEIC study area satisfied some key prerequisites for selection as case study for this research, these being:

- the area has been identified as a growth area of strategic interest, and is currently the subject of a strategic planning process
- SNAMUTS data for the area had been collected and analysed previously
- there was an ongoing or workable relationship between the research team and planners involved.

The area has the distinction of being something of a case study in automobile dependency, and in how transport planning involves the interfacing of technical and political decision-making. The Monash University Clayton Campus was built in 1961, in what was then city fringe (see Figure 2). A site within metropolitan Melbourne was chosen over one in regional Victoria, in order to be closer to where its 'customers' lived, in the rapidly expanding south-eastern suburbs, as well as close to the industrial belt between Oakleigh and Dandenong. The first preferred site, recommended by Melbourne Metropolitan Board of Works' chief planner, was the Caulfield Racecourse, a large expanse of underutilised Crown land located at the junction of two rail lines, close to two trams, and only 18 minutes from the city. However, protests from small, but politically influential, racing club members pushed the campus further afield, "a decision that was ultimately political rather than economic" (Davison and Murphy 2012:15). In the end, the campus was built in Clayton, in the newly industrialising farmland, where residents both made cars and owned them in higher percentage than people in other suburbs – and out of the reach of Melbourne's public transport. The worries about access to the remote location were immediate: the campus was built on the promise of a 'spur line from Huntingdale', a soon-to-be-constructed railway line that would connect Melbourne's second university to the city (Mees 2010). The railway line, however, was never built: the vague promise was "occasionally repeated and long remembered but never kept" (Davison and Murphy 2012:21). Meanwhile, Monash Clayton became an 'automobile campus': as early as 1963, less than a quarter of

the students came to Monash University Clayton Campus by public transport (Davison and Murphy 2012).

2. Monash University stood on the very eastern edge of Melbourne in 1960. Source: Davison and Murphy (2012).

The 'Rowville line', as it came to be known (Knox City Council 2018), became a mythical project of sorts. It was included among the proposals for new rail connections in the 1969 Melbourne Transportation Plan, but not pursued (Davison and Murphy 2012). It was studied again as part of the Scoresby Transport Corridor Environmental Effects Study (EES) in 1998, which led to the EastLink freeway project, but was ultimately not proceeded with. The local council, Knox City, prepared its own feasibility study in 2004 (which came out positive), and then engaged in high-level advocacy, including the formation of the Eastern Transport Coalition (Knox City Council 2018), which led to a state government-led feasibility study in 2012. That study also came out positive, but ultimately concluded that the line would be required in 2027, 15 years in the future (Carey 2018). In the interim, a boost in bus services was recommended (Carey 2018). The services have improved in recent years, with a 'smart bus' (a high-frequency bus service) added in 2006 (Mees 2010) and a dedicated university shuttle that brings the bus frequencies to Huntingdale to 4 minutes (Planner 1, research interview), but Monash University is still dependent on buses for connecting to the nearby train line.

And with 32,000 students and staff (Resident 3, research interview), the University is by far the biggest employer in the area.

However, in recent years the area has been designated of strategic importance to the state. The 2013 Plan Melbourne, the current strategic plan for Victoria, designated Monash one of six National Employment and Innovation Clusters. Once released, Plan Melbourne triggered the process of creating strategic plans for the NEICs, led by the state planning body, Victorian Planning Authority (known as the Metropolitan Planning Authority at the time). An Advisory Group was formed between state planners and representatives of the businesses in the area, and two preliminary consultant studies were produced during the four-year preparation process, both assessing the commercial activity in the area and the business needs of the commercial residents of the NEIC. Though their importance to the process of planning Monash NEIC is limited, the consultant studies were significant in identifying and articulating transport needs of the area as central to its economic development. Both confirmed that poor public transport links were a major limitation in attracting businesses to the cluster, in bringing clients and retaining qualified staff, a limitation on market reach, and a constraint on the development of the cluster as a whole (Urbis 2014:3). Additionally, lack of public transport was cited as a significant problem for overseas visitors, attracted to the area's unique science enterprises of international distinction (Urban Enterprise 2015). Public transport was consistently placed as the top priority, with all other suggestions qualified as dependent on public transport improvements (Urbis 2014). Significantly, no transport or land-use (let alone integrated) strategy scenarios were considered in the preliminary studies.

In May 2017, VPA released the Draft Framework Plan for the area; our study commenced soon after. According to the initial timeline (Figure 3), the Framework Plan was to be adopted in early 2018. Our study was designed to test transport infrastructure scenarios under consideration by the planners during the time when the Draft Framework Plan was being discussed by the stakeholders. The workshop took place in November 2017, and the final round of interviews in early 2018. As the following section will detail, the planning process ended up significantly deviating from this timeline.

3. The official planning timeline for Monash NEIC. Source: MPA (2016).

3 Findings

3.1 Transport plans to date

The Draft Framework Plan released in March 2017 did not include a transport plan – perhaps not surprising, considering that no transport infrastructure scenarios were developed or tested in the four-

year preparation process, but somewhat unexpected considering the document's own mission (VPA 2017:1) to "boost local employment by… improving transport links and public transport" and the demonstrated high business importance of improving public transport in the area. The transport component of the Plan was limited to a two-page section, with its strategic 'outcome 3' being to "prepare" an "integrated transport plan" to "support economic growth" (VPA 2017:7). The actions supporting this outcome were an imminent freight road extension, a walking and cycling network to be developed by local councils in short-to-medium term, and a plan to plan for "a range of high-frequency and high-capacity public transport solutions to be developed in the short to long term" (VPA 2017:12) by the newly established transport authority Transport for Victoria (TfV), with no detail, timeline, or scenarios under investigation (see Figure 4).

Figure 5 Transport Plan

4. Monash NEIC transport plan. Source: Monash National Employment and Innovation Cluster Draft Framework Plan. Source: VPA (2017:13).

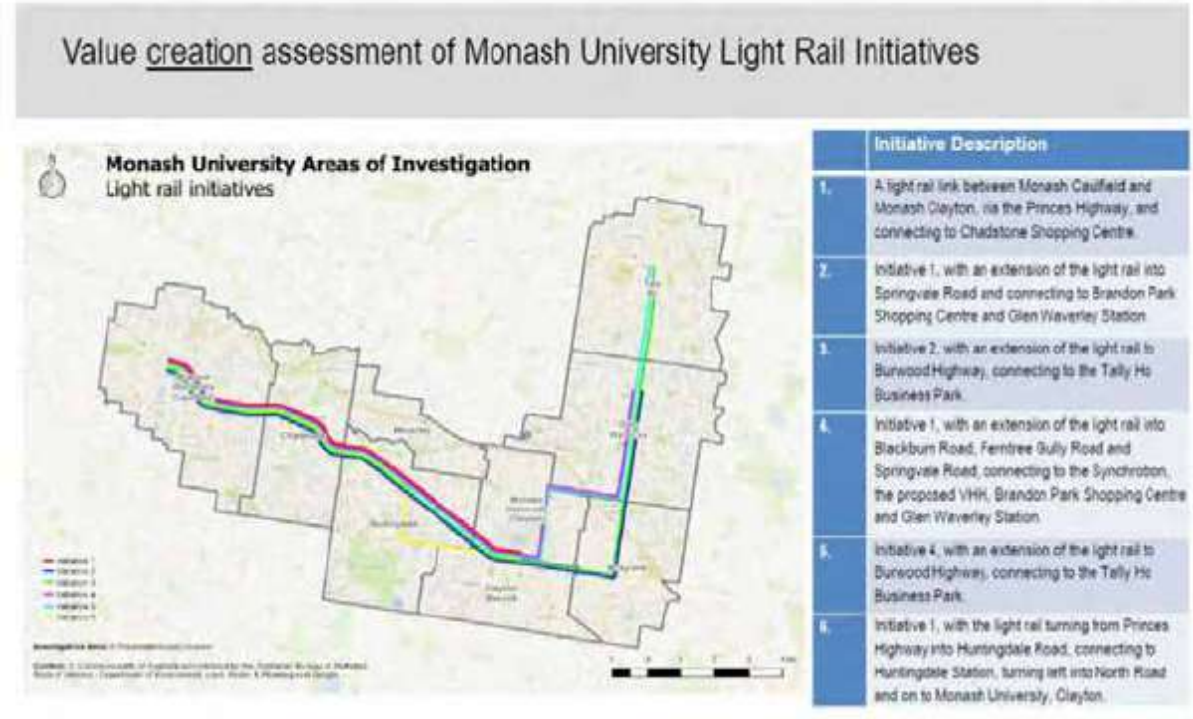
Indeed, the state government planners admitted that “the Draft Framework Plan was more of an attempt to jot on one page what all government agencies were already going” (Planner 2, research interview). In other words, the Plan collected previously approved projects in the area and showed them in relation to one another – no new strategy was generated in the preparation of the document. The interviews with state planners corroborated that there had been no confidential transport strategies either, that had been considered or assessed by state government planners. State planners from VPA and TfV both cited high staff turnover and departmental structure changes creating an uncertainty over whose responsibility it was to create a transport strategy. Local planners for Monash and Kingston City Councils were clear on what they wanted – a train line, or at the very least as much public transport as they could get – but that they could not make it happen without state government strategic support. One transport planner suggested that “a scenario suggests commitment (….) which could be interpreted as a political commitment. (…) [I]n the current political climate, public transport is very politicised and nobody wants to make claims they won't be able to deliver on” (Planner 1, research interview). This was echoed by a notable urban design consultant on Monash NEIC, who said that even the University transport submissions were kept confidential because “the State has been super nervous here about promising to do something before it's gone through a whole business case. [I]t will only say that once a business [case] is prepared, we'll commit to it – but before that, show nothing. Or show it so ambiguously that it's not clear” (Rob McGauran, research intervew). The informants from the government planning agencies were reluctant to even informally suggest transport options. Additionally, multiple state planners emphasised that they perceived the current political situation (on both state and federal level) as not suitable for making long-term plans – or even suggesting scenarios. Whereas state planners perceived that they had the ability to enact land-use zoning changes, and were confident that those changes would result in a different mix of uses on the ground – this certainty was lacking in the political processes needed for commitment to infrastructure delivery.

When questioned about using accessibility modelling in public consultation, state planners showed interest in gathering community feedback on different scenarios as a form of data: it was suggested that strong support within the cluster for a detailed transportation scenario might help push it forward by building and demonstrating consensus on future direction. However, the same problem persisted, of planners not wanting to suggest what those scenarios might be. There was a strong suggestion that it would be more convenient for the professional planners if the infrastructure scenario proposal came from elsewhere.

3.2 Informal transport scenarios

Where state planners were very reluctant to suggest any transport infrastructure scenarios for Monash NEIC, the opposite was the case for the residents of the area. Transport facility managers and business strategists for Monash University and CSIRO, as well as planners from Monash, Kingston and Greater Dandenong City Councils, were eager to meet, propose and discuss possible infrastructure investments. The 'phantom' of the Rowville Line kept returning to conversations – but this time mostly as a light rail following a similar alignment, and no longer as a railway line. Representatives of CSIRO and Monash University expressed tremendous frustration at not being able to work with the

planning professionals to influence changes they saw necessary for their business expansion – such as improving walkable paths between the businesses in the area, building their own accommodation facilities, and connecting the region to the airport with fast rail.



5. Fotios Spiridonos' unofficially developed scenarios for Monash University Light Rail Initiatives. Source: Fotios Spiridonos, pers.comm.

Where state planning documents provided no transport scenarios for consideration, let alone accessibility studies, such scenarios appeared in privately commissioned studies. The most notable example was a study commissioned by Monash University's Fotios Spiridonos, the university's Manager for Campus Access and Transport, which examined value creation effects of six different public transport options linking Monash University to Huntingdale and/or Caulfield Stations with tram. The study (see Figure 5) was the closest to a fully-fledged transport scenario for Monash NEIC, in the sense that it defined both the mode and the alignment of potential new links – even though it did not detail service frequency or stop locations.

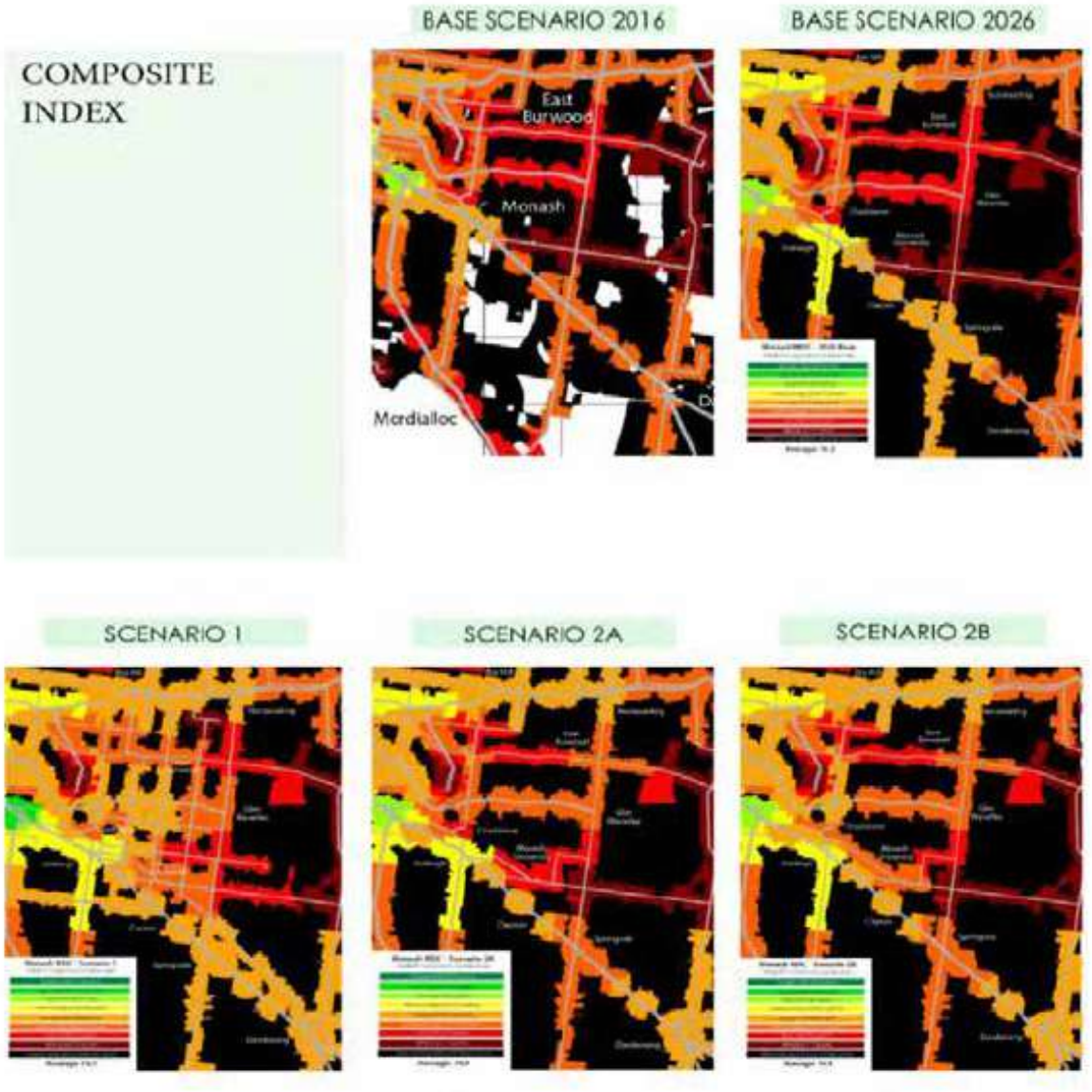
3.3 SNAMUTS modelling and workshop

The absence of transport scenarios under consideration by the state – formally and informally – the SNAMUTS models were produced for two transport proposals (known to us at the time) with the greatest level of detail: Fotios Spiridonos' Value Creation Assessment of Monash University Light Rail Initiatives, commissioned by PriceWaterhouseCoopers (unpublished and not publicly available at the time of writing, though Mr Spiridonos shared the basic details), and the transport 'composite' plan present in the Draft Framework Plan (VPA 2017) which involved "intensification and high-capacity public transport" on all major roads in the cluster.

Both plans had to be fleshed out in detail by the SNAMUTS team to model their effects. Mr Spiridonos' initative was assessed on two scenarios with the best outcomes: Scenario 2A involved a

light-rail link between Monash Caulfield and Monash Clayton campuses, via the Princes Highway, connecting to the major Chadstone Shopping Centre, continuing via Burwood Highway and connecting to the Tally Ho Business Park (initiative 5), but extending at the northeastern end to Nunawading Station; and an alternative scenario (2B) following the same alignment east of Monash campus, also as far as Nunawading, but on terminating on the western side at Huntingdale station. Both scenarios included some modifications to the existing bus services, to avoid duplication of services. The ‘transport intensification’ plan in Draft Framework Plan for Monash NEIC was fleshed out in detail to include boosting the bus routes in the district to 10-minute frequencies during the weekday interpeak (and at least 30 minutes seven days a week), creating a multidirectional grid between (and to some extent beyond) the Dandenong and Glen Waverley train lines that frame the area north and south. The new bus grid included the existing SMART buses (routes 900, 902 and 903), as well as parts or all of existing routes 623, 693, 703, 733, 767 and 800.

Taking into account the realistic timeframes for infrastructure planning and constructions, both scenarios were modelled as a hypothetical situation in 2026, including demographic and job growth predictions for 2026 used by VPA, and all 'committed transport projects' likely to be completed or implemented by that date. To allow comparison, the existing state of transport at Monash NEIC was also modelled, as was the 'do-nothing scenario' for 2026, which only took into account the already committed infrastructure plans and demographic and job changes. The accessibility outcomes of those four scenarios formed the basis of the workshop.



6. SNAMUTS maps: Composite Index blends together the results of all SNAMUTS metrics to show an easily legible map of how public transport performs across the metropolitan area. It is intended to be absolute (i.e. allow international comparisons), but it remains an imprecise index due to the complexity of the underlying calculations.

The results (Figure 6) paint a stark picture of just how poorly connected Monash Clayton is – particularly stark when compared to the University's secondary campus in Caulfield, also shown on the maps. In every metric, Monash Clayton scores below the Melbourne metropolitan average:

Closeness centrality = 64 (Claufield = 46), average 67

Transfers = 1.5 (Claufield = 0.8), average 0.99

Betweenness centrality = 19 (Claufield = 172), average 36.5

Nodal connectivity = 5 (Claufield = 346), average 90

30-minute catchments = 3% (Claufield = 18%), average 8.9%.

It is of note that accessibility results improve very little in alternative transport infrastructure scenarios (scenarios 1, 2A, 2B). Though all indices marginally improve with the additional bus or light rail services, the changes are microscopic, even compared to the accessibility index maintained by Caulfield: average transfer time to reach the rest of the network improves from 1.5 to 1.3 (scenario 1) or 1.4 (scenarios 2A and 2B), or betweenness ('movement energy', the sheer amount of PT) increases from 19 to 31-34 – compare this to Monash Caulfield existing betweenness centrality index of 172, 186-196 under future scenarios! Crucially, the 30-minute catchment of Monash Clayton, i.e. the percentage of the city's population and employment accessible within 30 minutes of travel of public transport, an index of huge importance for a university trying to attract top students, increases from a woeful 3% to just 4-7% (compare to 23-4% for Monash Caulfield in 2026, or 28-29% for RMIT University (currently 25%) and 24% for Melbourne University (currently 13%)). Only on nodal connectivity, or the potential for transit-oriented development, is there a significant improvement: the improved bus network (scenario 1) raises Clayton's TOD potential from 5 (extremely low) to a respectable 96. By contrast, improved light rail brings an improvement to 31 (scenario 2A) and 42 (scenario 2B) respectively.

In conclusion, the SNAMUTS modelling of the Monash NEIC area showed very poor accessibility metrics for Monash University Clayton Campus and the surrounding 'employment and innovation cluster'. This was not a surprise: after all, the government's own consultation documents showed that, and there had been a long history of advocacy for better public transport in the area. What did surprise, however, was how little the proposed transport infrastructure improvements – developed over many years and supposing lengthy and expensive interventions into the network – improved the status quo. While local accessibility marginally improved in all scenarios (as evidenced by the local network health in Figures 26-28 REF), absolute accessibility indicators remained on the low end of the scale in all cases.

3.4 Workshop observations and post-workshop interviews

Analysing the SNAMUTS results went beyond the scope of the study: the models were produced for the planners and stakeholders for Monash NEIC, and the role of the researchers was to elucidate the results and observe how they affect the planning process.

Three distinct themes emerged while analysing the conversations during and after the workshop:

1. ***the maps allowed the participants to see metrics and understand the outcomes of infrastructure investment on accessibility outcomes, replacing some of the rhetorical arguments with more pragmatic questions;***

The Monash NEIC residents' most common observation about the planning process thus far was that the residents did not feel heard, nor that their needs were considered. There was a perception of a professional 'language barrier' in which the professionals in the cluster could articulate what they needed for their businesses to grow, but they did not know how to make a case for it – be it financial, political or administrative.

> Resident 1: “It's all based on hard data, and that's important. Everybody talks about bad connection, but what does it mean?”

Planner 2: “It's really important to carry people through these decisions as well, especially the community. A lot of people, when they're confronted with a bunch of numbers on the page, tend to shut down, whereas this is a really clear way to see what the interventions would do.”

Resident 1: “The colours and the mapping made clear how badly connected certain parts are. It was quite shocking, actually. It gave a lot more information than I previously had. It made it very detailed.”

2. ***A disinterest in discussing the details of public transport scenarios under consideration, which revealed a mismatch in roles between the planners and the residents.***

What became apparent during the workshop was that there was no-one in the role of strategic transport planner in the area. Instead of modelling the big-picture vision, planners from local councils were raising issues of individual behaviour change, and urban design at place level:

Planner 4: “Is anyone looking at urban design potential for improving the linkages and connections?”

Planner 4: “I'll just throw this in. Employers need to think about how their people work. Employees could work from home. They could be staggered to work different hours.”

In contrast, it was the local stakeholders, representing businesses operating in the cluster, that talked about the strategic importance of the cluster, and need for infrastructure of metropolitan-wide impact. Here is a representative dialogue between the business manager at CSIRO and a transport planner at TfV:

Planner 1: “Monash University is doing a lot of master-planning. This recognised that, to achieve those outcomes, you have to do something to the road network. I guess the question is which comes first, and it has to happen simultaneously.”

Resident 4: “More of a comment: all of this looks like band-aids, because it's still so reliant on the roads. Everything still goes in and out of the city. In European cities, you don't need vehicles. Is any thought being given to the public transport network?”

Planner 1: “I guess it would be a long-term option. It's often hard to justify the investment before the service has been proved. We're thinking about prioritising buses - a 5-minute network, or a 10-minute network. High-level accessibility. And exploring that potential before we commit.”

Resident 4: “It just puts more buses on the road.”

3. ***the main perceived usefulness of the data was as a tool for political lobbying with evidence-based input; there was a strong sense that the decision-makers were not present in the room – that the real strategic decisions about public transport in Monash NEIC would be made elsewhere***

In particular, when asked about the perceived benefits of accessibility modelling, representatives of businesses in the cluster expressed an interest in accessing numbers and calculations that they could use in what they perceived as a political, public opinion-dependent process of lobbying for infrastructure. The interest in comparing scenarios in detail was scarce: the respondents were not interested in gaining a nuanced understanding of how different transport and land-use scenarios

compare. What they wanted, instead, was “anything... anything you can provide us would be great” (Resident 1, research interview).

> Resident 1: “It was a very insightful and a good way of presenting... that you could see what it meant in terms of bad connections, how long it would take. […] It was a good way of presenting information that would speak to higher-level decision-makers.”
>
> Planner 4: “It’s grounded. The methodology sounds very, very sound. It highlights the problems we have all been aware of... but puts the science behind. We may need to bring you to a new audience in order to move this forward.”
>
> Planner 4: “If we were to put together a very influential group of people, could you do this presentation again?”

4 Post Scriptum

In April 2018, Victorian state government made a surprise announcement to build a light rail to Monash University (as well as a train link to Melbourne airport on the other side of the city), surprising commentators and transport experts alike (Currie, 2018). A financial commitment of $3 million was made in the coming Victorian budget (June 2018 – June 2019) for designing and planning the light-rail route, which would connect two main Monash University campuses via Chadstone, as well as the Australian Synchotron, the Monash Medical Centre and the future Victorian Heart Centre. The as-of-yet untimelined stage two would continue onto Rowville via Waverley Park. Planning work for stage one was to start immediately, and to include examining alignments, park-and-ride options, stop locations, cost and travel time benefits, and would include engagement with residents, resident businessses, and other local stakeholders (Carey 2018, Monash University 2018). (See Figure 7 for the proposed alignment). The plan showed a similarity with Fotis Spiridonos’ Value Creation plan, but had no obvious reference in Draft Framework Plan.

7. The proposed route of the new light rail link from Caulfield Station to Rowville. Source: Carey (2018).

Mere weeks later, the federal government announced it would invest $475 million to build a (heavy) rail line to Monash, as part of the announcements in the federal budget for 2019 (Fletcher 2018). Media commentators noted that this represented a clash with the state government light rail commitment. It is important to note than neither of these announcements came with accessibility models or data on passengers – the maps supplied were mere illustrations of the proposed network.

In August 2018, some three months before the state election and five months after the surprise announcement of the light and heavy rail options for Monash Clayton, Victorian state government released a video announcement on social media announcing plans for a massive underground rail loop, that would link up all of Melbourne's radial commuter rail lines with an orbital line from Werribee Station in the outer west to Cheltenham Station in the south, stopping at both ends of Port Philip Bay at the distance of 20-30km from the CBD (Henriques-Gomes, 2018). Described as "the biggest public transport project in history" of Victoria, it would include 10 existing stations and five new ones including, crucially, one at Monash University in Clayton (see Figure 18). At 90km of new rail, $50 billion projected costs, and the completion date of 2050, the plan sat closer to a vision than to a detailed plan. Still, speaking at a press conference a few hours later, Victorian state premier Daniel Andrews also added that the state government had already committed $300 million to the project, that "all the geotechnical work, engineering, design and planning will be done beginning first thing next year," that construction would commence in 2022 "if not sooner," and that the project would be staged, with stage one involving the 25-km line between Cheltenham in the south and Box Hill in the east, the span of the rail that would pass through Monash University (Smith 2018:unpaginated). At the

time of the completion of this paper, no accessibility data of any significance has been released to accompany this announcement.

This is the context in which the post-workshop discussions took place: one of unexpected policy announcements that had taken everyone by surprise, and that were in no way envisaged in the 'ordinary' planning process for Monash NEIC in the previous years. The follow-up conversation took the opportunity to explore how those decisions were made. Three complex themes emerged in the interviews:

4.1 'Every little bit helps'

Rich descriptions of the decision-making process revealed that transport planning was a political, and not expert-led process, and that behind-the-scenes lobbying played an outsized role.

> Planner 2: "From what I can gather, it wasn't so much TfV. It may have been successful lobbying of Monash Uni to the Premier, who then decided that this is the project that we're going to do. [...] My colleague Jess was speaking to [TfV] and it wasn't really on their work program either. So it was something that... it hasn't come out of the blue, but it has jumped forward a lot faster than people thought it might."

> Fotios Spiridonos: "The only comment I have is that I like to be proactive, and that's why I had that value created work started in mid-2016, the report coming out in mid-2017, then trying to get it socialised, and that's good. To develop an evidence base for advocacy and I like to think that that's what it did. ... And as I said also it's an election year. what I'm trying to say, Jana, is every little bit helps."

4.2 'Happy with the outcome, don't mind the lack of process'

The second theme that emerged was, surprisingly, satisfaction: all stakeholders appeared happy with the outcome, rather than disappointed with the opaque process that led to it.

> Resident 3: "It's all relatively good news."

> Resident 1: "At Monash University, we don't have a position on [which proposal is better, light or heavy rail]. We welcome both proposals, as long as we get better connected. It's really important that it's not a slow tram or something, but that it's fast connectivity, that we can transport a lot of students. People come to Clayton every day. That's our point. ... So how does it fit in with what we're trying to create? Which is positive."

4.3 'Without process, we don't know where SNAMUTS would fit in'

Finally, in an echo of workshop observations, the vast majority of the interviewees struggled to identify when SNAMUTS could be used in the future, as the process going forward was both outside of their control, and fundamentally unknown.

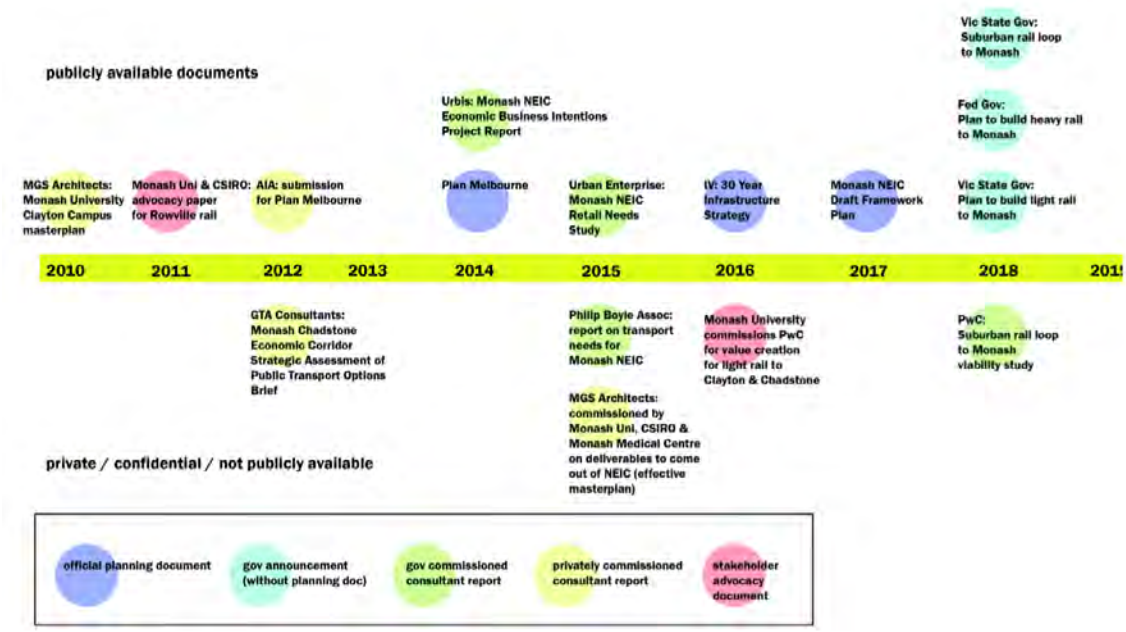
> Resident 1: "I know they are doing a... feasibility study and analysis to come up with the best solution. I guess, in that context, they might benefit from SNAMUTS more. So... yeah. I don't really know how is the process going forward, how they will use the feasibility study, whether they will consider a model like that. I think it would definitely be interesting for them to see."

5 Conclusions

Accessibility is a useful indicator in any process of strategic planning. But once inserted into the planning process, accessibility – itself a complex concept – finds itself within a larger 'wicked' problem, a multi-stakeholder and multi-layered process of long-term change affected by many factors. The data is pointing to the conclusion that it would be challenging to place an Accessibility Instrument, a tool for providing an evidence base to policy, in a planning context characterised by politicisation. This in itself is not surprising; however, having put detail into an abstract situation, the study sheds some light on why this has not been able to happen – by demonstrating the limitations of the stakeholders' roles in a poorly defined process.

Rob McGauran summarised some of the problems with the integrated planning for Monash NEIC when he singled out transport planning in Victoria as a 'vexed political thing':

> We have a history in this state of priorities for transport being based around swinging seats, not about transformation of a city. (Rob McGauran, research interview)



8. What actually happened: the full timeline of planning documents for Monash NEIC.

In contrast to best practice encountered in planning literature, the planning of Monash NEIC has been characterised by a highly inconsistent long-term process, with changing vision, strategic priorities, and financing. The assignment of roles has been (and remains) unclear, as even short engagement with the process has demonstrated that key decisions are made by political rather than planning players, lacking sufficient consultation even with responsible government bodies. It is notable that a number of key documents informing the planning process are confidential and not publicly available. Why confidential? The planning and financing of public transport infrastructure is certainly a matter of clear public interest. For the stakeholders from the private sector, those whose business interests, assets and professional roles are inextricably tied to the fortunes of the Monash NEIC area, the need to operate in an environment of great uncertainty and secrecy has led to frustration in some cases,

advocacy in others; as well as a tactical, ad hoc engagement with state politics, in the form of self-commissioned economic and planning reports, which are then used for lobbying – sometimes very successfully. The number of unofficial, confidential and purely secret documents in Monash NEIC almost rivals the official documents created within the process, and the extent of the problem becomes apparent (see Figure 8). Another salient characteristic of the transition process in Monash NEIC is its sheer unpredictability: the often expressed 'anything goes as long as we have a good outcome' attitude reflects a fundamental uncertainty around the likelihood of a good outcome. In other words, that government documents have marked Monash NEIC for a transition towards better connectivity does not give certainty to private actors: instead, small victories are celebrated each step of the way.

The introduction of SNAMUTS models into the planning process of Monash NEIC was welcomed by stakeholders and planners because it 'introduced clear metrics' to what appears to have, until then, been a largely impresionistic discussion of transportation outcomes. It is notable, and not entirely positive, that these metrics were immediately seen as a lobbying tool, not information to underpin nuanced decision-making. Decisions around public transport network structure, individual routes and stops, should be made in order to maximise accessibility outcomes. Only a public transport system that optimises accessibility will bring optimal economic, social and environmental benefits to the city.

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