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How to Deliver Smart Heritage within Local Government:

Defining Smart Heritage and Smart Heritage Principles

THESIS

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ABSTRACT

Local governments are innovatively applying smart city technology to resolve challenges in their jurisdictions. These challenges commonly relate to environmental sustainability, infrastructure, and transportation, and result in novel discourses within local government strategies and operations, such as Smart Environment, Smart Infrastructure, and Smart Mobility. Driven by the success of these discourses, local governments seek further solutions through converging the smart city technology with other disciplines. The next likely convergence is with the heritage discipline, subsequently producing the *Smart Heritage* discourse. Academic literature records that Smart Heritage is an emergent yet unformed discourse that is on the verge of application within local government. Smart Heritage presents opportunities to converge historical narratives with the automated and autonomous capabilities of smart technology. However, due to its novelty, the local government sector has no guidance on delivering Smart Heritage within strategies and operations. Therefore, this thesis comprehensively explores and defines the Smart Heritage discourse and addresses Smart Heritage's delivery within local government strategies and operations.

The original contributions to knowledge in this thesis are the first thorough definition of Smart Heritage in academic literature and the production of Smart Heritage Principles, which direct the delivery of Smart Heritage within local government. This thesis firstly defines Smart Heritage through an investigation into the nascent patchwork of academic literature at the intersection of the smart city and heritage disciplines. This definition establishes the discursive framework for the subsequent inquiry into how to deliver Smart Heritage in local government organisations. In this inquiry, the researcher conducts three case studies on local governments in Australia: Broken Hill City Council, the City of Melbourne, and the City of Newcastle. In each case study, the researcher analyses strategic smart city and heritage documents and then interviews their smart city and heritage advisors regarding strategic and operational convergences between the disciplines. The researcher then synthesises the resulting data into cross-case key considerations that contextualise a base understanding of how local governments deliver Smart Heritage. Using this understanding, the researcher conducts a second round of interviews and synthesis that, in turn, produces the refined Smart Heritage Principles. The researcher

validates the principles' relevancy and applicability through an additional case study with Wellington City Council in New Zealand.

The research finds that Smart Heritage in the academic literature is nascent yet organically forming around a shared discourse between the smart city and heritage disciplines. As a result, there are numerous understandings of Smart Heritage. Nevertheless, these understandings agree that Smart Heritage convergences historical contextual narratives with automatic and autonomous technologies and advances from the passive Digital Heritage discourse. The case studies find that there is a foundation for Smart Heritage within local government through strategic documents that share similar focuses and advisors who seek multi-disciplinary convergences. However, the disciplines' overlapping is not explicitly recognised in strategic documents and operational models, leading to inadequate financial and staff resourcing of Smart Heritage and inefficient cross-disciplinary initiatives in local government. The research identifies four thematic key considerations that address delivering Smart Heritage within local government; recognition, delivery, resourcing, and innovation; and proposes four Smart Heritage Principles for local governments to follow in order to deliver the discourse. The researcher presents the principles in an industry-ready document at the end of the thesis.

The implications of this research are the increased visibility of Smart Heritage as an academic discourse and support for the delivery of Smart Heritage within local government strategies and operations. Smart Heritage becomes more visible as this research solidifies then illuminates a discursive pathway that researchers can engage with. Importantly, this research presents evidence that Smart Heritage is extant within academic literature and local governments, supporting its position as a constructive academic and practical discourse. The Smart Heritage Principles support the delivery of Smart Heritage within local government strategies and operations through the applied guidance they offer the organisations. As the industry-ready document is the first publication with this focus, the influence on the delivery of Smart Heritage is significant. The researcher aspires to share the Smart Heritage Principles document beyond this research context through its distribution to other councils globally.

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GLOSSARY

Advisor	An employee of a local government.
Automated	A process that operates independently according to a preset schedule or action.
Autonomous	Having the right and ability to operate independently of external direct control or input.
Community	A group of people with a common characteristic or interest, such as a shared geographic region, cultural identity, or interest.
Councils	The same definition as 'Local Government'
Discipline	A branch of knowledge or an area of study and profession.
Discourse	A linguistic and philosophical system focused on an area of knowledge or study.
Governance	A term that encompasses the systems, structures, and mechanisms for governing.
Infrastructure	The basic physical and organisational structures and utilities in a city.
Interpretation	The process of communicating and understanding the meaning of something.
Local Government	The third-tier of government organisations in Australia who typically administer utility service provision, community administration, and urban development regulation.
Local Government Strategy	A document that stipulates political aspirations of a local government.
Mobility	Related to the ability to move, be moved, and transportation.
Operations	The performance of practical work and action.
Place-Making	A process and philosophy that creates a connection between people and a location by capitalising on local assets, identities, and aspirations.
Smart Heritage	Smart Heritage is the convergence between the smart city and heritage disciplines that intertwines the autonomous and automatic capabilities and innovation of smart technologies with the contextual and subjective interpretation of the past.
Smart technology	Technology that is automated and autonomous.
Social	Relating to human interaction between individuals, groups, and society and their welfare.
Statutory	Related to, set, or controlled by legal statutes or laws.
Technologies	The manifestation of a solution or tool to resolve a task.

PUBLICATIONS FROM THE RESEARCH

- Batchelor, D. & Schnabel, M.A. (2019). Smart Heritage in selected Australian local government smart city policies. In *53rd International Conference of the Architectural Science Association, 28–30 Nov 2019* (pp. 245–254).
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CHAPTER ONE

AN INTRODUCTION TO THE RESEARCH

1.1 Smart Technologies in Local Government

Over the past ten years, there has been a dramatic increase in local governments applying the smart city discipline to overcome challenges within their jurisdictions. Many notable cities have adopted the discipline in coordinated programs, such as Smart London Together (Greater London Authority, 2018), Amsterdam Smart City (Amsterdam Economic Board, 2020), and the Quayside project in Toronto (Waterfront Toronto, 2020). The UN-Habitat (2020) and Organisation for Economic Co-operation and Development (Matsumoto et al., 2019) also encourage governments to deploy smart technologies to address rapid urbanisation challenges. The smart city discipline offers local governments the framework to converge automated and autonomous technologies with other disciplines. These automated and autonomous technologies promise improved effectiveness and efficiencies for councils and citizens by using data and computer-led decision-making to tailor services to specific needs. The resultant ideal benefits are reductions in physical and financial resources and time expenditure, enabling greater productivity and a better experience for citizens and visitors. Smart technologies are commonly applied throughout cities globally to address challenges in the environmental, economic and infrastructure disciplines. These applications see smart technologies reducing carbon emissions through more efficient energy use in buildings, improving business communications and consumer activities, monitoring infrastructure operations, and planning infrastructure or other civic repairs and upgrades when required or best economised. Embodying these applications are the academic and practical smart discourses: Smart Environment, Smart Economy, and Smart Infrastructure. These discourses enable researchers and private sector professionals to characterise and engage the smart city discipline's convergence with traditional disciplines. Proponents of these discourses host dedicated forums and discussions that are distinct from their traditional discipline and the overarching smart city discipline due to the substantial interest in and breadth of their innovative capabilities and applications.

In more recent years, local governments expanded the application of the smart city discipline to other disciplines. These other disciplines extend beyond environmental, economic, and infrastructure, and feature more social and cultural local government services. Such convergences between the smart city and other disciplines deliver positive outcomes for communities, democracy and governance, and social wellbeing. These convergences produce the Smart Living, Smart Governance, and Smart People discourses. The naming of these new discourses vary among commentators due to their novelty but often adopt the prefix ‘smart’ to differentiate them from their non-smart counterparts.

As local governments continue to bring together the smart city discipline with other disciplines, convergence with the heritage discipline is likely to be next, giving rise to a *Smart Heritage* discourse. Early signs of Smart Heritage are evident in the academic literature, but there is a notable absence of a comprehensive definition and contextualisation of the discourse within the contributing smart city and heritage disciplines, as is discussed in Chapter Two. However, if research addressed these matters, Smart Heritage could lead to innovative protection and preservation, conservation, and promotion measures for smart cities and historical sites. Globally, the local government sector could benefit from Smart Heritage as it can assist in them meeting their overarching national and state heritage and innovation obligations and delivering their local ambitions to manage and enhance their cities through smart technology while retaining, protecting, and providing for heritage.

1.2 Australian Smart Cities

Local governments in Australia are already applying the smart city discipline to address challenges in their jurisdictions and, in doing so, are broadening its application. A survey of local governments reports a substantial presence of smart city programmes, with approximately 42 per cent of local governments developing a smart city strategy and 21 per cent piloting real-world smart city initiatives (KPMG, 2019). It identifies growing interest in the discipline and its varied applications, with a higher response rate than surveys in previous years. It also identifies an increased focus on the social aspects and services of smart cities, like governance, engaging places and communities, and citizens’ input and oversight. This increase in the smart city discipline is primarily driven by the Australian Government’s Smart Cities and Suburbs Program (2020a).

This program allocated \$50 million across two rounds of contestable funding in 2017 and 2018 for local governments to deliver innovative smart technology solutions to local challenges. The program is currently delivering the second round of funding and supporting the implementation of the first round's projects. Its eligibility criteria encouraged local governments to develop smart city strategies and smart city teams to manage their decision-making and delivery processes, then to apply for funding for initiatives. There were 278 funding applications from councils across Australia, ranging from the outback, rural, regional, suburban, and metropolitan areas. The councils' initiatives sought various outcomes, including reducing carbon emissions, supporting social and digital connectedness in city parks, and monitoring water usage. To date, eighty-one local governments have received funding through the program's two funding rounds. In a survey conducted in 2019, at the end of the second round of funding, the Australian Government (2020b) found that local governments primarily seek liveability, council service delivery enhancements, and reduced operational costs from smart city initiatives. Interestingly, liveability outcomes are more often sought than environmental sustainability outcomes. This shift towards social aspects in the smart city discipline reflects the global trend of broadening convergence between the smart city discipline and other disciplines, especially those in the humanities. Australian local governments will likely follow this global trend to seek broader convergences, meaning that the smart city discipline's convergence with heritage is on the horizon.

1.3 Australian Heritage Sector

The Australian heritage sector consists of national and state statutes and local government regulations and initiatives. The statutes and regulations form a tiered system of historical importance and controls in Australia. On the national level, the Australian Government operates numerous statutes that address specific heritage matters, which all contribute to a national governing framework for the heritage sector. The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (1984) preserves and protects "from injury or desecration of areas and objects in Australia and in Australian waters, being areas and objects that are of particular significance to Aboriginals in accordance with Aboriginal tradition". The Act allows the Minister for the Environment to declare an area or object as 'significant' upon the request of an Aboriginal or group of Aboriginals, therefore, requiring its preservation and protection. The Act has been

criticised for the lack of incorporated procedures for making declarations and for using declarations as a tool of last resort rather than the Australian Government proactively protecting Aboriginal heritage (Evatt, 1996). The *Environment Protection and Biodiversity Conservation Act 1999* (1999) provides “for the protection and conservation of heritage” of natural value. It requires approval from the Minister for the Environment for activities with a significant impact on a declared World Heritage property under the *World Heritage Convention* (United Nations Educational, Scientific and Cultural Organization, 1972). The Act also protects declared and enables the declaration for the protection of national heritage places, wetlands, species, ecological communities, marine environments and other natural resources. The *Australian National Heritage List* and the *Commonwealth Heritage List* result from the Act, which registers the declarations.

Under the national federal system, each state and territory has the autonomy to manage heritage within its state in accordance with national declarations. In New South Wales, the *Heritage Act 1977* (1977) states that its objectives are to promote an understanding of heritage, encourage its conservation, provide for its identification and registration, encourage suitable adaptive reuse, and assist owners of heritage with these outcomes. The Act enables the state’s Minister for Heritage to declare items as holding ‘state or local heritage significance’, requiring protection by the state and their local governments. The Act establishes the Heritage Council of New South Wales, which consists of nine individual members who make recommendations to the Minister concerning these declarations. The Council maintains the *State Heritage Register* that records items of state and local heritage significance. The Act enables the Minister to enter into agreements with owners of significant heritage items to protect the item’s heritage value, including the acquisition and maintenance of a property. The other states and territories operate similar legalisation with comparable heritage councils and registers.

Local governments operate and enforce regulations on land development and activities that protect and control heritage. These regulations are primarily in the form of overlays and scheduled sites in planning schemes. Overlays cover suburbs or large areas, and scheduled sites refer to individual properties. They impose rules and standards on the underlying sites that protect the site’s heritage value. Common rules prohibit the demolition of historic buildings and

control the scale of modification to the historic building and surrounding site. Proposed land developments and activities that do not comply with the rules or standards are subject to the local government's discretion through a development application process. The local government may accept, accept with conditions, or reject proposals that require their approval. Local governments also introduce and operate initiatives that encourage the protection and preservation of heritage. These initiatives are often financial funding to support owners of historic properties with maintenance and local property tax reductions or waivers. Local governments may also undertake education, tourism, and community initiatives that enhance heritage appreciation, such as promoting historical sightseeing experiences and developing suburb identities that refer to a shared past through art installations, street names, and festivals.

1.4 Research Questions

The research seeks to understand the theoretical characteristics of Smart Heritage and its delivery in local government. It is evident from the increased interest in the smart city discipline and its expansion to other disciplines that there is an opportunity for novel investigations into new smart discourses and their practical deliverance. Of particular interest to the researcher is the convergence between the smart city discipline and the heritage discipline and the resulting Smart Heritage discourse. As detailed in Chapter Two, the research identifies existing tentative yet isolated explorations between these disciplines in theoretical and local government contexts. However, there is a lack of research that consolidates these isolated investigations into a visible and tangible discourse. There is also an absence of specific guidance on delivering Smart Heritage in local government. This absence of a unified discourse and guidance indicates a gap in knowledge that this thesis seeks to address.

To understand the theoretical characteristics of Smart Heritage and its delivery in local government, the primary research question of this thesis is: **'How to deliver Smart Heritage within local government?'** The question prompts the production of practical guidance for local governments as an answer.

This primary question begs two further questions that enable the researcher to resolve gaps in the knowledge and answer the primary question. The first additional question is **'What is**

Smart Heritage? This question seeks to resolve the absence of a unified Smart Heritage discourse by defining the concept. It is fundamental to answering the primary question because it defines what is being delivered within local government. The second additional question is **‘What are the benefits and challenges to delivering Smart Heritage within local government?’** The answer to this question provides nuance to understanding what the delivery of Smart Heritage in local government entails and highlights its contribution to local governments and academia.

1.5 Research Scope Limitations

The research is pragmatic in scope with the specific aim of delivering Smart Heritage within local government. The researcher selects this scope as it reflects their expertise as an urban planner and understanding that local government advisors require practical guidance that is informed by academic research to deliver meaningful change in cities. Also, as the literature review in Chapter Two describes, pragmatic approaches are a primary driver behind the smart city and heritage disciplines’ development over time. Researchers, governments, and practitioners have applied these disciplines to their contexts, which have produced unique solutions, processes, and advancements. It is often practitioners and governance organisations, including professional and public governance entities, that also represent these disciplines in public discourse. The research engages with the disciplines’ theoretical discussions in the Literature Review to ensure depth to their framing in the thesis. However, due to the research methodology’s pragmatic methods and focus, the thesis does not continue these discussions in depth through the document. Instead, the researcher prioritises the investigation into the policy and operational environment where local government advisors operate. This prioritisation is important to ensure that the research is clear, concise, and purposeful. Yet, the researcher acknowledges that the theoretical aspects of the disciplines, especially their criticisms, pose unresolved questions that Smart Heritage may inherit. The discourse may confront these criticisms and questions in the future due to them not being addressed in this thesis. The researcher discusses the disciplines’ criticisms, including nefarious economic and neo-liberal undercurrents in the smart city and political influence and definition vagueness in the heritage discipline in Chapter Two. In Chapter Three, the researcher also highlights the research’s methodological limitations in regards to these theoretical inquiry lines.

Therefore, this thesis' research scope reflects its pragmatic aim of delivering Smart Heritage within local government. It does not investigate the moral driving forces behind the smart cities and heritage disciplines. This limitation is evident but is put aside for the scope of this research. In Chapter Ten, the researcher recommends that future research grapple with the contributing disciplines' underlying criticisms to ensure Smart Heritage is equal and just.

1.6 Original Contribution to Knowledge

There are two original contributions to knowledge in this thesis. The first contribution is a complete review of the emergent Smart Heritage discourse in academic literature and the subsequent presentation of a comprehensive definition for Smart Heritage. The review and definition of Smart Heritage are the first for the discourse in the academic literature. The review and the definition importantly identifies the emerging features and qualities of Smart Heritage, including from the contributing disciplines, and recognises how Smart Heritage advances from Digital Heritage. As discussed in Chapter Two, Smart Heritage is currently without a clear and tangible theoretical base. It is, therefore, problematic for researchers and local governments to develop and apply the discourse in academia and real-world contexts. The implication from the first contribution is the demarcation of the Smart Heritage discourse, which initiates its uptake in academia, the professional sector, and the governance sector.

The second original contribution to knowledge is the production of the Smart Heritage Principles. The Smart Heritage Principles are a set of strategic and operational directives, including practical approaches, which the researcher recommends that local governments adopt to deliver Smart Heritage. In the absence of similar guidance on Smart Heritage, these principles benchmark the practice for the first time in applied and academic literature. The thesis presents the Smart Heritage Principles in a standalone industry-ready document in the appendices. The principles are a distinctive toolkit for local governments to apply in their strategies and operations. They lead to the real-world convergence of historical narratives with automated and autonomous smart city technologies that produce powerful and tailored experiences for users and councils. There are also commercial opportunities, as the standalone industry-ready document is a product for distribution across the local government sector and can be coupled with Smart Heritage consultancy services.

1.7 Structure of the Thesis

There are ten chapters in this thesis. Figure 1 locates these chapters within the research's structure.

Chapter Two details the academic literature on the smart city and heritage disciplines, paying attention to their relevant theoretical and practical discussions and criticisms. The chapter concludes with a definition of each discipline and culminates with a definition of Smart Heritage. **Chapter Three** contains the research's methodological structure and discusses the overarching research approaches and methods. In this chapter, the researcher also introduces the local governments that are the case studies for the research, examines similar studies on smart technology and heritage, and discusses the limitations and ethical considerations of the research.

Chapter Four reports on examining the smart city and heritage strategies in each case study for interdisciplinary Smart Heritage components. Importantly, it chronicles the relevant data from these documents for later analysis in the research. **Chapter Five** summarises interviews with the smart city and heritage advisors from each local government case study regarding Smart Heritage within their operations. In **Chapter Six**, the researcher thematically synthesises the case-specific data from the strategies and interviews into generalised key considerations. These key considerations contextualise and reveal attributes of Smart Heritage in local government, such as its knowledge, discourse, and opportunities. Guided by these key considerations, **Chapter Seven** reports on the second round of interviews with the local government smart city and heritage advisors on how to deliver Smart Heritage in their organisations. The chapter presents case-specific data for the Smart Heritage Principles. **Chapter Eight** contains a thematic synthesis of the second round of interviews' data that produces the Smart Heritage Principles. An industry-ready document in the appendices formally presents these principles. **Chapter Nine** validates the Smart Heritage Principles document by reporting on interviews with a smart city and a heritage advisor from another case study about their applicability and value. In the chapter, the researcher also reflects on the principles and their delivery in the local government sector. Lastly, in **Chapter Ten**, the researcher concludes the thesis by addressing the research questions, highlighting the research's original contributions to knowledge, and briefly discussing the future of Smart Heritage research.

Figure 1: Thesis structure.

CHAPTER TWO

AN OVERVIEW OF SMART HERITAGE & ITS CONTRIBUTING DISCIPLINES

2.1 Introduction

This chapter is a literature review of the academic and professional literature on Smart Heritage and the smart city and heritage disciplines. The purpose of this review is to provide an understanding of these concepts, which are central to the research. In this chapter, the researcher firstly reviews the Smart Heritage literature and finds that Smart Heritage is an emergent yet undefined discourse that is on the verge of application within local government. The discourse has emerged in the literature over the past decade. However, the literature notably lacks a comprehensive overview and definition of the discourse. This shortfall in the current literature draws attention to the vast openness of the Smart Heritage discourse and the opportunity for this research to contribute to Smart Heritage's theoretical development. Next, the researcher reviews the academic and professional literature on the smart city and heritage disciplines that converge to form Smart Heritage, including the various definitions and criticisms, to deepen the understanding of the novel discourse. The researcher finds that a consensus definition of these disciplines is elusive due to competing definitions, continuing evolutions, and competing sub-disciplines within each sector. From this literature review, the researcher proposes a comprehensive Smart Heritage definition and discusses its innovation. The researcher defines Smart Heritage as the convergence between the smart city and heritage disciplines that intertwines the autonomous and automatic capabilities and innovation of smart technologies with the contextual and subjective interpretation of the past. The review of Smart Heritage's literature and the comprehensive definition of the discourse are the first of their kind and, together, is the first original contribution to knowledge in this thesis.

2.2 The Emerging Smart Heritage Discourse

The academic and professional literature contains an increasing quantity of references to Smart Heritage. These references are at the intersection of the smart city and heritage disciplines and are primarily in museum and historical artefact management, tourism, governance, and systems contexts. Smart Heritage researchers converge the disciplines to enhance the understanding, experience, and operation of heritage and smart cities. This section of the thesis is an overview of the emerging Smart Heritage discourse in the literature.

The first reference to Smart Heritage is by Thwaites (2013), who describes “smart heritage and cultural futures” as “hybrid virtual-real worlds rich in detail, interpretation, and aesthetic impact” aided by animation, narratives and immersive sound and vision technologies. Thwaites proposes that smart technologies create new immersive experiences that interact with digitalised historical sites, artworks, and objects in museums, galleries, and controlled public spaces. Thwaites does not examine the theoretical implications of this novel convergence between smart city and heritage. However, the reference to Smart Heritage signals the awareness of a new paradigm where technology actively curates the heritage experience. Chianese and Piccialli (2014) offer the second Smart Heritage reference in the literature. While they do not directly state ‘Smart Heritage’, they discuss a smart “Cultural Heritage Environment” in their application of the Internet of Things within museums and static heritage spaces. The Internet of Things is a decentralised network of devices that automatically communicate within their system and is often a tool that smart cities deploy. Chianese and Piccialli use the Internet of Things to monitor cultural objects’ health within an exhibition space, such as measuring moisture and structural strength via digital sensors; see Figure 2 for the schematic layout of the exhibition space in their research and how they apply these sensors. While initially focusing within authorised museums and controlled cultural spaces, Chianese and Piccialli identify that smart technology has further applications for enhancing the valorisation, knowledge diffusion, fruition and growth of a positive and engaging heritage experience through active and unscripted interaction with museum visitors. They state, “we can imagine a situation in which a user is walking within a museum among a number of art objects, and when he is particularly close to one of them, its mobile device (e.g. a smartphone or a tablet) is detected by the object...the object begins to talk about itself, its story and its status by means of multimedia content and facilities”. Therefore, this reference

illuminates a research avenue to explore Smart Heritage's expansion into more immersive and smart paradigms.

Figure 2: A schematic layout of Internet of Things devices in the museum and an image of the sensors (Chianese & Piccialli, 2014).

Qiu et al. (2015) discuss a decentralised “public service platform” where users access “culture, legends, and history of a scenic spot, through a strong physically linked network”. Referring to this platform as “smart heritage”, they state that it creates a digitally enhanced environment that automatically shares historical site’s data with site managers and visitors in real-time data. This system also collects data on the user by monitoring online, onsite, and offline activities through in-situ and mobile device sensors. Qiu et al. envision that the platform “expands the limitations of traditional and single-site area [heritage] consumption” as it transforms physically independent cultural sites into a broader cultural landscape. These new cultural landscapes unlock new economic and social opportunities through the novel convergence of heritage and visitors’ data. For example, it allows the analysis of tourist behaviour and cultural and economic patterns to assist in the design, promotion, and management of heritage places that are scalable across landscapes. Qiu et al. expand the Smart Heritage discourse beyond museums and add an economic and touristic lens.

Angelidou et al. (2017) refer to “cultural heritage in smart city environments” in an investigation of how local government smart city policy can support the historical and cultural heritage of Barcelona, Amsterdam, and London. In the paper, Angelidou et al. (2017) compare smart city and cultural heritage documentation in the three case studies and find mutual interests

between the disciplines regarding cultural heritage preservation and promotion outcomes. However, Angelidou et al. (2017) also find that these opportunities are not exploited or recognised in the documentation. The paper contributes to the understanding of how cultural heritage can converge with the smart city in a governance context. The researchers advocate for a unified interdisciplinary discourse in local government strategies to better incorporate “cultural heritage objectives in technology-led urban development”. However, they do not offer guidance on how this may materialise.

Borda and Bowen (2017) report the novel technological applications within the heritage discipline from Australia, the United States of America, the United Kingdom, South Africa, Spain, and China. Borda and Bowen refer to these applications as Smart Heritage, but they mostly employ augmented and virtual reality technologies and intranet connected devices. Only a few applications use smart technologies. One example is *The Collection Wall* in the Cleveland Museum of Art, Ohio, which automatically updates and rearranges a historical image exhibition based on users ‘liking’ artworks on an digital interface and a mobile device application; see Figure 3. While the smart rearrangements are an auxiliary function of the exhibition, its presence marks a novel realisation of Smart Heritage. Borda and Bowen conclude that “smart heritage focuses on adopting more participatory and collaborative approaches, making cultural data freely available, and consequently increasing the opportunities for interpretation, digital curation, and innovation”. They foresee Smart Heritage enhancing multi-community and social network interoperability to reach new geographically and demographically diverse audiences through personalised and niche online social networks. However, Borda and Bowen recognise that heritage organisations typically lack the technical knowledge and funding resources to engage the smart technology discipline. They indicate the need to resolve these knowledge and financial difficulties before Smart Heritage can significantly materialise. The research by Borda and Bowen provides the first overview of the Smart Heritage discourse.

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Figure 3: The Collection Wall employs user data to curate an exhibition (Borda & Bowen, 2017).

Wang et al. (2018) refer to ‘smart cultural heritage’ in their paper detailing a wireless device-to-device network that establishes high-speed video and communication capabilities in museums to assist in protecting artefacts. Wang et al. is similar to the museum management application in Qiu et al. (2015) but introduces new communicative abilities within the network, such as monitoring visitors’ movement in the museum. Their paper highlights how the smart city and heritage disciplines are improving their convergence, likely supported by technological advancements, and expanding Smart Heritage’s discourse as a result. Reflecting on these technological advancements, Khoshelham (2018) refers to Smart Heritage in the application of spatial data to support decision-making for managing heritage value in Building Information Management systems. Khoshelham defines Smart Heritage as “the use of technology to optimise decision making on the use and management of heritage buildings”. This research produces the first references to Smart Heritage in engineering contexts, expanding the discourse beyond the established museum discussions.

Piccialli and Chianese (2018) refer to ‘smart cultural environments’ in a special issue on ‘The Internet of Cultural Things: Towards a Smart Cultural Heritage’ in the *Future Generation Computer Systems* journal. They state smart cultural environments “is a novel concept integrating intelligent objects, sensors, services and applications within static cultural places such as museums, monuments, exhibitions and so on”. Piccialli and Chianese are evidentially aware of its innovation and distinction, and their contribution is an early attempt to formalise the discourse in the academic literature. Articles in their special issue describe case studies where smart technology converges with heritage narratives. Of particular note in the issue is an article by

Vassilakis et al. (2018), who report a system where smart technology automatically curates novel heritage exhibitions from an expansive cultural collection database that is guided by users' personal data. This article highlights smart technology as the sole and lead curator for heritage experiences in Smart Heritage. It is a stark theoretical achievement for Smart Heritage in comparison to its nascent and conceptual state in Thwaites (2013) and in contrast with its assistant role to curation in Chianese and Piccialli (2014) through to Wang et al. (2018). However, the special issue's museum and artefact management focus does not comprehensively review the discourse in adjacent fields, ignoring Smart Heritage in other contexts and its potential broader benefits.

Mar et al. (2018) report the 'Smart Heritage City project', which utilises a network of sensors and an algorithmic computer system to aid the maintenance, conservation, energy savings, and tourist management in the historical city of Avila, Spain. It offers a centralised smart system for heritage site managers called 'SHCity-Manager' that diagnoses issues with heritage assets and heritage attractions, such as overcrowding and failures of protective measures for objects. The project also features a mobile device system called 'SHCity-Tourist', which curates an "optimised visit sequence" tour of the city for visitors based on a short questionnaire of personal preferences, such as accessibility restraints and interest. Figure 4 shows the interface for the mobile application. The system compares each user's responses against the real-time wait times at attractions, the user's location, and the distance to the attraction to maximise the time spent at the attractions. The mobile device 'SHCity-Tourist' application highlights the individualistic curatorial capabilities of Smart Heritage in a novel tourist user context, while the 'SHCity-Manager' shows its operational and governance application. Mar et al.'s contributions offer the first illustrated description of Smart Heritage delivering a visitor experience in the literature and transitioning it into the public and commercial realms by adopting a user-friendly design. Mar et al. offer the most developed understanding of Smart Heritage as a tourist experience and as a complete product or service.

Figure 4: Diagram of the SHCity-Tourist mobile application showing an option to create an 'optimised visit sequence' (Mar et al., 2018).

The most recent references to Smart Heritage are the stepping stones for the comprehensive definition of Smart Heritage offered in this thesis. Angelidou and Stylianidis (2020) update Angelidou et al. (2017) with a closer analysis of the shared objectives between smart city and heritage policy documentation in three other cities, Tarragona in Spain, Budapest in Hungary, and Karlsruhe in Germany. Angelidou and Stylianidis find that the smart city and heritage disciplines are discernibly closer than they were in 2017, and there are nascent connections within the disciplines' strategic documentation, mainly serving tourism outcomes. They state that "it could be argued that we are in front of a new generation of smart city initiatives in which cultural heritage is of increasing importance". However, they find that further work is required to confirm Smart Heritage's existence in these case studies, such as formally recognising the discourse in the strategic documents and understanding the practical steps for how cities could deliver Smart Heritage. This updated paper positions Smart Heritage as on the verge of breaking into the local government sector, expanding the discourse into the new governance context. It indicates that the next step of advancing the Smart Heritage discourse is to unify the discourse into a single narrative and provide practical guidance on how to deliver it in these organisations. Due to the shared local government focuses between Angelidou and Stylianidis and this research,

the researcher examines the methodology used by Angelidou and Stylianidis in Chapter Three to glean insights into how to conduct this research.

Brusaporci (2020) refers to Smart Heritage as a new conceptual and operative relationship between the technology and heritage disciplines. Brusaporci directly refers to the contemporary holistic approach to the smart city discipline and how it seeks to fuse expanding disciplines, with heritage on the verge of induction. Through this holistic approach, seamless interactions occur in a personal, continuous, and multidirectional manner between smart technology and heritage. This framing of Smart Heritage is a conceptual leap in the discourse's development as it aligns the discourse to the smart city discipline's current civic system-wide approach that applies autonomous and automated technologies ubiquitously; section 2.2.3 of this thesis explains this approach in detail. It contrasts with the separate management of the disciplines in the previous explorations of Smart Heritage. Therefore, this novel framing importantly disestablishes traditional boundaries between the smart technology and heritage disciplines as it identifies a singular discourse where both disciplines intertwine within the holistic ecosystem. Brusaporci anticipates that Smart Heritage can increase cities' "cultural DNA" by unleashing culturally-rich heritage content by means of smart technology's innovative abilities. Through their convergence, historical narratives would be amplified and explored while technology would gain new cultural status and relevancy. Brusaporci states that Smart Heritage is a "cultural turn, in relation to which a Smart City becomes able to innovate its development dynamics in a cultural sense and in a sustainability perspective".

It is evident from the academic literature that Smart Heritage is consolidating as a discourse. The literature records a reduction in the conceptual distance between the contributing smart city and heritage disciplines and the production of one interdisciplinary Smart Heritage discourse. However, it is nascent and primarily within museum and historical artefact management, tourism, governance and system contexts. Table 1 provides an overview of the current definitions of Smart Heritage and similar terms, including variations on the terms. These definitions inform this research. Nevertheless, these definitions are vague, some are out of date, and others show theoretical shallowness. The discourse still lacks a comprehensive definition that summarises the latest advances in the definition and draws substantial theoretical depth from

the contributing smart city and heritage disciplines. Therefore, the following sections review the academic and professional smart city and heritage literature before providing a comprehensive definition of Smart Heritage.

Table 1: An overview of the current definitions of Smart Heritage and similar terms.

Author(s)	Definition
Thwaites (2013)	“ smart heritage and cultural futures are comprised of applications that combine imagery and sound captured at locations of high cultural significance with animation, narratives and immersive sound and vision technologies to create hybrid virtual-real worlds rich in detail, interpretation, and aesthetic impact.”
Lupo and Ozdil (2013)	“the concept of designing a smart heritage , an approach that goes beyond the idea of ubiquitous or diffused museum by mixing both” and “can be intended as an intangible geography of cultural contents associated with tangible elements of a patrimony, that can be enabled, accessed, experienced, and shared by different technologies and communities of users in person or remotely.”
Vattano (2014)	“ Smart cultural heritage , indeed, can be conceived as the identity of places through the implementation of smart technologies, knowledge and social inclusion, for total participation in the promotion of cultural heritage.”
Qiu et al. (2015)	“The application of smart heritage public service platforms on big data mixes the digital display system, the 3-O service system and the smart management system together, forming a scientific service system, by which tourists can understand the culture, legends, and history of a scenic spot, through a strong physically linked network. Tourists can see more lost heritage sites landscape at by utilising digital applications and interpretation systems. They can also participate in a variety of cultural experiences, which increase online the consumption, transportation booking and other functions. By using the 3-O service system, visitors can easily achieve their travel, consumption and study needs, and also share their experiences and suggestions with each other, as well as have the opportunity to participate in the management and construction of scenic spots thereby becoming the direct legacy of the culture market and help to spread and inherit cultural heritage.”
Ivars-Baidal et al. (2017)	“such as smart heritage applications for historical buildings that measure the degree of conservation and the impact of the visits.”

Mar et al. (2017)	“With the ambition of integrating urban heritage centres with the smart city concept, an innovative challenge to create an open source tool was embraced within the Smart Heritage City project (SHCity), managing historical centres and helping responsible entities to take accurate decisions about their monuments management. The proposed solution aims to use data collected from a sensor network, which is inserted in urban areas, to control and have access to data related to buildings, its surrounding areas, which allows to prevent against existing risk factors.”
Borda and Bowen (2017)	“ Smart heritage focuses on adopting more participatory and collaborative approaches, making cultural data freely available (open), and consequently increasing the opportunities for interpretation, digital curation, and innovation.”
Angelidou et al. (2017)	“the historical and cultural heritage of cities is and can be underpinned by means of smart city tools, solutions and applications.”
Baeza (2018)	“The concept of smart heritage thus appears as a definition of an architectural heritage [structure] connected to a structural health monitoring system, which is capable of detecting its own service condition, even responding automatically if an alarm threshold is triggered.”
Khoshelham (2018)	“ smart heritage refers to the use of technology to optimise decision making on the use and management of heritage buildings.”
Intach Heritage Academy (2020)	“if the city is on a path to becoming ‘ Smart ’ heritage too should redefine in order to “help manage the problems of the present and the future.”
Piccialli and Chianese (2018)	“The Internet of Things (IoT) framework applied to the Cultural Heritage domain is a novel concept integrating intelligent objects, sensors, services and applications within static cultural places such as museums, monuments, exhibitions and so on. The main goal is represented by the transformation of such spaces into Smart Cultural Heritage Environments . The Internet of Cultural Things is an emerging discipline that aims to design a novel fruition, tutelage and promotion models of the Cultural Heritage in the worldwide.”
Vassilakis et al. (2018)	“We examine how opportunities arising from technological advances in the fields of IoT and semantics can be used to develop smart, self-organizing exhibits that cooperate with each other and provide visitors with comprehensible, rich, diverse, personalized and highly stimulating experiences.”

Wang et al. (2018)	“Internet of Things (IoT) and wireless sensor network (WSN) techniques are widely used in the cultural heritage protection oriented networks for the environment monitoring, security enhancement issues, and etc.”
Siountri et al. (2018)	“The proposed model is called Smart Cultural Heritage as a Service (SCHaaS) and aims to promote and preserve the cultural heritage through smart applications and participatory processes.”
Angelidou and Stylianidis (2020)	[in the context of discussing a strategic document from Tarragona, Spain] “Heritage and cultural tourism, more particularly, dubbed as ‘ Smart Heritage ’, aim to bring out the 2,500-year history and heritage of the city (also acknowledged by UNESCO) to the forefront and promote it as a touristic attraction of the city.”
Brusaporci (2020)	“the meeting between ICT and Cultural Heritage facilitates a cultural turn, in relation to which a Smart City becomes able to innovate its development dynamics in a cultural sense and in a sustainability perspective.”

2.2 In Search of the Smart City

This section reviews the academic and professional literature regarding the smart city discipline. It records that over the past two decades, the smart city discipline thematically expanded from the notion that it involves physical automatic and autonomous technologies and extends across social elements and towards a holistic system understanding. However, recent concerns regarding the risk to the public’s privacy appear to have instigated a slowing of its evolution. The smart city is currently a holistic city-wide system consisting of multi-layers of policy, community, and technology drivers.

2.2.1 The Smart City as Automatic and Autonomous

Over the past two decades, defining the smart city has been a favourite pastime for many researchers in the academic and professional literature. A new prominent definition appears every few years then undergoes revision and critique until it is ultimately replaced by another (Hollands, 2008; Townsend, 2013; Albino et al., 2015; Balestrini, 2017). These definitions are quickly outdated due to the discipline’s constant expansion into new elements, requiring it to consider additional elements. Driving this expansion is the interest in the smart city by new audiences outside its initial technocratic adherents. These new audiences have an expanding array of backgrounds, such as the governance, mobility, infrastructure, sustainability, wellbeing, and

community sectors, and seek to redefine the discipline in relation to their contexts. Neirotti et al. (2014) state that "smart cities [have] been the subject of increasing attention and now appears to be a new paradigm" that soon will encompass all aspects of society. Van den Boogaard (2018) states that social pressure for all sectors to become 'smart' has driven this expansion. As a result, Van den Boogaard states that the discipline is becoming self-defining as static definitions are no longer applicable due to the constant introduction of new elements. These new elements understandably frustrate researchers who seek a definitive smart city definition, but each evolution attempts to improve and expand the discipline's applicability. By reviewing these evolutions in this research, insight is gained into the smart city discipline, which aids in forming the Smart Heritage definition.

The smart city discipline began in earnest at the start of the 21st century. Growing out of proto-smart city disciplines like the 'wired city' and the 'digital city', it envisioned a city that automatically and autonomously served people (Dutton, 1987; Ishido, 2002). Early discussions of the smart city discipline highlighted this serving role of the smart city. Partridge (2004) stated that a smart city is "where the ICT strengthen the freedom of speech and the accessibility to public information and services". Bowerman et al. (2000) describe the smart city as "a city that monitors and integrates conditions of all of its critical infrastructures including roads, bridges, tunnels, rails, subways, airports, sea-ports, communications, water, power, even major buildings, so it can better optimise its resources, plan its preventive maintenance activities, and monitor security aspects while maximising services to its citizens". Mahizhnan (1999) credits Singapore's early smart city status as a result of the city "recognis[ing] the tremendous advantages of [information technology] as well as telecommunications. It is understood that [information technology] will change the way we live, work, and play". Mahizhnan describes Singapore's investment in physical information technology, including computer facilities for young students and the installation of communication networks as driving its emergence as a smart city. These definitions highlighted the smart city's initial technological physicality through communication, environmental sustainability and transportation infrastructure. However, the discipline's most prominent innovation was removing people from the equation and encouraging technology's ascension as the civic arbiter. This switching of roles encouraged new thinking about the relationship between people and cities. Instead of the city being a consolidation of human creativity and enterprise that

is tied together by passive technologies, smart cities were distinct entities that actively engaged and consulted with society, including humans, but ultimately held a distinctive agenda. In short, smart cities were independent.

2.2.2 The Smart City as a Social Solution

As the first decade of the century progressed, interest in the smart city discipline underwent its first notable expansion. This expansion was beyond physical technologies as it applied smart technology to solve social issues in the city and added new governance and economic elements to the smart city's definition. It was spurred on by an increased societal focus on urbanisation, with predictions of mass migration of rural populations into cities and increased demand for responsive governance and economic systems. Smart city commentators frequently contextualised the smart city as a solution for these social issues and, therefore, included social elements within the discipline's remit. A popular definition at the time was from Giffinger et al. (2007) that defines the smart city as delivering economic, governance, mobility, environment, people, and living elements. Giffinger et al. state that "a smart city is one which is well-performing in these six characteristics, built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens". This definition is notable as it formally includes the social elements under 'smart people' and 'smart living' alongside and equal with the more infrastructure-focused 'smart mobility' and 'smart environment'. Figure 5 is an excerpt from Giffinger et al. that details these characteristics and assigned factors.

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Figure 5: Characteristics and factors of a smart city (Giffinger et al., 2007).

Hollands (2008) records how national and local government organisations in the United States of America and the European Union advocated for novel technologies to support land-use planning and economic decision-making. Holland describes how San Diego's 'City of the Future' and Ottawa's 'Smart Capital' projects seek to enhance business and governance functions. However, few governance and economic initiatives were truly 'smart' or successful due to the limitations of early technologies and poor user uptake. Nevertheless, the smart city's exploration into governance and economic elements continued. Harrison et al. (2010) describe the smart city as connecting the physical infrastructure, the information technology infrastructure, and, notably, business infrastructure to leverage the city's collective intelligence. Caragliu et al. (2011) state that the smart city features "investments and human and social capital and traditional ICT infrastructure [to] fuel sustainable economic growth and high quality of life, with a wise management of natural resources". The introduction of economic terminology characterises the

smart city discipline during this period. However, the physicality of communication and other infrastructure is still emphasised.

The next evolution to the smart city came at the start of the second decade. The evolution was adopting social elements, which directed smart city researchers' attention towards how smart technology may serve peoples' lives. The new-era definitions softened the physical and infrastructure-dominated discipline. Townsend (2013) provides a prominent definition from this period in the seminal book *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia*, "places where information technology is combined with infrastructure, architecture, everyday objects, and even our bodies to address social, economic, and environmental problems". This definition highlights how the smart city could feature in people's lives and enhance the everyday. Academic literature also adopted the social element. Nam and Pardo (2011) describe a smart city consisting of human, technology, and institutional factors. The human factors serve the people, educational, learning and knowledge outcomes. Figure 6 below is an excerpt from Nam and Pardo (2011) that depicts this definition. In a similar vein, Piro et al. (2014) define the smart city as "a city that intends as an urban environment which, supported by pervasive ICT systems, is able to offer advanced and innovative services to citizens in order to improve the overall quality of their life". These academic definitions highlighted the social emphasis in the discipline at the time and enabled the broadening of the discipline into even more complex humanistic elements.

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Figure 6: Fundamental components of smart city (Nam & Pardo, 2011).

The smart city discipline further expanded into more humanistic elements throughout the millennium's mid-second decade. Community and wellbeing became the dominant new additions to the discipline, which drew the discipline's focus firmly away from a physical infrastructure-led definition. The community element materialised in various ways, such as community participation, in "a smart city is a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership" (Manville et al., 2014). Lara et al. (2016) highlight wellbeing by describing a smart city as "a community that systematically promotes the overall wellbeing for all of its members, and flexible enough to proactively and sustainably become an increasingly better place to live, work and play". During this time, it appeared that the smart city was primarily a social construct to serve its population, and the technological aspect of the discipline was a minor operational detail hidden behind a user friendly interface. Other humanistic elements also appeared, such as an emphasis on tourism, social equality, privacy and ethics (Khan et al., 2017; Kempin Reuter, 2019; Lung-Amam et al., 2019).

2.2.3 The Smart City as a System

During this mid-decade period, the smart city discipline was the most in flux as it expanded into the complex social, community, and well-being realms. Sadowski and Bendor (2018) suitably state at this time that “few urban development models are as popular as the smart city”. The smart city's definitions were so plentiful that commentators focused on meta-analyses to maintain pace with understanding the discipline (Albino et al., 2015; Fernandez-Anez, 2016; Ramaprasad et al., 2017). The smart city underwent such constant change that researchers seemed defeatist to claim a universal definition, and assumed further changes to whatever they proposed. Seemingly in reaction to this challenging situation, commentators instigated the next fundamental shift in the smart city discipline, which was framing the smart city as a holistic and self-managing system. This understanding discussed the smart city as an arrangement of multiple elements that interact, evolve, and adapt across geographic regions, countries, and applications. Joss et al. (2019) state that a “smart city can thus be considered a ‘global discourse network’”. Shelton et al. (2015) similarly describe the smart city as not an actual place but as “imaginary to capture the minds of corporations, policymakers and average citizens”. March (2018) interestingly captures this imagined definition by stating the “smart city encapsulates all the desires and prospects on the transformative and disruptive role technology will have in solving urban issues”.

A predominant definition from this period, which maintains its relevancy in 2021, is by Yigitcanlar et al. (2018), who identify three main drivers of smart cities; community, policy, and technology. These drivers interlink to produce the outcomes: productivity, sustainability, accessibility, wellbeing, liveability, and governance. An overarching environment contextualises the drivers’ and outcomes’ within a singular smart city system. The result is a holistic city-wide system and multi-layered characterisation. Figure 7 shows how the drivers and the outcomes interlink. Yigitcanlar et al. offer this definition to the enviable further evolution of the smart city discipline. They identify “technology as a means not an end” and predict that the discipline will evolve better understandings on how to support its social and humanistic aspects. However, this definition maintains as the predominant smart city definition through its broad framing that allows flexibility in interpretation and application. Recent publications refer to Yigitcanlar et al.’s holistic city-wide system and multi-layered characterisation of the smart city as the current definition (Shamsuzzoha et al., 2021; Mozuriunaite & Sabaityte, 2021).

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Figure 7: Multidimensional smart city framework (Yigitcanlar et al., 2018).

In recent years the evolution of the smart city discipline consolidated. Commentators are less absorbed in debating for consensus on a definition. Instead, the zeitgeist in research reflects on the rapid rise of the discipline's popularity over the past two decades, taking stock of the new smart city sector and sub-disciplines. Ingwersen and Serrano-Lopez (2018) reflect on the development of the smart city between 1990 and 2016. They found that the average annual median age of citations was merely 3.6 years. After this point, the discipline innovated further and the previous definitions were abandoned. They also found distinct smart city sub-disciplines associated with the environment, transport, urban studies, economics, and public services, complete with individual professionals, forums, publications, and discourses. In research by others, the journeys and struggles of smart city projects worldwide are frequent reflection points. Coletta et al. (2019) describe Dublin as an "accidental smart city" that became 'smart' through a piecemeal and gradual manner. Until 2014, Dublin had no city-wide smart city programme and suffered from incomplete Smart Mobility and other infrastructure initiatives for many years. However, Coletta et al. recall that their now-coordinated programme, Smart Dublin, delivers an articulated and effective city-wide smart system. They state Dublin required time to develop the

necessary coordination and awareness across the city and in local government organisations for the smart city discipline to succeed. Yigitcanlar et al. (2019) reflect on the smart city journeys of Songdo, Masdar, Amsterdam, San Francisco and Brisbane, concluding that “our expectations [of smart cities] are unrealistic and full of speculations”. These cities failed to deliver their ambitious visions to entirely switch significant sectors over to smart technologies. Yigitcanlar et al. state that the failures’ cause was an over-reliance on technology to deliver change and a lack of support for decision-makers and practical guidance. However, Yigitcanlar et al. are confident that the required decision and support will arrive as local governments understand and resource the literature’s previous advancements. A notable reflection point is the cancellation of the smart city Quayside project in Toronto in 2020, headed by Alphabet-owned Sidewalk Labs. Morgan and Webb (2020) and Goodman et al. (2020) detail that the Quayside project suffered significant criticism concerning the public/private balance of power between the owners of technology and the public and users regarding data privacy, governance, and the planning process. Despite efforts to placate future residents and communities with assurances of change, the project became a symbol for loathed ‘big brother’ smart cities driven by international technological corporate interests. Morgan and Webb state that “the very public clash between corporate and civil society on Toronto’s waterfront risked a winner-take-all battle for the future smart city”, and it “suggests there is a need to further explore the ways in which municipal activism and civic engagement are harnessed in smart city debates”. Given the capitulation of Sidewalk Labs on the international stage, it is likely that the smart city discipline is currently undergoing reflection before its subsequent expansion.

2.2.4 Criticisms of the Smart City

Criticism of the smart city discipline in the academic and professional literature has occurred throughout its development and relate to its specific evolutionary stages. However, constant criticisms from commentators target its lack of a clear definition and link it to nefarious political and private business motivations. The lack of definition clarity arguably stems from the constant expansion of its definition, but to some commentators, these criticisms remain valid due to the absence of a consensus definition. Attempts to address these criticisms have driven the smart city’s evolution, aiding in clarifying the terminology and imagery in the definition and empowering the discipline to confront adverse political actors in the sector. Those who criticise existing definitions

often pose new definitions of the smart city that advance the discipline. The smart city discipline is, therefore, notably more substantive and accepted as a result.

It is evident from the smart city's constant evolution that it has struggled with maintaining a steady and reliable definition. The previous section in this research details its expansion from a technocratic and physically dominant concept to a holistic city-wide and multi-layered system. As a result, a primary criticism throughout its evolution has been its lack of clarity. Early criticisms about its lack of clarity reflected teething issues of defining what 'smart' is. During the start of the decade, the smart city contested with other similar terms, such as the 'sustainable city', 'creative city', 'dynamic city', and the 'knowledge city' (Chatterton, 2000; Carley et al., 2001; Begg, 2002; Carrillo, 2006). Some commentators blurred these terms by applying them synonymously, which enabled criticisms to arise; 'smart' had yet to be designated its select interest area or definition. Therefore, a clear identity of the smart city was not apparent in the literature during this period. The seminal paper by Hollands (2008) during this time summarised these early criticisms. Hollands states that smart and other similar terms are universal but ultimately empty terms for innovative debates, asking 'what city does not want to be smart or intelligent?' Hollands, therefore, challenges the discipline to find a distinguishing value that separates it from other terms, stating that "real smart cities will actually have to take much greater risks with technology, devolve power, tackle inequalities and redefine what they mean by smart itself, if they want to retain such a lofty title".

As the smart city discipline expanded into governance and economic elements at the end of the century's first decade, commentators applied this criticism to these new definitions. Nam and Pardo (2011) argued that 'smart' is marketing language for governments as it implies normativity, being strategic, and "achieving policy success in their jurisdictions". They attest that the 'smart city' is more user-friendly than other terms like the 'intelligent city' and the 'sustainable city' due to its vagueness. This understanding of the smart city as a more palatable concept reveals an interesting benefit of the term's lack of identity that perhaps aided its broad adoption by other disciplines. In a similar criticism, Vanolo (2014) highlighted how policymakers apply the smart city label to strategic documents to signal a new direction or image even when the strategy does not include smart technology or smart city characteristics. Townsend (2013) criticised that the

discipline has failed to provide effective methods and evidence to address cities' economic concerns. Townsend warned that the discipline is likely a buzzword like 'sustainability' or 'globalisation'; a criticism that these terms also refute by finding their distinctive value.

The criticisms that the smart city discipline was unclear escalated as it expanded into social elements and system approaches during the second decade. The inherent subjectivity and intangibility of social well-being, community, and liveability were easy targets for critics. Albino et al. (2015) stated that "the term is proliferating in many sectors with no agreed-upon definitions. This has led to confusion among urban policymakers, hoping to institute policies that will make their cities smart". Hugel (2017) criticised the subjective elements' lack of "a robust theoretical framework capable of assessing the quality of its real-world output, which can be subjected to examination and critique". The discipline's movement from physical and measurable infrastructure initiatives to subjective elements created an evident tension in the discipline's academic and practical applications. However, commenters could not simply dismiss the expanding and popular smart city discipline as inapplicable due to its ambiguity because they and others saw innate value in malleable definitions. Albino et al. (2015) concluded that "cities have different visions and priorities for achieving their objectives, but they must promote an integrated development of different aspects, both hard and soft". This conclusion indicates that the 'softer' social elements of the smart city were valuable additions as they allow the discipline to reflect cities' different contexts and aims, including non-western cities and those in the Global South. Albino et al. and Hugel's criticisms are often repeated in the contemporary academic literature that reflects on the discipline's meteoric rise over the past two decades (Deakin & Mora, 2019; Diganta, 2020; Chaosu, 2021). Even in the current predominant definition, Yigitcanlar et al. (2018) state that the social elements and holistic approach require further development.

The criticism concerning the discipline's motivation has also been present throughout its evolution. This criticism claims that the smart city is a cover for global corporations to sell technology and for politicians to empower neo-liberal politics under the veil of urban solutions. These claims predominantly appeared in the academic literature once the smart city discipline gained political traction in the second decade of the century. Vanolo (2014) described the creeping influence of global technology corporations into the smart city sector during this period. Vanolo

identifies Cisco's 2015 sponsorship of a public-private smart city exhibition in Milan and IBM's partnership with the New York, Chicago, and Madrid governments to deliver urban safety management, healthcare and energy services as examples of this growing presence. Vanolo argued that this influence could "impress a new moral order on the city by introducing specific technical parameters in order to distinguish between the 'good' and 'bad' city". Other commentators have claimed that vague definitions of the smart city enable businesses to sell the smart city to more governments, implying that corporate interests may be actively resisting its clarification and creating new elements to advertise proprietary solutions (Soderstrom et al., 2014; Han & Hawken, 2018; Sadowski & Bendor, 2018). In more recent years, Caird and Hallett (2019) maintained this criticism by contending that commercial entities often sponsor smart city rankings, which encourage cities to further purchase technologies to improve their ranking.

The neo-liberal-based criticism extends into political claims that go beyond corporations only selling their products. Grossi and Pianezzi (2017) warned that the smart city's inherent technological focus is a prearranged political discourse to benefit consultants, technicians, and private companies. They highlighted a case study in Genoa, Italy, where the smart city discipline defined the city's issues around what technological solutions private businesses can provide and tied the government's operations to private contracts. Pileri (2015) contended that technological solutions reinforce and appeal to those governance structures with top-down processes because of dependencies on the technology and the ability to dictate outcomes. Wiig (2015) described "IBM's Smart Cities Challenge as an example of global smart city policymaking", adding it "was always oriented to fostering globalised business enterprise". Capdevila and Zarlenga (2015) also warned that the neoliberal ethos might not share the governments' best interests. They noted a "potential problem of smart city policies is that they risk to be more focused on technology-push than on demand-pull". These criticisms are omnipresent for the smart city discipline, where it enlists private enterprise. However, with the discipline's maturation within government organisations, where smart city initiatives appear to be developed and delivered more in-house rather than through private companies, it appears that these risks are subsiding. The shift in delivery structure arguably lessens the risk of outside political interference.

These criticisms leave many pointed questions unresolved for the smart city discipline. Since its inception, they have plagued the discipline and rightfully so, as there is significant evidence of how corporations have inserted themselves into local government decision-making and operations. These criticisms appear to have continued even through the smart city's 'softening' from its physical beginnings to including humanistic elements and holistic civic system approaches. Future evolutions of the smart city may also not completely resolve these concerns and further issues are likely to arise as a result of its ongoing progress. Therefore, the researcher expects and accepts that these criticisms will also be valid for the discipline's contribution to the Smart Heritage discourse. Researchers and commentators will likely question Smart Heritage and any organisation that delivers it due to its smart technological background, especially when private companies are involved in decision-making or Smart Heritage curatorial processes. The researcher views these questions as valid and worth investigating. However, they are outside this research's pragmatic aim to deliver Smart Heritage within local government policies and operations. The following sections of the thesis consequently do not address these ethical questions. However, these criticisms inform the smart city discipline's contribution to the Smart Heritage definition in section 2.4.2 of this research, albeit not explicitly.

2.3 What is Heritage?

In this section, the researcher examines the academic and professional heritage literature. The examination focuses on the definition of heritage by other researchers. This section records that the heritage discipline is the abstract and subjective valuing process that interprets the past. It is subject to government and organisational frameworks and practitioner applications that influence its interpretation, most notably within governed entities and heritage categories. The section also discusses predominant criticisms of heritage. These insights and criticisms contribute to forming the Smart Heritage discourse later in this chapter.

2.3.1 Heritage as the Abstract

In the academic literature, researchers frequently tout heritage as abstract and malleable. These descriptions speak to the richness of the discipline and the matured state of academic thought on heritage.

They describe heritage as an abstract thought or idea that is unique for individuals and collectives rather than a physical form, building, or object. Due to this abstraction, researchers adopt various approaches in expressing this pliable quality; however, they mostly share the essence that heritage is an abstraction and malleable discipline. Larkham (1995) states that heritage is "all things to all people", with its definition appearing through the definer's eyes and thereby avoiding claiming a standardised description or value. Lowenthal (1998) states that heritage "is as old as humanity", and it pertains to building personal and collective identity by interpreting information from tangible and intangible entities and society. Lowenthal also notes that heritage commands the same social power as religion over human thought, actions, and emotions, with the ability to define morals through a subjective interpretation process. This contrast with religion shows the significant social power of invoking the past. Johnson and Thomas (1998) emphasise the link between the past and its interpreter. They contend that heritage is "virtually anything by which some kind of link, however tenuous or false, may be forged with the past". In a similar view, Harvey (2001) states that "heritage has always been with us and has always been produced by people according to their contemporary concerns and experiences". Lowenthal (2006) muses on the breadth of the discipline, adding that "heritage denotes everything we suppose has been handed down to us from the past". Lowenthal also emphasises the supposition of value in handed down items. Harrison (2012) similarly states that "heritage has expanded to such an extent that almost anything can be perceived to be heritage". It appears that researchers in the academic literature are convinced that abstractness and malleability is the bedrock of the heritage definition.

Other commentaries on heritage's definition align with this view but also contribute interesting other lenses that provide depth to the understanding. For example, some discuss it in the light of consumption and commercialisation. Urry (1990) argues that heritage is the leisure consumption of the past that offers individuals contemporary escapism. Uzzell (2009) states that history is a "resource and source of inspiration, meaning and identity as well as commercial profit". While simultaneously also being "a social construction, an empty box, waiting to be filled with our values, beliefs, desires...we construct meanings from the heritage, and we construct ourselves from it as well". Pendlebury and Porfyriou (2017) reason it is the use of 'imagined pasts' for present-day purposes. These views echo the aforementioned abstract and malleable interpretation process and further identify a purpose in the past's interpretation.

Some researchers highlight the nuances within heritage's interpretation process. Winter (2012) records that "heritage is both enmeshed in, and constituted by, complex, entangled and contradictory processes", including social, political, governance, individual, collective, and economic processes. These processes intertwine and inform the interpretation of the value in the past. However, these processes can dissolve and reconfigure with the changing of the interpretation context, such as a different political climate, juxtaposition of histories, and mixing with other people's readings. Janssen et al. (2017) state that heritage is "constantly in flux and whose substance and meaning are continuously being redefined by society". Examining this contextual nuance, Smith (2006) claims heritage only exists within a discourse, and there is "no such things as heritage" external to a discourse. Smith and Waterton (2009) echo this view in their statement that heritage is "the performance and negotiation of identity, values and sense of place" and, therefore, continually requires the stage and exchange. Succinctly, Konsa (2013) contends that "heritage is an active process, through which people perceive and understand, as well as shape, the world around them".

The academic literature is consistent in the view that heritage is abstract and a subjective valuing process that interprets the past. This process is present and separate for individuals, collectives, and societies and varies between contexts. The literature maintains this view over recent decades. It appears that there has been no fundamental and material shift in its definition over the previous decades. However, some may contend there has been a shift in what historical stories are prioritised, for example, gender, race, and other cultural and social issues. Discussing these details, Marmion et al. (2010) conclude that "there is a multiplicity of possible meanings that heritage may hold for different people, even within relatively homogenous groups and that these meanings will vary depending on each individual's unique personal and social background and circumstances". Harvey (2001) similarly states that heritage is objectively undefinable and, therefore, many commentators decidedly left the term as abstract and nuanced.

2.3.2 Heritage as Governed Entities

Intergovernmental and national organisations define heritage through governance documents. These documents reflect each organisation's political purpose, jurisdiction, and specific heritage interpretation. In these documents, organisations denote governed heritage entities, such as a

subject, object, building, landscape, or another article that they deem as being or representing heritage. Examining these documents highlights the difficulties of standardising the discipline since the differing political, geographical, social, historical, and other contextual forces result in various governed heritage entities and heritage definitions that seek to validate the author organisation's view.

The International Council on Monuments and Sites (ICOMOS) is a prominent international organisation within the heritage sector. ICOMOS was formed in 1964 at the Second International Congress of Architects and Specialists of Historic Buildings and adopted the *Venice Charter* (1964), formerly the *International Charter for the Conservation and Restoration of Monuments and Sites*. The *Venice Charter* refers to heritage twice, firstly in "the unity of human values and regard ancient monuments and common heritage" and secondly concerning the study and safeguarding of architectural heritage. Besides these two mentions, there are no further references to 'heritage'. Instead, the Charter frequently uses the term 'historic monument'. Later ICOMOS charters offer greater insight into the organisation's heritage definition. The *Charter for the Protection and Management of the Archaeological Heritage* (1990) refers to archaeological heritage as "part of the material heritage in respect of which archaeological methods provide primary information". In this definition, heritage includes "all vestiges of human existence and consists of places relating to all manifestations of human activity, abandoned structures, and remains of all kinds (including subterranean and underwater sites), together with all the portable cultural material associated with them". The charter frames heritage as a cultural resource that all human beings have a moral obligation to protect. It also identifies a separate archaeological category for heritage and specific measures to define and engage with this category. Other international ICOMOS charters also understand heritage as a cultural resource that people must protect (1981; 1987; 1999; 2003). The *Nara Document on Authenticity* (ICOMOS, 1994) addresses "the expanding scope of cultural heritage concerns and interests" and authentic heritage value. It states authenticity is an "essential qualifying factor concerning [heritage] values", and it is of the "highest importance and urgency that, within each culture, recognition be accorded to the specific nature of its heritage values and the credibility and truthfulness of related information sources". It is evident from these documents that heritage holds a discernible moral value within ICOMOS' organisation and heritage can be defined under categories.

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) is another prominent international organisation for the heritage discipline. Founded in 1945, it is the United Nations' specialised agency for education, the sciences, and culture, including heritage. UNESCO defined heritage in its *Convention Concerning the Protection of the World and Cultural and Natural Heritage* (1972). The convention describes heritage as holding Outstanding Universal Value. The *Operational Guidelines for the Implementation of the World Heritage Convention* (UNESCO, 2017) defines Outstanding Universal Value as "cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity". If UNESCO inscribes an entity on their World Heritage List as holding with Outstanding Universal Value, it unlocks financial assistance through the World Heritage Fund, proffered by the organisational member countries.

The document titled *Managing Cultural World Heritage* (2013) discusses that "today, there is general recognition that the whole environment has been affected by its interaction with humanity and is therefore capable of being recognised as heritage" (International Centre for the Study of the Preservation and Restoration of Cultural Property et al., 2013) co-published by ICOMOS and UNESCO. The heritage valuing process applies universally to these organisations, even if these organisations apply categories and definitions to heritage. This publication views heritage as interlinking natural and human-made contexts and subject to ongoing interpretative processes and meaning. This view is an international perspective on the heritage discipline.

National organisations define heritage differently according to their national context and understanding. However, they typically share the quality of valuing the past for the purpose of building a national cultural narrative or narratives. Historic England (2021) describes heritage as "all inherited resources which people value for reasons beyond mere utility". The National Trust of Australia (2021) defines heritage as "something that we have inherited from the past and something that is valued enough today to leave for future generations". It includes both the tangible and intangible, buildings, natural and landscape places, landmarks, objects, places, languages, customs, and ceremonies. The Heritage Council (2021) in the Republic of Ireland states heritage is "our tangible, intangible and natural heritage and all the associated myths, legends, traditions, and memories provide us with a common language and insight that enables us to

communicate on a deep level with each other and to express ourselves in a unique way to the outside world". Japan's Agency for Cultural Affairs (2019) states heritage is "a connection to our past, a legacy of our cultural and natural history, and an invaluable source of inspiration to pass on to future generations". The 'we', 'people', and 'our' in these definitions highlight these organisations' national purpose and how the national contexts can influence their heritage definitions.

2.3.3 Heritage as a Category

Researchers, practitioners, and cultural and social groups define the heritage discipline through categories that validate their distinct type of heritage. Fredheim and Khalaf (2016) identify that these categories follow the naming convention of added prefixes to the discipline. These prefixes and focuses are typically associated with a discernible quality of the heritage, such as physicality, age, cultural group, or time period. Ahamd (2006) notes that heritage categories employ concise language to construct a discourse that supports its particular focus and enables practitioners to claim a specific area of expertise. Through concise jargon, the categories become independent research areas, identities, and professional services. Their adoption in academic literature, governance documents, and practitioner membership associations defend and normalise their claimed area of expertise.

There are many examples of these categories in academic and professional literature, all with different characterisations of their particular heritage. The ICOMOS Charters identify numerous examples of these categories, including historic gardens, historic towns, built vernacular heritage, and architectural heritage. Each category has a definition of heritage that reflects its unique application. For example, the *Charter on the Built Vernacular Heritage* (ICOMOS, 1999) states that this category of heritage "is the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints". In contrast, the *Charter for the Protection and Management of the Archaeological Heritage* (ICOMOS, 1990) defines archaeological heritage as "part of the material heritage in respect of which archaeological methods provide primary information. It comprises all vestiges of human existence and consists of places relating to all manifestations of human activity, abandoned structures, and remains of

all kinds (including subterranean and underwater sites), together with all the portable cultural material associated with them". These two definitions overlap in some respects, but they contain different language and focuses that construct alternative discourses within the same organisation.

UNESCO is another prominent example of heritage categories. The *Convention Concerning the Protection of the World Cultural and Natural Heritage* categorises cultural heritage, natural heritage, and world heritage separately. It defines cultural heritage as monuments, groups of buildings and sites. Natural heritage includes geological and physiographical formations and natural sites. World heritage as an overarching category comprising of cultural and natural heritage that signals their collective importance to "mankind as a whole". Notably, for this research, UNESCO (2003) formally categorises Digital Heritage in the *Charter on the Preservation of Digital Heritage*, and Roussou (2002) identifies virtual heritage. These categories highlight the practical application of heritage in emerging technological fields.

Examination of these categories highlights the difficulties of squaring the abstract and malleable discipline into a practical profession. In practise, the discipline's pivotal abstractness and malleability enable it to fit all interpretations, but this arguably undermines these definitions' validity if compared with others that claim the same conceptual ground. The multitude of categories in the academic literature appears endless, with new categories forming from closer examination and specialisation of existing categories. Notably, each category does not alter the broader heritage discipline, nor does it resist the claim of adjacent or similar categories of heritage. For example, built heritage may include architectural heritage and industrial heritage, and all three categories may be relevant for the same site. The lack of contention against new categories in the literature does not support the discipline's precise definition. Table 2 provides an overview of other examples of the heritage discipline in practice.

Table 2: An overview of heritage categories.

Categories	Definition
Aboriginal Heritage	"Aboriginal heritage is indivisible from the country. It is the past and the present connections to that landscape. It is living cultures imbued with cultural heritage through story, song, dance, language, kinship, custom, ceremony and ritual. It is living heritage given life through oral tradition and continued interaction with the landscape." – <i>We're a Dreaming Country: Guidelines for Interpretation of Aboriginal Heritage</i>, National Trust of Australia (2012)
Archaeological Heritage	"Archaeological heritage is that part of the material heritage in respect of which archaeological methods provide primary information. It comprises all vestiges of human existence and consists of places relating to all manifestations of human activity, abandoned structures, and remains of all kinds (including subterranean and underwater sites), together with all the portable cultural material associated with them." – <i>Charter for the Protection and Management of the Archaeological Heritage</i>, ICOMOS (1990)
Architectural Heritage	"monuments: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings; groups of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest which are sufficiently coherent to form topographically definable units; sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogeneous to be topographically definable and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest." – <i>Convention for the Protection of the Architectural Heritage of Europe</i>, Council of Europe (1985)
Built Heritage	"The term Built Heritage refers to built structures, cultural landscapes and objects and their appropriate curtilage which are of heritage significance and warrant recognition and conservation." – <i>Policy on Built Heritage</i>, National Trust of Australia (2014)

Built Vernacular Heritage	"The built vernacular heritage is important; it is the fundamental expression of the culture of a community, of its relationship with its territory and, at the same time, the expression of the world's cultural diversity. Vernacular building is the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints." – <i>Charter on the Built Vernacular Heritage</i>, ICOMOS (1999)
Cultural Heritage	"monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science; groups of buildings: groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science; sites: works of man or the combined works of nature and of man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological points of view." - <i>Convention Concerning the Protection of the World and Cultural and Natural Heritage</i>, UNSECO (1972)
Digital Heritage	"Digital heritage consists of unique resources of human knowledge and expression. It embraces cultural, educational, scientific and administrative resources, as well as technical, legal, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources. Where resources are "born digital", there is no other format but the digital object." – <i>Charter on the Preservation of Digital Heritage</i>, UNSECO (2003)
Historic Heritage	"means those natural and physical resources that contribute to an understanding and appreciation of New Zealand's history and cultures, deriving from any of the following qualities: (i) archaeological: (ii) architectural: (iii) cultural: (iv) historic: (v) scientific: (vi) technological; and

	includes— (i) historic sites, structures, places, and areas; and (ii) archaeological sites; and (iii) sites of significance to Māori, including wāhi tapu; and (iv) surroundings associated with the natural and physical resources." – Resource Management Act (1991)
Inauthentic Heritage	"Invented places, relative authenticity, ethnic intruders and sanitised and idealised pasts." - Timothy and Boyd (2006)
Industrial Heritage	"Industrial heritage consists of the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activities related to industry such as housing, religious worship or education." – <i>The Nizhny Tagil Charter For The Industrial Heritage</i>, The International Committee for the Conservation of the Industrial Heritage (2003)
Intangible Cultural Heritage	"practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognise as part of their cultural heritage." – <i>Convention for the Safeguarding of the Intangible Cultural Heritage</i>, UNESCO (2003)
Moving Image Heritage	"All moving images of national production should be considered by Member States as an integral part of their 'moving image heritage.'" – <i>Recommendation for the Safeguarding and Preservation of Moving Images</i>, UNSECO (1980)
Natural Heritage	"natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; natural sites or precisely delineated natural areas of outstanding universal value

	from the point of view of science, conservation or natural beauty.” – <i>Convention Concerning the Protection of the World and Cultural and Natural Heritage</i>, UNESCO (1972)
Social Heritage	“The compendium of folkways, mores, traditions, institutions, laws, customs, etc. passed on within a social system from generation to generation. Thus, the term captures the same essential meaning as the term culture.” – Reber et al. (2009)
Underwater Cultural Heritage	“all traces of human existence having a cultural, historical or archaeological character which have been partially or totally under water, periodically or continuously, for at least 100 years.” – <i>Convention on the Protection of Underwater Cultural Heritage</i>, UNESCO (2001)
Urban Heritage	“...is a combination of physical parts, historic association and mythical story telling... Urban heritage cannot be narrowed down to individual buildings or monuments of historic interest, nor can it be interpreted simply as a totality of built parts. Urban heritage exists in the physical attributes of buildings, public spaces and urban morphology; it is experienced by users (inheritors) in the present and it is concurrently in the making of the next generation of heritage.” – Orbasli (2000)
Virtual Heritage	“Virtual heritage involves the synthesis, conservation, reproduction, representation, digital reprocessing, and display with the use of advanced imaging technology.” – Roussou (2002)

2.3.4 Criticisms of Heritage

Criticisms of the heritage discipline reveal political undercurrents inherent in the discipline that risk the ability to create an impartial definition. These criticisms target the western dominated socio-cultural perspectives of the heritage discipline and the use of the Authorised Heritage Discourse to control the past's valuing. A prominent criticism that discusses this socio-cultural bias is from Smith (2006). Smith highlights that western perspectives dominant the discipline and, resultantly, define heritage according to western values such as physicality, age, and aesthetics. These values ignore spiritual, social, and cultural readings of value that are central in non-western societies. Smith also argues that the emphasis on ‘measurable’ metrics within western perspectives creates a ‘false objectivity’ that its heritage is irrefutable and that intangible or cultural non-

western heritage is less genuine. Smith contends that dominant western perspectives embed its physical metrics deeply in organisational and societal understandings of the discipline, which institutionalise discrimination against non-western cultures' histories. Smith, therefore, encourages the questioning of socio-cultural perspectives in defining heritage. There are numerous other criticisms along this socio-cultural vein. Harrison (2012) states that heritage is "both a product and producer of Western modernity" and reflects a modern notion of time that separates the past from the present. The separation between the past and the present creates powerful notions of tradition and historical pretext that the western heritage perspectives leverage to validate Western culture's existence and superiority over those who have 'lost' or have been forcibly removed from their past.

Concerning controlling heritage's valuing process, Smith (2006; 2012) criticises how governing organisations influence the heritage discipline through the Authorised Heritage Discourse. The Authorised Heritage Discourse is a political framework that reinforces approved understandings of heritage by repeating or uplifting certain historical narratives that fit with the certified organisational, cultural, and national identities and ignores other narratives. These organisations can anoint narratives as historically meaningful and worthy of recognition, study, and value. These organisations also have the resources to promote these narratives to the broader country or cultural population without significant challenges due to their size and official status. Smith describes "the listing of sites on site registers is an act of heritage making" and highlights that it occurs in professional, national, and international organisations. Smith claims that the heritage discipline is too politically, and likely financially, engrained with official discourses from governing organisations and that this burdens the discipline's honest investigation of the past. Therefore, Smith (2006) states that "for effective change to be initiated an explicit and critical recognition of the cultural and political nature and consequences of the [Authorised Heritage Discourse] does need to be made". Other researchers support this criticism. Winter (2012) argues that official heritage lists and criteria entrench the western perspective within societies through governing organisations. Winter also claims that the complex officiating pathways for adding to these lists defend this cultural divide and prohibit new non-western or revised heritage discourses from interfering with the status quo through complex processes that require high social capital,

which minority groups do not hold due to generational repression. Winter, quoting Chakrabarty (2000), states that non-conforming heritage forms are “in the imaginary waiting-room of history”.

Déom and Thiffault (2013) caution against the authorisation process as these structures limit the past’s assessment through alternative narratives. The longer the subject remains authorised, the less vivid other perspectives become. Harrison (2009) states that “the problem with official forms of heritage is not so much that it is ‘bogus history’, but that it is often directed towards establishing particular national narratives in reaction to the influence of globalisation on the one hand, and the local on the other”. In a thought-provoking critique of authorised heritage, Stone (2016) examines how urban explorers challenge this notion of the Authorised Heritage Discourse through their unrestrained discovery of places. The dissemination of these explorations through online videos creates well-known alternative heritage narratives for places without acknowledging or respecting Authorised Heritage Discourses. Stone states that authorised heritage organisations often exclude the findings and experiences of urban explorers regardless of the explorers recording previously unseen and interesting historical items. It is therefore evident that politically-driven influence from organisations is a significant and valid criticism of the heritage discipline.

These criticisms highlight fundamental issues that resonate throughout the heritage discipline. This research must consider these criticisms in the heritage discipline’s contribution to Smart Heritage. The following section comprehensively defines Smart Heritage for the first time in the academic and professional literature.

2.4 Defining Smart Heritage

The first section in this chapter details the nascent Smart Heritage discourse in the academic literature and its formation through closing the theoretical gap between the smart city and heritage disciplines. It is evident from this literature that the Smart Heritage discourse currently consists of a patchwork of research without a central definition or distinct theoretical framing that considers its advancements and future trajectory. This chapter's subsequent sections detail the academic and professional literature of the contributing smart city and heritage disciplines that converge to form Smart Heritage. However, through examining the disciplines’ literature and the

Smart Heritage literature, it is evident that they share similar perspectives, contexts, and trajectories. These similarities establish a foundation for comprehensively defining the Smart Heritage discourse. Therefore, this section details Smart Heritage's foundation by identifying the interdisciplinary similarities before comprehensively defining Smart Heritage.

2.4.1 The Foundation for Smart Heritage

The smart city and heritage disciplines contain similar perspectives, contexts, and trajectories that lay the foundation for Smart Heritage. Firstly, both disciplines share a system perspective based on contextual abstraction and malleability. The smart city discipline's current predominant definition by Yigitcanlar et al. (2018) identifies three main drivers of smart cities (community, policy, and technology) within an overarching environmental context that views the smart city as an all-inclusive system, in which interactions and responses occur. The heritage literature's consensus is that heritage is an abstract and subjective valuing process that interprets the past, which is present and separate for individuals, collectives, and societies and materialises as governed entities and niche categories. Therefore, the literature from both disciplines view themselves as systems that intertwine various elements and apply, adapt, and respond to various contextual applications. It is through this shared perspective that Smart Heritage is currently emerging. The latest Smart Heritage literature reports that the discourse is a conceptual and operative relationship between the disciplines. In Smart Heritage, the smart city and heritage disciplines seamlessly converge the smart city's autonomous and automatic capabilities with the "cultural DNA" of the past in an ecosystem (Brusaporci, 2020). Notably, the latest Smart Heritage literature refers to the smart city discipline directly, and researchers appear to be seeking frameworks to integrate the two contributing disciplines into a unified system that can sustain research and discussion.

Secondly, the disciplines share contexts. The smart city literature records its application within governance, mobility, infrastructure, sustainability, wellbeing, and community contexts, resulting from its significant academic and professional interest over the past two decades. The heritage discipline also occupies governance, sustainability, wellbeing, and community contexts through its practical application in government and international organisations, conservation of natural and built historic sites, and the protection of historical connections that sustain social and

community identities. The disciplines, therefore, overlap in their focuses, which lays the foundation for their convergence. The Smart Heritage literature reflects the shared interests between the disciplines. Chianese and Piccialli (2014), Qui et al. (2015), and Wang et al. (2018) detail the emergent use of Smart Heritage to sustain cultural materials through smart technology. Controlled environments in museums offer a stable testing ground for this novel discourse. Borda and Bowen (2017), Mar et al. (2018), and Vassilakis et al. (2018) highlight how Smart Heritage serves social and community outcomes through producing new technological and historical narratives. For example, by curating an art exhibition to reflect personal identities and values hidden in big data or by actively managing and delivering historical cities' enjoyable experiences (Mar et al., 2018; Vassilakis et al., 2018). Angelidou et al. (2017) and Angelidou and Stylianidis (2020) capture the latest Smart Heritage expansions into governance with their comparative analysis of local government smart city and heritage documentation. From the emergent explorations into the discourse, it is evident that Smart Heritage is building on the similarities between the smart city and heritage disciplines. Smart Heritage will establish itself in these contexts through additional theoretical and practical discussions that add weight to its relevance and draw interest from researchers and practitioners.

Thirdly, the literature indicates that the disciplines share a trajectory that enables their further convergence. The smart city literature indicates that its discipline is likely to expand into additional social and humanistic elements as its system approach envelops around all aspects of the city and society. Its rapid growth and its now-established subdisciplines provide a track record for this trajectory and the professional, commercial, and academic resources to aid its expansion. The heritage discipline is likely an early contender for its next expansion due to its close association with liveability and social issues like race and identity. Smart city researchers highlight that these elements require further development and that the recent rejection of Alphabet's Quayside project, and the ongoing criticisms of it being overly technologically deterministic, suggest a reactionary focus on more humanistic and socially complex elements (Lara et al., 2016; Yigitcanlar et al., 2018; Morgan & Webb, 2020; Goodman et al., 2020). Heritage offers the smart city discipline a formed, socially and culturally significant, and largely untapped discipline that aligns with the smart city's interest in humanistic and holistic aspects.

On the other hand, the heritage discipline's proliferation of practical categories indicates that it is open to additional novel applications. In particular, the formal categorisation of Digital Heritage in the *Charter on the Preservation of Digital Heritage* and the recognition of virtual heritage signpost the expansion into more technological contexts (Roussou, 2002; UNESCO, 2003). With the advancement of smart technology, a categorisation relating to the smart city discipline would likely be a natural extension of digital and virtual heritage. The emerging Smart Heritage literature also suggests that it has further offerings that could interlink the contributing heritage and smart city disciplines (Brusaporci, 2020). While governance, sustainability, wellbeing, and community contexts are currently present in Smart Heritage, it is possible that other contexts, like mobility and infrastructure, could benefit from technology creating historically-inspired value for users or the past informing automated decision making. Due to both contributing disciplines' evolving nature, additional and yet unrecognised outcomes could also arise as conduits for Smart Heritage to deliver. From the smart city, heritage, and Smart Heritage literature, it is evident that the Smart Heritage discourse has further potential. The Smart Heritage definition in the following sub-section stems from these similarities and trajectories. It defines Smart Heritage against a complete review of the discourse's literature for the first time in literature.

2.4.2 A Comprehensive Smart Heritage Definition

The research proposes the following comprehensive definition for the emergent Smart Heritage discourse in this research:

Smart Heritage is the convergence between the smart city and heritage disciplines that intertwines the autonomous and automatic capabilities and innovation of smart technologies with the contextual and subjective interpretation of the past.

It is a novel discourse that advances from previous technology and heritage confluences, such as Digital Heritage and Virtual Heritage, through its innovative framing of technology as the lead curator in the technological and heritage experience. Smart Heritage builds on the present state of the smart city and heritage disciplines in the academic and professional literature, which perceive themselves as systems that apply, adapt, and respond to various contextual applications. These similar perspectives disestablish their traditional interdisciplinary boundaries and enable a

unified and meaningful new discourse to emerge. In the literature, Smart Heritage has a foundation within governance, sustainability, wellbeing, and community contexts due to the currently shared focuses between the contributing disciplines. The discourse can expand into further contexts through the inevitable further closing of the theoretical gap between the smart city and heritage disciplines and the expansion of their respective applications into additional shared contexts.

This definition is the first Smart Heritage definition in the literature that surveys the emerging discourse within the broader context of the contributing smart city and heritage disciplines. As the first such definition, it arguably still requires development and will undergo refinement as the Smart Heritage discourse establishes its distinctive ontology and expands into new contexts over time. However, its clear links to the academic smart city and heritage literature provide a roadmap to other researchers who wish to further develop and criticise the discourse in the future. In the context of this research, its purpose is to guide the researcher's search for the emerging Smart Heritage discourse within present-day local government policy and operations across different case studies. It fulfils this purpose well as its academic background proffers a high-level and inclusive discursive framework of both disciplines that enables the definition to work within different case study contexts. As Chapter Two highlights, prescriptive smart city definitions are at risk of being outdated swiftly by the smart city's evolution. Also, many existing heritage definitions are politically biased to their heritage organisation or professional worldview. Therefore, the researcher does not adopt existing definitions for the smart city and heritage contributions to the Smart Heritage definition. However, the research recognises the proposed definition's temporal and research circumstance is the domain in which this definition is suitable. Notably, the researcher does not prescribe the definition to future research or other inquiry lines without criticism and review.

Nevertheless, the above Smart Heritage definition is the first contribution to knowledge from this thesis, answering the first additional research question: 'What is Smart Heritage?' The researcher applies this definition while investigating how to deliver Smart Heritage within local government.

2.5 Summary of the Chapter

This chapter finds that Smart Heritage is an emerging discourse. It offers the first complete review of Smart Heritage's literature and the first comprehensive definition of Smart Heritage. It results from the innovative convergence between the smart city and heritage disciplines, enabling them to intertwine and deliver novel value to both disciplines. Smart Heritage is a unique opportunity to reframe the smart city within the cultural context of the past and position smart technology as a lead curator of the heritage narrative. It currently exists within governance, sustainability, wellbeing, and community contexts and can expand into additional contexts through the evolution and expansion of the distinct smart city and heritage disciplines. Since this chapter provides the first thorough examination of Smart Heritage as a distinct discourse and definition, it standardises the understanding of Smart Heritage in the literature. The following chapters utilise this definition to frame the inquiry into how to deliver Smart Heritage within local government by applying it in the context of Australian cities. Chapter Three details the research's methodological structure and the theory behind the methods used and introduces local government case studies.

CHAPTER THREE

METHODOLOGICAL STRUCTURE, RESEARCH APPROACHES, & METHODS

3.1 Introduction

Chapter Three details the methodological tools used to engage the smart city and heritage disciplines and produce the Smart Heritage Principles. It firstly discusses and visually presents the methodological structure, which signposts the logic for the research. Secondly, it explains the two conceptual research approaches underpinning the methodology: Grounded Theory and Thematic Approach. These approaches provide the epistemology of inductive and deductive reasoning to bridge the knowledge gap between the smart city and heritage disciplines and deliver Smart Heritage within local government. The chapter then explains the individual methods used to achieve this research, informed by the conceptual research approaches. The methods used are Content Analysis, Interviews, and Thematic Synthesis. Thirdly, the chapter discusses similar research methodologies in adjacent smart city and heritage disciplines that contextualise and inform the research. Then, the chapter profiles the local governments that are the case studies for the research. Lastly, the chapter closes by discussing the research's limitations and ethical considerations.

3.2 Methodological Structure

The methodological structure establishes the logical strategy for responding to the research questions by signposting how its conceptual approaches and individual methods interlock. The visual depiction in Figure 8 is the critical roadmap that the reader should refer to throughout the thesis for contextualising the different chapters. The methodological structure contains two consecutive stages: Stage One and Stage Two. Each stage's structure oscillates between the two research approaches, Grounded Theory and Thematic Approach, which apply inductive and deductive investigation modes to three local government case studies, respectively. Within each stage, and directed by these approaches, are the research methods: Content Analysis, Interviews, and Thematic Synthesis. The legend at the bottom of Figure 8 allocates these methods to the

methodological structure's overarching approaches. Stage One contains all of these methods as it collects the initial case-specific data on the case studies, culminating in the production of generalised key considerations in Stage One Thematic Synthesis. Stage Two contains Interviews and Thematic Synthesis only, as it narrows the focus of the research on these key considerations to produce the Smart Heritage Principles. As Figure 8 shows, the final Smart Heritage Principles are in Chapter Eight, with Appendix One containing the stand-alone industry document for the later dissemination of the research findings. Chapter Nine is the validation of the Smart Heritage Principles, which is a deductive process of testing that is separate from the Grounded Theory and the Thematic Approach. The following sections in this chapter introduce the research approaches and research methods, then explain their application in this methodological structure.

Figure 8: Methodological structure.

3.2.2 Epistemology and Ontology

The researcher adopts a constructivist-pragmatist epistemological stance on understanding knowledge and framing the inquiry's methodology and methods. From the constructivist stance, the researcher understands that there are multiple realities within the two distinct disciplines. The researcher must interpret the valuable and relevant aspects of these disciplines before constructing the Smart Heritage discourse. The methodology reflects this by positioning the researcher as the primary 'reader' of data in the Content Analysis and as the instigator of data's creation in the semi-structured Interviews. Due to the Smart Heritage discourse's nascent state and the current distance between its contributing disciplines, the inquiry requires the researcher's more active voice to construct meaning compared to research of more established discourses or topics that likely self-produce data. Between these methods and the Thematic Synthesis method, the researcher shifts to a pragmatist stance. The researcher adopts the pragmatist stance that these smart city and heritage realities are constantly negotiated, debated or interpreted. The evolution of the smart city definition over time and the political balance between heritage governing organisations show this evolution. Therefore, the researcher accepts that knowledge creation must use incomplete data to pursue a productive outcome in this changing environment. The stances require the researcher to apply the best-suited tools at the time to deliver their research. The methodology features pragmatism by reviewing the latest smart city and heritage definitions and recent Smart Heritage literature before developing the Smart Heritage definition while recognising that these understandings will change in the future. The researcher also acknowledges and embraces the definitional vagueness and seemingly perpetual criticisms of the contributing disciplines but continues to advance the search for Smart Heritage knowledge. Throughout the research structure's Stage One and Stage Two, the methods discover, formalise, then deliver Smart Heritage through inductive and deductive approaches. In the research's final method, validating the Smart Heritage Principles in Chapter Nine, the researcher's stance is entirely pragmatic as they deliver the industry-ready document and accept the criticisms within the research design.

The research is ontologically grounded in the smart city and heritage disciplines in Chapter Two. The disciplines' currently-distinct literature and practical applications highlight the diverse knowledge bases that Smart Heritage emerges from to engage with local government. Therefore, the ontologies are initially separate in the research's early stages, but the researcher reconciles

these into a uniform language that forms the Smart Heritage discourse as the thesis progresses. For example, the smart city discipline's use of the term 'smart' refers to technologies' ability to operate without direct and regular human oversight, typically through automatic and autonomous means. This usage differs from its everyday understanding as 'clever' or 'intelligent'. The heritage discipline similarly features unique ontologies in its categories, such as Industrial Heritage and Built Heritage. These two 'heritages' are both human-constructed, but their categories' ontologies define them differently according to their subjective historical readings. Industrial Heritage regards heavy industry machines, landscapes, and warehouses. Built Heritage focuses on buildings in general, yet, at times, does not include buried buildings as these are distinctly Archaeological Heritage. In Smart Heritage, the disciplines' ontological frameworks exist within the same paradigm. The Smart Heritage definition in section 2.4.2 achieves this by stitching automatic and autonomous technologies to subjective historical interpretations. However, the dichotomy between the ontologies remains evident at this early stage while researchers and practitioners become familiar with using the shared language. The researcher anticipates that as local governments adopt Smart Heritage and the interdisciplinary sector grows, the discourse will form its distinctive and stable ontology over time.

The researcher's constructivist-pragmatist epistemological stance and dual ontological background build a unique backdrop for this research. From this stance and broad background, the researcher could take various other inquiry routes, including following additional questions such as 'who is Smart Heritage for?' and 'does Smart Heritage continue or disrupt existing dominant elements in the underlying disciplines?' However, due to the research's purpose to understand how to deliver Smart Heritage within local government, the researcher places these other valid questions aside for now and focuses the methodology and subsequent discussions on answering the practical-focused primary and secondary questions. The following sections detail how the research's methodology implements this research paradigm to engage with local government smart city and heritage operations and policies.

3.2.3 Grounded Theory

Grounded Theory is a bottom-up methodological approach whereby the researcher deploys inductive reasoning on data to hypothesise without predetermined parameters for the findings. As developed by Glaser and Strauss in their seminal work *The Discovery of Grounded Theory: Strategies for Qualitative Research* (1967), the researcher adopts the identity as an 'explorer' who investigates conceptual avenues between data to find a pathway that justifies their relationship. These relationships are unknown at the start of the investigation. However, as the researcher discovers additional data and pathways, hypotheses about inter-data relationships form and are tested and adapted through further exploration. The approach is valuable where a rationale for understanding phenomena is not apparent, and existing theories are inadequate for the task. It allows for new hypotheses to form around unique contexts, such as understanding the novel deliverance of Smart Heritage in local government. Oktay (2012) views Grounded Theory as based within the broader philosophical movements of pragmatism and symbolic interactionism, which reject top-down deductive and typically traditionalist approaches to knowledge. Pragmatism asserts that something is true if it works satisfactorily, meaning that a hypothesis is practical within its context and unpractical hypotheses are rejected. Therefore, this philosophical outlook emphasises a clear and positive relationship between the hypothesis and its context. Symbolic interactionism contends that humans seek symbols or known phenomena within data, then dynamically construct associations between the symbols to form meaning. It rejects non-symbols as not relevant for understanding. Therefore, interactional symbolism is the emergence of meaning within data sets and results from the researcher's viewpoint and the research context. Grounded Theory embodies these philosophical movements in its practical and dynamic approach for constructing knowledge. It is valuable where there are nil or inadequate justifications for meaning, so it applies a creative and investigative process to building research pathways.

Grounded Theory predominantly exists within qualitative research where the researcher observes non-numerical data, such as text, interviews, and actions, that do not have rigid or mathematical justification. Glaser and Strauss (1967), the attributed founders of Grounded Theory, sought to refocus social sciences on these qualitative data sources. They considered that standardised quantitative methods failed to address new social phenomena that had dominated the social sciences during their time of writing. Urquhart (2013) explains that the mid-twentieth

century, when Glaser and Stauss formulated the theory, was a period of considerable social and political change, notably increasing social and political fluidity. Against this backdrop, Glaser and Strauss proposed Grounded Theory as an enterprising approach to discover knowledge that addresses these changes. Distilling Grounded Theory, Urquhart et al. (2010) identifies its four key characteristics:

1. “the main purpose of Grounded Theory is theory building;
2. as a general rule, researchers should make sure that they have no preconceived theoretical ideas before starting their research;
3. analysis and conceptualisation are engendered through the core process of constant comparison, where every slice of data is compared with all existing concepts and constructs, to see if it enriches an existing category (by adding to/enhancing its properties), forms a new one or points to a new relation; and
4. ‘slices of data’ of all kinds are selected by a process of theoretical sampling, where researchers decide, on analytical grounds, where to sample from next.”

Grounded Theory’s application typically features raw data codification, which classifies data points in the dataset and attributes them with distinct meanings that summarise their value to the interpretation process. Strauss and Corbin (1990) call this process ‘open coding’, as the researcher observes and formulates the codes as they engage the data, experiencing initial links between individual data points. Next, the researcher theorises draft relationships across the whole coded dataset and observes insights that appear as a result. Researchers use this process as an iterative and active ‘theory building’ process that requires their creative input and heuristic inclination. Lastly, the researcher tests and refines the theories for justification through comparative methods, such as cross-case analysis, deviant case analysis or third-party verification. This final step sees the vetting, adaption, or construction of new theories across the dataset and, in the words of Glaser and Stauss (1967), which “fit and work” in the research context.

Grounded Theory is valuable in this research because it allows the researcher to explore meaning within the nascent Smart Heritage discourse and construct new knowledge away from existing knowledge frameworks’ safety and bias. The Smart Heritage discourse, as Chapter Two details, does not yet contain a consolidated theoretical framework or significant volumes of existing research. Thus, a Grounded Theory approach enables the researcher to develop

meaningful theories that help fill the gaps in the existing knowledge base about Smart Heritage, without falling back on other disciplinary frameworks that might have less relevance, exclude essential smart city and heritage nuances, or have a detrimental effect on understanding this novel discourse. It is critical that the researcher adopts the exploratory and heuristic Grounded Theory as a guide to research this novel discourse and illuminate the required new knowledge.

3.2.4 Thematic Approach

Thematic Approach is a deductive methodological approach that sees the researcher applying themes to a dataset to infer knowledge (Braun & Clarke, 2006). It is an umbrella term for the positivist application of themes in a dataset. Positivism is the philosophical theory that knowledge derives validity from enacting an overarching authority or logic rather than intuitive or moral authority. Thematic Approach implies an omnipotent and omniscient position for the researcher over the data as they identify, arrange, and interpret meaning from data at will. The approach is valuable for drawing conclusions that easily transfer to other contexts through the same thematic framework. The approach, therefore, keeps the researcher and research in line with existing modes of inquiry. However, Braun and Clarke (2006) and others such as Chamberlain (2000), Antaki et al. (2003), and King and Brooks (2017) warn that flexibility should not come at the expense of systematic and fair research. It is particularly subject to methodolatry and proceduralism in lieu of actual relevancy between data. Therefore, the researcher should prioritise comparable data to apply the themes across and quality-check the themes' relevancy instead of prioritising the procedure over reflexivity.

Thematic Approach is common across qualitative research where the researcher engages data from various contexts, and differing methodological manifestations demand adaptations to thematic understandings. The researcher's ability to construct and apply the cross-case and cross-methodological themes offer the researcher flexibility to bridge the gaps with a static basis for comparing and mixing un-uniform data. However, there is no definitive set of guiding principles for the approach in academic research; this is perhaps due to its personalised usage and adaptations (Braun & Clarke, 2006; Attride-Stirling, 2001). In a recent reflective paper on the lack of guidance for the approach, Braun and Clarke (2019) state that the Thematic Approach is a 'theoretically

flexible' and 'generic' methodology from which research-specific methods construct different philosophical assumptions. In their advice to its application, they provide the following:

1. "Being explicit, thoughtful and deliberate ('knowing') in the application of method and theory is important;
2. Assumptions and positionings are always part of qualitative research. Reflexive practice is vital to understand and unpack these. It is good practice to reflect on and identify what you're assuming, and then interrogate whether those assumptions hold for any particular project;
3. There are different approaches to TA – and they're not necessarily compatible with each other. Being aware of this and doing TA in a deliberate ('knowing') way, can help avoid confusion and mismatches in concept and practice;
4. Use a TA approach that suits your research purpose and analytic sensibility (theoretical and conceptual frameworks); and
5. Quality matters. Understanding what you're doing, why you're doing it, and what the criteria for doing it well are, are vital for doing (reflexive) TA well."

Thematic Approach typically applies sequential stages that situate the researcher above the research to infer knowledge deductively. Braun and Clarke (2006) state that firstly the researcher defines the dataset, then isolates the dataset within the research context and familiarises themselves with it through observation. The research then generates and systematically applies initial themes and reviews the themes for relevancy to the research question, perhaps through a visual mapping exercise of connecting themed data. Lastly, the researcher finalises the themes, applies them to the entire dataset, and extracts samples to construct narratives that serve knowledge production. It is important to note that the application of these stages is research-specific. Its practical steps rely on the researcher to apply themselves as the identifier, arranger, and interpreter of meaning from data. Without the researcher, the positivist methodological approach views knowledge as absent.

Thematic Approach is valuable in this research because it allows the researcher to identify relevant knowledge about Smart Heritage from a broadly captured dataset. Its decisiveness is especially valuable when coupled with an inductive approach, such as the Grounded Theory, and a novel research topic, like Smart Heritage, that potentially gives rise to an unmanageable number of research avenues. Without the deductive approach, the researcher would find forming generalised knowledge from the case studies problematic due to case-specific peculiarities. Thematic Approach, therefore, permits the researchers clarity in the application of meaning to the data to answer the research questions.

3.3 Research Methods

The research has three methods: Content Analysis, Interviews, and Thematic Synthesis. The three methods deliver Grounded Theory and Thematic Approach in the research. As Figure 8 shows in section 3.2, Content Analysis and Interviews deliver the Grounded Theory approach, and Thematic Synthesis applies the Thematic Approach. The methods closely follow standard protocols in qualitative research. However, the unique context of their application to smart city and heritage disciplines within local government in this research requires conscious applications to bridge the disciplinary gap and fit within local government political constructs. The following sections detail the methods and their specific application in the research.

3.3.1 Content Analysis

Content Analysis is a commonly used qualitative research method where the researcher studies recorded data to examine phenomena and patterns systematically (Berelson, 1952). It follows the Grounded Theory approach as it allows the researcher to engage a novel dataset containing different formats and contexts, such as text and audio recordings. Abrahamson (1983) contends that Content Analysis can engage with most materials, such as narrative responses, open interview transcripts, focus groups, observations, and printed materials. A means for this multi-material engagement is its unobtrusive practices, where the researcher studies the data after it is created or recorded rather than during its formation. It typically sees the researcher observing the data and using exploratory and subjective interpretation to emerge phenomena from the content (Mayring, 2000; Priest et al., 2002). The researcher then codes the phenomena, which reveals patterns. Initially inductive due to a Grounded Theory basis, the method can later blend into deductive

approaches through the stricter application of coding and pattern identification, making it well-suited to methodologies that apply multiple iterative stages to create knowledge.

The researcher applies Content Analysis in Stage One of the research, which is the study of the smart city and heritage strategies from the three local governments in the case studies. The method's purpose is to record and examine data from the case studies to establish an understanding of the current foundation for Smart Heritage in the cases. The smart city and heritage strategies are publicly available textual documents prepared by the local governments that provide strategic direction to their management of the smart city and heritage disciplines. The strategies are non-statutory, meaning the state or national law do not require or enforce them. However, they are essential for decision-making in the local governments as they establish the political course of action when dealing with the disciplines. Most local governments have at least one strategy for heritage or smart cities depending on their prioritisation of the discipline. Local government smart city and heritage strategies are typically operative for four years, after which the council reviews them. The strategies studied for this research were operative. The smart city and heritage strategies of all councils tend to follow a similar structure. This structure includes a foreword by the Mayor that sets the document's political tone, followed by introducing and defining the discipline. Heritage strategies contain a brief history of the local government area and its occupation, and the smart city strategies detail the advancements in smart technologies in the city to date. Both documents then provide the vision for the discipline, followed by a hierarchy of components that collectively deliver and materialise that vision. In descending order of hierarchy, these components are typically classified as a discipline definition, objectives, provisions, and initiatives. The components reduce their scope as they descend the hierarchy, with objectives detailing broad strategic directions and the initiatives detailing specific actions or projects. All the case studies in this research have both strategies.

In the undertaking of Content Analysis in this research, the researcher first retrieves the smart city and heritage strategies from each local government case study's website. The retrieval requires locating and downloading these documents. The researcher digitally saves the strategies offline and solely refers to these saved documents for the analysis. As the local governments manage the disciplines differently, there is variation between the location, titles, and terminology

of the council website strategies. Therefore, the researcher must search through the websites and compare potential documents for the most appropriate smart city and heritage strategies to represent each case study. The appropriate strategies are the documents that most directly address the disciplines and contain the component hierarchy mentioned above. Typically, these documents are under headers such as 'Strategies and Documents' and the titles explicitly state 'smart city' or 'heritage'. Secondly, the researcher reads the document and records its unique strategic context, noting that these may vary between cases and influence the document's interpretation and coding of the components. Thirdly, the researcher codes the documents, identifying components that bridge across the disciplines to deliver Smart Heritage. For example, coding components within the smart city strategy that are relevant to the heritage disciplines. The researcher records the components' interdisciplinary relevancies through a colour-coded interpretative cypher that refers to the literature in Chapter Two. The cypher reflects the understandings of the disciplines for ease of understanding the components' connection to the broader discipline; for example, 'smart city as automatic and autonomous' and 'heritage as abstract'. The document's context also informs the coding process, where the context of the document infers a connection between the disciplines. The researcher codes each strategy in isolation to avoid contamination of interpretations in a local government case or between the cases.

The coding process results in a two-column document, with relevant components in the left column and the identified relevancies in the right column that justify their inclusion. To maintain a fair reading and coding of the documents, the researcher provides a sample of the uncoded text to another researcher, their primary supervisor, for their coding of the text. The researcher discusses and resolves discrepancies through dialogue. This process ensures that the primary researcher maintains fair and reasonable coding of the documents. The researcher then extracts the relevant components into tables for analysis as strategies individually and then as a local government case that includes the codified data from its smart city and heritage strategies. A sample of the textual coding is in Appendix Two with the full interpretative cypher, which generalises that particular heritage understanding and references the academic literature. A simplified version of the cypher is in Table 3. The researcher undergoes this reading and coding process for each strategy in the research before moving on to the next method: Interviews.

Table 3: Simplified Content Analysis Coding Interpretative Cypher.

Content Analysis Coding Interpretative Cypher	
Smart City Discipline	Heritage Discipline
Smart city as automatic and autonomous	Heritage as the abstract
Description: The smart city as automatic and autonomous technology that actively serves its populous.	Description: Heritage as an abstract concept that is not tangible; historic buildings, objects, places represent heritage but are not heritage itself.
Smart city as physical technology	Heritage as subjective valuing
Description: The smart city as physical installations, sensors, gadgets, and trackers.	Description: Heritage as a subjective process where the reader interprets value within their distinct and historical context.
Smart city as a social solution	Heritage as governed entities
Description: The smart city as a solution to social issues in the city, like governance, economic, wellbeing, and community.	Description: Heritage as governed entities, including a subject, object, building landscape and other articles, that an organisation deems as being or representing heritage.
Smart city as a system	Heritage as a category
Description: The smart city as a holistic system that contains multiple interacting elements that serve its populous and evolving context.	Description: Heritage as a research, professional, and group identity defined through prefixes and distinct identifiers, such as criteria, jargon, and membership.

3.3.2 Interviews

Interviews are a qualitative research method that involves engaging a person, often called a 'participant', to produce and collect data. Engagement can be face-to-face, written, video-calling, verbal-only, or in other communication forms that include questioning and discussion. Researchers adopt the Interview method as they require information held by a participant. This information varies and can include technical information concerning external objects, facts, or practices or relate to a participant's personal experiences or views. Depending on the required information, interviews can be structured along a dedicated line of questioning; semi-structured, setting an initial line of inquiry but allowing deviation if the researcher considers it valuable; or open-structured, where the researcher follows the pace and inquiry direction of the participant. In all interview structures, the researcher is an active voice in the research as they initiate, ask, and respond to the participant. This voice decreases the less structure is present. However, the researcher's voice never entirely vanishes as the researcher determines the interview's broad

context through the rationalisation to engage the participant in the research. The researcher can also significantly influence the participant's responses through pointed questions, question structure, and responses to answers that direct the participant. This researcher's influence is critical to acknowledge, as it is a defining characteristic of the method.

In this research, Stage One and Stage Two Interviews are one-on-one engagements with smart city and heritage advisors from the local government case studies. In each of the Interview stages, there is one interview per advisor. The advisors do not change between the Interview stages. There are 14 planned interviews in total, including 12 from the initial three case studies and two from the additional case study that validates the Smart Heritage Principles. The researcher contacts the potential interview participants, the smart city and heritage advisors, through email and video calling to ask for their involvement and introduce the research scope and researcher. The researcher individually briefs each advisor on confidentiality measures in the research, such as using gender-neutral pronouns and avoiding politically or otherwise sensitive information. The researcher allocates each advisor with a pseudonym and collects signed consent forms from them and their organisation. The pseudonyms are 'Smart City Advisor' and 'Heritage Advisor' for their respective local government. The researcher informs the participants that their identities could be discovered due to the specificity of their role and the naming of their local government. The researcher requests that the advisors hold considerable knowledge about their specific discipline in the organisation, such as the Smart City Advisor holding knowledge about the smart city operations, and freely express their personal views about these council operations. The advisors do not have to hold knowledge about the other disciplines or be knowledgeable about Smart Heritage. Ultimately, the local governments' managers identify the participants as appropriately experienced and knowledgeable and approve their involvement in the research. The researcher organises the interviews to fit around the schedules of the participants.

The Interviews are semi-structured, following the Stage One and Stage Two Interview Question Guides in Appendix Three, and designed for approximately one hour in duration. The questions probe each participant concerning Smart Heritage within their local government. The semi-structured questions allow the researcher to deviate from the prepared questions to illuminate case-specific details about Smart Heritage. The researcher shares the stage's Interview

Question Guide with the participants before the interview, asks the questions and verbally summarises the interview responses to ensure understanding between the researcher and participant. The researcher audio-records the interviews and transcribes the recording for later review. After the interviews are complete and transcribed, the researcher textually summarises the interviews by describing the participants' views. Quotes from the transcripts support these summaries. Chapter Five, Seven, and Nine in the thesis contains these summaries and quotes as data. The Interview data in Chapters Five and Seven and the Content Analysis data in Chapter Four are the inputs for the following method, Thematic Synthesis. The Interview data in Chapter Nine validates the thesis's findings and inputs into the researcher's reflections at the end of that chapter.

3.3.2 Thematic Synthesis

Thematic Synthesis is a research method that involves the systematic deduction of a qualitative dataset into aggregated themes that identify trends and build a case for new generalised knowledge (Bethel & Bernard, 2010). It follows the Thematic Approach described above, as the method summarises, integrates, combines, and compares findings across cases to infer knowledge (Cruzes & Dyba, 2011). These themes crystallise around pre-set parameters in the research; the researcher determines the themes. It is, therefore, a flexible method for producing generalised knowledge in research. The synthesising process propels the research beyond the primary reported data by interpreting cross-case meaning within the research, commonly creating novel explanatory frameworks, new theories, high-order interpretations, and generalised conclusions. Therefore, the researcher must consider the flexible nature of the cases, mixed variable qualitative and quantitative characteristics of the data, and influencing forces placed on individual cases (Cruzes et al., 2015). The synthesising process relies on observation of cross-case themes by the researcher, meaning that its identification of trends and knowledge relies on the researcher's ability to recognise the themes and the actual similarities between the cases (Pope et al., 2007). The process is often undertaken to support data organising practises, such as data coding, visual charts, and textual summaries in prior data collection methods. These practices enable systematic and repeatable examination and comparison of data from each case.

In this research, Thematic Synthesis occurs twice, once in Stage One and once in Stage Two. Stage One draws on data from the Content Analysis and Interviews from the three local government case studies to synthesise Key Considerations. Stage Two then further synthesises the Key Considerations with data from the second round of Interviews to produce the Smart Heritage Principles. See Figure 8 in section 3.2.1 for the location of these methods in the research. Thomas and Harden (2008) provide a step-by-step guide to undertaking thematic synthesis on qualitative data. The research in this thesis adopts this guide. In both stages, the researcher begins the synthesis by observing the dataset for individual pieces of data, such as policy components in the strategic documents and relevant quotes in transcripts that resonate with Smart Heritage's theoretical research, which form the themes' building blocks. This observation requires the researcher to review the three cases' data and separate relevant data from non-relevant or superfluous data.

Next, the researcher thematically groups the individual data points. It requires the researcher to pose questions to the dataset to emerge the connections, such as shared terminology, phrases, subject matter. The researcher may re-read the data and re-listen to the Interview audio recordings to confirm their relevance. As connections develop through the researcher revealing shared themes, the researcher prepares preliminary thematic descriptions that describe these themes. The researcher revises the themes and descriptions to include newly connected data points and creates new themes when the data is not relevant. These thematic datasets initiate the interpretation of meaning in the data. The researcher aims to group data points in themes that apply across the three local government case studies. A theme that exists across all three of the case studies indicates its significance as relevant to the research. Not all data will connect directly with a theme. Therefore, the researcher tags in-direct data within spheres of relevancy with themes or creates auxiliary themes when required.

Lastly, the researcher refines the themes into clear statements that characterise the themes. These themes guide the researcher in their later interpretation of meaning and knowledge creation. The researcher uses these themes in the research process by pitching questions to them that produce insights into how the local governments deliver Smart Heritage. In Stage One, these themes are the Key Considerations that offer insights that the research can address, such as

problems, areas for improvement, and Smart Heritage opportunities in councils. The resulting understandings are the Key Considerations noted in the methodological design in section 3.2.1. In Stage Two, the themes are the Smart Heritage Principles that produce practical methods to deliver Smart Heritage in local government. This second stage of synthesis is finer grain than the previous as it works within the thematic confines of the Key Considerations, using the additional data from the second round of Interviews to shape the principles. Therefore, the data subject to the thematic grouping process in Stage Two is less variable than in the initial synthesis round in Stage One. The following section details similar studies and research in adjacent fields that contextualise the design of the research.

3.4 Similar Studies and Research

A few academic studies parallel the proposed methodological design and topic of this research. These studies contextualise the research and offer insights into considerations for this thesis. This section details these similar studies and considerations.

Angelidou et al. (2017) provide the closest methodological design and topic to the proposed research. Their research examines how cities' historical and cultural heritage underpin smart city tools, solutions, and applications. The methodology is a cross-case analysis between three local government cases: Amsterdam, London, and Barcelona, that compares trends and relationships in the cases and enables for extraction of cross-case theoretical hypotheses. They first analyse the scope, structure, and components, such as objectives and policies, and present the relevant data in tables. Next, they vertically and horizontally scan the tables to identify patterns and relationships in the data using inductive reasoning. Once they identify a trend or pattern across the cases, deductive reasoning shapes it into an overarching hypothesis about historical and cultural heritage and smart cities. Their research finds that cultural heritage is not systematically incorporated into smart city initiatives and lacks integration between on-the-ground smart solutions and historical sites and promotions. Regarding limitations of their research, they note that the large size of the selected local governments may hinder their ability to recognise the connection between smart city solutions and cultural heritage in the strategies due to the broad scope of the strategies and balancing various other demands in the cities. The researchers consider that their research may benefit from smaller sized case study local governments, specifically

historical cities that have narrow economies around heritage, and more intrusive methods that confirm convergence between smart city and heritage.

The research by Angelidou et al. (2017) is similar to the methodology design and topic proposed in this thesis. Both adopt an inductive to deductive approach to analyse cases, then produce cross-case hypotheses and focus on smart city and heritage convergence. However, this thesis's research differs as it contains two stages of inductive to deductive methodology, examines heritage strategies alongside smart city strategies, and produces the Smart Heritage Principles for local government. Therefore, this research extends the investigatory depth and scope past that of Angelidou et al. The proposed research adopts the considerations for smaller local government case studies with significant heritage sectors that provide an encouraging basis for connecting the smart city and heritage disciplines. See section 3.5 below for information on the cases. It also considers more intrusive methods by deploying Interviews that add another layer to the investigation into the disciplines' convergence.

Angelidou and Stylianidis (2020) update Angelidou et al. (2017)'s investigation into strategic similarities between the smart city and heritage disciplines with an investigation into three other local governments. The update follows the same cross-case analysis methodological design as the previous study, with inductive searching, then cross-case comparison and then deductive reasoning of hypotheses. In Angelidou and Stylianidis, the three local governments are Tarragona in Spain, Budapest in Hungary, and Karlsruhe in Germany; these are smaller sized cities and have significant heritage sectors, which show learning from the considerations in the previous study. Their research also adopts a more rigid analytical method by employing a 'simplified digital strategy canvas' that directs their examination to strategic context, management and governance, and services between smart city solutions and cultural heritage. The change in methods adds a deductive approach compared to the previous research and may reflect the earlier consideration for more intrusive examination. Angelidou and Stylianidis find a notable connection between smart city solutions and cultural heritage, particularly preserving and protecting cultural heritage, enhancing storytelling experiences, and promoting knowledge exchange between cultural heritage stakeholders. There is also a clear connection between the disciplines in touristic contexts, such as branding and promoting historic attractions and narratives through smart

solutions and sustainable development, such as using technology to promote historic urban fabric renewal by making visible historical values through mobile applications.

Regarding the limitations of their research, Angelidou and Stylianidis note that the research only reviews the strategic documents and does not examine the social or practical administrative aspects between smart city solutions and cultural heritage in local government. The researchers are yet to investigate these aspects. Therefore, they propose in-depth case studies on local government organisations that understand the working relationships between the disciplines within these institutions and explore how smart solutions support citizens and visitors at historical sites and experiences. The researchers consider that these in-depth investigations will enable local governments to enhance their use of smart technology in cultural heritage contexts and generate more attractive and sustainable solutions. Ultimately, influencing technological and heritage policy in the organisation and user experience for citizens and visitors.

The methodology in the article by Angelidou and Stylianidis (2020) is also similar to the proposed methodological design in this thesis due to its inductive to deductive approach and case study methods. The more deductive approach with the digital strategy canvas, which guides the cases' analysis, parallels with the Key Considerations that guide the Interviews and Thematic Synthesis in Stage Two in this thesis. However, Stage Two offers further refinement because it repeats the inductive to deductive approach, which provides another layer of deduction. The methodology in this thesis adopts the consideration from Angelidou et al. (2017) and Angelidou and Stylianidis (2020) to investigate the relationship between the smart city and heritage disciplines through comparative methods. This research also adopts the preferred medium to small city size in selecting those local governments for the case studies.

In summary, the above studies contextualise and inform the research in this thesis. The inductive to deductive reasoning methodologies in Angelidou et al. (2017) and Angelidou and Stylianidis (2020) offer a framework for this research to adopt and considerations to guide the research towards new knowledge. Against this context, this thesis's research extends the investigatory depth and scope of these existing studies through a two-stage methodology, examining heritage strategies, producing Smart Heritage Principles, and conducting in-depth interviews. There are other similar studies that inform the inquiry of this thesis. However, the

above are the most relevant studies in the academic literature relating to the lens of this thesis. The following sections detail the case studies that the methodology draw on.

3.5 Introducing the Case Studies

The researcher enlists three Australian local governments as case studies to extract data for the research process. The researcher chose the Australian local governments due to the similar social, cultural, language, and local government environments to the researcher's New Zealand background. These similarities enable the researcher to understand in-depth the heritage and smart city disciplines and communicate effectively. Optimistically, the similar context would inspire the development of Smart Heritage in New Zealand. The researcher initially planned to travel to interview the advisors in-person to facilitate a greater contextual understanding of the cases. However, the COVID-19 travel restrictions prevented this from happening, requiring the interviews to be over video calling instead. Contact with the advisors was already made by the time of the pandemic's restriction, so changing the local governments to incorporate other countries were out of the research's scope at that stage.

There are 537 local governments, also known as councils, in Australia (Australian Local Government Association, 2021). Approximately 55% per cent are regional, rural, or remote local governments, with the remaining 45% categorised as urban or metropolitan. Regional, rural and remote local governments are typically located in agriculture-based environments and cover large areas, while urban local governments are in cities. Local governments typically administer utility service provision, community services, and urban development regulation. However, there are no federal provisions for local governments in the national federal constitution. Therefore, each state government ordains the location, number, and powers of local governments in their state. There is no standardisation in size, name, or power across the country as a result.

The selected local governments are Broken Hill City Council, the City of Melbourne, and the City of Newcastle. The researcher selected these local governments as they all have operative smart city and heritage strategies and employ expert advisors within the smart city and heritage disciplines. The strategies and advisors are the sources of the research data in each case study. Also, these local governments represent a cross-section of councils in Australia. As further detailed in this section, Broken Hill City Council is rural, the City of Melbourne is a metropolitan

centre, and the City of Newcastle is urban. These local governments vary in population size from 17,400 in Broken Hill City Council to 170,000 in the City of Melbourne and vary in geographic size from 37km² in the City of Melbourne to 187km² in the City of Newcastle. The geographic, population, financial and other differences provide depth to the research data collection and validate the research's findings as applicable to a broad cross-section of local government. The following sections profile the local government case studies to detail their unique demographic, locational, historical and smart city contexts.

3.5.1 Broken Hill City Council

Broken Hill City Council is a local government in the far western outback of New South Wales, located approximately 1,100 kilometres west of the state capital, Sydney, and 500 kilometres east of Adelaide, South Australia. The council covers a land area of 170km² and has a population of approximately 17,400. The main urban area is the township of Broken Hill. The remainder of the local government area consists of the regional airport, the Living Desert State Park, and former and active mining sites. The local government is encircled entirely by the Unincorporated Far West region of New South Wales, an outback region with no local government organisation.

Broken Hill has a significant mining and outback heritage that Broken Hill City Council proudly celebrates (City of Broken Hill, 2021). The council records on its website that the Barkindji people inhabited the region 50,000 years ago and the first European visited the area in 1835. In 1885, the Broken Hill Proprietary Company Limited established in the area to mine ore, which drove the township's expansion and population growth. The Broken Hill was proclaimed a municipality in 1888 and, profiting off the nearby mines, became the second-largest settlement in New South Wales after Sydney in 1907. The population peaked at 35,000 in 1915. Since 1915, the city struggled with population decline and employment. The largest employer and business, the Broken Hill Proprietary Company Limited, left the city in 1939. However, other mining companies continue to the present day. Between 2006 and 2019, the population declined 12 per cent, dropping from approximately 20,000 to 17,400 inhabitants. There are approximately 7,000 local jobs, with the largest industry in the area by employment being healthcare and social assistance. In recent decades, Broken Hill has been the film set for desert-themed films and the Living Desert Sanctuary, a 2400ha nature reserve, opened in 1992. In 2015, Broken Hill became

the first city in Australia to be inscribed on the National Heritage List for its significance to the mining industry and connection to the outback landscape. The council manages over 380 historical sites across the local government area, including mining sites, buildings, public parks, mosques and churches, and aboriginal sites.

Broken Hill City Council engaged the smart city discipline in 2016 when the council partnered with the telecommunications company Telstra and a consulting firm to develop the *Smart Community Framework* (City of Broken Hill, 2016a). This document identifies opportunities and needs that the smart city discipline could address in the city. The council aspired that the smart city discipline would primarily enhance and improve cost-efficiencies for core council services, like transport, waste collection and disposal, energy and water usage, vehicle parking, and public facilities. The document steered the council to develop a targeted smart city strategy that delivers these opportunities. This smart city strategy is the strategic document included in this research and analysed in Chapter 4. Broken Hill City Council successfully applied for funding from the federal Smart Cities and Suburbs program in 2018 for their ‘Australia’s First Heritage City becomes an Australian Future City’ initiative (Australian Government, 2020a). This initiative established an Internet of Things platform and other technologies to attract and enable visitors, investors, and businesses to the city, leveraging the historic mining and outback narratives as an asset to these new arrivals.

3.5.2 City of Melbourne

The City of Melbourne is the local government at the centre of the broader urban area comprising Melbourne, Victoria. The council has an area of 37km² and a population of approximately 170,000 people. It is metropolitan, consisting of high-rise office and residential buildings with urban parks and plazas. Eight other councils surround the local government area. Greater Melbourne has 31 local government areas in total.

The City of Melbourne contains significant legislative, economic, and cultural heritage for the local area, the state of Victoria, and Australia. The council’s website records the area as the traditional lands of the indigenous Wurundjeri, Boonerwung, Taungaurong, Djajawurrung and Wathaurung peoples (City of Melbourne, 2021a). Europeans arrived in 1835 and, since then, state institutions established within the city. For example, St Patrick’s Cathedral was dedicated in 1851

to the Archdiocese of Melbourne, covering the broader Melbourne region. The state Parliament House opened in 1856, and the Melbourne Mint produced gold sovereigns from 1872 and Commonwealth coinage from 1916 on behalf of the British Royal Mint. Many financial and trade industries grew out of the 1850s gold rush, which saw the city's population grow from 80,000 to 140,000 inhabitants between 1854 and 1861. The council's website notes that the city continued to urbanise throughout the 1900s (City of Melbourne, 2021a). Skyscrapers arose in the 1950s, and the city soon transitioned from port and trade industries, redeveloping its docklands for residential apartment and office towers. The City of Melbourne continues to thrive in modern times. It contributes 37 per cent and 24 per cent of the greater Melbourne and Victorian gross domestic product, respectively. There are approximately half a million jobs in the city, and the most significant employment industries are professional, scientific and financial services. The City of Melbourne manages more than 8000 historic places, including places of local, state, and national significance (City of Melbourne, 2021b).

The council firstly appointed a Chief Digital Officer in 2015 to integrate the city with the smart city discipline (itnews, 2015). Since then, the city deployed testbeds for business and government services to trial Internet of Things and 5g technologies, city-wide pedestrian counting systems, smart bins, and a community engagement space called CityLab, promoting thinking about the future civic challenges (City of Melbourne, 2021c). The council developed and implemented various smart city strategies, frameworks, and initiatives since 2015. With the maturing of the discipline in the organisation, the council seeks to integrate the smart city discipline into its everyday operations and strategic thinking. The City of Melbourne was successful in its 2017 application to the federal Smart Cities and Suburbs program for its 'Delivering accessible and improved processes and platforms for *CLUE* (Census of Land Use and Employment)' initiative (Australian Government, 2020a). The initiative supported a visual interactive cloud system to improve the user experience of CLUE survey data, which enables non-technical users, such as local government decision-makers, to interact with the system better.

3.5.3 City of Newcastle

The City of Newcastle is the local government that incorporates much of the broader Newcastle urban area. The local government is part of the greater Newcastle and Lake Macquarie urban area,

the second-largest continuous urban area in New South Wales, after greater Sydney. The council covers an area of 187km² and contains a population of approximately 160,000 people. The city is urban and contains suburbs, town centres, semi-rural areas, and the Port of Newcastle. Four other local governments surround the City of Newcastle.

The harbour and its industrial past characterise the City of Newcastle. The council's website records that the Awabakal and Worimi people extensively settled in the area before European penal settlement began in 1804 at the Hunter River's mouth (City of Newcastle, 2021). The city grew as a penal settlement until 1823 until the local military government reduced the number of convicts and became a 'free town'. The city further expanded from 1828 with the provision of 2000 acres of coal-bearing land to the Australian Agricultural Company and the associated development of coal railways, associated commerce, and the port. The port is the largest coal export harbour in the world and the oldest in Australia. Other mines opened throughout the century, which spurred further growth across the Hunter River region. Coal mining was largely ceded by 1901, and by 1919, other heavy industries, such as steel and shipbuilding, were dominant in the city. However, in recent years, many heavy industries closed, leading to the ongoing transition away from these sectors and the redevelopment of former industrial areas. The Broken Hill Proprietary Company Limited's closure in 1999, the same company that grew the city of Broken Hill, heralded a decade of social-economic hardship for the city. In the present day, the City of Newcastle is still transitioning away from heavy industries. Manufacturing is still the largest employer in the city, with health care and social assistance the second largest. The City of Newcastle manages approximately 1000 historical sites, including aboriginal places, penal sites, and settler buildings.

The local government adopted the smart city discipline in 2016 with a state government-backed infrastructure project called Hunter Innovation Project (Engineers Australia, 2016). The project delivered smart city infrastructure and an innovation hub in the city. Since then, the city has continued to roll out smart city infrastructure, like internet fibre, environmental sensors, and Internet of Things devices. The city adopted its first smart city strategy in 2017. This strategy is the smart city strategic document in this research. In 2017, the City of Newcastle received funding from the federal Smart Cities and Suburbs program for its 'Smart Move: Newcastle Intelligent

Mobility, Energy and Data' initiative (Australian Government, 2020a). The initiative delivered technologies across the city to reduce energy use and improve transport efficiencies. The technologies include laser-enabled roadside light poles, solar and battery-powered electric vehicle charging points, smart bus stops and smart parking tools.

3.6 Limitations & Ethical Considerations

This section addresses the limitations and ethical considerations in the methodology and highlights mitigation measures. Some of these matters relate to the researcher's positionality. It is appropriate to recognise the researcher's influence to understand how the individual influences research, particularly in active methods like interviews. Other matters are the research methods and confidentiality of interview participants.

The researcher's position limits and influences the research. The researcher is an urban planner and heritage advisor with a background in smart cities. This position offers the researcher a greater technical understanding of local government mechanisms and the disciplines as well as enabling them to inquire more deeply and directly into the strategic documents and interviews due to them understanding the likely source of particular phenomena. The researcher also significantly understands the impact of land use planning zoning, historical heritage site designation and overlays, and smart city aspirations, capabilities, and political positioning within local government. Therefore, the researcher's professional understanding could influence the research, through an unconscious favouring of a planning solution or understanding of the Smart Heritage discourse. A limitation is that the researcher is not familiar with the Australian local government system. The lack of Australian experience demands that the researcher assumes similarities between the New Zealand and Australian organisational processes and interpretation of strategic documents to initiate the research, and learn about these matters as the research develops. The researcher is also not familiar with the Aboriginal cultural perspective or the Australian governance structure relating to indigenous matters, which likely impacts the heritage and smart city disciplines as they intersect with these social and cultural issues. The researcher is aware that the Aboriginal peoples and the Australian governance context differ from the New Zealand Māori peoples' experience and Te Ao Māori (Māori world view). Therefore, others can

likely provide greater insight into Smart Heritage's analysis regarding Aboriginal cultural perspectives and issues pertaining to these matters.

Other limitations stem from the methods and are addressed by mitigation measures in the research. All the methods contain the researcher's voice. Therefore, the researcher is to consider mitigation measures. Content Analysis attempts to disconnect the researcher from the data and its creation through the induction of trends and relationships in the data itself. However, this process still requires the researcher to record these trends and relationships, relying on their personal academic, cultural, and contextual understandings. The sample coding of the strategic documents by another researcher for quality assurance mitigates interference by the primary researcher. This mitigation measure follows the industry standard for coding data (Maier, 2017). Also, as the researcher cannot engage the case studies in person due to travel restrictions, their disconnected position arguably reduces bias towards individuals and or specific cases, as personal experiences in the city or the advisor outside of the interviews do not sway the data's recording or analysis.

Furthermore, the public availability of the strategic documents positions the interpretation and coding process within the public sphere for scrutiny, which encourages accuracy. The researcher's voice is more present in Interviews as the researcher determines and asks the questions and responds to the participant. The researcher mitigates their influence by standardising the questions with a pre-set Interview Question Guide, see the guide in the appendices, and offering neutral responses to participants' responses not to agree or disagree or sway a later response. These mitigation measures reduce the likelihood of a "one-way dialogue" where the interviewer actively shapes the participant's responses, rather than leading the participant to questions (Kvale, 2006). The Thematic Synthesis method is less problematic regarding the researcher's voice. It follows a deductive approach, meaning the method consciously leverages summarises, integrates, combines, and compares findings by the researcher to infer cross-case knowledge. Nevertheless, the method requires the researcher to adhere to the transparency of inference by recording the relevant data that construct trends and creating narrow deduction gaps that logically follow (Thomas & Harden, 2008; Hoffmann et al., 2017).

The interviews present ethical considerations to safeguard the identities of the participants. Whilst the researcher refers to the participants under the pseudonyms Smart City Advisor and Heritage Advisor and refer to their local government, these pseudonyms are descriptive. These pseudonyms and references to the organisation are because the setting of local government heavily influences their responses. With this knowledge, the researcher can distinguish this influence and filter it out in the generalised Smart Heritage Principles. It is made clear to the participants that the research is not wholly confidential as their identities are discoverable due to their specific roles in their organisation. The researcher also stored the consent forms from the participants and organisations for the interviews, the audio-recordings and transcripts, and any other information following the Victoria University of Wellington Human Ethics Committee requirements. The Victoria University of Wellington Human Ethics Committee approved the research under application number: 0000028394.

3.7 Chapter Summary

Chapter Three detailed the methodological structure and the approaches and methods in the research. The methodological structure in section 3.2 signposts the structural logic for the research and is in two stages. It features the overarching concepts of Grounded Theory and the Thematic Approach, and the methods of Content Analysis, Interviews, and Thematic Synthesis. The resultant process of the approaches and methods across the two stages firstly collects and distils the data into Key Considerations. It then collects data guided by the Key Considerations and distils it into the Smart Heritage Principles. There are similarities and learning from adjacent research that influences this structure and methods, which the research uses to contextual its inquiry. The research draws on three local governments as case studies; Broken Hill City Council, the City of Melbourne, and the City of Newcastle in Australia. These local governments offer the research data and represent rural, metropolitan, and second-tier cities, offering the research varied exposure to the local government sector. The researcher then discusses the limitations and ethical considerations of the research, including mitigation measures to avoid bias. Overall, the chapter equips the researcher with the methodological tools to address the primary research question, 'how to deliver Smart Heritage within local government?'.

CHAPTER FOUR

STAGE ONE CONTENT ANALYSIS OF SMART CITY & HERITAGE STRATEGIC DOCUMENTS

4.1 Introduction

Chapter Four chronicles the relevant data produced from the Content Analysis on each case studies' strategic smart city and heritage documents. It results from the researcher retrieving the strategic documents from each case study's website for examination, recording, and coding relevant material and components that pertain to the research on Smart Heritage. The chapter's product is raw data in the form of relevant components from the three case studies. The researcher summarises the relevant data from each case study's smart city and heritage strategies, following the schema: Broken Hill City Council, the City of Melbourne, and the City of Newcastle. For each case strategy, the researcher firstly introduces its title, local government, location on the council's website, stated purpose, the period before its review, and relevant associations to other strategic documents within the council. Next, the researcher contextualises the document by describing the challenges and opportunities it addresses in the city and provides an overview of the document's structure. Lastly, the researcher summarises the relevant components that bridge from the document's discipline to the other discipline; for example, in a smart city strategy, from the smart city discipline to the heritage discipline and vice versa in a heritage strategy. These summaries refer to the coded components and draw on the smart city and heritage definitions in Chapter Two and the contextual interpretation of the strategies. The researcher thematically synthesises the resultant data in Chapter Six with additional data from the interviews with the advisors from Chapter Five to produce Key Considerations about Smart Heritage in local government. Refer to Chapter Six for the analysis of the data from this chapter.

4.2 Broken Hill City Council

The first case study is Broken Hill City Council. As stated earlier in Chapter 3, Broken Hill City Council is an outback local government in New South Wales. For this research, the smart city

strategy is the *Broken Hill Digital Strategy* (2017a), and the heritage strategy is *Heritage Strategy 2017-2020* (2016b). The below sections summarise the relevant material and components from these strategies.

4.2.1 Broken Hill Digital Strategy

The *Broken Hill Digital Strategy* (2017a) is by Broken Hill City Council. It is accessible on the website of the council under the 'Other Strategies & Documents' menu. The purpose of the document is to "propose a vision for Broken Hill's future, enhanced by broadband and digital technologies". The strategy has a three-year lifecycle, set for review in 2020. However, this review is yet to be completed at the time of writing in May 2021. It associates with the interdisciplinary and city-wide *Community Strategic Plan* (2017b), which identifies the council's main priorities for ten years, and the *Smart Community Framework* (2017c), which outlines the council's roadmap to become a smart city. The *Broken Hill Digital Strategy* provides the practical components for the aspirations in these associated documents. The strategy contextualises the challenges facing Broken Hill and the opportunities that the smart city discipline offers. It describes that the city is facing "austerity, demographic change, increasing citizen and business expectations, and the need to maintain sustainable services" as Broken Hill's economy shifts from historic mining industries and national urbanisation trends pulls populations away from the outback. However, it frames smart technology as creating opportunities to generate new economic and social opportunities. Specifically, "internet, fixed and wireless broadband, smartphones, social media, the council, big data, sensors, machine-to-machine communication" and machine learning that will "[reinvent] the way we live, work and play". It sees smart technology as delivering "economic development and prosperity through investment and improved productivity for local business, and by capitalising on business expansion, tourism opportunities and attracting new residents".

Regarding the structure of the document, the strategy is 28-pages, containing approximately 7,000-words. The strategy primarily communicates information through text, including bullet points, quotes, and tables; there are few images and graphics in the document. The document uses simple language and avoids references to internal council documents, processes, and legalisation. It, therefore, appears the primary audience for the strategy is the public

and local businesses. The strategy includes an introduction and vision for the city's smart city future, an overview of previous digital innovation in Broken Hill, and a brief discussion of smart technology's nationwide cultural and commercial adoption. It then presents its components across various sections. The strategy defines a "smart community" on page 4 in the introduction. The strategy contains three objectives, stated as 'Key Targets for the Strategy' on page 11. There are nine provisions, titled 'Programs' in a "Digital Strategy Roadmap" on pages 16-17, and 52 initiatives identified as 'project/action' on pages 18-20, which align under the provisions. Inclusive of the 'smart community' definition, there are 65 components in the strategy.

Nine components in the strategy bridge from the smart city discipline to the heritage discipline and are therefore relevant to the research. These relevant components consist of one definition, one objective, one provision, and six initiatives. They represent 13 per cent of the total components in the strategy, 33 per cent of the total objectives, and 11 per cent of both the provisions and initiatives. The smart city definition's "stronger community" is relevant to the heritage discipline's abstractness as it speaks to the shared historical narrative that binds the community. The associated and overarching *Community Strategic Plan* (2017b) supports this contextualised reading as it states, "we are a connected community and enjoy our safety and wellbeing. We keep our heritage alive and relevant; it is the foundation for the way we unite to get things done and maintain our inclusive lifestyle". The definition's emphasis on "businesses and visitors" connects with the subjective valuing of heritage due to the significance of the local heritage tourism industry. The relevant objective is similarly relevant as it discusses tourism. Most of the city's tourism activities revolve around Broken Hill's identity as 'Australia's First Heritage Listed City' and as the founding place of BHP (Broken Hill Proprietary), a global mining company. The relevant provision continues with an abstract connection with the historical city through its emphasis on "community content". The six relevant initiatives confirm the heritage discipline's presence in this novel interpretation of the strategy with explicit references to heritage tourism and historical and outback community contexts. For example, using technology to enhance the historic central business district and installing smart way-finding services promotes historical tourism sites. The other components in the strategy are not relevant as they do not connect with the heritage discipline. Instead, these components discuss digital literacy and

capacities of local businesses and economic opportunities, such as start-ups and retail, accommodation, knowledge services that appear unrelated to heritage.

In summary, *Broken Hill Digital Strategy* by Broken Hill City Council contains nine components that are relevant to the heritage discipline. These components are the smart city definition, objectives, provisions, and initiatives. They connect with the heritage discipline through heritage tourism and community references that contain the unique context of Broken Hill. However, these components are a low proportion of the strategy's overall components, comprising a third of the objectives and a marginal portion of the provisions and initiatives.

4.2.2 Heritage Strategy 2017-2020

The *Heritage Strategy 2017-2020* (2016b) by Broken Hill City Council. It is accessible on the council's website under the menu titled 'Other Strategies & Documents'. The document's purpose is "to provide a summary of strategies that the Broken Hill City Council will employ to guide heritage management for the financial years 2017/2018, 2018/2019, 2019/2020". It closely associates with the *Recommendations for Local Council Heritage Management* from the Office of Environment & Heritage in the New South Wales Government (2013) that states the recording and preservation requirements of historic assets by local governments under the *New South Wales Heritage Act 1977* (1977) and offers guidance. The strategy adopts these recommendations and sets to deliver the city's statutory obligations under state legalisation. The strategy states that Broken Hill is of "outstanding heritage value" for its "significant role in the development of Australia as a modern and prosperous country" through its contributions to mining technologies and industry and its outback social and architectural character. The strategy follows Broken Hill becoming the first National Heritage-listed city in Australia in 2015. Therefore, the strategy identifies that Broken Hill City Council faces the challenge of maintaining and providing for this heritage value and has the opportunity to benefit from its cultural, historical, and other assets.

The strategy is a 17-page document of approximately 3,700 words. It presents most of its information in text form, and there are no graphs and only three images that offer visual supplementation. It appears that the intended audience is council staff and heritage professionals. The structure of the strategy is simple. It features an introduction then nine separate sections, each titled as a 'Recommendation' that addresses a separate matter and contains the strategy's

components. At the end of the strategy, a table summarises the strategy and records the council's implementation progress against each recommendation. The strategy does not define heritage or a similar term. However, the strategy infers adoption of the definitions in the *New South Wales Heritage Act 1977*, as the strategy delivers the statutory requirements of this Act. The Act states that "state heritage significance, in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item". The strategy contains nine objectives, one in each 'Recommendation' section across pages 4-11, and eleven provisions titled 'Aims' under each objective; one recommendation features three aims. There are 46 initiatives titled 'Actions' divided between the individual recommendations, with multiple initiatives under each recommendation and aim. In total, there are 67 components, including the inferred definition.

Eight components in the strategy are relevant to the smart city discipline, consisting of one provision and seven initiatives. These relevant components represent 12 per cent of the total components in the strategy, including zero per cent of the objectives, 9 per cent of the provisions, and 7 per cent of the initiatives. The relevant provision connects with smart city discipline through the smart, or at least online, Broken Hill Heritage Asset Register that reflects the 'smart city as physical technology'. This register records heritage assets and their value to assist in the council's decision making and the community's engagement with conservation efforts through data transparency. The provision also partially reflects the smart city notion as a social solution by supporting council decision-making by emphasising community participation with organisational governance. The seven initiatives are relevant to the smart city as physical technology. They refer to digitalising historical materials on websites and electronic databases and using smart technology to create new or amplified interpretation and way-finding experiences. These initiatives also signal relevancy to the smart city's automatic and autonomous role through the terminology "amplify", "transform", "alert", "activate", and the phrase "immersion in the narrative". The initiatives also support the subjective valuing process through references to using technology to enhance public and visitors experiences at the council's historical assets, such as historical installations and public museums. The other strategy components are not relevant.

They primarily discuss establishing a heritage committee, providing funding for local heritage initiatives and a heritage advisor in the council, and development controls.

In summary, the *Heritage Strategy 2017-2020* by Broken Hill City Council contains eight components relevant to the smart city discipline that connect with the smart city discipline by referring to smart and digital technologies, democratisation processes, and enhancing effectiveness and efficiencies in the council's processes. Numerically, the components are a marginal proportion of the overall components in the strategy and are of low strategic importance in the component hierarchy as they exist in the provisions and initiatives only; the definition and objectives do not contain the smart city discipline.

4.3 City of Melbourne

The second case study is the City of Melbourne. The City of Melbourne is a metropolitan local government in the greater Melbourne urban area. The operative *Council Plan 2017-21* (2019) contains the smart city strategy for the research, and the heritage strategy is the *Heritage Strategy 2013* (2013). The below sections summarise the relevant material and components in these strategies.

4.3.1 Council Plan 2017-21

The *Council Plan 2017-21* (2019) by the City of Melbourne is accessible on the council's website under the 'About Council' and 'Vision and Goals' menus. It is the principal strategic document for the council and provides strategic direction across multiple disciplines, including the smart city discipline. The local government reviews the document yearly and replaces the document every four years. The document associates with the council's ten-year plan, *Future Melbourne 2026* (2016), and directs annual plans, budgets, and other decision-making documents. As a city-wide strategic document, the *Council Plan 2017-21* contextualises the broader challenges facing the City of Melbourne. It states the city requires quality growth that "actively and thoughtfully works together with its citizens". It also identifies the city's evolving nature, stating that "changing demographics, economic shifts, environmental impacts, shifting community and social expectations and growth in technology will affect us all". The strategy anticipates the city is required to upskill its workforce to engage in emerging disciplines, such as smart technologies,

and adopt new increasingly digitalised communication, culture, and economies. However, as Melbourne is the capital of Victoria and a leader in the country's cultural and economic sectors, the strategy is optimistic that the city will capitalise on the opportunities that new technologies will provide. The strategy also notes that the city is "well-positioned to expand its profile on the world stage" through its connections with cities overseas and global influence as a cultural and economic hub for the Australasia region.

The strategy is a 76-page document containing approximately 19,000 words. Due to the considerable length and frequent references to legalisation and internal council processes, the strategy's primary audience are likely council employees and external policy professionals. The strategy's structure first introduces Melbourne and the local government. It then provides an overview of the document's strategic importance and the broader council and planning framework it directs. It then features nine sections detailing separate 'Goals' followed by appendixes. The 'Goals' provide specific subject lenses, like 'A City with an Aboriginal focus'. The strategy's components are within these separate 'Goals' sections, which feature smart city aspects. The strategy does not define a smart city. However, under the header 'Melbourne as a smart city', which refers to the *Council Plan 2017-21* on the council's website, the council defines the smart city discipline. This research adopts this definition for the strategy, "to enhance the aspects of our city that make us uniquely Melbourne, and intelligently prepare for the changing needs of the community, the environment and the economy... That's how a smart city should operate – adopting useful innovation that folds seamlessly into how we live our lives to improve our day-to-day experiences". The strategy contains nine objectives stated as 'Goals', 36 provisions stated as 'Outcomes', and 91 initiatives identified as 'Prioritises'. These components are within the separate sections across pages 16-48. In total, there are 136 components in the strategy.

There are 16 components, including the adopted smart city definition, that connect with the heritage discipline and, therefore, are relevant to this research. These consist of four objectives, three provisions, and nine initiatives. They represent twelve per cent of the total components in the strategy, including 44 per cent of the objectives, eight per cent of the provisions, and ten per cent of the initiatives. Appendix Two presents these relevant components in the strategy with coded text that indicates their relevancy to the heritage discipline. The smart city definition shares

the heritage discipline's abstract quality through the phrase "uniquely Melbourne", as the uniqueness is intangible and innate. The definition also references the community's valuing of needs and experiences, which reflects 'heritage as subjective valuing'. The relevant objectives and initiatives introduce 'heritage as a category' through the specific references to 'Traditional Owners', 'Aboriginal focus', 'Aboriginal and Torres Strait Islander peoples', and 'non-Aboriginal settlement'. These components also highlight the council's governance over heritage entities through demarcating heritage buildings, spaces, and landscapes, and discussing land management and policies. It is noticeable in Appendix Two that these relevant components do not explicitly refer to the smart city discipline, even though the research frames the document as representing the discipline. The seeming absence of the discipline is due to the city-wide scope of the strategy. However, the researcher interprets the smart city discipline through the strategy's contextual lens, which anticipates increasingly digitalised communication, culture, and economies. The other components in the strategy do not refer to the heritage discipline and, therefore, are not relevant for this research. These other components address a broad range of disciplines, such as environmental sustainability, the fine arts, and transportation.

In summary, *Council Plan 2017-21* by the City of Melbourne contains 16 components relevant to the heritage discipline. These relevant components are the definition, objectives, provisions, and initiatives. They connect with the heritage discipline through historically contextual and cultural perspectives, historical narratives such as Traditional Owners and conserving historical assets, and subjective interpretations and valuing of the past.

4.3.2 Heritage Strategy 2013

The *Heritage Strategy 2013* (2013) by the City of Melbourne is accessible on the council's website under the menus 'Building and Development' then 'Heritage and Planning'. The document provides "a framework to ensure the continued protection and enhancement of all the elements of Melbourne's heritage". The strategy has a 15-year life cycle. It delivers the heritage aspirations of the City of Melbourne's ten-year plan, Future Melbourne 2026. The strategy contextualises the local government as a custodian of heritage, which requires "knowing, protecting, integrating and interpreting the city's cultural and natural heritage" and following state and national legalisation. It also states that the City of Melbourne needs to work with partners in the community, the state

government and heritage groups to ensure a legacy remains for future generations. By achieving these outcomes, the strategy predicts heritage will “help sustain the rich and diverse mosaic of Melbourne’s communities” and give “lives meaning and purpose”.

The structure of the strategy is a 32-page document of approximately 8,100 words. It avoids technical jargon, there are no images or graphs, and it does not refer to internal council processes or other strategic documents. It, therefore, appears that the audience of the strategy is the general public and policy professionals. The strategy features a forward, an introduction, a history of Melbourne’s indigenous, colonial, and governmental importance, individual sections containing the strategy’s components, then information on the review and monitoring processes of the strategy and appendices that tabulate the components. The strategy defines heritage through a series of paragraphs on page 6. These paragraphs state that heritage is “the full range of our inherited traditions, monuments, objects and culture...expressed through places – buildings, landscapes, public parks and gardens, infrastructure, monuments, public art and more...[and] heritage is dynamic - what is valued constantly changes as society, culture and memories change... Other aspects of heritage are reflected in culture, traditions, events, stories and memories. This strategy is interested in how these can be shared in order to build public understanding and appreciation of Melbourne’s past, present and future”. It has four objectives, stated as ‘Goals’ and 38 initiatives as ‘Actions’ in the individual sections spread across pages 14-24. There is a total of 43 components in the strategy and no provisions.

Eleven components are relevant to the research as they bridge to the smart city discipline. These components are the heritage definition, one objective, and nine initiatives. They represent 25 per cent of the total components in the strategy and includes 25 per cent and 23 per cent of the total objectives and initiatives in the document, respectively. Appendix Two presents the relevant components from the strategy with coding that identifies the smart city discipline’s connection. The definition is relevant as it shares the notion of automatic and autonomy through framing heritage as ‘dynamic’ and constantly changing. The definition also understands heritage as a social solution and as installations within the city. The objective similarly connects with the smart city as a social solution because it improves wellbeing and community outcomes by documenting and making sure diverse heritage values are understood in the city. The initiatives more directly

connect with smart city discipline as they explicitly refer to physical smart city technologies, such as “new technologies”, and “mobile devices”, and technologies’ automatic and autonomous role in “broad-scale predictive modelling”. These technologies are likely entirely or partially smart, and their autonomous and automated capabilities will likely increase with further technological advancements. These initiatives continue the emphasis on social solutions by emphasising how resourcing ignored heritage narratives addresses community and governance concerns. An initiative reflects the holistic system understanding of the smart city in the mention of an “online heritage places information system”. The other components in the heritage strategy do not refer to the smart city discipline.

In summary, *Heritage Strategy 2013* by the City of Melbourne contains eleven components relevant to the smart city discipline. These components are in all three categories of components: the definition, objectives, and initiatives. They connect with the smart city discipline by recognising dynamic processes, democratising information, and improving the council’s processes with explicit references to smart technology. They represent a significant proportion of the strategy, comprising a quarter of the strategy’s total components.

4.4 City of Newcastle

The third case study is the City of Newcastle, a local government in New South Wales that incorporates most of the Newcastle metropolitan area. The local government operates the *Newcastle Smart City Strategy 2017-2021* (2017) and the *Heritage Strategy 2013-2017* (2014). The below sections summarise the relevant material and components in these strategies.

4.4.1 Newcastle Smart City Strategy 2017-2021

Newcastle Smart City Strategy 2017-2021 (2017) is by the City of Newcastle. It is accessible on the council’s website under the menu ‘Strategy and Actions’. Its purpose is to outline “the key priorities and actions to be delivered by Council in its commitment to leading Newcastle’s transition to a smart and innovative city”. The strategy is one of the multiple documents that deliver the strategic directions outlined in the city-wide *Newcastle 2030 Community Strategic Plan* (2018). The *Newcastle 2030 Community Strategic Plan* guides the strategy to create a “vibrant, diverse and resilient green economy”, “a culture that supports and encourages innovation and

creativity at all levels”, and a “thriving city that attracts people to live, work, visit and invest”. The smart city strategy identifies that the City of Newcastle requires improvements to its operational efficiency, sustainability, local community service, economic development activity, and community inclusion and participation. In particular, the city is facing the challenge to transition its economy away from its fading historical heavy industries base, which includes pivoting the associated industrial assets and workforce to new markets. The strategy sees that smart city technologies can assist in delivering this transition.

The strategy is a 21-page document consisting of approximately 12,500 words. It frequently presents information through images and graphs and, therefore, targets the public, business and research organisations, and policy professionals. The strategy contains an introduction to the city and its surroundings, the planning and governance context that influences the strategy, why Newcastle should become a smart city, and an overview of public consultation that contributed to the strategy. It then features its vision as and definition of a smart city, the council’s role in delivering the vision, then strategies and actions that are the strategy’s components. The strategy contains its definition of the smart city on page 15 that states a smart city is “a convergence of three interconnected statements: 1) a smart city is one that puts the community at its centre, 2) a smart city enjoys smart and digitally connected public and urban infrastructure, and 3) a smart city works to develop a thriving ecosystem to drive innovation and creativity”. The strategy presents six namesake objectives on page 29, then details 24 provisions identified as ‘Key Strategies’, and 108 initiatives titled ‘Actions’ on pages 29-37. There are between four and six initiatives per initiatives. There are 139 components in the strategy.

There are 16 components in the strategy relevant to the heritage discipline, with the definition, one objective, six provisions, and eight initiatives. These components represent eleven per cent of the total components and 16 per cent of the objectives. They also account for 25 per cent of all the provisions and six per cent of the total initiatives. The definition is relevant as it emphasises an abstract quality about the City of Newcastle, through its unique heavy industry past and its innovative character to leverage this past towards new sustainable opportunities. The objective builds on this abstract quality by subjectively valuing public places and the city’s unique amenity. It also highlights the abstract shared personal and collective connections in “new ways

of connecting people”. The provisions and initiatives continue these mentions. These components also introduce mentions of governed entities, such as “council-owned cultural facilities and public buildings” and delineations between the “citizens and council”, and highlight categorisations in “local businesses” and “local cultural production”. The initiatives openly discuss smart city technologies aiding the interpretation of historical significance and heritage place-making.

The *Newcastle Smart City Strategy 2017-2021* by the City of Newcastle contains 16 relevant components to the heritage discipline. These components are in all four categories of the strategy, from the definition to the initiatives, and bridge with the heritage discipline by supporting the city’s historical and cultural narratives and subjective meaning and processes regarding interpretation and place. While the number of relevant components is numerically high, these components represent a small proportion of the overall strategy due to its many lower-level components, representing eleven per cent of its total components.

4.4.2 Heritage Strategy 2013-2017

The *Heritage Strategy 2013-2017* (2014) by the City of Newcastle is accessible on the council’s website under the menus ‘Council’, ‘Forms and Publications’, then ‘Policies, Plans and Strategies’. The purpose of the strategy is to set “a strategic framework to guide Council’s approach to the management of heritage in the Newcastle local government area”. The strategy is operative; however, a review of the document is scheduled, with its replacement arriving in 2021. The strategy associates with the *Newcastle 2030 Community Strategic Plan* (2018); the same city-wide strategic document that directs the council’s smart city strategy; and the *Newcastle Heritage Policy 2013* (2013). The *Newcastle Heritage Policy 2013* “underpins the identification, preservation, conservation, celebration and promotion of the City’s rich cultural heritage, based on the principles of the Burra Charter and best practice”. It also closely aligns with the *Recommendations for Local Council Heritage Management* by the Office of Environment & Heritage in the New South Wales Government (2013), which identifies the statutory responsibilities for managing local heritage by local governments in the state. The strategy contextualises heritage in the city as subject to the broader national trend towards adaptive reuse of historic buildings over demolition, and increasing heritage tourism. For Newcastle, this is relevant as the city seeks to diversify its economy away from heavy industries and leverage its

substantial mass of heritage buildings, sites, and narratives. The council, therefore, sees opportunities to maintain heritage assets for tourism purposes; “the city contains a critical mass of heritage items that offer tourism product, and many of these items are owned or managed by Council”.

The strategy is a 32-page document consisting of approximately 8,000 words. It primarily presents information in text and tables and appears to target council officers and policy professionals as audiences due to frequent references to legalisation and internal council documents. The strategy provides an introduction, then the history of Newcastle, the strategy’s legislative context, the vision for heritage in the city, the emerging challenges and opportunities for heritage, and two sections containing its components. The strategy does not define heritage or a similar term. Instead, it implies the definition from the *New South Wales Heritage Act 1977* (1977) through its close alignment with state legalisation. The Act states that “state heritage significance, in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item”. The strategy features four objectives on page 15, titled ‘Strategies’, and 27 initiatives titled ‘Actions’ on pages 22-27. There are no provisions in the strategy and, in total, 32 components, including the adopted definition of heritage.

Ten components are relevant to the smart city discipline in the strategy. These components are three objectives and seven initiatives. They represent 37 per cent of the total components in the strategy, including 75 per cent of the objectives and 25 per cent of the initiatives. The relevant objectives seek to address the social issues in the city, namely the community’s knowledge of and regard for local heritage. The objectives also discuss physical installations as supporting this outcome. They state that the “council will invest in the promotion and care of these [historical] assets as part of the City’s economic and cultural development”. Within the context of the city’s transition, this investment sees the uplifting of former industrial sites to become efficient and attractive spaces for new sectors and, therefore, likely see new technologies also installed. The relevant initiatives continue with the connections in the objectives. However, they also explicitly mention technologies that direct heritage discipline to converge with the smart city discipline, such as websites, the media, and databases. A notable initiative implies using automated and

autonomous technologies in “high-quality interpretative treatments” due to the local government prioritising the smart city discipline. The other strategy components do not bridge across to the smart city discipline. They primarily discuss conservation practices and council processes and do not refer to technology or other pertinent matters.

In summary, the *Heritage Strategy 2013-2017* by the City of Newcastle features ten components relevant to the smart city discipline. These components are three objectives and seven initiatives. They connect with the smart city discipline through the democratisation of knowledge and participation, and efficiencies and effectiveness of the council’s decision making, with explicit references to smart technologies. These components represent a significant proportion of the strategy’s total components and within each component category.

4.5 Chapter Summary

This chapter summarises the relevant data produced from Content Analysis on the case studies’ strategic smart city and heritage documents. These summaries, along with the data in Chapter Five from the interviews, distil into the Key Considerations for Smart Heritage in Chapter Six that guide the development of the Smart Heritage Principles later in the thesis. This chapter presented the relevant components in each case study’s smart city and heritage strategies that bridge the disciplines.

Broken Hill City Council’s smart city strategy connects with the heritage discipline through heritage tourism and community references that contain the unique historical context of Broken Hill. The case study’s heritage strategy connects with the smart city discipline by referencing smart and digital technologies, democratisation processes, and enhancing the council’s effectiveness and efficiencies. The City of Melbourne’s smart city strategy connects with the heritage discipline through historically contextual and cultural perspectives, historical narratives, and recognising subjective interpretations and valuing of the past. The council’s heritage strategy bridges with the smart city discipline by recognising dynamic processes, democratising information, and improving the council’s efficiencies and effectiveness through smart technologies. The City of Newcastle’s smart city strategy reflects the heritage discipline by containing historical and cultural narratives in the city and subjective meaning and processes regarding interpretation and place.

The City of Newcastle's heritage strategy reversely connects via democratisation of knowledge and participation and efficiencies and effectiveness in the council.

Across all the case studies, the relevant components indicate conceptual convergences between the smart city and heritage disciplines. These convergences suggest there is a theoretical foundation for Smart Heritage existing within the case studies. However, it is notable that the documents do not explicitly recognise Smart Heritage as a conscious discourse in the local governments, and the convergences vary significantly in topics, quality, and quantity across the case studies. The Content Analysis finds that Smart Heritage is present within the local government but unrecognised, resulting in its existence as unstructured and tentative. The next chapter, Chapter Five, reports on the Stage One Interviews with the case studies' advisors.

CHAPTER FIVE

STAGE ONE INTERVIEWS WITH SMART CITY & HERITAGE ADVISORS IN LOCAL GOVERNMENT

5.1 Introduction

This chapter summarises the Stage One Interviews from the three local government case studies. It stems from the researcher conducting one-on-one interviews with a Smart City and a Heritage Advisor from each case study about their interdisciplinary knowledge, discourse, and opportunities regarding Smart Heritage within their local government. The chapter produces raw data in the form of written summaries, which include excerpts from the Interview transcripts as supporting evidence. The researcher presents the summaries from each Interview according to their local government, following the schema: Broken Hill City Council, the City of Melbourne, and the City of Newcastle. In the introduction of each case study, the researcher firstly states whether the advisors work internally for the organisation or are externally contracted and the interviews' date. Due to confidentially reasons, the researcher does not provide further details about the advisors or interviews. The researcher then reports the interview from the Smart City Advisor then the Heritage Advisor, before moving on to the next case study. Each summary presents the distinct aspects of interdisciplinary knowledge, discourse, and opportunities for Smart Heritage, following the structure of the *Stage One Interview Question Guide* in Appendix Three. Insights from the Content Analysis of each local government aids in the contextual interpretation of the responses in the summation of the interviews. Along with the relevant components from Chapter Four, the researcher thematically synthesises these summaries in Chapter Six into Key Considerations about Smart Heritage in local government that direct the later production of the Smart Heritage Principles.

5.2 Broken Hill City Council

In the first case study, Broken Hill City Council, the Smart City Advisor is employed directly by the council. However, the council contracts an external expert as their Heritage Advisor through a state-funded grant scheme. The Heritage Advisor is based in Sydney and travels to Broken Hill a few times a year. The researcher interviewed the Smart City Advisor and the Heritage Advisor separately on the 22nd of May 2020. The below sections summarise these interviews.

5.2.1 Interdisciplinary Knowledge

The Broken Hill City Council advisors reported varied knowledge about the other discipline in their local government. As Quote 1 shows [Q1], the Smart City Advisor gave a thorough explanation of the heritage strategy in the council and the decision-making and regulatory processes, including the outcomes such as conservation, interpretation, and enhancing city-wide cultural narratives in the city. The advisor valued these outcomes for supporting positive economic, tourism, and symbolic governance functions in Broken Hill. When questioned about the source of their knowledge, the advisor said it was because they were also responsible for operational management within the council, including the council's internal heritage operations. The Heritage Advisor admitted that they knew little about the smart city discipline in general and within the organisation [Q2]. In the conversation, the advisor equated the smart city discipline to using digital and online technologies to create efficient services for the council and its citizens, and informative and enjoyable experiences. The advisor's lack of knowledge was due to a personal lack of interest in smart cities.

[Q1] "Interestingly enough, if you talk to our planning department, it would be about conservation. If you talk to someone like me who works in economic development, it's also about how we showcase those heritage buildings... I think it's sort of a multi-layered question because depending on what aspect you're coming from, it is about how you would view and use that strategy." (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q2] "Well, I actually do not know an awful lot. I mean, I actually went and looked it up after you contacted me just to make sure I understood what it was about... There is [a lack of knowledge] for me because I am actually not interested in it per se. I like what it does

and I like seeing it happen, but I have no personal interest in it.” (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

The advisors knew that alignment between the disciplines existed within the local government. However, they were aware that this alignment was not meaningfully captured in strategic documents or operational directives. Instead, this alignment occurred through individuals’ enterprise to deliver projects, which often involves multiple individuals pooling grant funds, expertise, and staff resources. The advisors opportunistically combined smart city and heritage initiatives for local and state government grant applications to meet funding criteria. The Smart City Advisor considered this alignment to be a necessity for the small council to function [Q3]. As the Heritage Advisor’s role was funded through a state grant, the advisor notably appreciated this alignment to deliver the resources required for the small council and was involved in this alignment. However, the Heritage Advisor stated that aligning heritage services with other disciplines within the organisation was outside their contractual and funded obligations [Q4]. However, the advisor was willing to work extended and unpaid hours to align with other disciplines, such as the smart city discipline, to deliver projects that the advisor considered were vital to the city.

[Q3] “In order to pull a project together in a council of this size, we need to have a multi-disciplinary contribution, because otherwise it’s not going to happen and we’re not going to get all the information required.” (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q4] “I’m interested in being strategic. So that’s why I’ve spent a lot of time working with the council setting up projects and trying to get better outcomes for the city as a whole, such as seeking funding and working with other teams. I’ve created a job that’s probably more aligned with the smart city than would normally be the case.” (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

The advisors shared an understanding of how to engage each other and the other discipline in the council. Both relied on personal connections and the small size of the local government to communicate and share knowledge. The Smart City Advisor discussed how the council’s small

building facilities enable direct and unrestricted access to staff across the disciplines [Q5]. For the advisor, this produced an informal communication process where project-specific knowledge was shared regularly amongst other conversation topics and in passing. The advisor accepted this process due to under-resourcing and immediate demands not enabling the establishment or entertainment of lengthy or formal processes. The Heritage Advisor also noted this as the default method of communicating within the organisation [Q6]. As an external consultant who primarily works remotely from Sydney and travels to Broken Hill a couple of times a year, this method occasionally produced inconsistencies in communicating information relating to projects that require heritage input, such as information does not get relayed or recorded. The advisor was philosophical about these shortcomings as they stem from his physical distance from Broken Hill, which neither party could fix. As a result of the inconsistent communication processes, the advisor noted that the delivery and design of projects were regularly slowed or under-designed in the council.

[Q5] “I walk down the stairs with a cup of coffee... I can just set up a meeting and go and do that.” (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q6] “Stuff filters through because someone will say, “did you know that we’re doing that?” And you go, “no, I didn’t”, so you make a phone call, and you’re in. So that’s the communication level... then you find out that the whole project needs advice.” (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

5.2.2 Interdisciplinary Discourse

The advisors from Broken Hill City Council reported a handful of previous convergences between the disciplines. The leading convergence was revitalising the inner city by upgrading the historic precinct and adding places for rest and socialisation away from the outback heat. This initiative addressed the city centre’s declining activity due to new shopping precincts on the town’s outskirts [Q7]. However, the convergence of the smart city and heritage disciplines in the initiative were not explicit or directed. Instead, they were collateral and auxiliary to the revitalisation initiative. The Smart City Advisor installed automatic watering systems, public Wi-Fi, and smart lighting

systems within the historic cultural precinct. While the Heritage Advisor assessed development applications for the technology installations on historic buildings and sites, offering feedback through the statutory process rather than in the initial design phase. The advisors were pragmatic about their limited convergence and potentially missed opportunities for Smart Heritage. Both acknowledged the immediate need to address the population and economic decline within the city and work within the small local government budget [Q8]. Therefore, they prioritised cost-efficient and immediately effective initiatives rather than unknown outcomes from innovative Smart Heritage projects.

[Q7] “Our convergence is about economic uplift and about getting more people to spend more time in the central business district because, for the size of this town, we’ve got a couple of little shopping precincts that have drawn people out of that CBD space.” (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q8] “I see my job as principally to promote the future of Broken Hill because that’s how you conserve the heritage. I mean, anyone can do a paint scheme for a house. That’s easy. It’s the more urgent issue about keeping the population stable, to keep jobs there and tourism on the increase... I think there’s a high level of convergence in that sense even though that’s never been put to me by the council.” (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

The advisors accounted for a nascent discourse between the disciplines within Broken Hill City Council. They were conscious of their different perspectives and requirements and were still developing the language, tone, and subject areas of their interdisciplinarity. The Smart City Advisor described ‘robust conversations’ occurring between the advisors and others in the disciplines. For example, the advisors disagreed on the effects of installing smart bins and advertising within a historic park. The Smart City Advisor pre-emptively installed them but later removed and altered them to adhere to the site’s heritage values on the recommendation of the Heritage Advisor. As a result, the advisors learned to engage more and since worked together to develop a lighting project on historic building facades. Interestingly, the New South Wales Office of Environment and Heritage disagreed with the project, claiming it was unfit for the historic character of the building [Q9]. The advisors had to resort to only using soft white lighting rather

than their preferred coloured and moving projections. These ‘robust conversations’ and shared negative experiences with the state office aided their interdisciplinary discourse and introduced a willingness to negotiate alterations to historic fabric for well-considered and needed social, economic, and urban design outcomes. The Heritage Advisor stated the challenging pressures of the small outback city requires flexibility to heritage management, which may contrast to practices in higher-demand economies like Sydney, to enable projects to be delivered and ultimately protect, conserve, and enhance historic places for the betterment of Broken Hill. The advisor continued to experience pushback from local historical groups and state heritage advisors [Q10].

[Q9] “We’re having a lot of trouble with one particular building with state heritage, because they believe that it will change the way the building looks, even though it’s a lighting and projection project. We’ve got to go down to the minute-ist just detail of every screw and nail... I think convergence gives the opportunity for much more robust conversations, a lot more questions to be asked.” (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q10] “You’ve got to actually weigh up what you’re doing...What matters most is the heritage place actually has a future life and meaning...I certainly clash with the level historical societies and things, who are very, very traditional.” (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

As a result of this nascent interdisciplinary discourse, the advisors adapted their perspective and delivery of their specific disciplines. These adaptations were a greater awareness about the other discipline’s perspective, an inclination to share knowledge and resources, and a political cognisance about working together in the small organisation. The Smart City Advisor realised that the National Heritage Listed city’s heritage value is often the ‘gatekeeper’ to projects’ success as the effects on heritage can unlock local and state funding or block development applications. Therefore, the Smart City Advisor actively sought closer consideration of the implications on heritage early in the design and planning stage of smart city initiatives [Q11]. While already supporting an interdisciplinary discourse due to a multi-disciplinary background, the Heritage Advisor had adapted their delivery approach to the political and financial resource limitations in Broken Hill. The advisor realised the primacy of external funding in dictating the political support

for projects within the council and, therefore, focused on achieving state and national grants as a means to convincing local government officials that a project is viable [Q12]. The reliance on the grant system introduced the Heritage Advisor to a new skillset that, by coincidence, was shared by the Smart City Advisor and offered a financial vehicle to converge the disciplines. The advisor had not previously encountered such centrality of grant funding while working in Sydney or other larger urban centres.

[Q11] “The trigger should be as soon as we go “we got to do something in the CBD” that the heritage of advisors should go “have you thought about this, this, this, and this?” So, there’s a lot of learnings when you introduce a new player, which is the Smart City game.” (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q12] “If I can structure a grant around doing something and get it, then there’s a very high chance that it will actually happen. Then there’ll be someone appointed to do it in the council. The (Smart City Advisor) does all the lodging and the chasing up and she’s really good at that.” (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

5.2.3 Interdisciplinary Opportunities

The Broken Hill City Council advisors discussed opportunities to converge the disciplines that would deliver Smart Heritage in Broken Hill. These included proposed opportunities that were scheduled or discussed in the council and desired opportunities that the advisors considered valuable but had not been proposed to the council. The Smart City Advisor reported a council plan to digitise the art gallery and the outback archive, including offering smart technology to curate heritage narratives. The outback archive is nationally and internationally recognised for its collection of information on the multinational Broken Hill Proprietary Company, which originated in the city. The advisor thought integrating these technologies would be valuable to garner attention for the outback archive and attract tourists to Broken Hill. The Smart City Advisor also discussed the desired opportunity to install smart street lighting city-wide that dim at night when no pedestrians or cars are near [Q13]. The effect would be to emphasise indigenous heritage narratives in the dark night sky.

The advisor recognised that the remote location and small urban scale of Broken Hill provided an opportunity to explore this unique angle of aboriginal heritage. The opportunity to create heritage outcomes from the technology is a novel convergence of smart technology and heritage as smart street lighting typically targets reducing electricity expenditure in cities. The Smart City Advisor further mused on partnering with surrounding local governments to create a ‘dark sky region’ in the greater outback. The Heritage Advisor desired multiple opportunities to economically and culturally support the city through novel Smart Heritage applications. For example, the advisor sought the deployment of smart technology in historic mine sites and buildings around the city for smart technology-curated tours [Q14]. The technology—likely a combination of QR codes, mobile telephone tracking, and automated personalised interpretation software—would register, collect admission fees, guide, and track visitors autonomously through the mines and sites, and automatically unlock and manage historic assets, buildings, and artefacts during and after the tours. This method would enable the vast historic mines and numerous assets to be unstaffed and flexible to seasonal demand, reducing operational costs. The Heritage Advisor also suggested a smart platform to assist tourists in the city, addressing the lack of tourist support services in Broken Hill. In this opportunity, the smart technology would actively monitor tourist’s experience while in Broken Hill through an application or other tracking systems. It would digitally nudge the user regarding local accommodation, museums and galleries, restaurants, and other attractions based on personal information and in a timely manner, when they are near a location or their behaviour indicates an interest. This platform would integrate with other city information feeds and encourage opportunistic and unplanned explorations of historical and civic sites.

[Q13] “One of the big projects would be to change every streetlight, so they dim if no one is walking under them, but they light again when they need to be lit... We’re very much aware of the heritage and the storytelling that comes from the sky. Because [European cultures] join the dots to make the picture, but the indigenous people look at the black spaces in between, so it’s in reverse... That would be a really fantastic project to be able to, to invest in.” (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q14] “The aim would be to have the whole city set up so that you actually can walk around the city with these smart apps and just get the information you need. That’s, I

think, the direction where people are going to head. Replacing the 150 little physical signs around the place is still valid but it's losing validity with technological advancements." (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

The advisors recommended changes to their teams and disciplines to enhance the delivery of Smart Heritage in their council. The Smart City Advisor recommended that the strategic documents and operations become closer aligned to direct staff to converge, and regular meetings between the teams to better facilitate interdisciplinary communication [Q15]. Coincidentally, the advisor was becoming the acting manager of the heritage team the following week and was interested in pursuing these methods. The Heritage Advisor recommended that the council seek extra external funding to support additional staff and financial resources to converge the disciplines. Reflecting on the contractual limitations of their role as an external consultant to only assess development applications, the advisor sought further funds and scope to deliver Smart Heritage officially [Q16]. Currently, the advisor worked outside of contracted hours to converge the disciplines. The advisor also indicated that many of the council's staff, such as the Smart City Advisor, worked long hours and extra funding for additional staff would enable the time and energy for Smart Heritage. However, the reliance on external grants meant that change would only come with more successful grant applications.

[Q15] "We're a small council and have access to each other very easily. But, I think there is a gap between the strategies that need resolution. But, I think it's more operationally that we should be able to do better." (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q16] "Well, [Smart Heritage] is not in my brief at all. It just doesn't exist in it. I am interested in working with others, so I just do it. It's not in the brief of the others to engage with me particularly about those things either, they do when they have to, but there's no agenda that says we all need to coordinate." (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

In addition to these immediate team and discipline changes, the advisors recommended broader changes to their organisation that would improve the delivery of Smart Heritage in Broken Hill City Council. Both advisors recommended that the council establish an organisation-wide formal process for communication and initiative delivery. The Smart City Advisor spoke about how the broader staff in the council regularly communicate on an informal basis due to the small-sized of the organisation but endorsed a more structured approach to align strategic directions [Q17]. The Heritage Advisor similarly recommended a formal structure to improve procedural visibility and accountability on projects [Q18]. Both advisors thought that they could individually improve their communication and processes, formal council-wide processes were required to deliver Smart Heritage at an effective scale.

[Q17] “While we all talk to each other on a day to day basis, we just go about our work. And how we link strategic conversations across departments is an interesting question, which probably the executive leadership team may not have considered.” (Broken Hill City Council, Interview with Smart City Advisor, 22 May 2020)

[Q18] “Well, I think the only way to make it work in a place like Broken Hill is you put two or three people together who have the ability to strategically plan it, and you make them responsible to the general manager directly for its delivery.” (Broken Hill City Council, Interview with Heritage Advisor, 22 May 2020)

5.3 City of Melbourne

The second case study is the City of Melbourne. The council employs both the Smart City Advisor and the Heritage Advisor in-house. The researcher interviewed the Smart City Advisor on the 4th of June 2020 and, separately, the Heritage Advisor on the 21st of May 2020. The below sections summarise these interviews.

5.3.1 Interdisciplinary Knowledge

The advisors from the City of Melbourne reported reasonable knowledge about each other’s discipline. The Smart City Advisor primarily viewed heritage as a means to understand the city through a historical lens, and was aware of planning mechanics such as overlays, historic designations, and protections regarding development [Q19]. The advisor valued the heritage

discipline through their private view that the city should be mindful of cultures and the past. The Smart City Advisor gained their knowledge of the heritage discipline through a work project involving historical planning overlays. The Heritage Advisor was aware of the smart city discipline and its presence in the organisation but reported an unfamiliarity with the recent details of the discipline [Q20]. The advisor drew their knowledge from former employment, which explored Digital Heritage and early-smart city technologies. However, the advisor had not kept updated on the smart city discipline or what new technologies can deliver and was modest in their claim to knowledge.

[Q19] “I know that my fabulous colleague [the Heritage Advisor] has been part of work to understand heritage sites in Melbourne... I know there are lots of planning overlays, which is good for me usually in how it relates to my work.” (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q20] “I know a little bit about [smart cities] but not a huge amount, and I don’t know what’s happening with smart cities in the City of Melbourne at the moment.” (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

The advisors considered that their disciplines were supposedly aligned in the City of Melbourne. This alignment was due to an organisation-wide directive to work across disciplines for delivering outcomes in the city. However, in the council’s operations and their respective strategic documents, the advisors highlighted that the smart city and heritage teams struggled to converge due to the large size of the organisation, different managerial reporting lines, and no endorsed shared initiatives between the teams. The Smart City Advisor stated that the disciplines do not practically align and any alignment is indirect through their disciplines’ benefits spreading through the organisation [Q21]. The Heritage Advisor was aware of early-stage conversations between the teams, but these discussions had ceased. The advisor also reported limited visibility and consideration of other disciplines and teams in internal discussions in the heritage team due to a focused workload [Q22].

[Q21] “The smart city strategy doesn’t deliver anything for the heritage strategy, as far as I know, alignment is not explicit. Smart city for heritage just happens as a result of other

initiatives we do in council.” (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q22] “There’s been beginnings of talks between the teams about where things might go, but that’s about as far as it’s gone...I feel like there are a few obvious places we align, but I haven’t really thought them through.” (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

The advisors were unsure of the process to contact and converge with the other team. The large size of the organisation and regulated internal processes created uncertainty for them. Both advisors had not attempted to contact the other team recently. The Smart City Advisor discussed how the disciplines are in different organisational ‘groups’ in the council’s structure, which required coordination with the respective groups’ managers before convergence can meaningfully occur [Q23]. This coordination demands cognisance of political and operational matters from the advisors to navigate the organisation’s structure. The Heritage Advisor reported scepticism in the organisation about staff formulating new initiatives [Q24]. The councillors held the leadership role and the staff were to implement the direction. As a result of the uncertainty around the formal process to bridge the disciplines, the advisors relied on personal connections and informal routes, such as talking with the other team at council-hosted events or directly emailing each other, then working backwards to gain permission to officiate the convergence.

[Q23] “The City of Melbourne is a really big local government, and there is a lot of coordination that is required, but there’s still a lot of relationship-based activity. So, it’s based on your relationships. Even if there was a process, people don’t necessarily do that.” (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q24] “There’s scepticism about people just coming up with good ideas and then implementing them. I think that probably, to be honest, one of the biggest barriers. It is that everything pretty much needs to be endorsed by counsellors.” (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

5.3.2 Interdisciplinary Discourse

The advisors from the City of Melbourne reported a low occurrence of convergences between the disciplines. Both advisors noted that their workloads focused internally on their team and did not actively seek interdisciplinarity [Q25]. The advisors separately discussed the ‘Melbourne City DNA’ exhibition for Melbourne Knowledge Week, an annual public innovation festival. The exhibition converged smart city and heritage data alongside virtual and augmented reality, and displayed it on a series of interactive screens. It notably exhibited interactivity between aboriginal heritage narratives and planning mechanics in the city. The Smart City Advisor reported collaborations between the teams for managing the location of telecommunication utilities in the historic central city. The advisors worked together to utilise protective planning mechanics for directing the installation of these utilities to more favourable locations. State regulations permit the installation of telecommunication utilities in cities and offer councils little influence in their location otherwise. The Heritage Advisor accounted an ongoing ‘heritage data project’ with the GIS team who are associated with the smart city team [Q26]. The initiative collates the currently dispersed information about heritage places; including location, historical photographs, previous heritage investigations and reports, and planning controls, into a central system that supports development application decisions, strategic decision making, and broader placemaking and community initiatives. As of June 2020, the initiative ended its first year with the retrieval of the required data. The second year builds the digital system to accommodate and manage the data. However, advisors reported only being in the same room as each other once or twice in recent times due to the teams’ particular strategic and operational focuses rather than a lack of compatibility between the disciplines.

[Q25] “If there’s no permission to engage [the heritage team] then I don’t involve them, or like if there’s no benefit for the heritage team then I wouldn’t involve them. But actually thinking about it, maybe some of the work that I’m doing will be helpful for heritage, but I just haven’t had that interface with them.” (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q26] “[The] GIS [team] is pretty stretched, and getting them to do a project with you is pretty tricky. Everything needs some level of kind of endorsement in order to be able to

initiate working together. It's not just "hey, we've got some great ideas" as much as I would love that to be the case." (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

The Smart City and Heritage Advisors reported a Smart Heritage discourse within the council differently based on their individual experiences. The Smart City Advisor did not recognise its notable presence. But, reflecting on the smart city team's mantra for innovation, the advisor welcomed working with the heritage discipline and creating a Smart Heritage discourse. The advisor noted that they often find communication and perspective differences between teams in the council and address non-compatibility through explaining, listening, and compromise to achieve convergence. They would apply this approach to conversing with the heritage team in the future [Q27]. The Heritage Advisor identified a budding discourse due to a base-level of innovation in the council already [Q28]. The advisor held a view that the organisation already had the skills and innovative culture to develop Smart Heritage and the discourse was likely already in effect. However, the council's management was not aware of the discourse yet so it was not recorded or noticed. The advisor pointed to the conversations with smart city-adjacent teams, such as the GIS team, about converging smart technologies and heritage narratives. In the advisor's view, the council would find the discourse if they searched for it.

[Q27] "A discourse just hasn't come up. But I'm sure if I was doing a project, I would involve them. It seems the next smart city testbed will be in the CBD and there's lots of heritage sites there so it might happen." (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q28] "We're doing stuff with the GIS team on visualisation of heritage data, for instance. Now the GIS team officially sit within the smart city team, but we haven't made the leap to a full conversation [with the entire smart city team] yet." (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

The advisors accounted adaptations to their perspective and delivery of their discipline from their few convergences. The Smart City Advisor identified a new appreciation of heritage values, especially in the mundane and intangible. The advisor highlighted an example where they now value a lawn at a historic site [Q29]. Previously the advisor did not consider it historically

important as they did not know its history. From their convergence with the heritage discipline regarding telecommunications and the installation of smart technologies in other historic areas, the advisor also realised the challenges facing historic sites' management with multiple stakeholders. The advisor, therefore, adapted their expectations to the slower timeframe and cultural sensitivities of consultation on heritage matters. This learning curve was initially trying for the advisor as previously they relied on rigid statutory processes with infrastructure initiatives. The Heritage Advisor discussed how the conversations about public programming for the 'Melbourne City DNA' exhibition and encouragement from their manager educated their team of mostly urban planners to understand heritage beyond planning mechanics and development applications [Q30]. Their manager is passionate about communicating heritage to the public in accessible ways, which supported this approach. While still learning, the heritage team reframed their approach to managing heritage by focusing more on interpretation, educational, and contextual processes, than solely through property rights discussions and planning obligations. The Heritage Advisor anticipated this change would take a while to adopt completely.

[Q29] "Whenever I walk past the historic lawn, I'm like, "yeah, that is a heritage site, even though it's just a patch of grass and it is important to keep". So, understanding the past has definitely has helped me conceptualise value in the city." (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q30] "My team is mostly planners. I think that they have broadened out their view of heritage. And I think they don't think a lot about how you communicate heritage to an audience. Like what the gold is in the heritage review? The actually gold is not just the planning control but the dramatic environmental history that tells people the story of what their areas come from." (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

5.3.3 Interdisciplinary Opportunities

The City of Melbourne advisors discussed existing opportunities in the council and personal aspirations to deliver Smart Heritage within their local government. The Smart City Advisor for the City of Melbourne aspired for wide-reaching initiatives across the city. For example, the advisor described an 'intuitive city' heritage system that would monitor public streets and spaces

and ‘reprogramme’ them in real-time to enhance historical meaning and functionality [Q31]. The advisor leveraged this aspiration from existing applications of similar systems by the smart city discipline that reprogrammes public streets to accommodate vehicle demand better, distributing lanes between cars, cyclists, and pedestrians. The Smart City Advisor also proposed revising a previously prototyped mobile application that promoted city tours. The prototyped mobile application followed a basic logic through a short user-questionnaire that identified the promoted tour from a small selection of on the system. However, the advisor considered that smart technology could enhance this mobile application by freely curating tours based on the user’s interests, locational data, and topical civic data feeds, rather than selecting pre-curated routes. Users could also use a ‘free-roam’ mode to direct them to nearby points of interest that intersect with the tour’s narrative. The advisor considered this opportunity to have heritage, educational, and touristic opportunities and offer tours on various subjects. The Heritage Advisor also sought to continue the existing public programming work, in line with the ‘Melbourne City DNA’ exhibition. They would revisit the innovative thinking they did in their previous role, which intersected with Digital Heritage, to enhance how smart technology engages with heritage narratives to aid public discussion on city-shaping. Specifically, the advisor was interested in exploring visualisation, data collection, and data application for archaeological heritage. The advisor considered there would be opportunities for the economic development of archaeological sites and intangible heritage, such as aboriginal narratives, through better visualisation and engagement through smart technology. The advisor found it hard to describe the precise experience and mechanics of such a Smart Heritage initiative [Q32].

[Q31] “My colleagues and I were like, “we need no roads, no gutters. We need to be able to program the road according to the need. Let’s get rid of cars as much as we can. Let’s understand the city better”...I think it would cross over with heritage because it could highlight different heritage spaces and different heritage buildings, and the way that people understand the city.” (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q32] “I feel like I’m so locked down in what we have to do that blue-sky thinking is really tricky for me at the moment. It’s like I only know what I know and I feel like there’s a

whole lot of ways that we could be engaging with technology and people, but I can't even think about what they are at the moment." (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

The advisors then recommended changes to their teams and disciplines to enhance Smart Heritage's delivery in the City of Melbourne. The Smart City Advisor recommended that the teams become more familiar with and knowledgeable about the other to be aware of potential opportunities and share a discourse that facilitates convergence. The advisor specifically noted developing an interdisciplinary culture to achieve this and how, in the past, the teams were not experienced or comfortable at collaborating [Q33]. This lack of interdisciplinary familiarity was evident as the smart city team had not come across the heritage team during their 'pilot mode' when they encouraged collaboration. The Heritage Advisor stated that their team would require greater knowledge about the smart city discipline. In particular, the technical processes and abilities of the discipline, so the heritage team can proactively strategise, plan, and implement Smart Heritage [Q34]. The advisor also reflected on the permissions-based processes that directed the team's workload and recommended that both teams prioritise Smart Heritage internally. By internal prioritisation, it would ideally lead to mutual convergence. Also, one team would not have the capacity to deliver the required two disciplines. Therefore, both teams would have to be actively involved. The advisor considered this internal and shared prioritisation more critical to Smart Heritage's successful delivery than an overarching directive in a strategic document.

[Q33] "The heritage and smart city teams haven't been the best at collaborating. But at least in the time that I've been at the City of Melbourne, it's become much easier to work with different branches. Whereas it seems like before I got there, it rarely happened. I think the culture is a big part of the success of Smart Heritage, perhaps more so than having an official directive to work together in a strategy." (City of Melbourne, Interview with Smart City Advisor, 4 June 2020)

[Q34] "I think it would be great to have someone in that team who has that specific skill set, and then the capability would be there even more... Smart Heritage would need to get bumped up the prioritisation list somehow, in order to justify both sides putting resources into it." (City of Melbourne, Interview with Heritage Advisor, 12 June 2020)

Additionally, the advisors sought broader changes in the City of Melbourne to improve Smart Heritage's delivery further. Both advisors proposed long-term strategic, structural, and physical changes to the organisation. The Smart City Advisor targeted integrating Smart Heritage more explicitly into the overarching *Council Plan*, Chapter Four of this thesis reports this plan, guiding the council's strategic direction and all its disciplines [Q35]. The advisor considered this integration would formalise the Smart Heritage discourse and offer a strategic and validated framework that practical initiatives can deliver. Another option was for executive management in the council to direct a specific Smart Heritage initiative, validating its delivery to staff. The Heritage Advisor sought physical locational changes to the council's teams, specifically, positioning the teams in the same section of a building; currently, they are separate; and under the same director [Q36]. This model would allow for the sharing of knowledge and greater visibility between the teams.

[Q35] "If Smart Heritage was in the Council Plan, then that's a really way to formalise things. Often there are so many things at the City of Melbourne that you don't have to do it if it was a causal thing, but if you did it, your project would run better. Or Smart Heritage was an executive directive, that you must work with this team to do the thing. Either one of those is the best way to achieve outcomes in the long term." (City of Melbourne, Interview with Smart City Advisor, 12 June 2020)

[Q36] "It does sound ridiculous, but I think convergence is definitely easier when you're in the same building and area. I think structurally that makes a big difference. Also, under the same director. Currently, they're different, but they were the same previously." (City of Melbourne, Interview with Heritage Advisor, 21 May 2020)

5.4 Newcastle City Council

The third case study, Newcastle City Council, employs both the Smart City Advisor and the Heritage Advisor in-house. The researcher interviewed the Smart City Advisor on the 30th of June and the Heritage Advisor on the 23rd of May 2020. The below sections summarise these interviews.

5.4.1 Interdisciplinary Knowledge

The Newcastle City Council advisors reported significant knowledge about the other discipline in their local government. The Smart City Advisor was well-versed in the heritage discipline's contextual and subjective processes due to their PhD research into cultural theories and urban sociology, which contains and is adjacent to heritage discourses [Q37]. The advisor considered heritage as a core contributor to their perspective on cities. However, the advisor did not label themselves as an expert in technical heritage matters, such as historical facts or conservation methods, or its discourse. The Heritage Advisor understood the innovative perspective and strategic direction of the smart city discipline in the council and was familiar with some initiatives the smart city team was delivering [Q38]. This knowledge was because the smart city and heritage teams previously shared office space and, therefore, shared knowledge and became familiar with each other's disciplines. The advisor maintained an interest in the smart city discipline due to the resultant shared office space experience and collegial relationship with the Smart City Advisor.

[Q37] "My background is as a cultural theorist; that's my PhD discipline, it's a sub-discipline of urban sociology. So, when I think cities, I think of economies and culture and community. Over the years, I worked in architecture departments, I've worked in social science departments. So, heritage has always been something that's nearby and just over there in everything that I've done." (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q38] "It helps that [the Smart City] team was originally on the same floor as me in council, so I saw them on a daily basis. In simple terms, it's trying to use technology to run council services more efficiently and effectively, and collaborate with the knowledge economy within the city, particularly the university and other non-tech people." (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

The advisors also knew that alignment between the disciplines existed within the City of Newcastle. In the advisors' view, the alignment was evident in their overarching strategic view of how to improve experiences in the city and shared placemaking and community initiatives. The Smart City Advisor discussed that the disciplines strategically align as both considered the past and delivered for the future [Q39]. The advisor considered that history contextualises smart

technology and offers solutions for present-day issues that draw on the past for inspiration. The advisor noted that the disciplines typically share ideas for placemaking and community outcomes and often are grouped to deliver initiatives due to complementary skillsets and views. The Heritage Advisor primarily discussed operational alignment where the disciplines supported each other through shared ambitions to culturally and contextually enrich urban experiences in place and for communities. The advisor found the smart city discipline a useful vehicle to deliver novel interpretation projects alongside, as the technology enables intangible or lost heritage to be rediscovered in the city, such as aboriginal heritage. The common emphasis on sharing knowledge about places in the city with the public drew them together [Q40].

[Q39] “The smart city discipline in the council aligns in the sense that we are trying to create a future city that acknowledges and honours its past and delivers for, in terms of providing the mechanisms through which heritage projects can be realised.” (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q40] “The disciplines are aligned to some extent. I’ve tried to touch a bit of placemaking. We’ve got a placemaking officer as well, and also through the Guraki [Aboriginal Advisory Committee], I’ve got a co-facilitator. Those two officers work very closely doing placemaking initiatives with smart city, and I am learning from them.” (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

The advisors relied on their close familiarity from previously sharing office space in the council to engage each other. While they do not share office space currently, they have no qualms about directly contacting the other to discuss an initiative or idea. Both advisors reported directly contacting the other for projects [Q41]. The Smart City Advisor reported that the smart city team uses agile work methods. However, the council did not implement this method across the organisation. Therefore, the advisor typically tailored their approach to the other teams’ work methods, which was the direct approach in the case of engaging the Heritage Advisor. The Heritage Advisor explained that advisors mostly use informal processes for interdisciplinary interactions [Q42]. For example, they regularly use direct emails and phone calls to test and develop an idea before adopting formal procedures like preparing project briefs and officiating an interdisciplinary project group within the organisation. The advisor considered these processes

suit the size and culture of the organisation, and as the scale of the engagement between the two advisors.

[Q41] “For me to hatch a project with [the Heritage Advisor], I go downstairs and I walk up to his desk, and I say “Hey, can I have a chat?” and we go for a coffee and we hatch a project together. Then if we either like it enough, we craft it through the existing processes.” (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q42] “It’s quite an informal relationship. There is no set fixed meet on a regular basis or anything like that; it is more as things crop up. We mutually talk to each other.” (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

5.4.2 Interdisciplinary Discourse

Regarding interdisciplinary convergences in the City of Newcastle, the advisors recalled numerous existing and past collaborations. Their convergences were primarily on place-making initiatives in conjunction with the Guraki facilitator (an Aboriginal Advisor) and the council’s separate place-making team. The Smart City Advisor described a ‘dual naming project’ that educated communities about English and Aboriginal place names and integrated dual-cultural perspectives into place [Q43]. The advisors worked alongside the Guraki facilitator and Heritage Advisor to deliver digital and augmented reality experiences at these sites. In these experiences, users pressed a button on a signpost or information board to listen to the Aboriginal name and pronunciation of the place, then used their mobile phone to access an online digital or augmented-reality resource where historical narratives are told. The Smart City Advisor proffered technical coding and other digital services for the experiences, while the Heritage Advisor researched the historical content alongside the Guraki facilitator. The Smart City and Heritage Advisors also worked in parallel on a digital twin of Newcastle for the council’s planning team. A digital twin is a high-fidelity representation of real-world phenomena, including its features, systems, and behaviours. The advisors inserted their respective technical inputs to the digital twin to replicate the city’s digital infrastructure and historical features alongside physical features and planning controls. The Heritage Advisor previously supported the smart city team with technical advice for development assessment applications to install smart signage in the historic town centre and

supported the smart city team with historical research services for a mobile application coastal walking tour [Q44].

[Q43] “After many years of effort, we secured with our Geographic Names Board that eight place names in Newcastle would have an indigenous place name... We did a lot of work with our indigenous officer and with the heritage officer around creating some tech that brings to life cultural interpretation of indigenous heritage.” (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q44] “[The place-making officer] gets me involved to help with the heritage background, which can then be used for physical works in the local centre for interpretation. But then also that information can then be used by the smart city team for their apps and so forth.” (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

The advisors recounted a distinct discourse between the disciplines within the council resultant from these numerous convergences. This discourse unmistakably sought a connection between the disciplines and was aided by the advisors’ positive and informal relationship. The Smart City Advisor described how the advisors think along the same lines and circulate ideas between them, which produced shared and intertwined visions for the disciplines [Q45]. There were no philosophical barriers between the disciplines that required their individual management in convergences in the advisor’s view. Instead, the disciplines work together in a singular Smart Heritage discourse. The Smart City Advisor supported this discourse by avoiding jargon, which improved communicative clarity between disciplines. The advisor was aware that the smart city discipline was the newcomer within the organisation and, therefore, it should be considerate of existing perspectives and processes. The Heritage Advisor reported a similar singular discourse between the teams and added that the place-making team is frequently in this discourse as they often share these views. The Heritage advisor noted the ease of communication and fluidity between the disciplines. As the Heritage Advisor was previously the only heritage expert in the council, the advisor considered this emphasised interdisciplinarity in their role [Q46].

[Q45] “It just so happens that [the Heritage Advisor] is a good person and likes to think in a way that is in the spirit of how the smart city team and I want to operate, which is highly collaborative, future-focused, and get it done. We’ve got principles, and they seem

to suit, but there's no ledger where we help them out, and they go, "I owe you one". It's project by project." (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q46] "My role is to keep pushing for heritage by sending out the message to all those teams that heritage is critical to all of them. It's not the only thing, but it is helpful because it gives you a sense of place. You can make money off heritage, it's a benefit, it's marketable, and it's easy to promote." (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

The advisors reported adapting their perspective and delivery of their disciplines due to this interdisciplinary discourse. The Smart City Advisor discussed how a previous Heritage Advisor advocated for the council to consider the past when the council adopted the smart city discipline [Q47]. The advisor said this advocacy influenced their perception of what a smart city is and how it applies to the City of Newcastle context. Aided by their sociological research background, the advisor considered the smart city in this broader subjective and cultural context, including a historical lens, and actively sought convergence between the smart city and heritage disciplines as a result. The Heritage Advisor reported adapting their work to create more relatable and engaging heritage experiences [Q48]. The emphasis on the user-experience by the Smart City Advisor highlighted to the Heritage Advisor the concepts of immersive narratives and usability. The advisor identified how this emphasis breaks from the research-focused and heavily authorised narratives within the heritage discipline. It also advances beyond passive formats of heritage interpretation that the advisor was familiar with, such as non-digital signage, photographs, and plaques.

[Q47] "When I first started, I worked quite closely with one of [the Heritage Advisor's] predecessors. She made sure that when we were building this forward focus narrative for smart cities that there was room in it for the value of the past... We used to have great philosophical discussions with her." (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q48] "Working with the smart city team makes heritage more relatable. It's much more immediate with using immersive technology...I see smart city and place-making as complimenting each other. What I've got from working closely with the place-making

officer is that she very much thinks straightaway of smart city and how can [the smart city advisor] help us. I am now trying to do that.” (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

5.4.3 Interdisciplinary Opportunities

The City of Newcastle advisors discussed opportunities to converge the disciplines that would deliver Smart Heritage in the city. These included proposed opportunities that circulated in the council and unshared yet desired opportunities from the advisors themselves. The Smart City Advisor conferred about an already funded augmented reality experience of historical buildings that automatically pulls digitalised information from civic libraries and collections. The initiative primarily targets visitors to the city, as tourism is a growing sector in Newcastle. The advisor also mentioned the ongoing installations of smart technologies in historic buildings to improve their viability, maintenance, and user experience. These technologies are pedestrian trackers, solar panels, automated building maintenance and heating systems, security features, and Wi-Fi. The advisor noted these technologies were already in the city museum, and the technologies are scheduled to be installed in other civic and tourism buildings in 2020. The Smart City Advisor saw the potential to expand these two initiatives to all historic buildings and public facilities in the city and add greater smart capabilities [Q49]. The advisor ultimately desired to see a comprehensively ‘mediatised environment’ where sites in the city communicate in real-time to improve the user experience, such as more autonomous curation of tours and management of data feeds.

The advisor also recognised the benefit of the additive installation of smart technology across the city. They described how technological advancements and the resultant growth in novel perspectives unveils more ambitious aspirations. Therefore, the continual process of convergence itself was an opportunity. The Heritage Advisor discussed the funded and upcoming redevelopment of the city’s primary bus interchange. The interchange features smart technologies that convey Aboriginal histories and narratives interactively and intuitively throughout the building. These technologies target visitors to the city with upcoming events, commercial offerings, themes, and civic information and are integrated into civic mobile applications and other online platforms. It offers an impactful welcome to the city and builds

awareness and an appreciation of aboriginal culture. The Heritage Advisor also desired to use smart technology to repackage and promote historical collections, buildings, and spaces to new audiences [Q50]. In this instance, smart technology would curate new and attractive experiences to pique new and return visitors' interests. The advisor considered this would address the issue of heritage narratives becoming stale and losing relevancy once audiences know them. When asked about other outcomes; namely economic, historical conservation, governance, and environmental sustainability; the advisor acknowledged that other outcomes were likely possible but could not substantively describe what these would do or look like.

[Q49] "For example, in the museum, we could install something that helps management to understand which exhibitions are well attended, like heat mapping, and where else people go in the museum. So they're getting intelligence on the audience, which helps them to improve their delivery of that product and content." (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q50] "We've got a lot of heritage collections, old buildings, old streets, and places. There's a lot of heritage that people don't really know about or have forgotten, and it needs to be repackaged, promoted, and sold to the local population and visitors. It's about always pushing that bigger picture." (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

The advisors recommended changes to their teams and disciplines to enhance Smart Heritage's delivery in the council. The Smart City Advisor identified that their workload levels were high, restricting both teams' ability to have visibility over opportunities to converge. As a result, they prioritised and focused on internal team tasks rather than engaging with other teams. Therefore, they recommended establishing standardised communication processes, such as regular meetings, and resourcing of dedicated time to deliver Smart Heritage [Q51]. The Heritage Advisor recommended an increase in the heritage team's capacity to serve non-regulatory initiatives, including Smart Heritage initiatives. Until recently, the advisor was the only heritage expert in the council, which restricted their available time to matters outside of their core duties of assessing development applications [Q52]. The advisor also sought support from the council's management and the overarching smart city and heritage strategies to validate the convergences.

The advisor was optimistic that the new heritage strategy, which was under development during the interviews, would improve the prioritisation of interdisciplinary convergence, and another recently hired heritage advisor would help deliver Smart Heritage. Both advisors were also confident that they had sufficient knowledge about the other discipline to recognise opportunities and noted that they could rely on each other to help with advanced matters.

[Q51] “We’ve had plenty of project experience together. Between us, we’ve built up personal relationships. So, there’s no barrier there. I’m not the most techie person in the world, but I have confidence in their technological abilities and knowledge. So, I don’t have any reservations there. It’s more just down to resources, like my own time and work intensity.” (City of Newcastle, Interview with Heritage Advisor, 30 June 2020)

[Q52] “Convergence with other teams just takes time and resources. Until this point, it’s been very much about regulation and development for heritage. Since we do have another heritage officer, it helps, and with this new strategy, I can push a lot more.” (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

The advisors also recommended broader changes in the organisation to enhance the delivery of Smart Heritage in the City of Newcastle. Both advisors stated that structural changes in the organisation would be primarily required [Q53] [Q54]. While the advisors worked well together due to their good relationship, they recommended creating direct links between the team’s management and strategic documents. In their view, the current disconnect in these matters hinders the long-term future and scalability of Smart Heritage in the organisation. Specifically, the Smart City Advisor recommended a flat structure, similar to what the smart city team has, to encourage regular and open communication and visibility lines across the disciplines. The Heritage Advisor recommended that the organisation expands the scope of heritage to incorporate duties outside of the current regulation and land development lens.

[Q53] “Ideally, we would have more flat structures. I am trying to generate these as part of our internal organisational change so that those informal opportunities to share ideas occur at an early stage of concept development when it’s still pliable. So, more opportunities to rub shoulders, it comes down to really.” (City of Newcastle, Interview with Smart City Advisor, 30 June 2020)

[Q54] “Convergence is tricky because, in terms of structure, the only time we meet is at the CEO level. Then immediately, you have a different director and then a different unit manager. From a structural point, it’s making sure our strategies align, which is a fair pick up. I think that’s probably the strongest tool in terms of structurally speaking.” (City of Newcastle, Interview with Heritage Advisor, 23 June 2020)

5.5 Chapter Summary

This chapter summarises the Interviews’ relevant responses with the Smart City and Heritage Advisors in the three case studies. It draws from transcripts that probe the interdisciplinary knowledge, discourse, and opportunities for Smart Heritage in these local governments. These summaries, along with the data from the strategic smart city and heritage documents in Chapter Four, distil into the Key Considerations for Smart Heritage in the following chapter, Chapter Six. These Key Considerations guide the second round of Interviews in Chapter Seven, which produce the Smart Heritage Principles later in the thesis.

In general, this chapter, Chapter Five, records that the advisors recognise the other discipline and some operational alignment between the disciplines. It also records that the advisors converge and discuss the interdisciplinarity between smart city and heritage that indicate a possible foundation on which Smart Heritage could formally establish. However, it identifies there are notable challenges in delivering the discourse within local government contexts. Lastly, it records that the advisors are aware of and aspire for opportunities within their organisations to deliver Smart Heritage. The knowledge, discourses, and opportunities vary between the case studies. However, these broad findings indicate that there are likely cross-case themes in the data that the researcher can utilise as Key Considerations to inform the delivery of Smart Heritage in the sector. The next chapter reports on the Stage One Thematic Synthesis that produces the Key Considerations that inform the later production of the Smart Heritage Principles.

CHAPTER SIX

STAGE ONE THEMATIC SYNTHESIS FOR THE SMART HERITAGE KEY CONSIDERATIONS

6.1 Introduction

In this chapter, the researcher presents four Key Considerations that resulted from the thematic synthesis of the Content Analysis and Stage One Interviews' data from Chapters Four and Five. The Key Considerations are independent descriptive statements that contextualise Smart Heritage in local government, including unknowns, variations, or questions about Smart Heritage's delivery in the case studies. In this synthesis process, the researcher firstly observed the three case studies' Content Analysis and Stage One Interviews summaries for data that create cross case themes. Through an iterative process of grouping similar data and deduction, the researcher then distilled four themes from the data: Recognition, Delivery, Resourcing, and Innovation. These themes created a lens that the researcher uses to describe Smart Heritage's delivery in the case studies in the form of the key considerations. Figure 9 on the following page depicts the thematic synthesis process that produced the Key Considerations. The purpose of the Key Considerations is to direct the Stage Two Interviews in Chapter Seven that gather data on how the local governments deliver Smart Heritage and how to enhance its delivery, informing the Smart Heritage Principles' production in Chapter Eight. The following sections present the four Key Considerations under their respective overarching themes. A sub-section follows each Key Consideration with the thematic evidential data from each case study that supports the formulation of that consideration. There are likely other themes and Key Considerations in the dataset of this research. However, the selected considerations reveal the required knowledge to answer the research questions and guide the development of Smart Heritage Principles.

Figure 9: Visual representation of the Thematic Synthesis process in Chapter Six.

6.2 Key Consideration One: Recognition

The first Key Consideration centres on the theme of Recognition for Smart Heritage within local government. The key consideration is:

Smart Heritage is recognised within each case study, however, there is variation in the qualities of this recognition between the cases.

In this consideration, the researcher deduces knowledge from the Content Analysis and Interviews' data about whether Smart Heritage is present in the case studies and how the local governments recognise Smart Heritage. This knowledge is valuable for the researcher as it establishes an ontological foundation for Smart Heritage within the research, offering a stable basis to answer the primary research question. As a result, this Key Consideration establishes that Smart Heritage is a discourse within local government, but its recognition is not uniform across strategies or operations. This consideration directs the researcher to investigate how different strategic and operational contexts affect Smart Heritage's delivery. The following section presents

this Key Consideration's thematic data, drawing evidence from the Content Analysis and Interviews in Chapters Four and Five, respectively.

6.2.1 Thematic Data

The Content Analysis and Interviews from each local government case study present sufficient data to recognise Smart Heritage in the organisations. In the Content Analysis, the evidential data are the relevant components that bridge between the disciplines in the strategic documents; for example, an objective in a smart city document that enhances heritage knowledge or the preservation of historic buildings. As Figure 10 summarises, the Content Analysis data indicate that Smart Heritage is present within these organisation's smart city and heritage strategies, but the qualities of its recognition vary between the cases. The relevant Interview data are where the advisors recognise interdisciplinary knowledge, processes, initiatives, and discourses between the teams. Chapter Five records multiple instances of where the advisors recognise the discourse. The following paragraphs discuss the data in each case study.

Case Studies	% of Smart Heritage Relevant Components in Strategies		Most Common Location of Smart Heritage in Strategies' Component Hierarchy	Advisor's Preliminary Recognition of Smart Heritage in their organisation
	Smart City Strategy	Heritage Strategy		
Broken Hill City Council	13%	12%	Initiatives	✓
City of Melbourne	12%	25%	Equally Distributed	✓
City of Newcastle	11%	37%	Objectives	✓

Figure 10: Recognising Smart Heritage in strategic documents and operations.

Case Study Data: Broken Hill City Council

In the Broken Hill City Council case study, the *Broken Hill Digital Strategy* (2017a) contains nine components that bridge the smart city discipline and the heritage discipline. The *Heritage Strategy 2017-2020* (2016b) features eight components relevant to the smart city discipline. These components represent 13 and 12 per cent of the total components in these documents, respectively. These components signify a notable and shared Smart Heritage interdisciplinarity between the documents. The strategies also share similar distributions of relevant components

through their component hierarchies. Most of these relevant components are initiatives; six out of nine relevant components in the smart city strategy, and seven out of eight in the heritage strategy are initiatives. This clustering of relevant components in the initiatives infers that Broken Hill City Council recognises Smart Heritage in a low-order practical sense, rather than of high-order strategic importance, in both disciplines. The transcripts from the Interviews with the Broken Hill City Council advisors indicate the presence of Smart Heritage. In the interviews, both advisors discussed converging the smart city and heritage disciplines in their operations. Their knowledge of Smart Heritage, therefore, revolved around these contexts. The advisors often discussed the discourse in the context of the need to work together for the sake of limited staff and financial resources in the local government. Chapter Five includes multiple mentions of this sentiment from the transcripts, notably, the collaborative preparation of external funding grant applications, the inner city revitalisation project, and the no-frills approach to interdisciplinary communication. These transcript excerpts indicate that Smart Heritage exists for the advisors as a means to aid the practical delivery of initiatives.

Case Study Data: City of Melbourne

In the City of Melbourne case study, the smart city strategy, the *Council Plan 2017-21* (2019), contains 16 components relevant to the heritage discipline. The *Heritage Strategy 2013* (2013) features eleven components that are relevant to the smart city discipline. These relevant components represent significant proportions of the documents' total components, 12 and 25 per cent, correspondingly. It indicates that the City of Melbourne substantially recognises Smart Heritage's interdisciplinarity between the disciplines. These documents also share similar distributions of relevant components in their hierarchies, with even volumes from the definition to the initiatives. This distribution infers that the local government's recognition of Smart Heritage is consistent throughout the strategic hierarchy, not clustering in one component category. The Interview data from the City of Melbourne's advisors also show recognition of Smart Heritage in the council. In the Interviews, the advisors were conscious of the other team and discipline in the organisation and considered convergence. They primarily recognised Smart Heritage operating in the council under a broad organisation-wide directive for multi-discipline communication, collaboration, and discourse. Chapter Five records multiple instances of the

advisors identifying convergence in a hypothetical or theoretical sense, such as projecting how they could or are directed to converge through the local government's regulated management processes. While the advisors reported low rates of actual and practical convergence between the disciplines, it is evident that the advisors recognised a theoretical Smart Heritage discourse between the disciplines in the local government through the organisational directives.

Case Study Data: City of Newcastle

The City of Newcastle's *Newcastle Smart City Strategy 2017-2021* (2017) contains 16 components relevant to the heritage discipline, and the *Heritage Strategy 2013-2017* (2014) features ten relevant components to the smart city discipline. At 11 and 37 per cent, respectively, these components indicate a mutual recognition of interdisciplinarity between the strategies. The strategies also share high proportions of their relevant components in their objectives, which shows that the local government recognises the high-order strategic connection between the disciplines. The Interviews with the smart city and heritage advisors in the council reflect this notable convergence of the disciplines. In the Interviews, the advisors were aware of the strategic and operational discourse between the disciplines but were uninformed of Smart Heritage's novelty. However, due to practical benefits in their initiatives, they understood sought to nurture it in strategic documents and operations. While still a fledging discourse in the council, the interviews appeared to encourage the explicit recognition of Smart Heritage between the advisors. Therefore, based on this close working relationship between the advisors, it is arguable that the advisors recognised Smart Heritage in the City of Newcastle.

6.3 Key Consideration Two: Delivery

The second Key Consideration is on the theme of Delivery, targeting how the local governments deliver Smart Heritage in their strategic documents and operations. The key consideration is:

The case studies primarily deliver Smart Heritage through place-making, interpretation and information, and community outcomes.

The researcher distils the Content Analysis and Interview data into a theme that focuses on how local governments currently deliver Smart Heritage, for example, through which expected

outcomes. This knowledge aids the researcher in understanding the process of delivery, which is central to answering the primary research question. The consideration also infers these outcomes as benefits from delivering Smart Heritage within local government due to its delivery, which aids in answering the second additional research question. The data indicate that Smart Heritage currently delivers place-making, interpretation and information, and community outcomes within local government.

The consideration highlights three outcomes: place-making, interpretation and information, and communities. Place-making outcomes strengthen the identity of places in the city, interpretation and information outcomes support the communication of knowledge and meaning about a place or value to the public, and community outcomes enhance the social and cultural values of a place and its connection with specific peoples and identities. The councils emphasise these outcomes differently depending on their strategic and operational needs. The Key Consideration indicates these outcomes are the most effective means to deliver Smart Heritage within councils. This consideration implores the researcher to understand how to leverage these existing outcomes in the delivery of Smart Heritage. The following section discusses the thematic data that supports this Key Consideration.

6.3.1 Thematic Data

The Content Analysis and Interviews' data in the preceding chapters identify how local governments currently deliver Smart Heritage. The Content Analysis' data are the relevant components that characterise an outcome, such as applying a specific contextual lens through which the convergence of the heritage and smart city disciplines occurs. The Interview's data are where the advisors express their understanding of Smart Heritage's outcomes in their organisation. This data supports the deduction that the councils characterise Smart Heritage as currently delivering place-making, interpretation and information, and community outcomes. Figures 11 and 12 summarises what outcomes Smart Heritage delivers across the local governments' strategic documents and interviews. The following sections expand on the data in Figures 11 and 12.

Case Studies	Place-making Outcome		Interpretation and Information Outcome		Community Outcome	
	Smart City Strategy	Heritage Strategy	Smart City Strategy	Heritage Strategy	Smart City Strategy	Heritage Strategy
Broken Hill City Council	✓	✓	✓	✓	✓	
City of Melbourne	✓			✓	✓	
City of Newcastle	✓	✓	✓	✓	✓	✓

Figure 11: What Smart Heritage delivers in the strategic documents' relevant components.

Case Studies	Place-making Outcomes	Interpretation & Information Outcomes	Community Outcomes
Broken Hill City Council	✓	✓	
City of Melbourne			✓
City of Newcastle	✓	✓	✓

Figure 12: What Smart Heritage delivers in the Interview transcripts.

Case Study Data: Broken Hill City Council

In Broken Hill City Council, the *Broken Hill Digital Strategy* (2017a) contains relevant components that emphasise community, interpretation and information, and place-making. The definition refers to building “stronger communities”, while the other relevant components discuss the synergies between building place through local identities and the city’s outback setting and communicating these unique qualities to visitors. The relevant components in the *Heritage Strategy 2017-2020* (2016b) characterise Smart Heritage primarily through interpretation and information outcomes. These outcomes are evident in the way-finding experiences and using technology to improve the public’s access to information. There is a subtle emphasis on place-making in the heritage strategy due to its focus on historic places, sites, and areas. The transcripts from the Interviews with the advisors record a place-making focus in their current convergences with a secondary emphasis on and interpretation and information outcomes. Both advisors reported convergence on the inner city revitalisation initiative, which employs heritage and smart city disciplines to create an attractive cultural precinct based on installing interpretative historical narratives. For example, the advisors’ combined efforts on the projector lighting initiative present

visual narratives about the city. From these transcript excerpts, it is suggested that the advisors characterised Smart Heritage as primarily delivering place-making and interpretation and information outcomes.

Case Study Data: City of Melbourne

In the City of Melbourne case study, the *Council Plan 2017-21* (2019) features relevant components that primarily characterise Smart Heritage concerning delivering community outcomes. The definition emphasises daily experiences and the cultural uniqueness of Melbourne. The other relevant components primarily discuss supporting aboriginal communities by making visible their communities' narratives in the cityscape and the council's operations. There is a minor place-making characterisation through the few mentions of planning controls, such as using smart technology to improve historic buildings' conservation. The *Heritage Strategy 2013* (2013) emphasises interpretation and information outcomes through frequent references to technologies that support understanding the city and its heritage. For example, the objective that seeks that "values are understood and publicly accessible" and the initiatives that deploy an "online heritage places information system" and "broad-scale predictive modelling". The Interview transcripts from the City of Melbourne's advisors' reflect this community characterisation in delivering their roles. Smart Heritage's interdisciplinary encouraged the Smart City Advisor also to consider community value. The advisor came to understand the community value within a visibly mundane but historic lawn in the city due to the heritage disciplines historical contextualisation. The Heritage Advisor' understood the value to the community that heritage controls and planning influence due to the smart city discipline's communicative methods. Therefore, from the transcripts from the interviews, it is possible to deduce that the City of Melbourne advisors characterised Smart Heritage as primarily delivering community outcomes.

Case Study Data: City of Newcastle

The City of Newcastle case study's strategic documents present relevant components that emphasise place-making, interpretation and information, and community outcomes. The *Newcastle Smart City Strategy 2017-2021* (2017) contains a relevant definition that focuses on community outcomes. The relevant initiatives openly discuss aiding the interpretation of

historical significance and heritage place-making. The relevant components in the *Heritage Strategy 2013-2017* (2014) refer to enhancing community values and the sense of place through smart innovations. The strategy also discusses interpretation and information outcomes through websites, the media, databases, and “high-quality interpretative treatments”. The Interview transcripts from the smart city and heritage advisors of the City of Newcastle substantially emphasise these outcomes. In the Interviews, both advisors frequently discussed converging on place-making initiatives to strengthen areas’ identities. These initiatives also frequently featured interpretation tools and sought to enhance aboriginal narratives to support their communities’ identities. The Smart City Advisor explicitly framed their thinking of Smart Heritage around culture and community, drawing on their academic background as a cultural theorist. The Heritage Advisor described fluid and established Smart Heritage processes for delivering place-making initiatives and tandem with the organisation’s aboriginal advisors. Chapter Five features numerous data points from the advisors as characterising Smart Heritage along these lines. Therefore, it is inferred that the advisors understood Smart Heritage as primarily delivering place-making, interpretation and information, and community outcomes for the City of Newcastle.

6.4 Key Consideration Three: Resourcing

The third key consideration is on the theme of Resourcing for Smart Heritage within local government. The key consideration is:

The case studies do not sufficiently resource the delivery of Smart Heritage.

In the formation of this consideration, the researcher connects Content Analysis and Interview data regarding how local governments resource Smart Heritage. The distilling of this knowledge enables the researcher to identify the challenges of delivering Smart Heritage in local governments, aiding the researcher to answer the second additional research question in Chapter One. The studied local governments constrain Smart Heritage’s delivery through deficient processes, financial budgets, and staff restrictions. These deficiencies reflect local government’s existing internal structures, processes, and resourcing of the smart city and heritage teams. This key consideration highlights that resourcing these matters is a core challenge facing Smart

Heritage's delivery. Therefore, it directs the researcher to investigate the severity of these resource challenges and the means to resolve them within the local government.

6.4.1 Thematic Data

The Content Analysis and Interviews contain data on the resourcing of Smart Heritage in local government. The Content Analysis's data are the material and relevant components in the strategies that describe how the local government resources Smart Heritage's delivery, such as delivering Smart Heritage as a core government service or through a targeted initiative delivered by a single council team. The Interview's data are transcript excerpts, where the advisors identify how they resource convergences between the disciplines, including the challenges to this resourcing. The data supports the understanding that resources for Smart Heritage vary across the case studies, as Figure 13 summarises and the following case study data sections explain. However, the councils are generally deficient in their resourcing of Smart Heritage's delivery, primarily through a lack of processes, financial budgets, and staff.

Case Studies	Smart Heritage Resource in the Strategies	Smart Heritage Resource in Operations
Broken Hill City Council	• The city faces “austerity, demographic change, increasing citizen and business expectations, and the need to maintain sustainable services”; • Unclear funding pathways for heritage initiatives and Smart Heritage.	• Reliance on external grant funding; • High staff turnover; • Lack of interdisciplinary processes and communication.
City of Melbourne	• Prioritises smart city funding; • Dedication to resource heritage; • Unclear funding for Smart Heritage.	• Sufficient staff and financial resources; • Confidence in advisors' expert ability to engage Smart Heritage; • Absence of interdisciplinary processes.
City of Newcastle	• Prioritises investing in smart technologies that support culture and heritage; • Dedication to resource heritage; • Implication to fund innovative heritage outcomes.	• Sufficient staff and financial resources in the short-term; • Lack of strategic, structural, and communication processes in the organisation; • Requires additional staff to support Smart Heritage in the long-term.

Figure 13: Summary of Smart Heritage resources in the strategies and operations.

Case Study Data: Broken Hill City Council

The *Broken Hill Digital Strategy* (2017a) in the Broken Hill City Council case study states the city is facing “austerity, demographic change, increasing citizen and business expectations, and the need to maintain sustainable services”. These substantive challenges set the scene for the lack of resourcing Smart Heritage. The relevant components financially align Smart Heritage’s resourcing with the tourism industry, indicating that Smart Heritage would generate income from visitors, new attractions, and system efficiencies, such as the way-finding services that autonomously direct and support tourists. The relevant components in the *Heritage Strategy 2017-2020* (2016b) implies dedicated resourcing by the council due to that statutory obligation under state legalisation to deliver the strategy. However, these components are not sufficiently clear in the resourcing of specific initiatives, such as creating the Broken Hill Heritage Asset Register that digitally records heritage assets and online information databases that support preservation initiatives. The heritage strategy also draws resources from the tourism industry through way-finding and other tourist initiatives. The Interview transcripts with the advisors more directly record the resourcing of Smart Heritage in the council. Both advisors discussed significant financial shortages to converge the disciplines due to the reliance on state grant applications. While the advisors collaborated on these applications, the application process takes substantial resources, and there is a chance of not receiving a grant. The advisors also frequently spoke about the council’s high staff turnover and its impact on sustaining an interdisciplinary Smart Heritage discourse and operations. The Heritage Advisor highlighted how the lack of interdisciplinary processes in the organisation created Smart Heritage communication problems. The transcripts explicitly recorded the financial and staff resourcing challenges facing Smart Heritage’s delivery in Broken Hill City Council. These substantial challenges overshadowed the positive collaborations on state grant applications and enterprise by the advisors to resource Smart Heritage.

Case Study Data: City of Melbourne

In the City of Melbourne case study, the *Council Plan 2017-21* (2019) describes resourcing smart city innovations, such as Smart Heritage, as a priority. It states that the council supports these innovations to ensure that Melbourne maintains its cultural and economic vibrancy. The relevant

components continue this organisational-wide approach to resourcing innovations through broad-scope components. However, the strategy does not explicitly discuss resourcing distinct Smart Heritage initiatives. Instead, the strategy provides mutual support for each discipline's advancement and implies their sharing of resources. The *Heritage Strategy 2013* (2013) states that the city has a custodian responsibility for "knowing, protecting, integrating and interpreting the city's cultural and natural heritage" under state and national legalisation. It indicates that the city will resource the heritage discipline due to these obligations. The components imply the resourcing through explicit references to "online heritage places information system", "broad-scale predictive modelling", "new technologies", and "mobile devices" for the management of heritage. The Interview transcripts suggest the large council has sufficient staff and financial resources. Both advisors were confident of the council's staffing abilities and capabilities to deliver Smart Heritage; yet, the COVID-19-induced uncertainty placed many initiatives on hold in recent months. The advisors did note that a resourcing challenge was the lack of interdisciplinary processes between the disciplines due to their teams' structural separation and the demands to gain managerial approval for convergence. The Heritage Advisor specified the stretched GIS team that hindered their convergence, which showcased limitations for non-approved initiatives. Therefore, this data suggests that Smart Heritage in the City of Melbourne is financially resourced and has sufficient staff skills, but faces procedural challenges that hamper its delivery.

Case Study Data: City of Newcastle

The *Newcastle Smart City Strategy 2017-2021* (2017) in the City of Newcastle case study states that the city requires investment to pivot away from heavy industries and seek a "vibrant, diverse and resilient green economy". It identifies that the council seeks to achieve this by investing in smart technologies that support culture and creativity, read as inclusive of heritage. The high-order relevant components encourage local cultural initiatives and accessing new technologies for creative industries. The initiatives specify smart city investments in council-owned cultural facilities, such as museums. The *Heritage Strategy 2013-2017* (2014) states its obligation to identify, preserve, conserve, celebrate, and promote the city's heritage under the Burra Charter (Australia ICOMOS, 2013) and deliver the city's heritage obligations under the *New South Wales Heritage Act 1977* (1977). These obligations infer resourcing for these outcomes. The relevant

components identify the allocation of this resourcing by the council. Notably, a relevant component directly notes that the “council will invest in the promotion and care of these [historical] assets as part of the City’s economic and cultural development”, which is understood to include Smart Heritage initiatives. The Interview transcripts record that advisors consider there are sufficient financial and staff resources for the anticipated demands of Smart Heritage, specifying the required staff are each other and the place-making and Guraki advisors. However, in the interviews, the advisors highlighted the immediate need for broader procedural support in the organisation, such as support in the strategic documents, structural change in the council to encourage convergence, and formal communication processes. The Heritage Advisor noted their Smart Heritage ability to influence broader organisational change was restricted as their core duties to assess development applications primarily demanded their time and hindered their operational scope. Additional staff resources would be required in the long term to deliver Smart Heritage if processes did not improve. These data points indicate that Smart Heritage in the City of Newcastle requires additional procedural support in the short term and a likelihood for additional staff.

6.5 Key Consideration Four: Innovation

The fourth key consideration concerns the theme of Innovation, specifically how Smart Heritage offers innovation for local government. The key consideration is:

Smart Heritage has the potential to deliver additional innovations for local governments.

The researcher deduces the Key Consideration from the Content Analysis and Interview data that highlight the future trajectory of Smart Heritage in these organisations. These insights enable the researcher to identify how to deliver Smart Heritage in the future. It anticipates Smart Heritage’s growth beyond its current delivery outcomes that the second Key Consideration outline and supports answering the primary research question. The data reveals that Smart Heritage has the potential to deliver additional innovations for local governments. The data identifies pathways for Smart Heritage innovations that build on the cities’ strategic and contextual aims, including distinct heritage and smart city aspirations. Some of these aims

continue the current primary outcomes' delivery, while others explore new topics. This Key Consideration points the researcher to investigate these additional innovations' viability and integrate them into Smart Heritage delivery.

6.5.1 Thematic Data

The Content Analysis and Interviews contain data on the innovation of Smart Heritage in local government. The Content Analysis' data are the sections of the strategies and relevant components that identify potential future directions to deliver Smart Heritage. The Interview's data are transcript excerpts in that the advisors discuss the existing and aspirational opportunities for Smart Heritage in the organisations. The data supports the understanding that additional innovations are available to the local governments beyond the existing initiatives and discourses currently within the organisations. Figure 14 summarises these possible opportunities in the strategies and Stage One Interviews, which the following case study data sections expand on.

Case Studies	Smart Heritage Innovation in the Strategies	Smart Heritage Innovation in Operations
Broken Hill City Council	• Leveraging the city's historic mining and outback identity to support the city's growth; • Signpost potential in-roads into novel heritage tourism applications.	• indigenous heritage outcomes • local business marketing outcomes; • Smart Heritage tourism opportunities in the historic mines.
City of Melbourne	• Upskilling the city's workforce to meet the demands of cultural and economic shifts; • Heritage dynamic and a "rich and diverse mosaic of Melbourne's communities" worth preservation.	• Improving archaeological sites' and intangible heritage's visibility; • 'Intuitive city' heritage system initiative.
City of Newcastle	• The city encourages novel innovations for the city's historical heavy industry assets; • References to cultural production in digital formats; • Direct investment in novel promotional heritage ventures.	• Expanding novel technologies to historic buildings throughout the city; • Creating a 'mediatised environment' in historic buildings through smart technologies; • Promotion of heritage collections and historical narratives through smart technology.

Figure 14: Reference to innovation in the strategies and Stage One Interviews.

Case Study Data: Broken Hill City Council

In the Broken Hill City Council case study, the *Broken Hill Digital Strategy* (2017a) contextualises future innovations as addressing “economic development and prosperity” by “capitalising on business expansion, tourism opportunities and attracting new residents”. The relevant components contextualise this future direction as leveraging the city’s historic mining and outback identity to support the city’s growth, initially through tourism but long-term through using novel technologies and heritage values to attract businesses and remote workers. The attraction of businesses and remote works is a novel innovation. The *Heritage Strategy 2017-2020* (2016b) does contain future innovations in its forward sections. The relevant components of the strategy signpost potential in-roads into novel heritage tourism applications, such as the digitalisation of historical material. However, these applications are not explicitly futuristic or innovative and lack detail. The strategy essentially maintains its emphasis on community, interpretation and information, and place-making outcomes. The Interview transcripts from the Broken Hill City Council advisors highlight innovations for indigenous heritage and local businesses. For example, the Smart City Advisor aspired for a ‘dark sky region’ in the greater outback to leverage the uniqueness of the city’s low-light setting to connect with aboriginal heritage. The Heritage Advisor aspired to use smart technology for historic mine tours and establish a smart platform to assist tourists in the city and support local businesses. These strategies and interviews indicate a future trajectory for Smart Heritage in Broken Hill to support aboriginal and local businesses.

Case Study Data: City of Melbourne

The *Council Plan 2017-21* (2019) in the City of Melbourne case study identifies future innovations as upskilling the city’s workforce to meet the demands of cultural and economic shifts. It states that these novel innovations will maintain the city’s position as a cultural leader in the country and on the world stage. The relevant components explicitly support this future as the definition references “innovation”, supporting its citizens’ lives, and the “uniqueness of Melbourne”. Along with the existing community outcomes for aboriginal people and culture, the other relevant components offer Smart Heritage insights into enhancing cultural narratives in new and brownfield urban development. The data from the *Heritage Strategy 2013* (2013) infers that Smart

Heritage could preserve a legacy for future generations, stating that its heritage is a “rich and diverse mosaic of Melbourne’s communities”. The relevant definition discusses heritage’s future and its dynamism, reflecting the awareness of a civic inheritance for future generations. The other relevant components continue the theme of sustaining the city. Therefore, in the heritage strategy, the relevant components indicate that Smart Heritage can preserve the city for the future. The Interviews with the advisors built on the existing community outcomes and identified new archaeological innovations. The Smart City Advisor aspired for an ‘intuitive city’ heritage system to better connect with and represent different communities in the physically colonial public spaces, which showed consideration for the city’s decolonisation. The Heritage Advisor aspired to use smart technology to improve archaeological sites’ and intangible heritage’s visibility in Melbourne. For the City of Melbourne, the strategies indicate novel workforce and legacy innovations. Simultaneously, the advisors highlighted how Smart Heritage could build upon the community outcomes and expand into archaeological futures.

Case Study Data: City of Newcastle

In the City of Newcastle case study, the *Newcastle Smart City Strategy 2017-2021* (2017) encourages novel innovations that pivot the city’s historical heavy industry assets to new uses. The relevant components frequently reference cultural production as an avenue for the city to improve, such as in digital formats in public spaces. The *Heritage Strategy 2013-2017* (2014) identifies that the future for the city’s heritage is in the adaptive reuse of historic buildings and innovative heritage tourism. The relevant components speak to this future as they direct investment in novel promotional ventures and maintenance of historic assets to support their heritage’s repurposing. The components identify technology as a tool for delivering this future. However, the strategy does not detail exact initiatives. The Interview transcripts offer detail into this future. The Smart City Advisor spoke about expanding the installation of smart technologies in historic buildings across the city. Currently, smart technologies are only in primary heritage buildings. Ideally, the advisor sought that Smart Heritage would create a ‘mediatised environment’ in the city where experiences would continually change based on personal and collective data feeds. The Heritage Advisor aspired for smart technology to widely repackage and promote heritage collections and public but overlooked narratives. Therefore, the strategies and

advisors direct Smart Heritage to seek means for the city to pivot away from its heavy industrial past through repurposing and revitalising historical buildings and heritage collections.

6.6 Chapter Summary

The chapter presents four Key Considerations and evidential data that result from the Thematic Synthesis of the Content Analysis and Stage One Interview data from Chapters Four and Five. The chapter finds the considerations form around the themes of Recognition, Delivery, Resourcing, and Innovation and records evidential data to support these findings. The Key Considerations are descriptive statements that contextualise Smart Heritage in local government. The researcher applies the Key Considerations to direct the Stage Two Interviews with the advisors, summarised in Chapter Seven, which produce the Smart Heritage Principles in Chapter Eight.

The Key Considerations are:

1. **Smart Heritage is recognised within each case study, however, there is variation in the qualities of this recognition between the cases.**
2. **The case studies primarily deliver Smart Heritage through place-making, interpretation and information, and community outcomes.**
3. **The case studies do not sufficiently resource the delivery of Smart Heritage.**
4. **Smart Heritage has the potential to deliver additional innovations for the local governments.**

These Key Considerations guide the Stage Two Interviews with the advisors in the following chapter. The resulting data from the Stage Two Interviews produce the Smart Heritage Principles presented in Chapter Eight.

CHAPTER SEVEN

STAGE TWO INTERVIEWS WITH SMART CITY & HERITAGE ADVISORS

7.1 Introduction

This chapter summarises the Stage Two Interviews with the Smart City and Heritage Advisors from the three local government case studies. It repeats the one-on-one format of the Stage One Interviews summarised in Chapter Five. This second stage of Interviews engages the Key Considerations as subject matter in the discussions to understand, in greater depth, the considerations and how to transition these considerations into practical Smart Heritage Principles that deliver the discourse. In the undertaking of the Stage Two Interviews, the researcher presents the advisors with the Key Considerations, including the thematic data, and questions the advisors on the Key Considerations raised in Chapter Six to produce case-specific knowledge about these central themes. The researcher then requests the advisors to recommend solutions to enhance Smart Heritage's delivery in their local government, asking follow-up questions where necessary. This chapter records their responses in written summaries, which include excerpts from the transcripts as supporting evidence. It presents the responses following the same schema as the earlier interviews: Broken Hill City Council, the City of Melbourne, and the City of Newcastle, and under headers referring to the Key Considerations' themes: Recognition, Delivery, Resourcing, and Innovation. The researcher thematically synthesises the case-specific summaries into generalised Smart Heritage Principles, which guide Smart Heritage's delivery in local government, in Chapter Eight.

7.2 Broken Hill City Council

The researcher conducted the second stage of Interviews with the Broken Hill City Council Smart City and Heritage Advisors on the 9th of December and 17th of November 2020, respectively, approximately six months after the Stage One Interviews. The below sections summarise this second round of interviews concerning the Key Considerations.

7.2.1 Recognition

The Broken Hill City Council advisors confirmed the first key consideration that Smart Heritage was present within Broken Hill City Council. They agreed that Smart Heritage was present through a circumstantial convergence between the strategic documents and informal and unplanned operations. The Smart City Advisor diagnosed Smart Heritage as forming in the council due to the General Manager's Office initiating the smart city discipline in the organisation five years prior [Q55]. These earlier initiatives primarily sought visible smart city technologies in the cityscape, such as smart rubbish bins. While this smart city ambition delivered some small projects quickly, the advisor noted that the council did not recognise the smart city discipline meaningfully in its strategic documents and teams. It subsequently left the discipline poorly integrated into strategies and unaligned with other disciplines like heritage. The Heritage Advisor stated that Smart Heritage quietly became their responsibility for their contracted tenure through the inevitable improvement and adoption of smart technologies in the historic city. However, the advisor noted that Smart Heritage was not in their contracted role nor directed by management, leaving the advisor to define the Smart Heritage discourse and its position between the strategic heritage documents and establish it in the council's operations [Q56].

[Q55] "While the General Manager's Office is going "we want to be a smart city", it probably has not infiltrated into the organisation. Even though he said any project needs to have a smart city element, it has not really infiltrated down into the regular workforce. At a management level, they still want to follow that. And you've seen it, that it's not intrinsically linked through all our policies, protocols, and procedures." (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q56] "The heritage strategy picks up little bits and pieces of Smart Heritage, but it certainly does not deal with it. It was not given to me as a priority or even talked about. I don't think my particular boss knew about the similarities between smart city and heritage. Which is interesting in itself." (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

To resolve the haphazard recognition of Smart Heritage in Broken Hill City Council, the advisors recommended top-down and bottom-up approaches. The Smart City Advisor

recommended formal recognition of Smart Heritage in strategic documents to create leadership from management and councillors from the top-down [Q57]. This approach included the smart city and heritage strategies and other documents, like the Heritage Advisor's recently drafted planning framework for Broken Hill that manages the city's heritage holistically. The Smart City Advisor considered Smart Heritage's inclusion in these documents vital to formalise the discourse in the organisation. The Heritage Advisor was sceptical of the influence that strategies had on the council's recognition of Smart Heritage [Q58]. The advisor discussed the disconnection between strategies and the local politics in the city that typically hold sway. Often strategies are ignored when councillors, management, or the public are not entirely supportive. The advisor supported a bottom-up approach that required enlisting key staff in the organisation to advocate for and manage Smart Heritage's recognition. These key staff would be long-tenured and those more active persons. The Heritage Advisor recommended not specifically recognising Smart Heritage as a new discourse with new demands but instead as an existing, accepted, and practical tool in the community and council. The advisor recommended this approach to naturalise the discourse within the council and the community. The Smart City Advisor was also somewhat supportive of this approach, noting that enterprising individuals at all employment levels influenced the organisation due to the council's small size.

[Q57] "The really interesting thing about this particular council is that there are certain drivers, and then there are certain passengers. Like, some people are driving the bus, and some people just go along for the ride." (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q58] "Big picture plans are often transported into Broken Hill from somewhere and dumped there. They can be extremely successful but it really comes down to the skill of the people who are actually working on them and how open they are to change. However, these projects typically die a natural death when no one takes them on or it loses favour. They lose all the funding for it, and they have to give most of the money back." (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

7.2.2 Delivery

When posed with the second Key Consideration that Smart Heritage primarily delivers place-making, interpretation and information, and community outcomes, the advisors added further examples that supported the prevalence of these deliverables in the Broken Hill context. The Smart City Advisor discussed how the council worked with the state organisations Destination New South Wales and Create New South Wales to attract tourists and remote workers by combining heritage experiences and novel technologies [Q59]. The council promoted the city's historical place and community, and smart technology's information functions as drawcards for tourists and workers. The Smart City Advisor reflecting on the recent impact of the COVID-19 lockdowns, stated that the music and art sector, which takes inspiration from the outback, mining and aboriginal histories, explored digital and innovative technologies to capture and display collections and performances. The library and museum sectors prioritised smart technology to coordinate ticketing, communication, and visits for the first time in their operations. Notably, the advisor discussed how smart technology and the close-knit historical community mutually bound people together socially through the isolating periods of lockdown. The Heritage Advisor confirmed these outcomes were at the core of what Smart Heritage delivered in the city as they aligned with the city's needs [Q60]. The Heritage Advisor also reflected on the lockdown period when interstate travel was banned, noting that Broken Hill received many people passing through the city, but few tourists stopped in the city. The advisor considered this was due to a lack of sense of place. Therefore, the advisor focused their Smart Heritage efforts on this outcome.

[Q59] "Broken Hill has a global appeal, and there are always people here doing sabbaticals and internships and fossicking around doing all sorts of wonderful things... There has been some really good work using technology to draw people to Broken Hill that tells stories in a different way." (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q60] "Place-making, in the end, is what Broken Hill is about because it is rediscovering itself to some extent, particularly as the main street gets emptied and the shopping malls get built. Technology offers us a way to improve our chances by showcasing our past." (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

The advisors recommended that the council focus on Smart Heritage's place-making, interpretation and information, and community outcomes. Considering the resource-tight and socially conservative Broken Hill, the Smart City Advisor thought it was wise to align Smart Heritage's delivery closely with the city's existing needs and initiatives [Q61]. This alignment would allow Smart Heritage to benefit from existing political support and not represent the discourse as introducing new demands and social changes. The Heritage Advisor also suggested that the council continue delivering outcomes but was more enterprising in the approach. The advisor identified the dire need to deliver these outcomes above the current scope and rate to safeguard the city's future [Q62]. The advisor also discussed that the council needs to expand Smart Heritage's focus on online marketing the city and curating its historical attractions, showing its historic place, experiences, and community. The advisor projected that these would then spur further positive economic and other outcomes. However, the advisor conferred that this delivery approach required considerable political support from within the council as it deviated from the current initiatives. With the recent turnover in staff, it was unclear whether this support existed. The advisor stated their greater ambition for the city reflected external-contractor position and Sydney background, and this ambition did not always mesh well with the outback context.

[Q61] "When we go, "we are gonna go fully electronic" with anything, there is quite a bit of resistance from the organisation and community. Slowly that sort of level of resistance is declining. I think it is a cultural change thing when you start going fully electronic in an older community. There might be a longer path of resistance from the community as opposed to if you live in Sydney or Melbourne." (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q62] "Broken Hill has got to reinvent itself to have any chance of survival. It is not a day trip out of Sydney. It is an effort to get to places like Broken Hill; it is deliberate. You're either doing the long haul or you are going there for a reason. So, the way you deliver place-making is vital." (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

7.2.3 Resourcing

The Broken Hill City Council advisors reflected on the absence of sufficient resources for Smart Heritage delivery, especially the significant financial shortages, the council's lack of expertise due to high staff turnover, and interdisciplinary communication problems. These reflections offered further insights into these particular issues. The Smart City Advisor discussed how the organisational silos isolated disciplines and respective strategies in Broken Hill City Council and how staff regularly work outside of the strategies' scope to counteract these silos, but this was an undesirable solution [Q63]. The advisor stated that the *CBD Master Plan*, which directs the inner-city revitalisation initiative, does not directly refer to the smart technology or heritage disciplines. Therefore, the advisor had to seek free Wi-Fi for the historic area outside the plan's scope. The Heritage Advisor detailed how the high staff turnover often left the advisor being the sole staff member throughout a project's lifecycle and decayed political support for initiatives within the council due to a lack of ownership and initiative-specific knowledge [Q64]. The advisor considered it vital to have political support for innovative initiatives, like Smart Heritage, as they typically require the pooling of knowledge, time, and financial resources in the close-knit organisation and community. The advisor described how the limited staff resource for Smart Heritage stretched beyond the council in Broken Hill. For example, the advisor could not find a builder in the city or region to repair the historic mosque and install new technologies due to the required technical skill. The advisor ended up recruiting a builder from Sydney but preferred to hire a local. To the advisor, this exemplified how the high population turnover in Broken Hill impacts the city's ability to sustain relevant technical abilities and deliver innovative projects. The Heritage Advisor accepted the financial limitations on Smart Heritage resulting from the council's reliance on state and external grants. It was not seen as problematic. Instead, the lack of funds was part of the broader and common issues facing rural cities.

[Q63] "The Key Consideration is certainly correct in terms of the limited ability to match smart city and heritage in the council. And in the new heritage strategy, I would confirm that those are still two disparate ideas." (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q64] “On some of the projects, I had five project managers in the three years. They all left. They would try to pick up the pieces, not knowing what to do. It was not even a new direction. It was like, “Oh, how do I make this work? Where are we up to?” Like Humpty Dumpty putting it together.” (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

The advisors recommended solutions that addressed the resource difficulties in Broken Hill. The Smart City Advisor sought to improve communication and interdisciplinary accountability through more explicit internal processes. The advisor recently stepped into a management role after another staff member resigned and recommended allocating essential duties and reporting lines to individual staff members and management for specific Smart Heritage initiatives [Q65]. The advisor also recommended circulating the smart city and heritage strategic documents during their drafting to ensure that the disciplines’ teams have input and understand the shared resourcing requirements. Ideally, the advisor sought to mandate a smart element in every strategy, including the heritage strategy, with a monitoring process such as ‘key performing indicators’ that reports convergence and success. The Heritage Advisor recommended a culture change in Broken Hill City Council, with the result being more active leadership from the council’s management on innovative initiatives like Smart Heritage [Q66]. The advisor preferred this direct leadership style to address immediate communication issues and recommended building a core team that delivered specialised Smart Heritage initiatives. The advisor compared this approach to the more process-driven approach in larger councils, noting how there is no critical mass in Broken Hill City Council to rely on organisational processes. The advisor also recommended that the organisation continue to explore enterprising grant applications to state governments to deliver Smart Heritage creativity. The advisor encouraged the council to explore funding sources by individual staff and sought the pitching of opportunities to management. Once grant applications are successful, the council could fund improved processes, interdisciplinary convergence, and hire and retain staff.

[Q65] “I love the word “accountable”. It is my favourite word in the dictionary. They hear me stomping around the office going “accountable” at least ten times a day... It is about making sure that the right people are on the ground in those conversations in the first

instance. But, to be honest, with linking smart city and heritage, I still think we have a way to go with that.” (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q66] “There needs to be a whole mind-set change at the Council level, and with a new CEO that might happen. I would want a CEO who plugs into the detailed matters as much as the big picture and coordinates it all. It is fine to put a new sign up, but you actually have to make sure all your signs are working.” (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

7.2.4 Innovation

The advisors responded to the fourth Key Consideration that Smart Heritage could deliver additional innovations for local governments. The Smart City Advisor reflected on the shift in the council’s governance since the previous interview at the beginning of their COVID-19 pandemic lockdown. The advisor stated that the council has become more open to technology-led processes and, therefore, more open to novel convergences between disciplines and the smart city [Q67]. Broken Hill City Council had transferred internal and external communications and development application processes online during this period. The advisor was impressed at the speed of this technological adoption and aspired to continue it in the long term for the council’s management and promotion of historic places. The Heritage Advisor stated that there was no shortage of opportunities that Smart Heritage could not serve in the historical context of Broken Hill [Q68]. The city’s historical setting and the constant advancement and ubiquity of smart technology offered all industries and sectors opportunities to intersect with Smart Heritage. To the advisor, the main factor in delivering these Smart Heritage innovations is resourcing. The advisor considered that if the Smart Heritage could become well-known, like the broader smart city discipline, opportunities and innovations would naturally arise.

[Q67] “During COVID, everything that was live suddenly went online, even the indigenous art awards, library services, and everything. And it probably speeded up the use of technology from an organisational point of view. Things that might have taken us ten years to get done suddenly we had done in two months.” (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q68] “There is no shortage of opportunities in Broken Hill for Smart Heritage. I do not think that is a problem. I floated a stack of opportunities when I was up there, and the general manager was interested in all of them. But he had other things to worry about at the time. Some of them are really interesting and innovative. They all require a bit of money, but they were not impossible.” (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

The advisors detailed further opportunities for Smart Heritage in Broken Hill through the Key Consideration’s focused lens. The Smart City Advisor built on the learnings over the COVID-19 lockdowns to add that Smart Heritage could deliver governance outcomes in the future, along with the aforementioned indigenous heritage and local businesses innovative opportunities in Chapter Five. The advisor identified that technology challenges established modes of thinking [Q69]. As a result, the uptake of novel technologies over the lockdown period encouraged the council to think independently about managing heritage rather than relying on the state government for expertise. Drawing on the governance issues regarding the projector lighting of historic buildings initiative as an example, the advisor recommended that the council become more ambitious using technology to tell stories, promote the city, and engage the community. Following this independent line of thinking, the advisor opposed the conservative heritage opinion that solar panels and other new building technologies should not be placed on Broken Hill’s historic buildings due to it detracting from the heritage aesthetic. Instead, historical places should be open to justifiable change. Therefore, the advisor considered that the innovation inherent within the Smart Heritage discourse challenged traditional governance models with novel managerial frameworks. However, the advisor noted that the council would require a significant community education and engagement program to ensure a smooth transition as some local communities and historical organisations were not familiar with recent technologies. The Heritage Advisor recognised the unique relationship between the city and local businesses’ heritage as an opportunity for Smart Heritage to produce beneficial partnerships for the city [Q70]. Using the now-global corporation BHP, formerly the Broken Hill Proprietary Company, as an example, the advisor explained how often large businesses seek partnerships with their founding communities to serve their legacy, public image, or charity. In the advisor’s view, a Smart Heritage partnership with BHP could produce any benefit from Smart Heritage, such as

environmental sustainability or economic and community investment, due to the partnership's modern yet historical lens. The advisor drew inspiration from philanthropic projects in other cities that the advisor worked on and BHP's previous civic donations. Other potential partners were worker unions, which started the first Australian retirement funds and welfare benefits in Broken Hill during the late 1800s. Smart Heritage's opportunity to bridge with larger corporations was a novel proposal to deliver outcomes beyond the small outback council's capacity.

[Q69] "Smart City technology may disrupt heritage or heritage may disrupt smart technology. How will we become this self-sustaining city using smart technology without disrupting the heritage precincts?" (Broken Hill City Council, Interview with Smart City Advisor, 9 December 2020)

[Q70] "Partnerships seem like a good way to encourage innovation and aspire the councils to look for something further beyond their means." (Broken Hill City Council, Interview with Heritage Advisor, 17 November 2020)

7.3 City of Melbourne

The researcher interviewed the Smart City and Heritage Advisors from the City of Melbourne on the 20th and 18th of November 2020, respectively. The following sections summarise this second round of interviews about the Key Considerations.

7.3.1 Recognition

The City of Melbourne advisors stated that the first Key Consideration was correct in that Smart Heritage existed within their organisation. They considered that Smart Heritage was present due to the council's high-level operational organisation-wide dialogue about innovation. However, the strategies and operations do not formally recognise Smart Heritage. The Smart City Advisor reflected on how the City of Melbourne does not have a standalone smart city strategy; it is within the city-wide *Council Plan 2017-21* (2019); and how it hinders explicit convergence between the disciplines [Q71]. However, the smart city team has built an internal brand of interdisciplinarity across the organisation that encourages convergence in operations. The advisor considered that Smart Heritage occurred more in the operations than the strategic documents currently. The Heritage Advisor also discussed the absence of a standalone smart city strategy but the high

prioritisation of the smart city discipline in the organisation's operations. The advisor had attended workshops to input into converging the smart city discipline with others, including the heritage discipline, and was therefore aware of a Smart Heritage discourse in the operations [Q72]. The advisor was not aware of other directions by management or in strategic documents that explicitly bridge these disciplines.

[Q71] "As we don't really have a public-facing smart city strategy, there is not much publicly available between the smart city and heritage, but there's a lot of overlap operationally. It's all based on relationships. It's based on a willingness to work together and know about each other." (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q72] "There's not really a smart city strategy yet, although I went to workshops with the team that was leading its development. We have leadership roles in the organisation about strategy development across all the subject matter experts in the City of Melbourne. So I have been slightly involved in the development of their smart city thinking." (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

The advisors approached the resolution of recognising Smart Heritage through this organisation-wide lens. They recommended that the City of Melbourne, as an organisational entity, recognises Smart Heritage in its strategic documents and operational directives so that all staff become aware of the discourse and can implement it better. The Smart City Advisor recommended that the council direct the smart city and heritage teams to explore their connections during the next smart city strategy draft [Q73]. This exploration would reveal the direct and indirect presence of Smart Heritage in the operations. The advisor thought that recognising the range of convergences would empower those who already deliver Smart Heritage and inform those who currently are not aware of Smart Heritage. The advisor was also conscious not to prescribe the relationship between the smart city and heritage disciplines in the council through one unified approach to avoid limiting practical application and innovation. Instead, the advisor proposed that the smart city and heritage teams independently recognise their relationship and intersection in their distinct strategies and operations. Likewise, the Heritage Advisor recommended explicitly recognising Smart Heritage in strategic documents and

operations and framing its recognition in the organisational context [Q74]. The advisor valued identifying Smart Heritage as a tool that serves existing strategic and operational directions to ensure that the discourse is seen as already authorised within the organisation and practical, rather than an external discourse that requires new resources.

[Q73] “I think Smart Heritage would be two approaches. There would be one for heritage and then one for the smart city. I keep focusing on my little patch of technology, and I realise I have got to go bigger.” (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q74] “It is about recognising Smart Heritage and then investigating the possibilities. But, I feel like it needs to go further than just recognising it. Like, let’s recognise it, then look at what the possibilities are and how you implement Smart Heritage across the council.” (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

7.3.2 Delivery

The City of Melbourne’s advisors reflected on the second Key Consideration that the primary outcomes of Smart Heritage are for place-making, interpretation and information, and community. The advisors agreed that place-making and community outcomes summarise the current role that Smart Heritage has in their local government, especially as the council’s new strategic prioritisation towards aboriginal perspectives in the city and that Smart Heritage will likely be a tool for their uplift and delivery [Q75]. The advisor also mentioned heritage interpretation outcomes through smart technologies as another deliverable of Smart Heritage. The council is consistently looking to deliver new experiences across the city through installations, events, protections, and celebrations. The advisor discussed how novel technologies’ previous applications supported other marginalised communities, such as the rainbow communities, through digital walking tour applications and novel events. The Heritage Advisor also considered that place-making and community outcomes were the most applicable to how the City of Melbourne delivers Smart Heritage [Q76]. The advisor provided an update to the initiative where their team is working with Aboriginal Melbourne and the GIS team to create a 3D mapping layer of aboriginal heritage narratives in the city; this initiative is initially discussed in Chapter Five. This initiative’s progression encouraged the advisor to explore further convergences of

technology and heritage to reshape the intersection of place, community, and their interpretation. There were no other outcomes of Smart Heritage that were evident in the city or organisation for the advisor.

[Q75] “The City of Melbourne acknowledges that culture, art, and heritage plays such an essential part of creating the city that we all know and love. I think it could definitely be more focused for Smart Heritage, and that is coming down the road now, especially with the new Aboriginal focus of the council.” (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q76] “I think Smart Heritage really shows in the implementation of place-making and community outcomes. There definitely is an appetite there.” (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

Guided by the Key Consideration, the advisors recommended how the City of Melbourne could focus on place-making, interpretation and information, and community outcomes in their delivery of Smart Heritage. The Smart City Advisor recommended utilising Smart Heritage’s digital and online perspectives to rebalance the city’s cultural identities, information, and communities. Regarding aboriginal perspectives, the advisor advocated that these experiences should also be permanent fixtures in the city’s experience, not temporal or promotional mobile applications [Q77]. Instead, the council should use technology’s narrative shaping abilities to insert long-ignored perspectives in the city’s digital narrative. It would hopefully encourage more physical changes in the city regarding aboriginal perspectives. The Heritage Advisor recommended that the council target Smart Heritage’s delivery in the upcoming interpretation framework and its initiatives [Q78]. The advisor stated that the framework and initiatives aligned well with Smart Heritage’s outcomes. It would offer Smart Heritage a procedural vehicle while also introducing a fresh approach to interpretation in the city. Through the discussion, it seemed that the advisor had started integrating Smart Heritage into these outcomes in the council since the previous interview.

[Q77] “Digital cannot only be temporal anymore, it needs to be more permanent, which takes a lot more effort, but I think it is worth it. The best would be a combo of IRL [in real life] and URL. You would have both experiences ready for people where they are at

comfort-wise, accessibility wise, and energy-wise.” (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q78] “I’m hoping that next year we have something about developing an interpretation framework, then there is much opportunity for Smart Heritage to be embedded in the development of an interpretive framework. It should build on place-making information transmission and community initiatives that are already happening.” (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

7.3.3 Resourcing

The City of Melbourne advisors considered the third Key Consideration regarding the lack of sufficient resources to deliver Smart Heritage. Both advisors identified that the strategies’ alignment was insufficient to direct meaningful Smart Heritage outcomes. The council’s structure did not offer staff, financial, or procedural pathways between the smart city and heritage disciplines in the operations. The Smart City Advisor discussed how resourcing of innovation requires confidence from multiple levels of the organisation [Q79]. Individuals, particularly non-management staff, were often unable to influence budgets, allocate staff time, or strategic directions. Therefore, cutting-edge innovations that grew naturally between advisors like Smart Heritage were constantly under-resourced. It appeared that the smart city discipline also struggled to gain traction early in its existence within the organisation before it was formally adopted. However, the advisor was confident that the City of Melbourne was on the right trajectory to resource Smart Heritage eventually due to its inclination for innovation and creativity, but was conscious that change takes time to filter through the organisation. The Heritage Advisor similarly focused on the organisation’s size as impacting Smart Heritage’s resourcing [Q80]. Its large size meant that it was difficult for a new discourse to receive attention amongst the various teams and projects. The Heritage Advisor was conscious of the council’s hesitations to fund innovation during the COVID-19 pandemic. However, the advisor stated that financial resourcing was not an issue before the pandemic if there was a good business case. Once Smart Heritage received adequate attention, it would be resourced as there was a strong case for it in the advisor’s opinion.

[Q79] “Smart Heritage isn’t naturally going to occur because at the moment, it is dependent on the individuals in the role and whether they are comfortable in that innovation space. It’s not always going to be a Venn diagram that overlaps, so I think you need explicit intent to make it happen.” (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q80] “It is a really massive organisation. There are just so many people there. I have done a couple of things with the Smart City advisor. But because it’s such a big organisation, there’s probably less of those occurrences compared to when it’s a smaller organisation. Also, there’s so much going on. There is just no slow pace opportunity to kind of explore ideas.” (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

The advisors then discussed solutions to resourcing Smart Heritage in their city. Their responses indicated that change is already occurring that supports resourcing Smart Heritage. The Smart City Advisor stated that the organisation is starting to resource smart technology innovation, such as Smart Heritage, better as management understands the value that smart technology can offer other disciplines. The smart city team aimed to include its discipline in all strategic documents to ensure they provide sufficient and realistic financial, staff, and procedural resources for convergence with the smart city [Q81]. The advisor stressed that this approach is not technologically deterministic in that it will prescribe the forms of technology for each discipline. Instead, their inputs will reimagine solutions to the other discipline’s strategic aims, issues, and initiatives through a smart city lens. The advisor was optimistic that this approach would address the strategic and structural barriers highlighted in their first interview. The Heritage Advisor recommended that the council offer smart city and heritage teams the time, capability, and authority to explore Smart Heritage, understand its specific delivery needs in the organisation, and build processes [Q82]. An official directive for Smart Heritage would supply the required staff and financial resources. The advisor recognised that it would be optimal for the smart city and heritage teams to be structurally under the same director to have a clear inter-team link to support their convergence. It would be unlikely that the council would hire new staff to facilitate convergence, so the advisors would have to create an inter-team process to achieve convergence within their existing duties.

[Q81] “Change is starting to happen. We have a CEO who understands the value that we can deliver. In the organisational structure, we have our internal brand that we are here to help. Now in the strategies that are starting to get written, they are always putting something about digital. Rather than us having a digital strategy, we are in every new strategy or plan that’s written.” (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q82] “I think the key would be time and space for exploration and collaboration because Smart Heritage is not a known field or a known process. Like, we are making it up as we go along, which is really exciting. But I think there also needs to be scope there for that.” (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

7.3.4 Innovation

The advisors next assessed the fourth Key Consideration that Smart Heritage could deliver additional innovations for local governments within the City of Melbourne. The Smart City Advisor spoke about how their team balanced internal aspirations for exploring and delivering innovations in the council and externally serving the public’s known wants and needs [Q83]. The advisor considered place-making as central to how Smart Heritage serves the public currently. However, the advisor aspired for further Smart Heritage ways to insert indigenous cultures and identities in new urban developments and a heuristic testbed for Smart Heritage to explore further unknown opportunities.

Regarding inserting indigenous cultures and identities in new urban developments, the advisor highlighted an example of how authorities demolished sacred ‘birthing trees’ for a road project near Melbourne. Their view was that technology and data could have supported an argument that these trees represent a diminishing indigenous heritage narrative for the region by digitally recording and amplifying their representation and knowledge sharing. The Heritage Advisor valued seeking additional Smart Heritage innovations as the council pursued smart technology in many other disciplines but lacked regarding the heritage discipline. The advisor identified asset management as a promising area for Smart Heritage innovation as the council was struggling to efficiently and effectively balance conservation and promotion [Q84]. However, the advisor found it hard to materialise how this Smart Heritage initiative would function due to a

lack of technical smart city expertise. Nevertheless, the advisor considered it vital to encourage the council towards Smart Heritage innovations, with an eye on asset management, to update the heritage discipline in line with the broader council's innovations.

[Q83] "It is a balance between organisational intent and what the people want. But, we can see that place-making and being connected to each other makes Melbourne so unique. The most important thing that we could do with tech and data is to explore the relationship with the city, and our direction will naturally uncover new opportunities." (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q84] "The heritage team is currently getting our house in order in terms of identification and protection of heritage places. But, there are also many things that we're doing really badly, and one of them is about asset management. I think that there is definitely a huge opportunity there for Smart Heritage to be engaged as we are not utilising it fully." (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

The advisors recommended approaches for the City of Melbourne to deliver additional Smart Heritage innovations. The Smart City Advisor recommended that the council should continue to make visible historical knowledge through converging smart technology and history, with particular awareness to serve underrepresented indigenous cultures [Q85]. The advisor considered that the current focus on place-making would benefit from new knowledge as it will add new narratives into place, enriching the overly place-making outcome. Therefore, it seemed vital that Smart Heritage does not merely rely on known historical narratives for context but actively seeks new knowledge as part of its delivery in the city. The Heritage Advisor recommended that the council seek Smart Heritage innovation by inserting it into other strategic documents [Q86]. The Heritage Advisor was conscious of their limitations to conceptualise and deliver smart technologies, so it prompted a collective approach that leveraged others expert skills. The advisor felt that others could offer novel perspectives on converging smart technology and heritage that the specialised advisors could not perceive. The advisor reflected on the traditional authorised narrative of the heritage discipline and how it could benefit from disruption from the smart city and other disciplines.

[Q85] “If you surface that knowledge, then we can do something about it. Like here is the flood chart, here is the climate chart, here is the indigenous history data set. This is what you need to know about the land that you are occupying or considering developing.” (City of Melbourne, Interview with Smart City Advisor, 20 November 2020)

[Q86] “Across the council, you could use Smart Heritage as a lens by which to look at the other relevant and adjacent strategies and interlinking work. So rather than just saying Smart Heritage connects the smart city to heritage, instead of saying that there is a range of things that Smart Heritage can leverage to deliver across other strategic aspirations.” (City of Melbourne, Interview with Heritage Advisor, 18 November 2020)

7.4 City of Newcastle

The researcher requested further interviews with the Smart City and Heritage Advisors from the City of Newcastle. However, only the Heritage Advisor was available for another interview, and there was no suitable advisor who could speak on smart city issues. The researcher interviewed the Heritage Advisor on the 1st of December 2020. The following sections summarise this interview concerning the Key Considerations.

7.4.1 Recognition

The City of Newcastle’s Heritage Advisor confirmed the first Key Consideration that Smart Heritage is present within their organisation. However, the advisor considered that Smart Heritage only substantially existed in the organisation through operational convergences between the advisors [Q87]. This discourse had been naturally germinating through iterative collaborations between the advisors. Regarding the strategic documents, there was little substantive overlap. The advisor discussed how a new heritage strategy, currently being drafted, directed convergence better between the disciplines by explicitly referring to deploying technology for interpretation. The advisor considered this a substantial step towards formally recognising Smart Heritage as a distinct discourse in the council but was conscious of the need to name the discourse in the document in future revisions. The advisor was reluctant to explicitly recognise Smart Heritage as there was regular criticism from the National Trust of Australia and community groups against technological approaches in the heritage sector. These organisations

preferred traditional signage and ‘pen and paper’ data collection, recording, and promotion methods.

[Q87] “The best way for Smart Heritage currently is through personal relationships between the two teams on the day-to-day. The old heritage policy didn’t acknowledge the smart city but the smart city didn’t exist in Newcastle when it was written. So it didn’t think it’s the smart city’s fault at all. However, the new heritage policy speaks more directly to technology.” (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

While supportive and satisfied with the current advancements for Smart Heritage in the new heritage strategy, the advisor recommended that the council more explicitly recognise Smart Heritage in later strategy reviews. This recognition would be by inserting Smart Heritage in the heritage and smart city strategies and decision making processes to consider as an option [Q88]. The advisor viewed Smart Heritage as a philosophical tool for local governments. In their view, smart technology introduced new perspectives to heritage and vice versa, but they acknowledged that traditional methods also have their place. Therefore, the council should recognise Smart Heritage as an interdisciplinary tool that nudges staff towards novel convergences in strategic documents. The advisor would continue with the recognition of Smart Heritage in their operational work.

[Q88] “You can’t require everything to be Smart Heritage, but it has to be considered. And if it’s not considered, then there has to be an explanation of why not. There could be a perfectly sensible reason why it isn’t considered. But, without having it as a criteria then it gets overlooked and gets forgotten about.” (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

7.4.2 Delivering

The Heritage Advisor then reflected on the second Key Consideration that Smart Heritage primarily delivered place-making, interpretation and information, and community outcomes and agreed that it summarises what the discourse delivers in their council. The advisor specifically considered that place-making is the primary outcome of Smart Heritage currently, with interpretation and community outcomes closely subsequent [Q89]. For example, the advisor

described a mural painting initiative that highlighted place-based narratives across the city and how the Smart City and Heritage Advisors then built augmented reality and historical interpretation experiences on top of the mural initiative. The advisor noted that both the Smart City and Heritage Advisors consciously leveraged the council's and community's attention on adjacent projects in their work and how place-making is a frequent convergence point. Interestingly, the advisor explained a positive feedback loop regarding this process. The advisors and the council would support a place-making initiative and collect social media and footfall data. This data would then further encourage place-making initiatives and provide insights for more effectiveness.

[Q89] "Smart Heritage about engaging the public differently. It is about place-making, but it is also about particularly getting a wider audience. Once you've got their attention, then our role is to inform them of information about the place." (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

Therefore, the advisor recommended that the council frame its understanding of Smart Heritage around delivering the identified outcomes and incorporate a means to learn from the outcomes [Q90]. The council would insert directives in the relevant strategic documents for Smart Heritage, namely their smart city and heritage strategies, that instigate reflection on the council's understanding of smart technology and the past. Such as learning from new perspectives about a historic site's value and its contribution to communities and city experiences. The council would provide data collection and analysis in projects' design to facilitate this reflection and learning process. The advisor considered that in the context of the City of Newcastle, continuing with the current emphasis on place-making, interpretation and information, and community outcomes were the most beneficial path for achieving the city's aims of transiting to innovative and greener industries.

[Q90] "It is about getting feedback about what is popular instead of just doing it. Smart Heritage enables the council to better understand why that place is significant to inform future events or physical works. That way, we can be more responsive to how the community sees its heritage significance." (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

7.4.3 Resourcing

The City of Newcastle's Heritage Advisor considered the third Key Consideration that local governments do not sufficiently resource Smart Heritage's delivery. The advisor reported that their role was limited in the duration of time they could allocate to Smart Heritage, resulting in less than optimal discourse outcomes. In their view, this was the primary hindrance to delivering Smart Heritage in the organisation [Q91]. This limitation was due to their role being created before the smart city discipline was in the council. Therefore, their role prioritised legacy duties, such as assessing development applications, over new duties like Smart Heritage. The advisor accepted this prioritisation of duties within a Heritage Advisor role but did acknowledge that Smart Heritage requires additional staff time to deliver. The advisor discussed feeling torn between traditional more-regulatory duties and innovative promotional, place-making, and interpretative duties. It was implied that the advisor was actively seeking to deliver these old and new duties into their role but was struggling to find sufficient time. The advisor saw comparably more staff, financial, and procedural resources for the smart city team and hoped that the new strategy would utilise them to deliver Smart Heritage.

[Q91] "Resources are probably a constraint. If my whole time was devoted to pushing that angle of smart city and heritage, it would be much more cohesive. But I'm pulled in very, very different directions all over the place." (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

The advisor recommended solutions to resolve the lack of sufficient Smart Heritage resources in the City of Newcastle. The Heritage Advisor noted that their team had recently employed another advisor to alleviate staff pressures, enabling the Heritage Advisor to service innovations like Smart Heritage. However, the workload would still be high, and it was unclear on the political mandate to resource Smart Heritage in the new strategy as it was not explicitly recognised. The advisor, therefore, proposed an innovative solution where their role would be as an enabler within the organisation for Smart Heritage [Q92]. Other teams would curate and deliver the heritage discipline, while the Heritage Advisor would offer high-level guidance and expertise input when required. The advisor aimed to embed the heritage discipline within other teams, including contextual and subjective narratives and a broader understanding of historical

value. With Smart Heritage, the smart city team would take the lead in delivery and utilise their more extensive resources. Philosophically, the advisor sought to make their role redundant as other teams would incorporate heritage within their remits. To the advisor, this approach was the most practical method of increasing the delivery of Smart Heritage in the organisation as it was unlikely that the council would hire additional staff and likely that their traditional duties would remain.

[Q92] “I see myself more as an enabler. My role can be to encourage Smart Heritage outcomes rather than primarily deliver them myself. While I have strong connections with the place-making team, it is more about encouraging it to keep going. It is the aim that I do myself out of a job.” (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

7.4.4 Innovation

The Heritage Advisor then reflected on the fourth Key Consideration that there are additional innovations that Smart Heritage can deliver for local governments. This reflection offered the advisor the chance to materialise Smart Heritage’s future within their city against the two interview rounds’. The advisor was aware that the current inter-team structure and inter-personal relationships with the smart city, place-making, and Guraki Advisors led to a focus on place-making outcomes. However, the advisor was aware that there were other outcomes that Smart Heritage could deliver for the city if the smart city and heritage teams partnered with others in the organisation, for example, the infrastructure team. The advisor conferred that they relied on the smart city team for leadership in forming these partnerships. The smart city team had an organisation-wide mandate to search for opportunities and were personally enterprising [Q93]. The Heritage Advisor was thankful for their leadership in building new relationships and reported an initiative where the smart city team runs a competition between the council’s team to brainstorm future projects.

[Q93] “At the moment, the smart city team have a project where they opened it up to the whole of the council. They have got little groups all over the council who were coming up with innovative ideas. So innovation for new opportunities is already happening. The

smart city team has got massive support from the Lord Mayor down.” (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

The Heritage Advisor finished the interview with recommendations for how Smart Heritage can further innovate in the City of Newcastle. The advisor stated that the council should encourage other teams in the organisation to adopt, innovate, and deliver Smart Heritage in their initiatives beyond the smart city and heritage teams. For example, the advisor pointed to the augmented reality dual naming project, discussed in Chapter Five, as a base example of innovation that was ultimately led by the aboriginal advisors. They recognised further opportunities with the library, art gallery, museum, and theatre teams. The advisor highlighted that the libraries recently acquired professional digital scanning equipment, which encourages exploratory discussions with their staff to identify new opportunities in displaying and promoting their collections [Q94]. The new heritage strategy indirectly supports this approach. However, the advisor said this document still had to balance conservation duties and build trust amongst council staff and the community that technology is not an adverse disruptor in the heritage sector. The advisor closed the interview by reiterating that the council should seek to disperse Smart Heritage across its disciplines to identify and deliver new Smart Heritage innovations that the advisor is currently unaware of or unable to deliver.

[Q94] “The libraries team has just as much historical knowledge and background of the city as me. So they could put something together just as well, and it is about who wants to drive the project. Plus, my remit is always dragged more towards planning and assessments.” (City of Newcastle, Interview with Heritage Advisor, 1 December 2020)

7.5 Chapter Summary

Chapter Seven summarises the Stage Two Interviews with the Smart City and Heritage Advisors from the three local governments. These summaries confirm and reveal insights into the Key Considerations from Chapter Six that guide the production of the Smart Heritage Principles in Chapter Eight.

In general, this chapter, Chapter Seven, confirms that the Key Considerations accurately depict Smart Heritage in the local government case studies. They also importantly confirm that the foundation for Smart Heritage exists within the local governments and there is support from

each discipline for the discourse's delivery. These findings are vital for validating the emergent discourse as a politically and practically viable tool. The chapter also identifies various approaches to deliver Smart Heritage in these organisations. These different approaches stem from each case study's context, reflecting the variety of local governments in the research. These approaches offer the research data for deducing the means to deliver Smart Heritage in local government that are applicable across the case studies. Chapter Eight reports on the Stage Two Thematic Synthesis that distilled the distinct case study data into generalised Smart Heritage Principles.

CHAPTER EIGHT

STAGE TWO THEMATIC SYNTHESIS FOR THE SMART HERITAGE PRINCIPLES

8.1 Introduction

Chapter Eight presents the Smart Heritage Principles that stem from the thematic synthesis of the Stage Two Interviews in Chapter Seven. Smart Heritage Principles are strategic and operational directives that the researcher recommends that local governments adopt to deliver Smart Heritage. There are four Smart Heritage Principles and each principle derives from practical approaches recommended from the case studies. Each principle is independent, but they are collectively recommended for local governments to deliver Smart Heritage. Figure 15 on the following page presents the thematic synthesis process that produced these principles. In this synthesis process, the researcher firstly observes the Stage Two Interviews' data for shared approaches to deliver Smart Heritage. The researcher then forms descriptive statements from the data through deductive refinement. These statements materialise as Smart Heritage Principles through the consideration of all the relevant cross case data. The purpose of the principles is to address the four Key Considerations in Chapter Six and guide councils' delivery of Smart Heritage, therefore, answering the research questions in Chapter One. The principles effectively generalise knowledge for the local government sector from the specific case studies. The following sections present four Smart Heritage Principles under their respective overarching Key Consideration. A sub-section follows each Smart Heritage Principle with the thematic evidential data from each case study that supports that principle's formulation. These principles are presented formally in a stand-alone industry-ready document in Appendix One. The research validates the principles through an additional case study that the thesis reports in Chapter Nine. These principles are the second original contribution to knowledge from this research, the first contribution being the comprehensive Smart Heritage definition in Chapter Two. The principles apply to all local governments, such as those beyond the Australian case studies and internationally.

Figure 15: Visual representation of the thematic synthesis process in Chapter Eight.

8.2 Smart Heritage Principle One: Recognition

The first Smart Heritage Principle is:

Recognise Smart Heritage as a long-term and short-term discourse within strategic documents and operations.

It addresses the Key Consideration that each local government in the research recognises Smart Heritage. However, the local government case studies recognised Smart Heritage in differing contexts, and some recognised it more explicitly than others. Therefore, the principle directs the local government sector to recognise Smart Heritage while also directing them to realise the discourse in their distinct strategic and operational contexts. The principle accepts that Smart Heritage is a discourse that local government can utilise but may not be suitable on every occasion. It directs local governments to apply Smart Heritage in strategic documents and operations, reflecting this research's intention to deliver the discourse in the local government sector practically. Other application contexts are likely external to strategic documents and

operations within the local government, such as political and interpersonal structures. The first principle is valuable for delivering Smart Heritage because it ontologically materialises Smart Heritage as a known and conceptually tactile discourse for local government. As a result, it creates the foundation for councils to deliver, resource, and innovate Smart Heritage in their strategic documents and operations, as the later principles address. The following section summarises the thematic data from the Stage Two Interviews that support this principle.

8.2.1 Thematic Data

The Stage Two Interview transcripts present data that address the recognition of Smart Heritage in local government. The relevant data are the advisors' responses that discuss how local governments recognise the discourse within their strategic documents and operations and improve this recognition. The data confirm that the local governments require explicit direction to recognise Smart Heritage across their strategic documents and operations. As Figure 16 summarises, the case studies currently do not recognise Smart Heritage equally across this format. The data also indicate that the local governments require guidance regarding how to recognise Smart Heritage within their organisations' broader context. The following paragraphs summarise the data about recognising Smart Heritage.

Case Studies	Recognition of Smart Heritage in Strategic Documents	Recognition of Smart Heritage in Operations
Broken Hill City Council	✓	✓
City of Melbourne	×	✓
City of Newcastle	×	✓

Figure 16: Where the local governments recognise Smart Heritage.

Case Study Data: Broken Hill City Council

The Broken Hill City Council advisors' transcripts show that they recognised Smart Heritage faintly within their strategic documents and noticeably within project-specific contexts between them. For example, the Heritage Advisor identified few similarities between the smart city and heritage strategies, such as in the wayfinding components, but pointed out that their manager was not aware of this convergence. The council does not exploit these similarities. Therefore, the advisor was responsible for driving Smart Heritage through operational initiatives without an

overarching strategic framework. The Smart City Advisor also highlighted this disconnect between the strategic direction of the organisation and the operational reality, confirming that the advisors recognise Smart Heritage. The strategies often do not align with the immediate needs of initiatives. It was evident that Smart Heritage's recognition was unequal between the strategies and the operational contexts. To address this issue in the local government, the Smart City Advisor recommended recognising Smart Heritage in strategies to formalise it within the management structure, reflecting a top-down approach. The advisor's recent promotion to management may have influenced this view.

In contrast, the Heritage Advisor preferred enlisting key and long-tenured staff to advocate for Smart Heritage's recognition, leading an operation-first and bottom-up approach that produced an immediate shift in how interdisciplinary the council managed projects. This preference was influenced likely by the advisor's view that Smart Heritage would have to be immediately effective in the city's politics and economy, based on the advisor's experience of temperamental local politics that undermined long-term strategies. These recommendations indicate that there are long-term and short-term approaches to recognising Smart Heritage, even within a case study.

Case Study Data: City of Melbourne

The responses from the City of Melbourne's advisors recorded that they recognised Smart Heritage in their high-level operational organisation-wide dialogue about innovation but did not see it formally materialise in strategies or advisor-level processes and initiatives. The council's Smart City Advisor spoke highly of their internal interdisciplinary brand that supported organisational dialogue between the heritage and the smart city teams, which they felt had started an informal discussion for establishing Smart Heritage in the organisation. However, they could not recognise exactly how the strategies recognised Smart Heritage. It was apparent that the City of Melbourne does not sufficiently recognise Smart Heritage across its strategic documents and operations for its genuine delivery. Following the lead of this high-level strategic dialogue, both advisors recommended that the council look towards councillors and management to integrate Smart Heritage down the organisational-tiers and into the strategic documents and practical operations. Their focus on strategic documents and not on singular initiatives or an individual's

enterprise reflected the significant bureaucratic realities of creating change in the City of Melbourne.

Case Study Data: City of Newcastle

The City of Newcastle's Heritage Advisor's responses confirmed that they recognised Smart Heritage within their collaborative initiatives. Smart Heritage was a primary product of the initiatives with the Smart City Advisor. However, they were not aware that the discourse was novel. The advisors were also yet to see Smart Heritage filter beyond them and into strategic documents. Therefore, Smart Heritage was only recognised in the operations of the council, not in the strategies. Instead of directly rectifying the strategies' absence of Smart Heritage recognition, the Heritage Advisor interestingly recommended an operations-led approach. This approach focused on short-term initiatives that developed and tailored a Smart Heritage discourse for the local context. Through the likely growing success of these initiatives, the advisor aimed to build a case for Smart Heritage to increase its chances of recognition in strategies and the broader city. Therefore, it is evident from the transcript that the City of Newcastle requires a short-term operations approach to recognising Smart Heritage. Overall, the Stage Two Interviews signpost that the Smart Heritage Principle should explicitly direct local governments to recognise Smart Heritage in their strategic documents and operations. However, transcripts also highlight that local governments' political landscapes create different recommended approaches to recognising the discourse, which must be acknowledged.

8.3 Smart Heritage Principle Two: Delivery

The second Smart Heritage Principle is:

Deliver Smart Heritage through place-making, interpretation and information, and community outcomes.

This principle addresses the Key Consideration that the local government case studies primarily deliver Smart Heritage through these outcomes. Therefore, the second principle directs the local government sector towards these outcomes because the local governments currently favour them as the binding-agents for the smart city and heritage disciplines across the strategies

and operations. Other outcomes are present in individual cases. However, the data indicates these specific outcomes as the most valid across the local government sector for optimal Smart Heritage delivery. This principle is valuable for identifying the optimal modes for delivering Smart Heritage in local government. By focusing on these three outcomes, local governments will likely successfully deliver Smart Heritage in their strategic documents and operations. The following section presents the thematic data from the Stage Two Interviews that support this second Smart Heritage Principle.

8.3.1 Thematic Data

The transcripts contain data that address the delivery of Smart Heritage by local governments. The relevant data are the excerpts that discuss how local governments currently deliver Smart Heritage and recommendations to facilitate this delivery. The data confirms that local governments should primarily deliver Smart Heritage through place-making, interpretation and information, and community outcomes as they are the prioritised outcomes for the local governments. Figure 17 shows the order of this prioritisation across the case studies. Some of the local government cases slightly favour particular outcomes over others. The following paragraphs summarise the data regarding delivering Smart Heritage.

Case Studies	Deliver Place-making Outcomes	Deliver Interpretation & Information Outcomes	Deliver Community Outcomes
Broken Hill City Council	1	1	1
City of Melbourne	1	2	1
City of Newcastle	1	2	2

Figure 17: Prioritisation of the selected outcomes of Smart Heritage. The most prioritised: 1; secondary priority: 2.

Case Study Data: Broken Hill City Council

The Broken Hill City Council’s advisors’ data reaffirmed the centrality of place-making, interpretation and information, and community outcomes. These outcomes were core to delivering Smart Heritage as the disciplines experienced alignment between their strategic and operational aims. It was through these outcomes that the advisors engaged each other on the

inner-city revitalisation initiative. The advisors viewed the recent COVID-19 lockdown and impact of tourism confined to New South Wales as further encouragement to focus on novel technological ways to leverage the city's historical identity around place, interpretation and community. It appeared that the Broken Hill Advisors' duties had little else in common and did not see other immediate outcomes for Smart Heritage in Broken Hill. To facilitate Smart Heritage's delivery in their council, their recommendations, therefore, exclusively focused on these outcomes and the immediate need to revitalise the city through them. The Heritage Advisor specifically stated that place-making was essential to the future of Broken Hill. These recommendations indicate that Broken Hill City Council favoured place-making, interpretation and information, and community outcomes in Smart Heritage's delivery.

Case Study Data: City of Melbourne

The City of Melbourne advisors agreed that place-making and community outcomes are the prime modes for delivering Smart Heritage. These outcomes offer the councils the means to insert indigenous knowledge and identities into the city, reflecting the City of Melbourne's current strategic and operational focus. Interpretation and information outcomes were also important, with particular mention of installations, events, and celebrations that bridge the disciplines, such as Melbourne Knowledge Week's aboriginal data exhibition. The advisors could not materially identify other viable outcomes for Smart Heritage. It was evident that Smart Heritage's delivery narrowed to these select outcomes. This focused view was likely due to the advisors' limited experience working with the discourse in their strategic documents or operations. Therefore, in their recommendations for delivering Smart Heritage in their city, both advisors also focused on further delivering these primary outcomes. The researcher's attempts to guide them to consider new outcomes were unfruitful as the discussion was ultimately brought back to these select outcomes by the advisors. The Heritage Advisor directly stated that there were no other Smart Heritage outcomes currently evident in the city or organisation. It was evident that the City of Melbourne favours place-making, interpretation and information, and community outcomes for delivering Smart Heritage.

Case Study Data: City of Newcastle

The responses from the City of Newcastle's Heritage Advisor confirmed how place-making initiatives are the key driver to their interaction with the Smart City Advisor, and from these interactions, interpretation and community outcomes also flow. The mural painting example detailed how place brought the advisors together. The detailed knowledge of how the advisors deliver Smart Heritage through these outcomes supported the researcher's view that these outcomes were essential. Not surprisingly, the advisor recommended that the council continue delivering Smart Heritage through these outcomes, specifically through their convergence with the Smart City Advisor. The advisor was confident that this approach was optimal within the strategic and operational structure of the organisation. From this interview's data, it was clear that place-making outcomes were vital in the delivery of Smart Heritage in the City of Newcastle, and they supported the other outcomes. Therefore, the Stage Two Interviews confirmed that place-making, interpretation and information, and community outcomes were essential to delivering Smart Heritage across the case studies. There were no other viable outcomes for Smart Heritage at this current stage. The resultant Smart Heritage Principle should then direct local governments towards prioritising these outcomes as they are the most viable pathways for delivering the discourse.

8.4 Smart Heritage Principle Three: Resourcing

The third Smart Heritage Principle is:

Resource Smart Heritage with staff, processes, and financial capabilities to achieve delivery and innovation targets.

The third principle addresses the Key Consideration that the local governments in the research do not sufficiently resource Smart Heritage's delivery. In particular, these local governments are deficient regarding adequate processes, financial budgets, and available staff for Smart Heritage. Building on this knowledge, the principle directs the local government sector to scale Smart Heritage's staff time and expertise, internal processes, and financial budgets in accordance with each council's ambition so their delivery of Smart Heritage can be resourced effectively. This principle is valuable for delivering Smart Heritage as it addresses its core

constraints across the local government sector. It highlights and seeks to address the practical restraints in the organisations to improve Smart Heritage's practical delivery. The following section presents the thematic data from the Stage Two Interviews that support this third Smart Heritage Principle.

8.4.1 Thematic Data

The transcripts also contain data that address how the local governments resource Smart Heritage. The relevant data are those that discuss processes, staff, finances, and expertise in the organisations that deliver Smart Heritage, including recommendations for improving these resources' deficiencies. The data confirm that the local governments require direction to resource Smart Heritage adequately, and, as Figure 18 summarises, this direction targets staff, processes, and financial capabilities. The data also indicates that Smart Heritage's resourcing must balance contextual and political resource constraints within organisations due to organisational differences. The following paragraphs summarise the data regarding resourcing Smart Heritage.

Case Studies	Staff Resources	Processes Resources	Financial Resources
Broken Hill City Council	×	×	×
City of Melbourne	×	×	✓
City of Newcastle	×	✓	✓

Figure 18: Smart Heritage's adequate staff, processes, and financial resources across the case studies.

Case Study Data: Broken Hill City Council

The transcripts show that Smart Heritage in Broken Hill City Council relied on the advisor's application and the success of external grant applications. The council's Smart Heritage initiatives were directly affected by staff leaving the organisation, meaning that the council did not have a stable workforce to ensure continuity of the tentative Smart Heritage discourse or hold long-term institutional knowledge. It appeared that the advisors were the sole advocates for converging the smart city and heritage disciplines in the council and were not supported with processes. The transcripts show that these deficient resources are significant barriers to realising Smart Heritage in the council and caused significant emotional stress for the advisors seeking its delivery.

Therefore, it was evident that there were insufficient processes, budgets, or staff to deliver Smart Heritage in Broken Hill adequately. However, the advisor's responses characterised these issues as typical of a regional outback organisation in Australia and that Smart Heritage is still on their agenda. The recommendations to address the insufficient resources reflected the regional outback organisation's contextual and political realities. The Smart City Advisor's aim to improve interdisciplinary processes, through the advisor's recent promotion to management due to another staffer's resignation, showed that additional resources are likely unavailable. The advisor would have to find efficiencies instead. The Heritage Advisor's preference for direct intervention by management to make available internal resources and encourage all staff to seek external funding also reflected the isolation of outback councils' resourcing. It was clear from the transcripts that the council requires significant resources to deliver Smart Heritage but is also facing the overarching contextual challenges as a regional outback local authority.

Case Study Data: City of Melbourne

The City of Melbourne advisors' data highlighted that the lack of staff and procedural pathways for Smart Heritage resulted from poor strategic alignment and active managerial provision for the discourse in the council. While both advisors were confident that the advancement of smart technology's adoption across the council would eventually resource Smart Heritage and funding its advancement was not an issue. However, the interview's subtext was that the council does not allocate Smart Heritage with the same level of resources as other smart discourses in the organisation, such as Smart Mobility or Smart Buildings. Smart Heritage's lack of explicit recognition in the council evidentially meant it struggled to gain support resources within the large bureaucratic organisation. The advisors' recommendations reflected this organisational framing of its resources, emphasising that strategic documents allocate resources to Smart Heritage so that processes and staff were then authorised to support the discourse. The Heritage Advisor's recommendation that the smart city and heritage teams restructure under the same manager exemplified the primacy of working within the council's large political and bureaucratic systems. It was evident that Smart Heritage required further direction for supplying adequate staff and processes in the City of Melbourne that integrated into the broader structural systems of the council.

Case Study Data: City of Newcastle

The City of Newcastle's Heritage Advisor's interview noted the absence of dedicated staff time for Smart Heritage due to other more prioritised demands such as assessing development applications. The advisor identified that the smart city team had greater access to staff and financial resources and that the heritage discipline could rely on them to financially and procedurally aid Smart Heritage. Therefore, restrictions on the Heritage Advisor's time was the significant barrier to delivering Smart Heritage in the organisation. The Heritage Advisor's responses appeared to show they felt stressed or guilty of this lack of time. These comments showed the lack of the Heritage Advisor's time caused by tension in Smart Heritage's delivery. Therefore, the advisor's recommendation to resolve the resource issue focused on their specific time allocation issue. The advisor sought clarification of who must deliver Smart Heritage in the council through smart city and heritage strategies revisions. Ideally, the advisor sought to continue delivering Smart Heritage alongside the Smart City Advisor and use the strategies' formal mandate to draw on resources from additional teams in the organisation. But, it was clear that political forces were at play. The advisor was hesitant to assert that the council would achieve this, even though the advisors supported adopting its duties formally. Overall, the Stage Two Interviews indicate that the Smart Heritage Principle should direct local governments to resource Smart Heritage with staff, processes, and financial capabilities to achieve delivery and innovation targets. As these delivery and innovation targets vary between local governments, the resource demands also fluctuate.

8.5 Smart Heritage Principle Four: Innovation

The fourth Smart Heritage Principle is:

Innovate on opportunities that arise from converging smart technologies and the past that support the strategic and operational journey.

The fourth principle addresses the Key Consideration that Smart Heritage can deliver innovation for the local governments in the research, including for existing Smart Heritage outcomes and initiatives and other areas. Therefore, the principle directs the local government sector to innovate, including searching, research, and testing new relevant Smart Heritage

applications that arise along their strategic and operational journey. This approach encourages councils to expand the discourse's outcomes beyond the current benefits stated in the third Smart Heritage Principle, but ensure that these additional benefits suit their context and does not require unjustifiable resources. The principle specifies smart technologies and the past, rather than the smart city and heritage disciplines, to frame innovation between the disciplines in layman terms and avoid prescribed academic or professional discipline classifications. As the principle is applied in a stand-alone document without the specific context of this research and the disciplines' detailed definitions in Chapter Two, this terminology is preferable. This principle is valuable for Smart Heritage's delivery as, through innovation, local governments discover additional outcomes for the discourse that further engrain it in their strategic documents and operations. The following section presents the thematic data from the Stage Two Interviews that support this fourth Smart Heritage Principle.

8.5.1 Thematic Data

Lastly, the transcripts detail data concerning how the local government case studies can innovate Smart Heritage. The relevant data are the excerpts where the advisors' discuss the future of the discourse within their organisation and how to achieve it. The data confirm that there are viable opportunities for Smart Heritage to innovate solutions that address local issues and that innovation is already occurring. Figure 19 summarises these opportunities as delivering indigenous, governance, tourism, urban development, and infrastructure outcomes. However, the data also show that innovation must align with organisations' strategic and operational aspirations, including the organisation's political will for change and individual's enterprise. The following paragraphs summarise the data regarding innovating Smart Heritage.

Case Studies	Innovative Outcomes
Broken Hill City Council	• Indigenous: Aboriginal heritage story-telling through a smart-lighting enabled dark sky region; • Governance: Improvements to the council's management of heritage information; and • Tourism: Smart technology-enabled heritage tourist attractions and museum operations.
City of Melbourne	• Indigenous: tell, inform, and share heritage information to raise cultural awareness of historical and community value; and • Urban Development: insert forgotten into new urban developments.
City of Newcastle	• Infrastructure: using public infrastructure to convey heritage narratives throughout the city; and • Governance: use smart technology's appeal to insert heritage into other disciplines within the council.

Figure 19: Innovative outcomes for Smart Heritage.

Case Study Data: Broken Hill City Council

The transcripts from the Broken Hill City Council advisors' interviews show that they were confident that Smart Heritage could innovate to deliver further outcomes in their city. The advisors discussed how smart technology could enhance all aspects of the historical city, and through this heritage setting, Smart Heritage would be ubiquitous in Broken Hill. These opportunities appeared countless but appeared to focus on indigenous, governance, and tourism outcomes. The transcript shows that innovation was already occurring. Since the previous interview, the Smart City Advisor reported how the local museum and heritage sector adopted novel technologies during the pandemic lockdown to maintain base-level operations. It was evident that Smart Heritage had multiple open pathways for innovation in the city. Simultaneously, the advisors were confident about Smart Heritage's opportunities in Broken Hill. Their recommendations to achieving these innovations identified that the council must consider their regional outback context and challenges. The advisors both spoke about the challenges to Smart Heritage innovation in the city. These were balancing the views of external heritage organisations' views that funded many initiatives and those views of the public, which heavily influenced the small organisation and local politicians. It was apparent that Smart Heritage's innovation should sincerely consider these parties' influence as to not become off-side in the small city. However, it appeared that the advisors personally aspired for the direct and immediate

adoption of Smart Heritage across the organisation. The Heritage Advisor's contractor position and experience in Sydney likely encouraged a more ambitious and outspoken perspective.

Case Study Data: City of Melbourne

The interviews with the City of Melbourne's advisors confirmed that there are pathways for Smart Heritage's innovation in their city. They identified that Smart Heritage offers pathways to insert indigenous identities into colonised spaces and forgotten heritage into urban developments by using technology to tell stories. The Smart City Advisor's aspiration to use smart technology to tell, inform, and share heritage, reflecting on the example of the 'birthing tree' that an authority demolished for a road project, showed future governance and political applications of Smart Heritage in the city. However, it was evident that achieving these innovations would require strategic consideration by the advisors to deliver. The overarching organisational processes and the council's strategic vision coloured the advisors' recommended approaches. For example, the Heritage Advisor was conscious of their personal limitations to deliver novel initiatives and, therefore, sought a collective approach that leveraged others' expert skills. Yet, within the synthesis of their previous interview and the Smart City Advisor's interviews, it appeared that the political influence of others in this organisation was also desirable to build support. In the City of Melbourne, it was clear that Smart Heritage has to percolate naturally through the organisation to find and deliver innovations to function within their organisation-wide mantra.

Case Study Data: City of Newcastle

The interview with the City of Newcastle's Heritage Advisor confirmed that Smart Heritage could deliver additional innovations by partnering with other council teams, such as the infrastructure team. Partnerships like this would insert technologically-enhanced heritage narratives into road and utility initiatives that would tell the story and connect with people through these functional civic services. Even with the restrictions of the Heritage Advisor's time to support Smart Heritage, these innovations were likely to occur through the well-resourced smart city team and the advisors' individual enterprise. Therefore, it appeared that these innovations were likely in the organisation's future. The advisor's recommendations showed the importance of personal enterprise in the council's Smart Heritage innovation. Their responses primarily focused on what the advisors individually could do to share the discourse with other council teams and insert

Smart Heritage into revisions of the new heritage strategy, for example, using smart technology's broad appeal to attract and inform other teams in the organisation about heritage and how they can aid the discipline through Smart Heritage. The advisor did not appear to prioritise the broader organisation's context in the transcript, like the City of Melbourne's advisors. Instead, in the City of Newcastle, an individual's enterprise was vital to delivering Smart Heritage innovations. Overall, the Stage Two Interviews indicate that the Smart Heritage Principle should direct local governments to seek further innovations through Smart Heritage that support the strategic and operational journeys. The case studies show that the local government sector has much to explore and benefit from adopting Smart Heritage in its strategic documents and operations.

8.6 Chapter Summary

Chapter Eight presents the Smart Heritage Principles with supporting data that result from the thematic synthesis on the Stage Two Interviews in Chapter Seven. There are four Smart Heritage Principles that address the Key Considerations of recognition, delivery, resourcing, and innovation. Each principle draws on practical approaches from the case studies to direct the local government sector on how to deliver Smart Heritage in local government strategic documents and operations. Appendix One formally presents the principles in a stand-alone industry document for distribution across the sector. This stand-alone document also summarises the theoretical background of Smart Heritage covered in this thesis's previous chapters.

The Smart Heritage Principles are:

- 1. Recognise Smart Heritage as a long-term and short-term discourse within strategic documents and operations.**
- 2. Deliver Smart Heritage through place-making, interpretation and information, and community outcomes**
- 3. Resource Smart Heritage with staff, processes, and financial capabilities to achieve delivery and innovation targets**
- 4. Innovate on opportunities that arise from converging smart technologies and the past that support the strategic and operational journey**

The following chapter reports on the validation process that the researcher underwent to test whether the Smart Heritage Principles are relevant and valuable outside of their developmental-research context. It includes engaging advisors from a new case study, Wellington City Council in New Zealand, in interviews. This process ensures that the industry document in Appendix One can ‘stand alone’ and represent the Smart Heritage discourse in practitioner and local government contexts.

CHAPTER NINE

STAGE TWO VALIDATING THE SMART HERITAGE PRINCIPLES

9.1 Introduction

This chapter validates the Smart Heritage Principles stand-alone industry document in Appendix One by applying them to a new case study for testing. The new case study is Wellington City Council in New Zealand. The researcher presents the document to a Smart City Advisor and a Heritage Advisor in the new case study for reading prior to separate, semi-structured, one-on-one interviews. In the interviews, the researcher asked whether the document sufficiently introduces the Smart Heritage concept for application in the council and by the advisor, how relevant is the document to the council's strategies and operations, how their organisation would apply the document in practice, and any feedback regarding the next steps for delivering Smart Heritage. The interview question guide is in Appendix Three. The researcher records and transcribes these interviews as evidence of the principles' relevancy and applicability. The researcher then reflects on the feedback within the context of the preceding research in the thesis. The validation in this chapter is valuable because it tests the document in a context that does not benefit from the earlier interviews, meaning it has to 'stand-alone' and present Smart Heritage as a discernible discourse. The following sections introduce the Wellington City Council case study, summarise the feedback from the advisors, and reflect on the Smart Heritage Principles document.

9.2 Wellington City Council

The new case study is Wellington City Council, the local government for Wellington city. Wellington city is the capital of New Zealand and the largest city in the Greater Wellington Region, which comprises eight additional local government areas. The Wellington Harbour and the Cook Strait geographically restrict the city. Wellington city has approximately 216,000 people, covers an area of 303km², and is a mix of metropolitan and suburban areas (Wellington City

Council, 2021). The council has an internal smart city team of advisors and an internal heritage team.

Wellington City Council details that Whatonga, the chief of the Kurahaupo waka, were the first human settlers in the area (Wellington City Council, 2021). According to Māori tradition, indigenous Polynesian people settled in New Zealand in several migratory waves. Researchers understand that this migration occurred in the late 13th century. Māori people populated the area and region, forming several iwi/hapu (tribes/subtribes) with distinct settlements mainly along the coast. In the region, iwi formed diplomatic relationships, fought wars with other iwi, and experienced internal migration from other areas of New Zealand. The iwi Ngāti Toa Rangatira, Taranaki Whānui ki te Upoko o te Ika (a collective of various iwi that migrated to Wellington in the 1820s and 1830s) and Te Atiawa are recognised as the traditional owners of the region (Ministry of Māori Development, 2021). In 1839, the London-based New Zealand Company signed a deed with 16 Māori chiefs for settlement in the region. European settlement followed in the 1840s with the New Zealand Company transporting settlers from the United Kingdom. The company sold land to settlers, evicting the established Māori populations. From the mid-1800s, the city of Wellington grew along the Wellington Harbour. It became New Zealand's capital in 1865. The Wellington City Corporation, the pre-cursor to Wellington City Council, formed in 1870 to govern and construct public services (Wellington City Council, 2021). The city underwent dramatic institutional and commercial construction throughout the late 1800s and early 1900s. In recent decades, the city's arts, culture, and film sectors received national and international acclaim.

In 2010, the council began releasing geospatial data for public use free of charge to support third parties' innovation with open data (Data.govt.nz, 2021). Since then, the city has employed internal advisors to support its shift towards becoming a smart city. The council partnered with the Japanese information technology company NEC in 2014 to explore the use of data and technology aimed at improving the city. They installed a camera and sensor network to address begging, late-night public safety, and foot traffic through the partnership. The partnership ended in 2018, with the council pursuing internally delivered projects (Devlin, 2018). The council currently operates a digital twin and open data sets to analyse climate change effects, population

increases, and traffic demands and is active in governance and smart city conferences across Australia and New Zealand.

9.3 Feedback on the Smart Heritage Principles

The researcher interviewed the Wellington City Council Smart City Advisor and Heritage Advisor separately in June 2021. At the time of interviewing, the Heritage Advisor recently left the council's employment; they are on good terms with the council. The below sections summarise these interviews.

9.3.1 Introducing the Smart Heritage Concept

The Wellington City Council advisors reported that the Smart Heritage Principles document effectively introduces the Smart Heritage concept and frames it in an appropriate manner for them to understand it within their local government context. The Smart City Advisor stated that they did not know about Smart Heritage before, but the document's introductory sections provide sufficient context for understanding its premise [Q94]. The advisor compared it to known smart discourses in the council and the smart city discipline, like Smart Mobility and Smart Infrastructure. The advisor thought that the document was suitable for its high-level purpose to start local governments down the path of delivering Smart Heritage. The Heritage Advisor noted that the document's tone was academic in its introductory section about Smart Heritage but assumed that this was due to the discourse stemming from the academic literature rather than professional practice. They stated that the bullet points that describe the principles and the examples at the end of the document are useful for conveying Smart Heritage and its application [Q96]. In their view, operational staff will likely focus more on the principles and the examples, while the strategic staff, such as managers, would closely analyse the front sections to gain a high-level understanding. The Heritage Advisor also signalled that the document's abstract framing of heritage as a subjective discipline might irk heritage advisors as it is juxtaposed to the smart city discipline's practical and interpreted as more positive standing.

[Q95] "I thought the document was really interesting. I've never really read something about Smart Heritage before, but I understood it easily. It's also quite practically written, which helpful that it calls out what you actually need to deliver Smart Heritage." (Wellington City Council 2021, Interview with Smart City Advisor, 15 June)

[Q96] "When it comes to engaging with local government, clear and simple words and phrases are the best. Bullet points are a good way to do this. This is especially true if wanting to engage those who may not be that 'up to it' when it comes to academic language. I found the examples you provided at the end very useful." (Wellington City Council 2021, Interview with former Heritage Advisor, 8 June)

9.3.2 Relevancy of the Smart Heritage Principle document

The advisors thought that the document was relevant within Wellington City Council and interlinked well with their current approach to the disciplines. The Smart City Advisor found that the document aligns with their team's partnership approach in their organisation [Q97]. In this approach, the smart city team advises operational teams, like the heritage team, on how to engage and deliver technological solutions. The advisor highlighted that the smart city team does not lead projects themselves. In the interview, they also identified that the document is the catalyst their team needs to engage the heritage team. The advisor admitted that they had not considered working with the heritage team before but, through this document, recognised that there would be interdisciplinary synergies. The document challenged them to seek this engagement. The Heritage Advisor said that the document aligns with the heritage team's ambition to incorporate smart technology in their roles to resolve issues, enhance projects, or create new heritage and civic experiences. The advisor referred to their former team's existing interest in Digital Heritage as the basis for their likely interest in Smart Heritage [Q98]. The advisor understood that heritage advisors in local governments across New Zealand shared this interest in technology, implying that other councils would also find the Smart Heritage Principles document relevant.

[Q97] "It aligns with what we are doing at Wellington City Council, like how we're looking at the Smart City as a partnership model and how it calls out the different actors for engagement. It is the catalyst we need to go and meet with the heritage team and ask, "what's happening in your space, we're two disciplines. This is clearly something where

we can actually work together and add value". It's the kick-start that we need. Without it, I would never have thought to go to them." (Wellington City Council 2021, Interview with Smart City Advisor, 15 June)

[Q98] "I think that in an ideal world, most Heritage Teams in councils within New Zealand would like to incorporate technology and Smart Heritage Principles into their work. At Wellington City Council, the use and power of digital tools (GIS mapping, revealing 'hidden' landscape beneath our feet, e.g. Streams for interpretation to the public) are ideas that have been considered for some time." (Wellington City Council 2021, Interview with former Heritage Advisor, 8 June)

The advisors also considered that the document covers the relevant themes for delivering Smart Heritage in local government. The Smart City Advisor considered the first principle, 'Recognise', to be highly relevant. This principle directs local governments to recognise Smart Heritage as a long-term and short-term discourse within their strategic documents and operations. The advisor believed that Smart Heritage or similar convergences are likely already occurring in the council and city, and the council should reveal these instances by formally naming them as Smart Heritage in documents [Q99]. They thought that convergence between the smart city and heritage teams is often overlooked in their organisation and the smart city discipline, so the principle's focus on this area is useful. The advisor considered that the other principles took the reader through the logical steps of consolidating existing knowledge about Smart Heritage in an organisation, supporting its delivery, and then seeking additional innovations. The Heritage Advisor highlighted the third principle as highly relevant to local governments' strategic delivery of innovative discourses. This principle, 'Resource', directs local governments to supply the staff, processes, and financial capabilities to achieve Smart Heritage delivery and innovation targets. They noted that their former job largely consisted of regulatory duties, such as heritage assessments and reports for the resource consent process, and there is often no staff time or money to support innovation [Q100]. Therefore, they supported the principle specifying that resourcing is a fundamental aspect of delivering Smart Heritage in local governments. They also noted that the principles 'Recognise' and 'Deliver' requires the organisation to develop definitions about what Smart Heritage means in their context. However,

this understanding would become evident over time as more practical examples are available in the council, other councils, or literature. The advisor thought that the 'Innovate' principle was adequately future-focused to make council staff consider outcomes beyond their immediate workload and skill set. The advisor identified that Smart Heritage could be a practical tool to reveal Wellington's intangible or physically invisible past. For example, Smart Heritage could be used to "recognise and promote Māori korero and places within the city".

[Q99] "There is no doubt smart stuff already happening in Wellington. I think it's just identifying what's already happening so we can have a focused effort working together on it. But no one has ever asked, "what are you doing in the heritage space". So the document challenges us, but in a good way around, about how do we actually think of heritage in this smart city context." (Wellington City Council 2021, Interview with Smart City Advisor, 15 June)

[Q100] "The reality of the job of a heritage team is that a considerable amount of time is usually taken up by the regulatory function, e.g. Heritage assessments for scheduling, and heritage assessments for resource consents. The incorporation of digital tools also involves staff time and the use, and training in, of those tools. There is often no resourcing (staff time/ money) to go towards this." (Wellington City Council 2021, Interview with former Heritage Advisor, 8 June)

9.3.3 Application of the Smart Heritage Principle document

The advisors described how Wellington City Council would apply the document if it was available to them and the value it offers their organisation. The Smart City Advisor stated that their team would apply the document as the basis for engaging the heritage team in conversation and communicating the discourse to other teams. The advisor specified that it challenges their perception of the heritage discipline, and framed it in an innovative light [Q101]. They noted that their team typically overlooks the heritage discipline due to an assumption that the heritage discipline does not incorporate or desire technological innovation. However, the document challenges them to rethink this assumption and they would enlist the document to build their relationship with the heritage team. The advisor stated that the document is practically written and focused on delivery, which offers a useful framework for interdisciplinary discussions

concerning how to deliver the new discourse. The Heritage Advisor stated that the document is best suited to explain to upper levels of management the advantages of Smart Heritage as its high-level approach reflects their conceptual thinking [Q102]. The advisor considered that the urban design and place-planning team, which the heritage team is a part of, would also find the document useful due to their conceptual and innovative modes of thinking. In contrast, the advisor considered that more operational staff might request fine-grained contextualisation of the discourse into their specific roles. The advisor thought that the document successfully established the discursive framework for local governments to start the conversation about how to deliver Smart Heritage. Therefore, both of the Wellington City Council advisors validated the Smart Heritage Principles document as applicable to deliver the discourse in local government.

[Q101] “When I was reading it, I realised we really don't engage with heritage proactively in the Smart City space. I think it from that perspective, the document challenges us, but in a good way around, about how do we actually think of heritage in this smart city context. Because the smart city is often focused on infrastructure, safety, and all those traditional things. So I think the document brings a new perspective.” (Wellington City Council 2021, Interview with Smart City Advisor, 15 June)

[Q102] “This document would be used to explain to higher levels of management the advantages of the Smart Heritage approach to facilitate more resources towards this. The document could also support the work of the urban design and place-planning teams at Council to provide a means to ‘weave’ heritage stories into the urban environment using digital tools. Other components could pick up the Smart Heritage ideas of using technology alongside these urban environment interventions to tell these stories as well.” (Wellington City Council 2021, Interview with former Heritage Advisor, 8 June)

9.3.4 Next Steps for Smart Heritage

Building on the validation of the Smart Heritage Principles document, the advisors proposed that future research should investigate their case-specific application. They identified the examples at the end of the document as a starting point for local governments to begin considering its implementation in their contexts. The Smart City Advisor recommended that each local government hold a conversation between their smart city and heritage teams to identify their

unique remits, their organisation's overarching strategic direction and resources, and how Smart Heritage could align with or support the existing aspirations and initiatives [Q103]. Once these were identified, the advisor proposed that these teams would then consider the operational realities of delivering Smart Heritage in their organisation, such as which individual would lead its delivery, which funding source would support it, and internal reporting lines. The advisor presumed that these conversations would be unique to each local government due to the variability of staff expertise, organisational resources, and political landscapes. The Smart Heritage Principles would offer the framework for these discussions but would require a separate piece of research to formulate its context-specific delivery protocols. The Heritage Advisor also recommended that the next steps for future research would be contextualising the principles for each local government to deliver Smart Heritage in their individual context. In particular, the advisor discussed contextualising it for heritage teams in local government and how to address political sensitivities in some heritage teams. They noted that specific words and phrases in the document might have to be tailored to resonate with practically-focused heritage experts [Q104]. For example, they recommended reducing the explicit acknowledgement of the heritage discipline's various understandings and abstractness. The advisor discussed how critics within local government organisations often reference the discipline's vagueness to undermine their legitimacy and influence in the organisation and their technical expertise. Therefore, heritage advisors would likely prefer to closely control their discipline's narrative in conversations about Smart Heritage. It would be the task of those leading each specific application of the principles to identify the audience's preferences and tailor the jargon to contextualise Smart Heritage for its audience.

[Q103] "At the bottom of the document, you start to have some examples of what was happening. This is helpful to prompt the reader to think about the next steps. What I think would be required would a meeting in each council between the smart city and heritage teams to identify their individual way forward." (Wellington City Council 2021, Interview with Smart City Advisor, 15 June)

[Q104] "If you would like this document to be picked up by the heritage sector, it may be good to rephrase some of the words and phrases you use when describing what heritage

is. Whilst some of the points you make regarding the heritage discipline, for example, may be relevant, there may be some more subtle ways to phrase this by enlisting their jargon”. (Wellington City Council 2021, Interview with former Heritage Advisor, 8 June)

9.4 Reflection on the Smart Heritage Principles document

The feedback from the Wellington City Council advisors confirm that the Smart Heritage Principles document effectively communicates the Smart Heritage discourse, and the principles are relevant and applicable. Their feedback is also useful as it highlights areas for future research. The advisors’ comments are the capstone of the research that support the thesis’ findings and practical contribution.

Reflecting on the feedback, it is evident that the political realities of introducing a new discourse into a local government are a significant matter to consider for delivering the discourse. This consideration was less evident in the Australian case studies, likely because the research introduced Smart Heritage to the advisors throughout the interviews and framed it as a developing discourse. However, in the Wellington City Council case study, the Smart Heritage Principles document appeared complete. Therefore, the Wellington City Council advisors consequently took greater note of its potential material impact on their organisation than the Australian case study advisors. For example, the Wellington City Council Smart City Advisor’s comments on how the document provides the impetus for them to engage with the heritage team shows that innovative interdisciplinarity in councils often requires justification and how political boundaries exist for staff. In the Smart City Advisor’s case, they felt authorised to freely engage with the infrastructure team but thought that engagement with the heritage team required justification, which the Smart Heritage Principles document offered. This finding contrasts with the Interviews with the Australian case studies, who often spoke hypothetically about how they would engage the other discipline. Therefore, it appears that the reality of implementing the complete discourse and likely the formal and tangible presence of the Smart Heritage Principles document influenced the advisors’ responses. The researcher considers that these expressed boundaries reflect personal relationships and standardised disciplinary perspectives; the interviews with the three case studies support this claim but does not confirm it. However, the researcher also considers that the Smart Heritage Principles should not presume restriction to

normative disciplinary boundaries. Instead, the document should pitch Smart Heritage without inhibitions, and each case would address its political boundaries independently. It is the researcher's vision that interdisciplinary boundaries between smart city and heritage will dissolve over time as local governments, professions, and academics adopt Smart Heritage. Prescribing boundaries would hinder the discourse in the long term more than support its delivery in the short term.

The Heritage Advisor's awareness of the document's abstract and subjective framing of their discipline as irking heritage experts also revealed political realities in councils. It appeared that heritage advisors actively avoided mentioning the disciplines' abstractness and subjectivity and preferred to enlist their organisations' heritage definitions to assert heritage's objectivity. Through the conversation with the former Heritage Advisor, the researcher understood that critics often used these qualities to undermine the advisor's contribution and discipline's merit. This concern resonates with the criticisms in Chapter Two, section 2.3.4. Nevertheless, Chapter Two identifies the evident abstractness and variance in the discipline's understanding. The researcher deduces that the heritage advisors in local governments experience these criticisms acutely as they can result in reduced heritage resources and less political influence in organisations. Understandably, heritage advisors would defend their disciplinary territory and authority by requesting favourable depictions and jargon that identifies their exclusive expertise in organisations and public discussions. However, in this researcher's opinion and based on a New Zealand background, heritage advisors who transfer from professions such as architecture, archaeology, and art galleries are often poorly-versed in the theoretical understandings of heritage. Their singular professional lens, as Chapter Two section 2.3.3 exposed, confidently assert objectivity while conveniently ignoring the multitude of contrasting or contesting assertions by colleagues. The academic basis for this thesis' research shows that heritage is more than the constricted professional understandings of heritage, but the findings identify that the Smart Heritage Principles must navigate the political waters of local government if it is to be successfully adopted by these organisations.

The feedback also revealed similar interdisciplinary factors for delivering Smart Heritage in local government between the Australian and New Zealand contexts. As the research developed

the principles using solely Australian case studies, there was a risk that its findings would not translate to other countries due to differing governance structures, cultural perspectives, and interest and roles in heritage and smart city disciplines. Chapter Three, section 3.6, discusses these possible limitations. However, the feedback from the Wellington City Council advisors shows that the principles resonate in the New Zealand context. Specifically notable are how the two disciplines do not often interact in local government organisations, are interested in convergence and Smart Heritage, and are concerned about resourcing matters. The researcher recognises that Australia and New Zealand share similar cultural and governance histories, so this outcome is not unexpected, but it is an additional positive finding. It is uncertain whether the principles translate into other international local government contexts, such as Asia, North America, and Europe. The researcher anticipates that there will be different governance structures, cultural perspectives, and applications of heritage and smart city disciplines in these other contexts that will influence the ideal method to deliver Smart Heritage in these organisations. Notably, references to indigenous peoples, perspectives, and histories and colonialism narratives would be different, which would see alternative views on how Smart Heritage can deliver underrepresented histories into place and support community outcomes. Translating the Smart Heritage Principles into these other international contexts is an avenue for future research.

9.5 Chapter Summary

This chapter reports feedback on the Smart Heritage Principles document from a case study on Wellington City Council in Wellington, New Zealand. In the case study, the researcher presented the document to a Smart City Advisor and a Heritage Advisor and asked for their opinion regarding the discourse, its relevancy and applicability to their case, and next steps for delivering Smart Heritage in local government. The chapter reported their feedback with the support of quotations. The feedback concludes that the document conveys the discourse adequately for the advisors to understand it in their context. The feedback also recommends that the next steps for delivering Smart Heritage in local government are to engage local governments in conversations that contextualise the principles for their unique context, then focus on the mechanics of operations, such as who will lead Smart Heritage's delivery and fund it. Overall, the feedback

validates the Smart Heritage Principles document in Appendix One as a practical guide for local governments to deliver Smart Heritage in their strategic documents and operations.

In the chapter, the researcher also reflected on the additional perspective that the Wellington City Council case study offered. The case study underlined the political realities of introducing a new discourse into a local government. The political boundaries of the smart city team and the conscious political struggles for the heritage team were apparent in the feedback, which informs the Smart Heritage Principles regarding how it pitches itself in its early discussions. The feedback also revealed similar interdisciplinary factors for delivering Smart Heritage in local government between the Australian and New Zealand contexts. This finding is valuable as it enables the document to be applied easily across the two countries. However, it is uncertain whether the principles translate into other international local government contexts, such as Asia, North America, and Europe. Future research could investigate the document's applicability in this regard.

The following chapter concludes the research by answering the research questions, reflecting on the research methodology and limitations, discussing the contribution to theory and practical applications that the Smart Heritage Principles offer, and recommending the trajectory of further research.

CHAPTER TEN

CONCLUSION

10.1 Introduction

The inquiry in this thesis has been to identify how to deliver Smart Heritage within local government. The premise for this research set out in Chapter One is that local governments are converging the smart city discipline with other disciplines to resolve challenges in their jurisdictions, creating novel smart discourses such as Smart Mobility and Smart Infrastructure. These smart discourses have grown in influence and now command dedicated academic and professional forums, shaping cities as a result. The researcher proposes Smart Heritage as an emergent smart discourse, which convergences the smart city discipline with the heritage discipline. Chapter Two details Smart Heritage's emergence and how it is currently unexplored and under-utilised, with only a handful of academic researchers previously exploring this research area. While useful to set the scene, these initial researchers in the literature do not define Smart Heritage or appear to completely understand its novel theoretical framing between the smart city and heritage disciplines. They also do not investigate how Smart Heritage exists within local government or how these organisations deliver it. Therefore, the researcher's task in this thesis was a heuristic discovery of this new discourse and the production of practical solutions for local government to deliver Smart Heritage. Chapter Three's research design reflects this by applying inductive and deductive approaches that encircle then extract knowledge from these disciplines within three local government case studies. Chapters Four to Nine then deduced the discourse and produced and validated the principles. In the below sections, the researcher applies the new knowledge from these chapters to answer the research questions before reflecting on the research methodology and limitations, the research implications and suggesting future research areas.

10.2 Answering the Research Questions

The researcher poses one primary research question and two further questions in Chapter One. These questions guide the thesis's original contributions to knowledge. These contributions are a comprehensive exploration and definition of Smart Heritage in academic literature and the Smart Heritage Principles' production. The following sections answer these research questions individually.

10.2.1 Primary Research Question: How to Deliver Smart Heritage within Local Government?

The primary question driving this research has been to understand how to deliver Smart Heritage within local government. As stated in Chapter One, this question prompts the researcher to answer the 'how' aspect of the question, focusing on producing practical guidance for Smart Heritage's delivery in these organisations. Chapter Two details that theoretical and practical guidance is absent from the academic and professional literature for delivering Smart Heritage in local government. Therefore, the researcher has to balance a concise answer while also deflecting other potential answers that explore the nascent Smart Heritage discourse's vast theoretical and practical openness. In response to this challenge, Chapter Three's methodological structure narrows the answer's context to local governments' strategic documents and operational contexts in three case studies, framing the answer as addressing these matters exclusively. The research answers the question with the production of the Smart Heritage Principles. These principles are strategic and operational directives that the researcher recommends local governments adopt to deliver Smart Heritage. There are four principles in total. The principles address the Key Considerations to converge the smart city and heritage disciplines in the sector. The researcher recommends practical approaches as a means to implement each principle. Appendix One formally presents the Smart Heritage Principles in a detachable document that also summarises the theoretical background of Smart Heritage. Chapter Nine confirms the principles' relevancy and applicability to the local government sector by testing them with another local government. The following paragraph answers the 'how' in the research question through an explanation of the principles.

The first principle directs local governments to recognise Smart Heritage as a long-term and short-term discourse within their strategic documents and operations. It responds to the key

consideration in Chapter Six that Smart Heritage is present within local government, but its recognition is not uniform across strategies or operations. Therefore, the first principle guides local governments to recognise Smart Heritage in these contexts, which is the required first ontological step in its delivery. The second principle directs local governments to deliver Smart Heritage through place-making, interpretation and information, and community outcomes. It reacts to Chapter Six's finding in that these outcomes are the most present within the local government sector and are currently the most effective in delivering Smart Heritage. This principle, therefore, guides local governments to focus their efforts on these outcomes to deliver the discourse effectively. The third principle directs the local government sector to resource Smart Heritage with staff, processes, and financial capabilities to achieve delivery and innovation targets. This principle makes explicit the need for councils to resource the discourse as the research finds that these organisations do not sufficiently resource its delivery. The final principle directs local governments to innovate on opportunities that arise from converging smart technologies and the past that support their strategic and operational journey. It responds to the finding that there are further opportunities for Smart Heritage beyond the primary place-making, interpretation and information, and community outcomes and existing initiatives. As a result, this principle encourages local governments to build further knowledge on delivering Smart Heritage, keeping the discourse applicable to the organisation and their local needs and aspirations. Collectively, these Smart Heritage Principles answer the question of how to deliver Smart Heritage within local government.

10.2.2 Further Research Question One: What is Smart Heritage?

The first further research question asks, 'What is Smart Heritage?' Answering this further question importantly resolves the gap in the academic and professional knowledge regarding understanding Smart Heritage by comprehensively characterising the concept for the first time. Chapter Two highlights this gap in knowledge about Smart Heritage's definition by discussing the few brief mentions of the discourse in the literature. Answering this question is a vital step towards answering the primary research question, and the researcher must provide an answer before advancing through the inquiry's methodology that Chapter Three details. Without an answer, engaging in a sincere investigation of the discourse is not possible.

The answer to ‘What is Smart Heritage?’ is in the closing of Chapter Two. The conclusion in section 2.42 states that:

“Smart Heritage is the convergence between the smart city and heritage disciplines that intertwines the autonomous and automatic capabilities and innovation of smart technologies with the contextual and subjective interpretation of the past”.

This definition draws from the present state of the smart city and heritage disciplines in its academic and professional literature and considers criticisms and unique governance understandings of the disciplines. The stated definition comprises characteristics from both disciplines. It draws from the smart city discipline the primacy of autonomous and automatic technology capabilities that differentiate it from passive technologies and the conscious provision of services to a populous. From the heritage discipline, the definition sources the retrospective subjective valuing processes. The researcher arrives at this definition by balancing the two disciplines’ current primary characteristics in Chapter Two. This definition serves as the base understanding of what Smart Heritage is in Chapters Four to Nine. It is applicable within the research context and arguably represents the discourse in its contemporary state across academic and professional literature.

10.2.3 Further Research Question Two: What are the benefits and challenges to delivering Smart Heritage within Local Government?

The second further research question asks what are the benefits of and challenges to delivering Smart Heritage within local government. Answering this question offers nuance to understanding what Smart Heritage’s delivery entails and why local governments should deliver Smart Heritage. By extension, it also validates the Smart Heritage discourse by sincerely engaging in its discussion. The answer derives from across the thesis’ chapters, contrasting to the previous research questions. The answer draws contextual framing from Chapter One, which explains that local governments are creating smart discourses to address local issues, meaning that the benefits and challenges are those that these organisations face. It also pulls context from Smart Heritage’s definition in Chapter Two as this characterises what benefits and challenges are relevant for the question to address. It lastly sources descriptions of the benefits and challenges from the Smart Heritage Principles in Chapter Eight and the preceding chapters that contribute to these

principles. Chapter Nine validates these benefits and challenges as relevant and applicable to the broad local government sector. The following paragraph answers this further research question by explaining the relevant benefits and challenges of Smart Heritage's delivery within local government.

The primary benefit of delivering Smart Heritage in local government is an innovative ability to intertwine the past into cities by leveraging smart technologies' capabilities and, synchronously, informing the application of smart technology through the historical understandings of the past. Like the now-established Smart Mobility and Smart Infrastructure discourses, this bi-directional relationship between the disciplines acts as a reflective and evolutionary force that drives both disciplines forward through creative interdisciplinary convergences. It introduces constructive disruption to knowledge silos within organisations that enables expanding the possible outcomes through novel assemblages of expertise and perspectives. Embodying this constructive disruption, the Smart Heritage Principles identify that Smart Heritage offers innovative place-making, interpretation and information, and community outcomes that enhance, supplement, or replace these existing initiatives. For example, in the City of Newcastle, the Smart City and Heritage advisors deploy pedestrian trackers, solar panels, and automated building maintenance technologies to enhance visitor experience within city museums. These advisors are also looking to expand this to outdoor heritage narratives and other culturally significant sites. The research anticipates that additional benefits for local governments will come with further innovations, such as indigenous and tourism outcomes, signalled by the advisor's interviews and the Smart Heritage Principles.

The principal challenges to delivering Smart Heritage within local government are the conceptual vagueness facing the emergent discourse and the limited resources for its practical delivery. Regarding the challenge of its conceptual vagueness, Chapter Two details the absence of literature on Smart Heritage and how it produces a lack of theoretical structure for the discourse, including no structured or studied evolution of characteristics and criticism. Thus, this research produces the first comprehensive definition of Smart Heritage that reviews the nascent discourse's literature and draws from the separate smart city and heritage disciplines, both of which suffer from vagueness in their definitions. While this research significantly advances the Smart

Heritage's theoretical understanding through its definition, Smart Heritage still does not have a significantly sized or tested knowledge base, especially regarding delivery by local governments. Therefore, the discourse requires greater presence in the literature and within local government environments to compel local governments to pursue its delivery. Concerning the challenges of resourcing Smart Heritage for its practical delivery, the research finds that local governments do not sufficiently resource Smart Heritage with staff, processes, and financial capabilities. As the interview summaries in Chapters Five, Seven, and Nine record, this challenge can hamstring positive efforts within local governments. Therefore, addressing this challenge is paramount in the delivery of Smart Heritage within local governments, and that is why the Smart Heritage Principle 'Resource' focuses explicitly on this matter.

10.3 Reflecting on the Research Methodology and Limitations

The research's methodology aimed to deliver practical guidance for implementing Smart Heritage in local government. The conceptually elusive smart city and heritage disciplines were first reviewed to aid the definition of the emergent Smart Heritage discourse. This theoretical undertaking enabled the researcher to confidently apply the Smart Heritage discourse to three Australian and one New Zealand local government case studies to ultimately produce the Smart Heritage Principles that guide the local government sector. The methodological structure involved two stages of inductive Content Analysis of smart city and heritage strategies and Interviews with smart city and heritage advisors from the Australian case studies, then deductive Thematic Synthesis on the data. On reflection, the methodology effectively engaged the two distinct disciplines in these organisations and converged them into a discernible discourse within a practical setting. The Smart Heritage definition in Chapter Two and the Content Analysis and coding of relevant components in Chapter Four offered the researcher theoretical footholds to investigate the discourse's practicalities in Chapter Five and Seven's Interviews. The Thematic Synthesis in Chapters Six and Eight offered a practical method to distil the vast volumes of data into meaningful findings. The methods adhered closely to traditional qualitative approaches and methods to base the research on known and tested research mechanics. The transitions between inductive Content Analysis and Interviews and deductive Thematic Synthesis produced a transparent research methodology and minimised 'conceptual noise' from entering the research

by avoiding multiple methods. The three Australian local governments offered relevant smart city and heritage data and a broad range of contexts to form the Smart Heritage Principles. The New Zealand local government case study validated the Smart Heritage Principles as relevant and applicable to the broader local government sector.

Regardless of this clear and straightforward methodological structure, the research's switch between constructivist and pragmatist epistemologies is an underlying limitation. This shift between epistemologies shortens the investigative time for the interpretative stages in the research, as the researcher must move on to the practical delivery aspect to answer the research questions. Some may fault this truncation of interpretation or argue that the interpretation only extends until a pragmatic solution is visible, then the interpretation stops, leaving knowledge undiscovered. However, the researcher contends that the interpretative process assessed all the available data in the case studies' policies and operations. Any extension to the interpretation process would require additional case studies or additional methods, such as anthropological observation. The thesis' length and structural limitations and the travel restrictions during the research period would not allow these or other more in-depth interpretation methods.

Another primary limitation is the research's scope and the data sample size. The research's scope to define a new discourse from the literature then apply it in a practical setting stretches the Smart Heritage definition across the academic and professional settings. These settings hold differing worldviews and requirements for deeming a definition valuable. The three Australian and one New Zealand local government case studies do not represent all the local governments in either country or globally. The inability to interview the Smart City Advisor for the City of Newcastle in the Stage Two Interviews hindered the researcher's dataset for deducing the principles relevant for their specific role and case. Therefore, the Smart Heritage definition and the Smart Heritage Principles are arguably deficient to fringe cases and contextual nuance in the academic and professional settings. However, the research mitigates this limitation from conceptual difference and ill-fitting cases through its high-level framing of the Smart Heritage Principles. The purpose of these principles is to instigate the general direction for local governments to deliver Smart Heritage rather than prescribe governance structures, internal mechanisms, and practical initiatives in these organisations. The principles' document clearly

states that each local government must deploy discretion around their reading and application of the principles. The local government sector's breadth and constant evolution of the smart city and heritage disciplines mean that such research is unlikely to apply to all councils, researchers, and professionals. The researcher highlights this issue in the introductory sections of the Smart Heritage Principles document and Chapter Two, describing the ever-expanding smart city definitions and various heritage sub-disciplines like Archaeological Heritage differing from Built Heritage. Nevertheless, as this research is the first substantial definition of Smart Heritage in the academic literature and practical application of the discourse, it covers a discernible and valuable proportion of the academic and practical ground for delivering Smart Heritage in local government.

Other minor limitations stem from the smart city and heritage criticisms in Chapter Two. The criticisms are shortcomings in Smart Heritage's contributing disciplines, and it is unclear whether Smart Heritage and the Smart Heritage Principles resolve or address them. If unresolved or not addressed, the research findings may continue these shortcomings into the Smart Heritage discourse. In particular, the criticism that the smart city discipline lacks clarity is understandable as Smart Heritage is another socially complex discourse within the already complicated smart city ecosystem. The Authorised Heritage Narrative criticism is also pertinent for both disciplines. The researcher primarily engages Western and Global North smart city and heritage literature in Chapter Two and engages Western case studies only. Understandably, Eastern and Global South societies may hold different perspectives on the disciplines. Therefore, the research and principles are likely valuable primarily to Western and Global North local governments and do not comprehensively address all aspects for Eastern and Global South governments. The Smart Heritage discourse and principles could also unconsciously impose Western and Global North perspectives.

On weighing the limitations and considering alternative methodologies to answer the question, it is not apparent that there would be better suited structural arrangements of the methods or different methods that would address the research's unique context and purpose. The research's specific policy and operational research domains offer content analysis and interviews as traditional methods of inquiry. These methods are understood within governments and easily

engage with the policy and operational systems in the organisations. Alternative methods, such as anthropological observation of smart city and heritage advisors, would likely encounter barriers to gaining approval from advisors and their managers due to privacy concerns and hesitations that observation would interfere with their work effectiveness. Also, changes to the methods would likely require a different primary research question and research purpose that seek to deliver Smart Heritage in contexts other than policy and operations, for example, in theoretical contexts. It would also likely require different epistemological understandings, which would materially change the research's direction and may not offer practical solutions. Therefore, any change would not specifically inquire into the rise in smart discourses in local government and how to deliver Smart Heritage in these organisations practically. As such, the researcher questions the applicability and industry value of alternative research questions and methodologies.

10.4 Contributions to Theory

The research contributes the first comprehensive exploration and definition of Smart Heritage in the academic literature. It is a significant conceptual offering as it crystalises a relevant discourse for global, national, and local government organisations, innovators, researchers, and civic and professional leaders who balance the needs of urbanisation and a connection with the past. As Chapter Two records, these concerns exist independently within the smart city and heritage disciplines as conceptual drivers for each sector. The research accounts explicitly that Smart Heritage is a smart novel discourse, forming from the convergence of the smart city and heritage disciplines. It reflects Brusaporci's (2020) recent claim that it is distinct discourse and adds the theoretical context of the contributing disciplines. Without these merged contributions, the literature at the intersection of the smart city and heritage disciplines would remain a patchwork of loose incidental references and discussions. Therefore, the researcher's contribution of the discernible and defined Smart Heritage discourse creates the unified theoretical framework on which smart city and heritage researchers can find shared tasks to collaborate on and advance the concept.

The research also offers a contemporary review of the smart city and heritage disciplines as a secondary contribution to theory. The smart city discipline's review finds that the discipline only recently emerged from its turbulent adolescent years. It underwent the quick adoption of new

elements across two decades, and the discipline's evolution is slowing around a new holistic and system-based understanding of smart cities. The academic literature records that at the start of the 21st century, the smart city was evolving from a technocratic view. It expanded beyond physical information communication technologies and 'wired city' and the 'digital city' associations (Dutton, 1987; Ishido, 2002; Partridge, 2004). The early comprehensive definition from Giffinger et al. (2007) embodies its expansion into economic, governance, mobility, the environment, and people and liveability elements. The smart city then refined the multi-element characterisation through testing various structural forms and mixtures of these elements across the century's second decade (Nam & Pardo, 2011; Caragliu et al., 2011; Townsend, 2013). This refinement consequently rejected the multi-element characterisation, favouring a holistic city-wide system characterisation of the smart city. For example, Yigitcanlar et al. (2018) proposed a 'multidimensional smart city framework' of policy, community, and technology drivers that intertwine to produce desired outcomes within cities. Since Yigitcanlar et al. (2018), many commentators have reflected on the rapid rise in popularity and expansion of the disciplines' elements. A common discussion point in this reflection is the privacy controversies and 2020-cancellation of the smart city Quayside project in Toronto, headed by Alphabet-owned Sidewalk Labs (Goodman et al., 2020; Morgan & Webb, 2020). The struggles over privacy and the end of this project appear to have instigated a resting point in the smart city's evolution, leaving this holistic city-wide system characterisation as its current understanding. The research contributes this contemporary review of the smart city discipline's evolution.

The heritage discipline's review finds that the discipline is advancing beyond Digital Heritage as it converges with smart technologies and that Smart Heritage is the next step in its development. The academic literature in Chapter Two records that the UNESCO *Charter on the Preservation of Digital Heritage* (2003) dominated the heritage discipline's engagement with technology until recently. This charter frames technology as a passive store of heritage resources from which people can access. It regards technology as an archival tool and for displaying stored historical data through screens and projections. However, the academic literature indicates that the Digital Heritage definition is losing applicability as researchers engage active technologies that automatically and autonomously curate historical narratives. This thesis records Thwaites (2013) as the first to aspire beyond Digital Heritage by seeking "the on-going curation of work forward

in time as the technology evolves”. Since then, more heritage researchers have explored the practical applications of automated and autonomous technologies. Some of these researchers still awkwardly relied on Digital Heritage as a theoretical base, but it is evident that heritage’s innovation has moved beyond archiving and display (Qiu et al., 2015; Wang et al., 2018). Recently, researchers have been more confidently seeking a new frontier for the heritage discipline. Borda and Bowen (2017), Mar et al. (2018), and Brusaporci (2020) demonstrate this search by explicitly discussing technological heritage applications without reference to Digital Heritage but instead referring to the smart city and its associated concepts. Therefore, it is evident in the literature that the heritage discipline is advancing beyond Digital Heritage. The review of the heritage discipline in Chapter Two provides the case for this advancement. The definition of Smart Heritage offers the theoretical grounding for its expansion into this new discourse.

10.5 Recommendations for Further Research

The research in this thesis has set the course for further research into Smart Heritage as an innovative theoretical discourse and a practical tool for local governments. Through the contribution of the first comprehensive definition of Smart Heritage, further research has a basis for criticism and expansion of the proffered definition in Chapter Two. The criticism and expansion would likely echo the evolutionary pathways of the smart city and heritage disciplines, where researchers introduce new elements and perspectives that challenge definition that then undergo further review. Optimistically, this would lead to a distinct Smart Heritage sector within academia and professionalism as researchers engage with the discourse. The sector would likely attract academic and professional experts from the Digital Heritage discourse as Smart Heritage is the logical next step for those converging technology and the past. Therefore, the researcher recommends further investigation into the theoretical dimensions and practical applications of the novel Smart Heritage discourse and that researchers challenge and expand the definition in this thesis.

A start for this further investigation could be analysing high-level international heritage and smart city policy documents, such as those published by the United Nations, the European Commission, national governments, and international organisations like ICOMOS, to identify Smart Heritage on the global stage. This analysis would expand the conceptual insights into Smart

Heritage and offer additional political and international contexts to develop its definition. Another opportunity could be researching the discourse's presence and opportunities in different case studies, particularly those with Eastern cultures and from the Global South and other countries. These additional case studies would buttress the initial work by Angelidou et al. (2017), Angelidou and Stylianidis (2020), and now this thesis regarding Smart Heritage's application into governance contexts. They would provide additional data to refine knowledge on how to deliver Smart Heritage in local government.

The researcher presumes that the proposed definition will undergo substantial scrutiny from those in its contributing disciplines and critics. The researcher anticipates comments from architectural heritage professionals because the discourse's heritage characterisation does not prioritise buildings or objects, as is their common professional view. Chapter Two details their strong professional and organisational preference for physicality and objective categories. The Wellington City Council Heritage Advisor's comments in Chapter Nine also signal that heritage professionals will defend their political expertise in local government, which appear to be a sensitive topic, through a more objective characterisation of heritage. Of an equal measure, smart city researchers will test the contributing smart city understanding as new elements of the smart city emerge and evolve its remit. Critics will transfer the existing and valid criticisms of the disciplines to the new Smart Heritage discourse. Notably, the economic and neo-liberal criticisms that the smart city is a driver of private and 'big tech' wealth and influence over the public city. The researcher encourages the contributing disciplines' researchers to engage with Smart Heritage because it enables them to become aware of each other, further developing the Smart Heritage discourse. The researcher also welcomes open discussion about the underlying disciplines' criticisms because these are valid. Smart Heritage must address them to advance as a socially and culturally equal and just tool for delivering placemaking, interpretation and information, and community outcomes in cities.

The Smart Heritage Principles direct local governments to engage Smart Heritage as a practical tool for resolving issues in their jurisdictions. As noted in Chapter Nine by the Wellington City Council advisors, further research would apply these principles in a local government alongside its internal staff to materialise Smart Heritage in a council's strategies and

operations. The research would contextualise the discourse into the specific council's context, identifying its smart city and heritage teams purposes, their organisation's overarching strategic direction and resources, and how Smart Heritage could align with or support the existing aspirations and initiatives. Next, a fine-grained process would consider the operational realities of delivering Smart Heritage in their organisation, such as which individual would lead its delivery, which funding source would support it, and internal reporting lines. Research through this approach would likely unveil deeper understandings about local government's political and procedural nuances and the underlying perspectives of the contributing smart city and heritage disciplines. The researcher imagines this intimate level of research would expand into anthropological methods, such as observation of and participation in social groups, in councils. Ultimately, the researcher recommends that further research materialises effective Smart Heritage strategies and operations in local government to show academia, professionals, and other governments that Smart Heritage offers promising outcomes for cities globally.

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APPENDIX ONE
SMART HERITAGE PRINCIPLES FOR LOCAL
GOVERNMENT

Smart Heritage Principles

A GUIDE FOR LOCAL GOVERNMENT
STRATEGIC DOCUMENTS & OPERATIONS

Published by David Batchelor. May 2021.

A product of doctoral research in Wellington School of Architecture at Victoria University of Wellington.
Under the Supervision of Prof. Marc Aurel Schnabel, PhD, and Dr. Michael Dudding.

Images Credit: Destination NSW and Visit Victoria.

Executive Summary

The Smart Heritage Principles: A guide for local government strategic documents & operations is a guidance document for local governments to deliver Smart Heritage.

Smart Heritage is the convergence between the smart city and heritage disciplines that intertwines the autonomous and automatic capabilities and innovation of smart technologies with the contextual and subjective interpretation of the past. It advances the innovative understanding of technology as the lead curator in the technological and heritage experience.

The Smart Heritage Principles are for local government staff and elected officials. There are four principles:

- **Recognise** Smart Heritage as a long-term and short-term discourse within strategic documents and operations
- **Deliver** Smart Heritage through place-making, interpretation and information, and community outcomes
- **Resource** Smart Heritage with staff, processes, and financial capabilities to achieve delivery and innovation targets
- **Innovate** on opportunities that arise from converging smart technologies and the past that support the strategic and operational journey

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Introduction

The ***Smart Heritage Principles: A guide for local government strategic documents & operations*** is a guidance document for local governments to deliver Smart Heritage.

This section introduces the Smart Heritage Principles document and contextualises it against the expanding application of smart city in cities globally.

Over the past ten years, there has been a dramatic increase in local governments applying the smart city discipline to resolve challenges in their jurisdictions. Many notable cities have adopted the discipline in coordinated programs, such as London, Amsterdam, Toronto, and Melbourne. The UN-Habitat and Organisation for Economic Co-operation and Development also encourage governments to deploy smart technologies to address rapid urbanisation challenges.

The smart city discipline offers local governments the framework to converge automated and autonomous technologies with other disciplines. These technologies promise improved effectiveness and efficiencies for councils and citizens by using data and computer-led decision-making to tailor services to specific needs in real-time.

In more recent years, local governments converged the smart city discipline with other disciplines, forming innovative 'smart' discourses. As a result, there now are established 'smart' mobility, economic, and infrastructure discourses within local government strategic documents and operations.

The ***Smart Heritage Principles*** provide practical guidance for local governments to converge the smart city discipline with the heritage discipline, delivering the novel Smart Heritage discourse. The guidance is the first of its kind for Smart Heritage in the academic and professional literature.

It presents four principles that address the core themes in the convergence and offers practical approaches to deliver the Smart Heritage discourse in local government environments.

This document is a product of doctoral research in the Wellington School of Architecture at Victoria University of Wellington.

OCEAN BATHS

What is Smart Heritage?

Smart Heritage is an innovative discourse that local governments can deploy in their strategies and operations.

This section introduces Smart Heritage, briefly describes its contemporary application, and discusses its contributing disciplines.

Smart Heritage

Smart Heritage is the convergence between the smart city and heritage disciplines that intertwines the autonomous and automatic capabilities and innovation of smart technologies with the contextual and subjective interpretation of the past.

It is a discourse that advances from previous technology and heritage confluences, such as digital heritage and virtual heritage, through its innovative framing of technology as the lead curator in the technological and heritage experience.

Smart Heritage adopts the shared characteristics from the smart city and heritage disciplines. It views the city and heritage as various systems that apply, adapts, and respond to contexts. Smart Heritage converges these shared characteristics into a unified discourse where the city and the past intertwine.

The academic and professional literature contains an increasing quantity of references to Smart Heritage.

These references are at the intersection of the smart city and heritage disciplines and primarily within museum and historical artefact management, tourism, governance, and systems contexts. Smart Heritage researchers converge the disciplines to enhance the understanding, experience, and operation of heritage and smart cities.

Each reference contributes a new understanding and practical application for the discourse. Chianese and Piccialli (2014) apply Smart Heritage within museums and static heritage spaces. They describe its function as "the object begins to talk about itself, its story and its status by means of multimedia content and facilities". Mar et al. (2018) apply Smart Heritage in a tourist walking tour application that automatically curates an "optimised visit sequence" based on personal preferences and real-time data of the city's attractions.

These references highlight the curatorial capabilities of Smart Heritage. Additional capabilities are possible with its broader application.

See Further Reading on page 18 for the references.

The Smart City Discipline

The smart city discipline grew from the notion that the city can be automatic and autonomous. It initially expanded across physical technology applications, before incorporating complex social elements and a holistic city-wide system framework, where the city is a self-regulating entity that serves itself and its citizens (Ingwersen & Serrano-López, 2018).

The definition of what a smart city is has evolved over the past two decades. A new prominent definition appears every few years then undergoes revision and critique until it is ultimately replaced by another. Driving this evolution is interest in the smart city by new audiences outside its initial technocratic adherents. These new audiences draw from an expanding array of backgrounds, such as the governance, mobility, infrastructure, sustainability, wellbeing, and community sectors.

The smart city is understood currently as a holistic city-wide system consisting of multi-layers of policy, community, and technology drivers (Yigitcanlar et al., 2018). Commentators are currently focusing on how this system balances privacy and the public/private balance of power between the owners of technology and the users (Yigitcanlar et al. 2019).

It is likely that the smart city discipline is undergoing reflection before its subsequent expansion into new applications.

The Heritage Discipline

Heritage is an abstract and subjective valuing process that interprets the past. The process and its results are separate for individuals, collectives, societies and vary between contexts (Smith, 2006; Janssen et al., 2017).

Heritage application as a discipline subjects it to government and practitioner frameworks that influence its processes and results. Intergovernmental and national government organisations direct heritage through governed entities, such as designated historical buildings, landscapes, and objects. These classifications reflect the organisation's specific political purpose, jurisdictions, and relationship with the past.

Practitioners subject heritage to professional categories, such as architectural heritage, archaeological heritage, cultural heritage, and digital heritage. Cultural practitioners, like community and ethnic groups, ascribe identities to heritage, such as indigenous heritage, settler heritage, and authentic heritage.

These frameworks splinter the discipline outside of the academic literature but retain the abstract and subjective valuing process at their core. The heritage discipline is well-established in the academic and professional realms.

See Further Reading on page 18 for the references.

The Benefits of Smart Heritage

Smart Heritage benefits local government through place-making, interpretation and information, and community outcomes. Additional benefits will arise through innovation.

This section introduces the current benefits of Smart Heritage for local governments.

Smart Heritage benefits local governments by enhancing historical narratives through leveraging smart technologies' capabilities, and intensifying technological applications' by embedding heritage's social and cultural value within their experiences. Therefore, Smart Heritage offers cities an innovative framework that utilises both the smart city and heritage disciplines' functions to benefit the city.

Like in the now-established Smart Mobility and Smart Infrastructure discourses, this bi-directional relationship between the disciplines acts as a reflective and evolutionary force that drives creative outcomes. It introduces constructive disruption to knowledge silos within the disciplines that enable novel assemblages of expertise and perspectives. Organisations benefit from the resulting new perspectives.

The Smart Heritage Principles identify that Smart Heritage currently benefits placemaking, interpretation and information, and community outcomes in local governments. The principles envision additional benefits will arise through further innovations and research, likely serving indigenous and tourism outcomes.

The current benefits are:

- **Place-making**

Place-making is a process and philosophy that creates a connection between people and a location by capitalising on local assets, identities, and aspirations. Smart Heritage supports place-making by emphasising the identity of places through the deployment of technology and heritage.

- **Interpretation & Information**

Interpretation is the process of communicating information and understanding its meaning. Smart Heritage supports this outcome by using technology to communicate digitalized information while leveraging heritage's cultural and social values to create interest and connection.

- **Community**

A community is a group of people with a common characteristic or interest, such as shared geography, cultural identity, or pastime. Smart Heritage supports this outcome by uplifting specific identities in place through technologically and historically targeted deployments.

Cultural Walk Trail →

Who are the Principles For?

The Smart Heritage Principles are for local government staff and decision-makers. It is also critical to recognise how broader stakeholders support Smart Heritage's delivery.

This section identifies the Smart Heritage Principles' key audience and broader stakeholders' role in the delivery of Smart Heritage.

Local governments typically administer utility services, community administration, and urban development regulations. Through these tasks, they deliver smart city initiatives and manage, protect, and enhance heritage values. Local government organisations are usually the lowest level of formal governance in a country, under the national, state, and regional councils and, therefore, are directly responsible for smart city and heritage outcomes in cities.

The Smart Heritage Principles are for those staff and decision-makers who directly administer the contributing disciplines in these organisations. It includes managers, team leaders, technical advisors, and elected officials. These individuals bridge the disciplines and have the most influence in delivering Smart Heritage through their daily actions, expertise, and input into the overarching governance process.

These staff and decision-makers should consider the principles during the preparation of future strategic documents and daily operations.

Local governments are only one part of successfully delivering Smart Heritage in cities. National, state, regional, research, private business organisations and experts, and the public are broader stakeholders in delivering the discourse.

These stakeholders can support Smart Heritage's delivery through legislative, political, financial, innovative, and creative means. Their contribution may focus on a particular aspect of the discourse, such as the smart city or heritage discipline. However, collectively, their assemblage constitutes a comprehensive patchwork of voices that the local government can mediate between in their Smart Heritage delivery.

Local governments should recognise stakeholders' contributions and potential partnerships when implementing the principles. The nature and scale of these partnerships vary according to the local context.

The table on the following pages identifies how these broader stakeholders support the delivery of Smart Heritage.

Organisation**Role****National government**

National governments are responsible for the high-level legalisation and political direction of local governments. To support Smart Heritage, national governments could:

- Engage innovative technologies in national heritage legalisation and policy documents;
- Incorporate heritage issues in national technological legislation and policy documents;
- Initiate a national discussion regarding innovative solutions for managing heritage in cities through national institutions;
- Incorporate Smart Heritage in nationally significant public works.

State & regional government

State and regional governments implement the national government's agenda through legalisation and financial support on state/regionally significant issues. To support Smart Heritage, state and regional governments could:

- Coordinate Smart Heritage initiatives across local governments;
- Offer expertise to under-resourced local governments for upskilling staff and installing smart city systems;
- Direct local governments to include innovative technologies in heritage regulations and initiatives;
- Fund Smart Heritage initiatives in local government, research, business, and other organisations.

Research organisations

Research organisations consist of universities and research institutes. They typically create innovative new solutions for the public and private sectors. To support Smart Heritage, research organisations could:

- Support interdisciplinarity between smart city and heritage in their research faculties;
- Share their Smart Heritage innovations and expertise with other organisations.

Organisation

Role

Private business owners and experts

Private business owners and experts often implement new innovations through urban developments and recommending solutions. To support Smart Heritage, these parties could:

- Incorporate Smart Heritage applications into urban development projects and designs for public and private works;
- Educate professional associations on the interdisciplinarity between the smart city and heritage, and the resulting Smart Heritage discourse;
- Engage both heritage and smart city experts in the projects' design process.

The public

The public includes citizens, and cultural and community organisations. They inform and receive the outcomes from local governments and the other stakeholders. To support Smart Heritage, the public could:

- Initiate a public discussion about converging heritage and technological narratives in localities and their cities;
- Lobby local governments to recognise, deliver, resource, and innovate Smart Heritage in strategic documents and operations;
- Engage and support other stakeholders in their initiatives by offering skills, attention, and patronage.

Smart Heritage Principles

The Smart Heritage Principles are strategic and operational directives that guide local governments to deliver Smart Heritage. There are four Smart Heritage Principles. Each principle is independent and addresses a distinct aspect of Smart Heritage's delivery. The document provides practical approaches and context for each principle. Local governments are encouraged to adopt all the principles.

It is important to note that the principles are not rules or universal solutions for every local government in Australia or worldwide. Instead, they focus attention on the key themes of recognition, delivery, resourcing, and innovation. These themes likely vary in applicability between local governments and countries. Therefore, each local government must consider its context, needs and aspirations when applying the principles.

The following sections present the four Smart Heritage Principles under their respective overarching themes. Each principle is a statement, followed by its significance, approaches for delivering the principles, and context.

GRAIN STORE

PRINCIPLE ONE

Recognise

RECOGNISE SMART HERITAGE AS A LONG-TERM AND SHORT-TERM DISCOURSE WITHIN STRATEGIC DOCUMENTS AND OPERATIONS

The first principle acknowledges that Smart Heritage is present in local government strategic documents and operations. However, local governments recognise Smart Heritage in differing contexts, and some recognise it more explicitly than others.

The principle directs the local government sector to formally recognise Smart Heritage and directs each council to contextualise it in their distinct strategic and operational environments.

The principle is valuable for delivering Smart Heritage because it ontologically materialises Smart Heritage as a known and conceptually tactile discourse for local governments. Its recognition creates the foundation for councils to deliver, resource, and innovate Smart Heritage in their strategic documents and operations, as the later principles address.

Approach

- Recognise Smart Heritage in strategic documents to empower decision-makers to lead its delivery, and enlist key staff to advocate for and manage Smart Heritage's recognition in council operations.
- Investigate how the disciplines converge directly and indirectly in the organisation. Support the innovative convergences between the disciplines in the organisation.
- Frame Smart Heritage as a discourse that serves existing strategic and operational directions.
- Insert Smart Heritage into strategic documents and decision-making processes as an option to resolve issues.

Context

- Smart Heritage is present in councils through circumstantial convergence between the smart city and heritage disciplines' strategic components and operations. It is typically not identified directly in strategies or operational protocols.
- Smart city and heritage advisors often have a low technical understanding of each other's discipline and the other advisor's role in the organisation. The advisors generally do not perceive the other discipline as relevant to delivering their strategic and operational outcomes.
- Smart Heritage often occurs through piecemeal and spontaneous convergences within operations and produce innovative solutions for project-specific issues. These convergences are often poorly recorded in reporting methods and disconnected within the organisations' structure and management. As a result, these convergences are often not recognised by decision-makers.
- The staff are best suited to recognising Smart Heritage and its benefits in the organisation due to their proximity to its applications.
- Strategic heritage documents may pre-date the introduction of the smart city discipline and operations in the council, resulting in a restricted view of how technology and the past may intersect in the documentation.

“SMART HERITAGE ENABLES THE COUNCIL TO BETTER UNDERSTAND WHY THAT PLACE IS SIGNIFICANT TO INFORM FUTURE EVENTS OR PHYSICAL WORKS.

THAT WAY, WE CAN BE MORE RESPONSIVE TO HOW THE COMMUNITY SEES ITS HERITAGE SIGNIFICANCE.”

HERITAGE ADVISOR
CITY OF NEWCASTLE

PRINCIPLE TWO

Deliver

DELIVER SMART HERITAGE THROUGH PLACE-MAKING, INTERPRETATION AND INFORMATION, AND COMMUNITY OUTCOMES

The second principle addresses that local governments currently deliver Smart Heritage through place-making, interpretation, and community outcomes.

The principle directs the local government sector towards these outcomes because they currently bridge the smart city and heritage disciplines in local government strategic documents and operations. Therefore, these specific outcomes present the optimal avenues for delivering Smart Heritage in the local government sector currently.

This principle is valuable because encouraging these optimal outcomes enables local governments to efficiently and effectively deliver Smart Heritage and for the discourse to become established in cities.

Approach

- Align Smart Heritage's current delivery outcomes closely with the city's existing needs and initiatives to allow Smart Heritage to benefit from existing political support and not introduce new demands and organisational changes.
- Leverage the unique technological and heritage narratives that Smart Heritage enables to rebalance existing discourses in place-making, interpretation and information, and community initiatives.
- Insert directives in Smart Heritage-related strategies and decision-making processes that instigate reflection on the council's understanding of smart technology and the past.

Context

- Smart Heritage delivers multiple outcomes for local governments that reflect their contexts, needs, and ambitions. In general, Smart Heritage currently delivers place-making, interpretation and information, and community outcomes for councils. However, each local government understands and prioritises these outcomes differently.
- Delivering Smart Heritage can uncover new perspectives for staff and communities about their city through the novel convergence of smart city and heritage datasets.
- Smart Heritage can challenge dominant cultural discourses within a city by using digital platforms to reframe city narratives around marginalised cultural identities. Smart technology can uplift diverse and ignored data and present it to counter-balance visually dominant narratives in the city like colonial histories.
- Smart Heritage provides insightful data on the user experience of a place, consumption of information, and a place's value to the city and people. Through data feedback channels, local governments can understand how people interact with technology and the past to produce more meaningful experiences.

“ SMART HERITAGE REALLY SHOWS IN THE IMPLEMENTATION OF PLACE-MAKING AND COMMUNITY OUTCOMES.

THERE DEFINITELY IS AN APPETITE THERE.

HERITAGE ADVISOR
CITY OF MELBOURNE

PRINCIPLE THREE

Resource

RESOURCE SMART HERITAGE WITH STAFF, PROCESSES, AND FINANCIAL CAPABILITIES TO ACHIEVE DELIVERY AND INNOVATION TARGETS

The third principle identifies that local governments do not sufficiently resource Smart Heritage's delivery. Local governments are deficient in adequate processes, financial budgets, and available staff for Smart Heritage.

Building on this knowledge, the principle directs local governments to provide staff time and expertise, internal processes, and financial budgets in accordance with each council's ambition, so they can implement Smart Heritage effectively.

The principle is valuable for delivering Smart Heritage as it addresses its core constraints in the local government sector. Addressing Smart Heritage's resourcing constraints will improve its practical delivery and effectiveness.

Approach

- Allocate core duties and reporting lines to individual staff members and management for Smart Heritage initiatives, and align these duties with key performance indicators if required.
- Circulate the smart city and heritage strategic documents during their drafting to ensure that the disciplines' teams have input and understand the shared resourcing requirements.
- Resource the smart city and heritage teams with the time, capability, and authority to explore how Smart Heritage can serve the organisation, understand its specific delivery needs in the organisation, and build internal delivery processes.
- Engage other council teams to support where possible under guidance from the smart city and heritage staff.

Context

- There is often little interdisciplinarity in operational procedures and funding structures to deliver Smart Heritage in local government. Smart city and heritage teams typically lack direct communication channels and funding sources, which hinder resourcing their convergence.
- Smart Heritage may require new accountabilities and trial initiatives to prove their benefits to the broader organisation.
- Specialised roles and discipline silos reduce staff's confidence and capability to resolve interdisciplinary resource issues. Typically, the disciplines are in different locations in the organisation and under different managers.
- Local governments and managers can be sceptical to resource Smart Heritage because the benefit for their discipline's strategic direction and operations is unclear or not known.
- Smart city and heritage advisors in local governments are often at-capacity with regulatory duties, such as assessing development assessments, which results in little time for additional convergences or efforts to deliver Smart Heritage. Other teams in the organisation hold relevant expertise, capacity, and alternative funding channels that the advisors can utilise to resource Smart Heritage.

“WE’RE A SMALL COUNCIL AND HAVE ACCESS TO EACH OTHER VERY EASILY. BUT, I THINK THERE IS A GAP BETWEEN THE STRATEGIES THAT NEEDS RESOLUTION.

BUT, I THINK IT’S MORE OPERATIONALLY THAT WE SHOULD BE ABLE TO DO BETTER.

SMART CITY ADVISOR
BROKEN HILL CITY COUNCIL

PRINCIPLE FOUR

Innovate

INNOVATE ON OPPORTUNITIES THAT ARISE FROM CONVERGING SMART TECHNOLOGIES AND THE PAST THAT SUPPORT THE STRATEGIC AND OPERATIONAL JOURNEY

The fourth principle envisions that Smart Heritage can deliver additional innovation for the local government sector, including for the existing Smart Heritage outcomes and other outcomes. Therefore, the principle directs the local governments to search, research, and test new Smart Heritage applications that arise along their strategic and operational journey.

It encourages councils to expand the discourse's outcomes beyond the current benefits stated in the third Smart Heritage Principle, and ensure that these additional benefits suit their context and do not require unjustifiable resources.

The principle is valuable for Smart Heritage's delivery as it expands its applicability and ability to resolve issues in cities. With more useful applications, Smart Heritage becomes further engrained in local government strategic documents and operations and can resolve additional issues in cities.

Approach

- Become more ambitious using technology to tell stories, promote the city, and engage the community. Leverage its innovative aspects to challenge traditional and siloed governance models in the organisation and within disciplines.
- Surface and engage new or marginalised knowledge about underrepresented cultural narratives to discover new application contexts that could resolve social and cultural imbalances e.g. indigenous, natural, migrant, etc.
- Encourage other teams in the organisation and external stakeholders to adopt, innovate, and deliver Smart Heritage in their initiatives beyond the smart city and heritage advisors and the councils. Encourage research, private sector, and community economic, tourism, and other applications.

Context

- The shared aspirations in the council's smart city and heritage strategies sign-post additional innovations for Smart Heritage. These shared aspirations are for tourism, indigenous, environmental sustainability and natural, and economic outcomes.
- Smart technology and the past present drastically different worldviews. The smart city thrives on innovation and the new, while heritage often emphasises tradition and the past. Local governments can challenge their own and others' governance and discipline silos by applying a Smart Heritage solution to an issue.
- Innovation is an irritative process of discovery, testing, and success with new opportunities arising from all stages of the journey. Smart Heritage requires ongoing and additional innovation to unlock its full potential.
- Smart Heritage benefits from much of the technological infrastructure and historical resources already present within cities. Most councils already have the internal expertise and external partnerships to deliver Smart Heritage.
- Partnerships with other teams and external partners can illuminate new opportunities that are not apparent to the smart city and heritage advisors in the organisation. Partnerships can lead to market-viable solutions and new applications for Smart Heritage.

“

SMART CITY TECHNOLOGY MAY DISRUPT HERITAGE OR HERITAGE MAY DISRUPT SMART TECHNOLOGY.

HOW WILL WE BECOME THIS SELF-SUSTAINING CITY USING SMART TECHNOLOGY WITHOUT DISRUPTING THE HERITAGE PRECINCTS?

SMART CITY ADVISOR
BROKEN HILL CITY COUNCIL

Smart Heritage Examples

Smart Heritage initiatives are already occurring in cities across Australia. These initiatives can inspire other local governments to deliver Smart Heritage in their jurisdictions.

Below are example initiatives that deliver place-making, interpretation and information, and community outcomes. They are based on existing initiatives by local governments. Local governments must consider their distinct context, needs, and aspirations when delivering Smart Heritage.

Example Initiative: Placemaking

Deploy smart technologies to deliver experiences and manage assets at remote, seasonal, or unstaffed historical sites.

Smart technologies offer the practical means for people to experience less-resourced places through automated or autonomous selling of tickets, unlocking and care for buildings, sites, and objects, and delivering heritage narratives. Smart Heritage initiatives enable technology to lead users through experiences and manage historical sites without direct human input or cost.

Broken Hill City Council aims to explore Smart Heritage placemaking initiatives to deliver experiences in their historic mining and outback sites.

Image: Intercontinental The Rialto Hotel, Visit Victoria.

Example Initiative: Interpretation and Information

Utilise smart pedestrian-tracker and mobile data-capture technologies in historic buildings, museums, and public buildings to curate users' interpretation and information experience.

These and similar technologies can shape how controlled sites and museums deliver heritage narratives. Smart Heritage initiatives understand the interests of their audience to enhance the successful interpretation of information and enjoyment for the user.

The City of Newcastle is experimenting with Smart Heritage interpretation and information initiatives to deliver experiences in their museums and public buildings.

Example Initiative: Community

Embed heritage narratives within smart city tools and decision-making frameworks to influence technological forms, purpose, and experiences.

Heritage narratives enhance the effectiveness of smart city initiatives by introducing cultural and social value for users. Smart Heritage initiatives also enable local governments to uplift marginalised community narratives, particularly those that are non-tangible or not visible, such as cultural storytelling and archaeology.

The City of Melbourne is exploring Smart Heritage community initiatives to uplift indigenous narratives in the organisation's planning frameworks and smart city decision-making.

Further Reading

Literature supports the further understanding of Smart Heritage and its delivery within local government. Smart Heritage literature is emerging, and the smart cities and heritage disciplines offer useful texts.

The readings below are the recent contributions to Smart Heritage and relevant contributions from the smart city and heritage disciplines.

Smart Heritage Literature

- Angelidou, M., Karachaliou, E., Angelidou, T., & Stylianidis, E. (2017). Cultural heritage in smart city environments. *Proceedings of the International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* (pp. 27-31). ISPRS.
- Brusaporci, S. (2020). Towards Smart Heritage: Cultural Challenges in Digital Built Heritage. In G. Pavlidis (Ed.), *Applying Innovative Technologies in Heritage Science* (pp. 271-296). IGI Global.
- Chianese, A., & Piccialli, F. (2014). Designing a Smart Museum: When Cultural Heritage Joins IoT. In 2014 Eighth International Conference on Next Generation Mobile Apps, Services and Technologies (pp. 300-306).
- Mar, A., Monteiro, F., Pereira, P., & Martins, J. (2018). An Application to Improve Smart Heritage City Experience. In M. Ioannides, J. Martins, R. Žarnić & V. Lim (Eds.), *Advances in Digital Cultural Heritage* (pp. 89-103). Springer International Publishing.

Smart City Literature

- Ingwersen, P., & Serrano-López, A. (2018). Smart city research 1990-2016. *Scientometrics*, 117(2), 1205-1236.
- Yigitcanlar, T., Kamruzzaman, M., Buys, L., Loppolo, G., Sabatini-Marques, J., da Costa, E., & Yun, J. (2018). Understanding 'smart cities': Intertwining development drivers with desired outcomes in a multidimensional framework. *Cities*, 81(November), 145-160.
- Yigitcanlar, T., Han, H., Kamruzzaman, M., Loppolo, G., & Sabatini-Marques, J. (2019). The making of smart cities: Are Songdo, Masdar, Amsterdam, San Francisco and Brisbane the best we could build?. *Land Use Policy*, 88.

Heritage Literature

- Janssen, J., Luiten, E., Renes, H., & Stegmeijer, E. (2017). Heritage as Sector, Factor and Vector: Conceptualizing the Shifting Relationship between Heritage Management and Spatial Planning. *European Planning Studies*, 25(9), 1654-1672.
- Smith, L. (2006). *Uses of Heritage*. Routledge.

APPENDIX TWO
TEXTUAL CODING SAMPLE OF RELEVANT
COMPONENTS IN THE STRATEGIC DOCUMENTS

Smart City Discipline	Heritage Discipline
Smart city as automatic and autonomous	Heritage as the abstract
Description: The smart city as automatic and autonomous technology that actively serves its populous. Key references in Chapter 2.2.1: Dutton, 1987; Ishido, 2002; Partridge, 2004.	Description: Heritage as an abstract concept that is not tangible; historic buildings, objects, places represent heritage but are not heritage itself. Key references in Chapter 2.3.1: Larkham, 1995; Lowenthal, 1998; Smith, 2006.
Smart city as physical technology	Heritage as subjective valuing
Description: The smart city as physical installations, sensors, gadgets, and trackers. Key references in Chapter 2.2.1: Mahizhnan, 1999; Bowerman et al., 2000.	Description: Heritage as a subjective process where the reader interprets value within their distinct and historical context. Key references in Chapter 2.3.1: Urry, 1990; Lowenthal, 2006; Uzzell, 2009; Smith and Waterton, 2009; Harrison, 2012; Winter, 2012.
Smart city as a social solution	Heritage as governed entities
Description: The smart city as a solution to social issues in the city, like governance, economic, wellbeing, and community. Key references in Chapter 2.2.2: Giffinger et al., 2007; Nam and Pardo, 2011; Townsend, 2013; Lara et al., 2016.	Description: Heritage as governed entities, including a subject, object, building landscape and other articles, that an organisation deems as being or representing heritage. Key references in Chapter 2.3.2: ICOMOS, 1964; UNESCO, 1972; UNESCO, 2017; Historic England, 2021.
Smart city as a system	Heritage as a category
Description: The smart city as a holistic system that contains multiple interacting elements that serve its populous and evolving context. Key references in Chapter 2.2.3: Yigitcanlar et al., 2018; March, 2018; Joss et al., 2019.	Description: Heritage as a research, professional, and group identity defined through prefixes and distinct identifiers, such as criteria, jargon, and membership. Key references in Chapter 2.3.3: ICOMOS, 1990; Resource Management Act, 1991; UNSECO, 2003; National Trust of Australia, 2014.

Textual Coding Sample of Relevant Components from the City of Melbourne Case Study, including both the smart city and heritage strategic documents.

Component	Council Plan 2017-19	Coding & Reasoning
Definition	“...to enhance the aspects of our city that make us uniquely Melbourne, and intelligently prepare for the changing needs of the community, the environment and the economy... That’s how a smart city should operate – adopting useful innovation that folds seamlessly into how we live our lives to improve our day-to-day experiences” - from ‘Melbourne as a smart city’ on the City of Melbourne website	Heritage as the abstract ‘Unique’ as an abstract quality of Melbourne. Heritage as subjective valuing References the community’s valuing of needs and experiences.
Objective	A city that cares for its environment: Reconnects people to nature and works closely with Traditional Owners to enable them to fully participate in the stewardship of the land.	Heritage as governed entities Stewardship implies governance and care over particular land. Heritage as a category ‘Traditional Owners’ are a category of land owner that identify distinct cultural and historic identifiers relating to indigenous peoples.
	A city planning for growth: Recognises and values indigenous history and land management	Heritage as subjective valuing Explicit references to the process that interprets value through the ‘indigenous history’ context. Heritage as governed entities ‘Land management’ indicates a governance structure for the land.
	A city planning for growth: Respects its past, by enhancing the character and distinctive identity of the city’s heritage buildings, spaces and landscapes.	Heritage as the abstract ‘character’ and ‘distinctive’ as abstract qualities. Heritage as subjective valuing Interpreting value (respect) through an understanding of the past.

		Heritage as governed entities A list of distinct historical entities that the city governs.
	A city with an Aboriginal focus: Acknowledges that Aboriginal and Torres Strait Islander peoples were the First Peoples of this land and respects their customs, traditions and their special relationship with the land, waterways and sea. Acknowledges the right of Aboriginal and Torres Strait Islander peoples to live according to their own values and customs, subject to Australian law. Recognises the valuable contribution made by Aboriginal and Torres Strait Islander peoples, including the diversity and strength of Aboriginal and Torres Strait Islander cultures to the heritage of all Australians. Supports the ideal of reconciliation with Aboriginal and Torres Strait Islander peoples to redress their serious social and economic disadvantage. Recognises, protects and respects Aboriginal and Torres Strait Islander heritage and cultures and understands the impact of non-Aboriginal settlement of this country	Heritage as the abstract Values and customs represent the past and are not tangible. Heritage as subjective valuing Respecting interprets value within ‘customs, traditions and their special relationship’ through a cultural context. Heritage as governed entities Reconciliation in Australia is a governance response led by state organisations. Heritage as a category ‘Aboriginal and Torres Strait Islander’ and ‘non-Aboriginal settlement’ are categories of people with distinct cultural and historical identifiers.
Provision	A city planning for growth: Melbourne respects and preserves its heritage.	Heritage as governed entities Implies a defined heritage schedule within governance documents.
	A city with an aboriginal focus: Melbourne acknowledges its Aboriginal history, heritage and identity.	Heritage as a category ‘Aboriginal’ as a distinct identifier of a category of history, heritage, and identify.

	A city with an aboriginal focus: Melbourne fosters understanding about its Aboriginal heritage and culture.	Heritage as subjective valuing Implies that the City of Melbourne supports the valuing process contextualised around Aboriginal heritage and culture. Heritage as a category 'Aboriginal' as a distinct identifier of a category of history, heritage, and identity.
Initiative	A city planning for growth: Up-to-date heritage controls and policies throughout the municipality.	Heritage as governed entities 'Heritage controls and policies' are governance tools for the City of Melbourne.
	A city planning for growth: Progress the design, planning and delivery of high quality urban renewal in Arden-Macaulay and Fishermans Bend that utilises their heritage assets.	Heritage as governed entities 'Heritage assets' are defined entities on a schedule for management by the City of Melbourne.
	A city planning for growth: Design, plan and enable a world-class innovation district in City North and deliver public realm improvements.	Heritage as governed entities Identifies governed areas and delineates the public/private divide.
	A city with an aboriginal focus: Protection, recognition and promotion of Aboriginal culture, heritage and place.	Heritage as subjective valuing Creates a valuing process within the contextual interpretation of Aboriginal culture, heritage and place. Heritage as a category 'Aboriginal' as a distinct identifier of a category of culture, heritage, and place.
	A city with an aboriginal focus: Due recognition for Traditional Owners of the land through public events and commemorations, and opportunities for elders to provide welcome to country.	Heritage as subjective valuing Public events and commemorations show the subjective valuing process through the prioritisation of specific cultural value.

		Heritage as a category ‘Traditional Owners’ are a category of land owner that identify distinct cultural and historic identifiers relating to indigenous peoples.
	A city with an aboriginal focus: Promotion of Aboriginal experiences for the public to celebrate Melbourne as an Aboriginal place.	Heritage as the abstract ‘Experiences’ as a non-tangible cultural perspective. Heritage as governed entities ‘Aboriginal place’ as a distinct area that the City of Melbourne incorporates within their governance.
	A city with an aboriginal focus: Educate the broader community about Aboriginal and Torres Strait Islander heritage and culture.	Heritage as subjective valuing ‘Educate’ implies that the community interprets value.
	A city with an aboriginal focus: Promote community understanding of reconciliation including as part of National Reconciliation Week.	Heritage as subjective valuing ‘Understanding’ implies that the community interprets value. Heritage as governed entities Reconciliation in Australia is a governance response led by state organisations. National Reconciliation Week is an event led by the state organisations.
	A city with an aboriginal focus: The ideal of reconciliation with Aboriginal and Torres Strait Islander peoples including through a treaty or other instrument of reconciliation.	Heritage as governed entities Reconciliation in Australia is a governance response led by state organisations. A treaty or other instrument is a governance tool. Heritage as a category ‘Aboriginal and Torres Strait Islander peoples’ are a category of people with distinct cultural and historical identifiers.

Component	Heritage Strategy 2013	Coding & Reasoning
Definition	“...the full range of our inherited traditions, monuments, objects and culture... Heritage is expressed through places – buildings, landscapes, public parks and gardens, infrastructure, monuments, public art and more... Heritage is also represented in objects, artefacts, archives, photographs, maps, drawings and other items... Heritage includes our traditions, events and celebrations, people’s memories, artists’ expressions, monuments and memorials. Heritage is dynamic - what is valued constantly changes as society, culture and memories change... Other aspects of heritage are reflected in culture, traditions, events, stories and memories. This strategy is interested in how these can be shared in order to build public understanding and appreciation of Melbourne’s past, present and future”.	Smart city as automatic and autonomous Constantly changing, evolving, and reacting as a discipline. Smart city as physical technology Buildings, public parks, objects, and itemised entities are physically installed in the city. Smart city as a social solution ‘Public understanding and appreciation’ as a solution to enhance the social fabric of the city.
Objective	That the many and diverse cultures and heritages of the city are recognised and celebrated. That all heritage places are well documented and their values are understood and publicly accessible.	Smart city as a social solution Understanding socially diverse heritage values improves wellbeing and community outcomes.
Provision	<i>No provisions are relevant in the strategy.</i>	
Initiative	Develop an online heritage places information system to meet the needs of the City of Melbourne, the wider community and other users, that links with Heritage Victoria’s HERMES information system.	Smart city as automatic and autonomous An installed technology database system that integrate across decision making and planning tools in the council and for the public’s access. Smart city as a social solution Heritage serving the social needs of the populous and users. Smart city as a system A new online system that implies a citywide holistic approach to managing heritage.

Investigate the establishment of a City of Melbourne heritage information portal that provides access to all Melbourne's heritage information repositories, including the City of Melbourne's own collection.	Smart city as physical technology A physical installation or online service.
Investigate, identify, assess and document gaps in the record of items and places of cultural and/or natural heritage significance.	Smart city as a social solution Addressing gaps in the record resolve social inequalities in the heritage narrative and governance.
Scope and commission a broad-scale predictive modelling of the potential for significant archaeological material to survive within the city, and implement the findings. (This has been undertaken for the CBD by Heritage Victoria.)	Smart city as automatic and autonomous The modelling likely includes automatic and autonomous technologies. Smart city as a social solution A focus on discovering significant archaeological material support the heritage narrative on forgotten Aboriginal heritage, which supports their communities and wellbeing.
Review and update Melbourne Planning Scheme local policies (22.04), Heritage Places Within The Capital City Zone and (22.05) Heritage Places Outside The Capital City Zone. Consider principles for adaptation, re-use and creative interpretation in the review.	Smart city as a social solution Creative interpretation and re-imagining historic places in new developments introduce and maintain cultural narratives in the city.
Acknowledge the heritage value of the City of Melbourne's heritage assets by including them on its asset database .	Smart city as physical technology A distinct online technological service.
Investigate establishing an interpretation centre for Melbourne's past, present and future .	Smart city as a social solution An interpretation centre would likely address diverse community histories and identities, such as reconciliation.
Improve and expand the heritage information available through the City of Melbourne's website and through mobile devices and make heritage studies and data publically available.	Smart city as physical technology Mobile devices as a physical installation and the website as a distinct online service.

	Continue to support local communities recording and presenting of their local stories. Promote, support and encourage new and creative ways to tell Melbourne's stories and interpret Melbourne's heritage fabric, using new technologies, art and performance, celebrations, experiences, writing, visual and other methods.	Smart city as physical technology New technologies installed in the city and art installations using physical technologies. Smart city as a social solution Using technology to tell Melbourne's stories to support novel social outcomes, such as highlighting new narratives and reaching larger audiences.

APPENDIX THREE
STAGE ONE AND STAGE TWO INTERVIEW QUESTION
GUIDES

STAGE ONE INTERVIEW QUESTION GUIDE

HOW TO DELIVER SMART HERITAGE WITHIN LOCAL GOVERNMENT:

DEFINING SMART HERITAGE AND SMART HERITAGE PRINCIPLES

Introduction:

The purpose of this interview is to understand how the smart city and heritage disciplines converge in your local government organisation. The questions investigate this topic through various approaches to uncover insights that may not appear through a singular line of questioning.

I will first ask you questions regarding your understanding of the [smart city/heritage] strategy in this local government, the opposite discipline to your discipline, and your perception of how the disciplines align in the organisation.

I will then ask questions that investigate the operational and strategic processes, project examples, and barriers that converge the disciplines in the organisation. I will also seek your opinion on the success of these processes and project examples and whether these convergences impact your understanding of your discipline and the other discipline.

Lastly, I will ask questions that examine the potential and aspirational future for converging the disciplines in your local government and what would be required to achieve this convergence. The purpose of these last questions is to understand your view of a unique discourse between the smart city and heritage disciplines within your local government.

The interview is semi-structured, meaning it does not strictly follow a formalised list of questions. Instead, the questions on the following page guide the discussion. The purpose of this format is to enable you to share new knowledge and for us to explore the research topic through various approaches.

Before the interview begins, I will introduce the Smart Heritage discourse and the smart city and heritage disciplines in the academic literature, including definitions of the terminology. These may or may not be relevant to your local government. However, they offer a theoretical framing to the discussion. You are welcome to ask questions at any time to clarify the terminology and any other matters.

Please answer the questions according to your personal knowledge and experience and refrain from sharing classified information. The interview will be audio recorded. If you share classified information, please communicate which details are to be removed from the record.

The interview will take one hour.

STAGE ONE INTERVIEW QUESTIONS

1. What do you know about the smart city/heritage discipline within this local government, including its strategic direction and operations?
2. In your opinion, does your disciplines strategically or operational align with this other discipline and how?
3. What is the internal process you want to work with the other discipline in the organisation, and are you comfortable within or knowledgeable about this process?
4. Does your discipline consider the strategic direction and operations of the other discipline in your discipline's decision making? If so, why?
5. Are there any projects, meetings, other initiatives that the disciplines converge on in your local government? Please describe these convergences and what outcomes they deliver.
6. Are there any barriers to this convergence in the local government, and why?
7. Have you found any similarities or differences in philosophical outlook between the disciplines that support or hamper convergence, and why do you think these exist?
8. How have these similarities or differences materialised in your discussions, and how have these impacted your understanding of your discipline, their discipline, and the interdisciplinary discourse?
9. Are there any discussed, proposed, or funded projects in your council or the community that may see the disciplines converging? If yes, please describe these projects and how would the disciplines work together.
10. In these projects, how may the convergence impact the project and any outcomes in contrast to a singular discipline delivering the project?
11. Thinking aspirationally, what beneficial outcomes could the disciplines' convergence deliver for your local government and its community?
12. How would the disciplines work together to deliver these outcomes, and what would the project look like?
13. Would changes be required within your discipline to deliver these potential projects and aspirational outcomes? Please describe any required changes.
14. Would changes be required within your local government to deliver these potential projects and aspirational outcomes? Please describe any required changes.
15. Any last or additional comments regarding the existing or future convergence between the smart city and heritage disciplines in your local government?

STAGE TWO INTERVIEW QUESTION GUIDE

HOW TO DELIVER SMART HERITAGE WITHIN LOCAL GOVERNMENT:

DEFINING SMART HERITAGE AND SMART HERITAGE PRINCIPLES

Introduction:

The purpose of this interview is to investigate the cross-case study key considerations that emerged from the Stage One Interviews, with the aim of informing the production of Smart Heritage Principles. Smart Heritage Principles will be high-level directives that support local governments to converge the smart city and heritage disciplines in their strategic documents and operations.

There are four key considerations. I will address each key consideration separately.

I will first introduce the key consideration, including its theme and description. I will explain which data from your local government informs it and will summarise the contributing data from the other case studies.

I will then ask you to reflect on the accuracy of this key consideration for your case study based on your personal knowledge and experience. You may wish to add further information, clarify and contextualise the consideration for your local government, or provide an update to your previous answer since the last interview.

I will then ask you to consider approaches that address the key consideration regarding delivering Smart Heritage in your local government. Each consideration identifies a problem that the research resolves to deliver Smart Heritage within local government. As each consideration focuses on different aspects of Smart Heritage's delivery, these approaches and the answers will vary their focus throughout the interview.

The interview is semi-structured, meaning it does not strictly follow a formalised list of questions. The questions on the following page are a guide. However, the interview will primarily focus on what is uncovered in the interview. This format enables us to delve into how to deliver Smart Heritage within your local government.

Please answer the questions according to your personal knowledge and experience and refrain from sharing classified information. The interview will be audio recorded. If you share classified information, please communicate which details are to be removed from the record.

The interview will take one hour.

STAGE TWO INTERVIEW QUESTIONS

1. **Key Consideration One:** Smart Heritage is recognised within each case study, however, there is variation in the qualities of this recognition between the cases.

Theme: Recognition

Description: This key consideration establishes that Smart Heritage is a discourse within local government, but its recognition is not uniform across strategies or operations. This consideration directs the researcher to investigate how different strategic and operational contexts affect Smart Heritage's delivery.

Questions:

- Does this key consideration resonate with your understanding of how your local government recognises Smart Heritage and why?
- How would you approach enhancing the recognition of Smart Heritage in your local government, and how would this approach respond to your organisation's strategic or operational context?

2. **Key Consideration Two:** The case studies primarily deliver Smart Heritage through place-making, interpretation and information, and community outcomes.

Theme: Delivery

Description: The data indicate that Smart Heritage currently delivers place-making, interpretation and information, and community outcomes within local government. Place-making outcomes strengthen the identity of places in the city, interpretation and information outcomes support the communication of knowledge and meaning about a place or value to the public, and community outcomes enhance the social and cultural values of a place and its connection with specific peoples and identities. The councils emphasise these outcomes differently depending on their strategic and operational needs. The key consideration indicates these outcomes are the most effective means to deliver Smart Heritage within councils. This key consideration implores the researcher to understand how to leverage these existing outcomes in the delivery of Smart Heritage.

Questions:

- Does this key consideration reflect the primary outcomes of Smart Heritage within your local government?
- How would you approach integrating these outcomes into your local government's strategic documents and operations?

3. **Key Consideration Three:** The case studies do not sufficiently resource the delivery of Smart Heritage.

Theme: Resourcing

Description: The studied local governments constrain Smart Heritage's delivery through deficient processes, financial budgets, and staff restrictions. These deficiencies reflect local government's existing internal structures, processes, and resourcing of the smart city and heritage teams. This key consideration highlights that resourcing these matters is a core challenge facing Smart Heritage's

delivery. Therefore, it directs the researcher to investigate the severity of these resource challenges and means to resolve them within the local government.

Questions:

- Are these resource constraints relevant for your local government's delivery of Smart Heritage?
- How would you approach resolving the resource constraints in your local government, and how would you address procedural, financial, and staff matters specifically?

- 4. Key Consideration Four:** Smart Heritage has the potential to deliver additional innovations for the local governments.

Theme: Innovation

Description: The data reveals that Smart Heritage has the potential to deliver additional innovations for local governments. The data identifies pathways for Smart Heritage innovations that build on the cities' strategic and contextual aims, including distinct heritage and smart city aspirations. Some of these aims continue the current primary outcomes' delivery, while others explore new topics. This key consideration points the researcher to investigate these additional innovations' viability and integrate them into Smart Heritage delivery.

Questions:

- Do you see innovative outcomes for Smart Heritage in your local government, what are they, and how likely are they to be delivered?
- How would you approach new innovations for Smart Heritage in your local government, and what political, resourcing, and other factors would you have to consider in its delivery?

STAGE TWO VALIDATING THE SMART HERITAGE PRINCIPLES QUESTION GUIDE

HOW TO DELIVER SMART HERITAGE WITHIN LOCAL GOVERNMENT:

DEFINING SMART HERITAGE AND SMART HERITAGE PRINCIPLES

Introduction:

The purpose of this interview is to validate Smart Heritage Principles industry document with the aim of understanding its relevancy and value in local governments outside of this research's development process. The Smart Heritage Principles document contains high-level directives that support local governments to converge the smart city and heritage disciplines in their strategic documents and operations.

I have provided you the Smart Heritage Principles document for review and you have read it.

I will ask you a series of open ended questions that will prompt you to reflect on the document's relevancy in your organisation and what the principles may lead to in your local government. You may wish to add further information and ask questions.

The interview is semi-structured, meaning it does not strictly follow a formalised list of questions. The questions on the following page are a guide and you can discuss other topics. However, the interview will primarily focus on the topics of these questions. This format enables us to understand your perspective on whether the Smart Heritage Principles are relevant and valuable in your local government.

Please answer the questions according to your personal knowledge and experience and refrain from sharing classified information. The interview will be audio recorded. If you share classified information, please communicate which details are to be removed from the record.

The interview will take one hour.

STAGE TWO VALIDATING THE SMART HERITAGE PRINCIPLES QUESTIONS

Questions:

1. Does the document support your understanding of what Smart Heritage is and please let me know what you think Smart Heritage is?
2. In your view, does the document adequately address the key themes/challenges to deliver Smart Heritage in your role or organisation?
3. How would your organisation adopt the document into its structure and processes?
4. How would your role adopt the document into its structure and processes?
5. Are there any challenges that you see in your organisation or role that could hinder the adoption of the document and delivering its principles and outcomes?
6. Do you have any further comments regarding Smart Heritage and the document, including recommended changes to the document?