

## OPPORTUNITIES AND RECOMMENDATIONS FOR LOCAL GOVERNMENTS DELIVERING SMART HERITAGE

DAVID BATCHELOR<sup>1</sup> and MARC AUREL SCHNABEL<sup>2</sup>

<sup>1,2</sup>*Victoria University of Wellington*

<sup>1,2</sup>{David.Batchelor|MarcAurel.Schnabel}@vuw.ac.nz

**Abstract.** The expansion of smart computer-led technologies into new disciplines enables local governments to design and manage their cities with novel smart discourses. Smart Heritage, the convergence of the smart city and heritage disciplines, offers local governments means to regulate and steer these issues. However, due to its novelty, currently, no research exists on the opportunities and trajectory of Smart Heritage within local government. Therefore, the here presented paper reports the opportunities and recommendations for Smart Heritage within local government, drawing on interviews with smart city and heritage advisors from three Australian local councils. It finds opportunities for smart computer-led technologies to design unique economic, place-making, and governance experiences in cities and recommendations that normalise the delivery of local governments' regulatory duties by these technologies. The findings are significant for leading smart technologies further into the practical-political framework of local government and diversifying smart cities' scope while at the same time combining two separated policies.

**Keywords.** Smart Heritage; Heritage; Smart City.

### 1. Introduction

With the continual expansion of smart technologies into new disciplines, local governments can consider a growing range of computer-led solutions to design and deliver new experiences and address their cities' issues. Smart technologies are digital tools with autonomous decision-making capabilities that do not rely on constant human management. Local governments primarily benefit from smart technologies in their jurisdictions because they reduce staff costs and improve services' effectiveness, transforming it into a 'smart city' (Lara et al, 2016; Yigitacanlar et al, 2018). Smart city commentators report yearly increases in the number of local governments implementing smart technologies and a diversifying range of applications, including comprehensive data viewing and analysis platforms for traffic and parking management and environmental resource use (KPMG 2018; KPMG 2019). With the upsurge in and diversification of the smart city discipline, academic researchers account new 'smart' discourses resulting from novel convergences of computer-led technologies and traditional disciplines, primarily in community, social, and cultural sectors (Neirotti et al,

2014; Boogaard, 2018). These new smart discourses follow the now-standardised ‘smart’ naming convention; as in the established Smart Mobility, Smart Infrastructure, or Smart Governance discourses (Joss et al, 2019; Smith, 2020; Govada, 2020).

One discipline at the forefront of this convergence with smart technology is heritage. Heritage is the subjective and dynamic concept that results from understanding and applying the past (Uzzell, 2009; Smith and Waterton, 2009; Winter 2012). Within a local government context, heritage concerns identifying, protecting, and managing historic places, sites, areas, and objects. In this context traditionally, it rarely intersects with technology outside of digital heritage applications in local government-run museums, where it uses passive technology on heritage material (Rushton and Schnabel, 2021). However, over the last seven years, the academic literature has gradually closed in on the notion of Smart Heritage through a patchwork exploration between heritage and smart technology.

Batchelor and Schnabel (2019) and Brusaporci (2020) are the first to recognise Smart Heritage as a distinct discourse separate from digital heritage. Batchelor and Schnabel and Brusaporci emphasise the active autonomy of the technology in engaging heritage, and employ the smart city’s ecosystem lens to frame Smart Heritage as a ubiquitous tool within cities; where autonomous computer technologies lead citywide services, including scoping, management, and delivery. Batchelor and Schnabel describe Smart Heritage as a bridge across these two disciplines that enable them to ‘intersect, converse, and find value’ through convergence. Brusaporci discusses Smart Heritage as an experience of seamless interactions between the past and technology, resulting in heritage itself being shaped by technology while also mediating the technology through historical understandings. Therefore, Smart Heritage is the meshing of the past’s subjective interpretation and valuation with ubiquitous and autonomous technology.

Analysing interviews with smart city and heritage advisors from three local councils in Australia, the paper illuminates opportunities and recommendations for Smart Heritage within local government. It applies an inductive analytical approach to illuminate these understandings then locates trends across the case studies that deduce generalised findings pertinent to delivering Smart Heritage in the local government sector. It contextualises the findings in a discussion section against academic literature on interdisciplinarity within organisations. Against this backdrop, approaches and challenges arise that inform the findings on the delivery of Smart Heritage within local government. The findings are significant as they signpost how computer-led technologies can further expand into local government and promote diversify smart cities’ scope by introducing the novel Smart Heritage discourse.

## **2. Methods**

The researcher analyses interviews with three Australian local governments to infer generalised findings. In each local government case study, the researcher interviews a Smart City Advisor and a Heritage Advisor on the opportunities and recommendations for Smart Heritage within their organisation. The researcher

then formulates shared narratives to produce generalised findings for local governments. The interviews were semi-structured. The questions probed into the potential and practical of convergence of the smart city and heritage disciplines to produce Smart Heritage. The organisations chose the advisors, and they were all experienced in their roles. The researcher provides the monikers Smart City Advisor and Heritage Advisor. The interviews were during May and June 2020, approximately one hour in length each, and audio-recorded, then transcribed.

The local governments are Broken Hill City Council, an outback mining city; the City of Melbourne, the state capital of Victoria; and the City of Newcastle, a former coal and heavy-industry city. These cities all have Heritage and Smart City Advisors and respective strategies that guide these disciplines. They reflect the broad range of size, status, and capabilities of the 537 local governments in Australia (Australian Local Government Association, 2020). However, the small sample size is a limitation of the research, meaning that the findings offer merely an indication of the opportunities and recommendations for Smart Heritage within the local government sector. Regardless, this is the first investigation of its focus within the academic literature and, therefore, is a valuable initial study that advances the smart city discourse into new disciplines.

### **3. Interdisciplinary Opportunities**

The following sections report the unique opportunities from each local government case study.

#### **3.1. BROKEN HILL CITY COUNCIL**

The Heritage Advisor for Broken Hill City Council recognised how Smart Heritage could support economic growth in the city and resolve the lack of local heritage expertise and public funds for staff. For example, smart technologies could provide self-guided tours of the historical outback mine sites, buildings, and artefacts around the city. Technology like QR codes, mobile phone tracking, and autonomous interpretation software could provide visitors with the ability to register and pay for tours remotely. It would then track and guide the visitors through the sites, and unlock and manage the historic assets, buildings, and artefacts during and after the tours. This technology would enable the vast historic mines with numerous assets to be unstaffed and flexible to seasonal demand, reducing high operational costs that are a significant hurdle in the outback city. The Heritage Advisor also suggested an online marketing platform to attract to Broken Hill and service tourists during their stay. Personalised advertisements would target likely tourists and, like in the example by Monteiro et al (2018), the smart technology would curate a personalised experience for each tourist based on their interests, available time, and interactions with their surroundings. It would provide digital nudges for local accommodation, museums and galleries, restaurants, and other attractions based on personal information. This platform would integrate with other civic information feeds and would encourage opportunistic and novel explorations of historical and civic sites, similar to urban exploration discourses. In the opinion of the advisor, the city lacked economic opportunities and sees an

avenue for smart technology to converge with historic sites to create a novel and profitable tourist experience.

The Smart City Advisor for Broken Hill City Council recognised two opportunities. The first opportunity is to install smart street lighting citywide that dims at night when no pedestrians or cars are near to emphasise indigenous astronomical narratives; a critical aspect of Australian Aboriginal heritage. The advisor recognised that the remote location and small urban scale of Broken Hill provides an opportunity to explore unique outback Aboriginal heritage. While smart street lighting is typically a Smart Infrastructure provision for reducing electricity consumption in cities, the opportunity to create heritage outcomes from the technology is novel. The second opportunity is the installation of digital pedestrian trackers in waypoints and historical sites throughout the city. The trackers would automatically recognise the volume and direction of people who pass by. The resulting data would support understanding the effectiveness of tourist initiatives and align with the existing place-making in the city centre.

### 3.2. CITY OF MELBOURNE

The Heritage Advisor for the City of Melbourne proposed using smart technology to create more efficient processes and engagement in visualisation, data collection, and data application for archaeological heritage. The advisor considered there would be opportunities for economic development through a better activation of heritage sites via smart technology but found it difficult to ways to deliver it specifically.

The Smart City Advisor for the City of Melbourne identified opportunities for an ‘intuitive city’ system that monitors public squares and parks and redesigns them in real-time to enhance meaning and functionality. The advisor referred to Smart Mobility discourses that reallocate road space to accommodate traffic demand better. The advisor translated this to the Smart Heritage discourse, where public spaces could better accommodate historical narratives through changeable heritage symbols, artworks, and spatial arrangements of objects and information of historical significance. The Smart City Advisor also saw opportunities for Smart Heritage to make visible Aboriginal history, customs, and values in the cityscape. The advisor recognised that Aboriginal heritage is primarily non-tangible, which is not always respected by colonial governance processes and constructs. Recognising Aboriginal history and culture was part of an emerging strategic shift in the council, and Smart Heritage is an opportunity to deliver in this direction.

### 3.3. CITY OF NEWCASTLE

The Heritage Advisor for the City of Newcastle thought that smart technology could support the repackaging and promotion of heritage collections, historic buildings, old streets, and other heritage places to new audiences. Smart technology could deliver heritage on digital platforms and mesh historical narratives with new contexts in order to pique the interest of the public. The advisor prioritised the engagement of audiences as an opportunity for

Smart Heritage. When asked about other opportunities; namely economic, historical conservation, governance, and environmental sustainability; the advisor acknowledged that these were likely possible but could not substantively identify how they would work within their current role. The advisor noted that delivering these opportunities would require a shift in the operational vision for the advisor and cross-council team inputs.

The Smart City Advisor saw the potential for Smart Heritage to enhance current place-making initiatives by the council. Notably, with respect to historic buildings, the advisor proposed that smart technology would provide immersive, interactive, and delightful heritage experiences. The advisor desired to see a more 'mediatised environment' where sites in the city communicate in real-time in order to improve the user experience. For example, each site would utilise and analyse personal data and 'big data' to continually improve the experience of the sites for visitors. The assets could react to current trends and alter exhibitions and narratives autonomously. The advisor also recognised a benefit in the additive installation of smart technology across the city. Reflecting on the development of the smart city discipline in the council, they described how the technological advancements unveil new and more ambitious opportunities. Therefore, the continual process of advancement itself was an opportunity for Smart Heritage. Later in the interview, both advisors from the City of Newcastle considered there should be a continual review of opportunities and interdisciplinary innovations within the organisation. The Heritage Advisor noted that explicit convergence between the smart city and heritage disciplines should feature in the new heritage strategy that was currently in development.

#### **4. Recommendations to deliver Smart Heritage**

The following sections report the recommendations from each local government case study.

##### **4.1. BROKEN HILL CITY COUNCIL**

To deliver Smart Heritage in their organisation, the Heritage Advisor for Broken Hill City Council recommended that the council is required to allocate greater staff availability and funding to Smart Heritage as they do not have the capacity for new tasks. Currently, their primary workload is to assess development applications, with minimal time available for other tasks. The advisor also stated that many of the staff, such as the Smart City Advisor, work long hours already. However, the situation for the council is complicated as the council relies on state and national funding for heritage and smart city initiatives. The capacity of the teams can, therefore, only increase through successful grant applications to state and federal organisations for specific Smart Heritage tasks and projects. Additional grant applications that converge the smart city and heritage disciplines are then critical to delivering Smart Heritage in Broken Hill.

The Smart City Advisor also recognised a lack of workload capacity to deliver Smart Heritage. The advisor noted that this is a result of the small staff size of the council. The advisor stated that staff are required to hold multiple portfolios, which

restricts their ability to be involved in all conversations. The advisor recommended regular meetings between the disciplines to improve communication. However, ideally, the council would have additional staff to converge the two disciplines better. Coincidentally, the advisor was to become the acting manager of the heritage team the following week, while maintaining their smart city role, and was interested in pursuing Smart Heritage. The advisor also recommended the council establish a formal process for cross-discipline initiatives. The advisor talked about how the staff regularly communicate due to the small size of the organisation. But the advisor endorsed a more structured approach to focus on the practical delivery of projects, including funding applications and architectural design.

#### 4.2. CITY OF MELBOURNE

The Heritage Advisor for the City of Melbourne stated that Smart Heritage required endorsement by councillors and management for success. The advisor noted that the workload in the organisation is strictly guided by individual projects and permissions, restricting the scope for new interests like Smart Heritage. The advisor stated that the way to improve the delivery of Smart Heritage is to gain approval for a specific project. The advisor considered an increase in the capacity of the team, such as an additional staff member or allocated time for convergence, is highly unlikely due to more immediate demands on other ingrained projects such as COVID-19 recovery. Therefore, the advisor recommended that councillors and management become aware and supportive of Smart Heritage for its success and allocate it in the workload pipeline.

The Smart City Advisor for the City of Melbourne reported that their team was in 'pilot mode', where they are testing initiatives with any team who approaches them. As the heritage team had not approached them, the smart city team worked with other disciplines. The advisor recommended the heritage team contact them to start the convergence process. There had not been an initiative or directive to converge the two disciplines, and they were not aware of the strategic aims of each other. Addressing this issue, the Smart City Advisor recommended that the disciplines engage each other better to understand their knowledge, technical capabilities, and strategic aims so they can efficiently and effectively deliver Smart Heritage. However, while discussing the strategic alignment between the teams, the advisor considered that the disciplines strategically aligned because of a technology layer in all strategies, including the heritage strategy, encouraged interdisciplinary working. Therefore, strategically the council supported Smart Heritage but it required operational encouragement to occur. More effectively, both advisors also recommended the council structurally merge the smart city and heritage teams into a singular unit or deploy an executive directive that strategically converges the teams. The Heritage Advisor discussed how the teams currently have different directors within the organisation and how this structure reduced the prioritisation of convergence. The advisor considered the merger of the teams would address this issue.

#### 4.3. CITY OF NEWCASTLE

The Heritage Advisor for the City of Newcastle recommended an expansion to the duties so they can encompass non-regulatory tasks. Currently, regulatory processes, such as processing development applications, dominated their workload. Also, the advisor described the heritage team currently existed within an administrative-focused land development pillar in the council, which restricted their approved ability to proactively engage other disciplines, such as the smart city discipline. These operational and structural barriers hindered the convergence of the disciplines. The advisor recommended broadening their responsibilities within the council to include non-regulatory functions to increase their visibility of opportunities and ability to converge with the smart city team. The advisor was optimistic that the new heritage strategy, which was under development during the interviews, would improve the prioritisation of interdisciplinary convergence.

The Smart City Advisor from the City of Newcastle identified that high workloads restricted their visibility of opportunities with the heritage team to deliver Smart Heritage. As a result, they had not considered Smart Heritage as a distinct deliverable. However, they welcomed more collaboration with the heritage advisor as the smart city team sought to expand its operations across council disciplines. The advisor recommended that the smart city and heritage teams identify the mutual and relevant benefits from Smart Heritage and how they align with the strategic aims of the organisation, which may unlock the mechanisms to fund and resource Smart Heritage outcomes. The Smart City Advisor also recommended that the council adopt a flat organisational structure that encouraged more free and direct lines of communication and visibility between the teams. The advisor stated their team frequently tested different structures to generate agile and creative relationships and considered a new structure might be required to converge with the heritage team in this instance.

### 5. Discussion

The Smart City and Heritage Advisors reported a range of economic, place-making, and internal governance opportunities for Smart Heritage within their local governments. These opportunities are novel means to deliver each council's strategic aims and reflect their unique internal and external context. This finding aligns with the academic literature on interdisciplinarity within organisations, which states it enables organisations to address unique and often complex contexts and issues. Helga (2017) states that interdisciplinarity draws on tacit and explicit knowledge bases that were likely not connected previously, and the organisational framework provides the drive for their convergence and exploitation. Sousa and Gonzalez-Loureiro (2015) discuss how the creative socialisation and combination of knowledge within an organisation often produce practical but unrepeatable outcomes. However, Luring and Selmer (2012) warn that disciplines must have complementary skills and relevant information to co-create a viable and productive outcome. Without complementary and relevant inputs, interdisciplinary convergence is impotent. Translating these academic insights into the research infers that the identified opportunities are theoretically

viable, and encourages local governments to explore them sincerely. Local governments should consider Smart Heritage's novelty primarily a strength, rather than a hindrance, as it applies computer-led intelligence to complex cultural contexts and issues. These autonomous abilities present the tools to meet the increasing demands of our cities. Yet, these specific opportunities should not be carbon-copied across local governments due to various contextual challenges between councils. Instead, local governments should use these opportunities as clues for locating their specific opportunities. Each local government must assess the case-specific relevancy of their disciplines' skills and information and the demands of their context and issues to ensure a productive outcome.

The advisors recommended approaches to enhance the adoption of Smart Heritage within local government. These approaches are predominantly greater staff availability and funding, endorsement by councillors and management, and an expansion of the duties to encompass Smart Heritage. This finding aligns with the academic literature, which states that interdisciplinarity demands process and structural change in organisations. Clark et al (1993) and Swan et al (2002) find that convergence between disciplines initiates a learning and reflection process that requires each discipline to self-evaluate its contribution and position in contrast against the other discipline. This process results in subtle and regular iterative changes. Lanterman and Blithe (2019) identify that through this process, individuals typically reduce the opinion of their discipline in light of the inter-disciplinary approach, as they are hesitant to overextend their discipline politically. Leeuw et al (1994) note that organisations as a whole become aware of knowledge silos and biases towards specific disciplines and their distinct perspectives. However, Nonaka and Tekuchi (1995) warn that resource changes can disrupt existing well-performing aspects within an organisation and sow distrust in existing processes and management structures, weakening the organisation. Boone and Hendriks (2009) also recognise that interdisciplinary opportunities require time-intensive management of political motivations and each discipline's communication preferences. Interpreting these academic insights into Smart Heritage in local governments deduces that, in the initial stages at least, the shortage of resources for innovation due to existing structures and process is expected. But to be successful, local governments must change resource supply. This change may demand reducing resources to other tasks and upset practical and political balances in the organisation. Therefore, managers should consider the impacts on the organisation and scale or temper changes to ensure that productivity remains acceptable. Nevertheless, in the academic literature, Smart Heritage requires a change in resourcing within local governments.

It is important to note that the advisors' opportunities and recommendations are theoretical, meaning that the effectiveness and feasibility of delivering them are yet to be proven. But, established smart discourses, such as Smart Mobility and Smart Infrastructure, indicate a positive likelihood that these and other councils can deliver and benefit from the opportunities and recommendations. In earlier interviews by Batchelor and Schnabel (2020), advisors from the case studies identified a gradual and ongoing process, including across multiples years and various editions of strategic documents, that delivered similar outcomes and

changes. It is likely learnings from delivering these earlier smart discourses could support the delivery of Smart Heritage in local governments.

## 6. Conclusion

The paper presents opportunities for smart computer-led technologies to design and deliver unique economic, place-making, and governance experiences in cities, and recommendations that normalise the delivery of local governments' regulatory duties by these technologies. The findings are significant as they strengthen the business case for smart cities, digital heritage, and interactive environments. As discussed in the introduction, computer-led technologies are expanding further into local governments, and there is support for its success. So, understanding the opportunities and recommendations for adopting these technologies benefits this cause and signposts its trajectory. The findings also support the diversification of the local government's smart city delivery beyond now-established Smart Mobility and Smart Infrastructure discourses. The heritage discipline is mostly untapped by smart technology and presents significant opportunities to benefit councils due to its cultural value and dynamism. Local governments should, therefore, openly consider Smart Heritage in their operations and strategic futures. The research's small sample size discourages the complete translation of the generalised findings to other local governments and countries. However, support from the academic literature on interdisciplinarity within organisations aids the weight of the findings. Therefore, the findings set the tone for further research in this novel area intersecting the smart city and heritage disciplines.

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