The Role of Libraries, Archives and Museums for Metaliteracy in Smart Cities

Implications, Challenges and Opportunities

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ABSTRACT

The concept of smart cities is gradually gaining popularity within both academic and policy circles. Smart cities are intended to be self-sufficient via cutting-edge technologies, purposive innovations and inventions. However, while the technology is growing at an unexpectedly fast pace, one of the essential components of smart cities – humans –is lagging behind. The need for and scope of literacies to survive in smart cities pose challenges for their citizens. The evolution of human learning is not matching the pace of technology. There is a growing emphasis on developing learning capabilities through various ongoing literacies. This study aims to identify the range of literacies required in smart cities and the roles of libraries, archives and museums (LAM) in supporting citizen literacies for social and digital inclusion. The LAM sector is one of the major stakeholders in the digital transformation sphere and needs to work in collaboration with other stakeholders. Therefore, the LAM sector must identify the nature of required literacies, the roles and strengths of other stakeholders, and the opportunities to increase its presence in the process. This study systematically identifies and addresses these issues through a conceptual framework process and proposes future research directions for the LAM sector.

Keywords: Smart Cities and Citizens, Digital Transformation, Digital Literacies, Civic Literacies, LAM, Digital Inclusion, Social Inclusion, Community Engagement

INTRODUCTION

Two critical components of the digital age are digitalisation and digital transformation. Digital transformation is leading to the emergence of smart workplaces, homes and cities. Smart cities aim to bring

more ease to people by ensuring their legitimate rights within a sustainable environment through bespoke and user-centred technology (Sánchez-Corcuera et al., 2019). Smart cities are becoming a reality, and more and more nations have started experimenting with smart communities or smart localities on both small and large scales. This concept has evolved from a sector-based approach to a more comprehensive view that places governance and stakeholders' involvement at the core of strategies (Fernandez-Anez et al., 2018). Some emerging smart cities examples are Singapore (Bhati et al., 2017); Kemaman Smart Community, which is the first smart city initiative by the government of Malaysia (Mohd Satar et al., 2021); Vienna (Fernandez-Anez et al., 2018); and various smart communities in Japan (Granier & Kudo, 2016). A smart city is defined as a city that is performing well, in a forward-looking way, in terms of its economy, people, governance, mobility, environment and living, and is based on the smart combination of endowments and activities of decisive, independent and aware citizens (Chourabi et al., 2012, p. 2290). According to this definition, the components of smart cities include infrastructure, technology, governance, management and organisation, economy, and people and community. This chapter focuses on the last component – people and community. It is also pertinent to reiterate the notion that individuals form communities and several communities together construct cities.

The people, as users and residents of smart cities, are a vital component but are often neglected by smart city developers because their prime focus is on the technology, infrastructure and governance (Arroub et al., 2016). People in the information and communications technology (ICT) age are already facing challenges presented by the digital divide and digital inequalities. However, digital divide discussions have clearly moved beyond access issues. The digital divide domain now considers motivations, access, skills and usage opportunities (Reisdorf & Groselj, 2017). In addition, skills are not limited to digital skills but include other types of skills or literacy that may assist in obtaining correct information at the right time. Literacy limitations influence users' ability to effectively engage with ICTs in their local communities and smart cities (Muthpoltotage et al., 2021). Therefore, it is necessary to understand the landscape of required literacies and the role of key stakeholders who can provide these literacies to the people and communities. The emerging practices of smart cities and their modalities have attracted the attention of scholars from various disciplines, including education and libraries supporting digital literacies. Molnar (2021) argued that a separate educational policy is required to develop 'smart citizens' because education and skills training should address the challenges underpinned by multicultural and social interactions within the digital landscape. However, the progression of smart cities, where digital services and tools are being implemented to foster a range of goals, from more inclusive democratic dialogue to more efficient transportation, poses pedagogic and educational challenges for their citizens (Manchester & Cope, 2019). The fundamental questions for the people and communities of smart cities are as follows:

- What do citizens need to learn to be able to understand and live well within these environments as well as to shape their future development (Manchester & Cope, 2019)?
- How does literacy learning shift?
- How do individuals engage in their local environments for learning (Deshler et al., 2012)?
- What is the relationship between traditional literacy learning and new literacies (Deshler et al., 2012)?
- What pedagogical literacies are required in smart cities (Maclellan, 2008)?
- And, importantly, who are the stakeholders that will provide these literacies to citizens?

Scholars from diverse disciplines are trying to answer these interdependent and multi-aspect questions, and this chapter focuses on the types of literacies required for smart cities. It is hoped that this chapter will contribute to the understanding of the role of the libraries, archives and museums (LAM) sector in smart cities.

Smart Cities and the Role of Libraries, Archives and Museums

LAM, as trusted institutions for people, communities and governments, can play vital roles in smart cities. Ylipuli and Luusua (2019) suggested that public libraries can act as non-commercial nodes of physical and digital spaces that can also take on the role of educating the public about the importance of urban technology

and helping them to better understand these changes in modern society (p. 2). In line with this suggestion, academic libraries offer services and resources to children, adults and scholars that will lead them to become responsible citizens and lifelong learners. Borda and Bowen (2017) assessed the concept of smart cultural heritage services of museums to increase knowledge exchange and community connection with culture. Chianese et al. (2013) presented a case study of a location-based application for museums and art galleries to cater to the needs of smart citizens and, especially, tourists who visit smart cities. Also considered is the role of museums as providers of critical science literacies along with cultural literacy to their communities because this enables smart citizens to connect with their cultural heritage (Chinn, 2006; Hine & Medvecky, 2015; Rennie & Williams, 2006; Valdecasas & Correas, 2010). Schöpfel (2018) described four dimensions – intelligent services, smart people, smart places and smart governance – where LAM have a role to play. Research has also explored the most recent information professional service models, including information commons, learning centres and green libraries, which can contribute to educating people to be smart citizens (Gul & Bano, 2019; Jarosz & Kutay, 2017; Marty, 2006; Roff, 2011; Schöpfel, 2018). Yerden et al. (2021) surveyed librarians' perceptions of smart cities and their much-advocated benefits, such as equal and free accessibility to inclusive communities, and their capacity to bridge digital divides. Their study concluded that the library workforce needs to equip themselves with a diverse set of skills to have a role in smart cities. Mersand et al. (2019) also indicated that greater engagement and participation of members of the local community with literacies and learning opportunities results in greater economic development, and increased civic and legal understanding. After reviewing the literature, the authors of this chapter determined that LAM need to understand the literacies required for smart cities and then position their roles. Accordingly, this chapter provides insights from the literature to identify the roles of LAM for metaliteracy within smart cities. A critical research question addressed by the authors is, Why is it important to revisit the information literacy role of LAM in smart cities? The authors also explored the following:

- What key literacies are required in smart cities?
- Who are the key stakeholders?
- What are the existing information literacy standards?
- What is missing?

There is a wide range of literacies required in ICT. We use the term 'metaliteracy' to cover all types of literacies (see Table 2) because a combination of multiple types of literacies provides an overarching and 'unifying framework consisting the core information literacy competencies while addressing the revolutionary changes in how learners communicate, create, and distribute information in participatory environments' (Jacobson, 2015, p. 84).

This chapter is arranged in five sections. The first section presents a brief overview of smart cities, the literacies required in the age of digital transformation and the role of the LAM sector. The second section provides details of the research objectives and the structured research design. The third section presents a discussion based on the thematic analysis of the literature. The fourth section provides a conceptual framework of literacies for smart cities and indicates that stakeholders should position the LAM sector in smart cities. The final section summarises the discussion, limitations and future research directions.

Methods

The authors applied various thematic analysis techniques to develop a conceptual framework of the roles of LAM for the literacies required for smart cities. The conceptualisation techniques facilitated identification of the various variables and the building of a relationship between these variables. The authors first conducted a bibliometric search and analysis of the results to identify the emerging themes around different literacies (see Figure xx). This analysis led to a literature review to explore the various definitions of the different literacies. Finally, the researchers synthesised and discussed these themes to identify the variables and their relationships in order to propose a conceptual framework (see Figure xx).
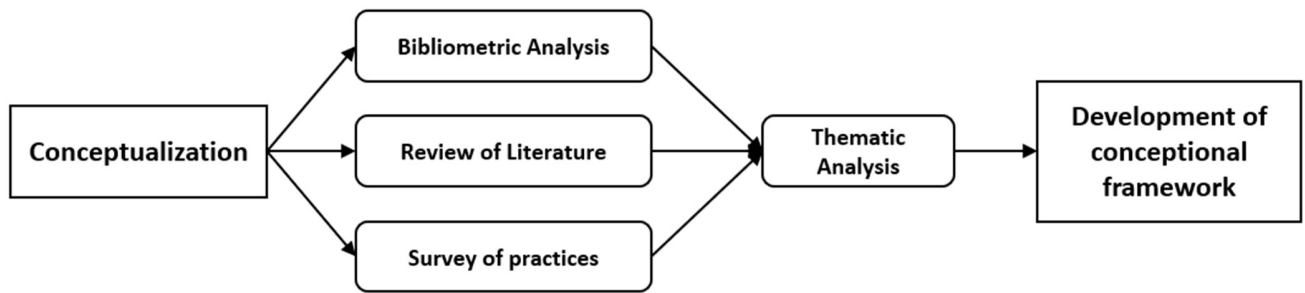
Figure 1: Summary of data collection, analysis and synthesising process

The search for articles was conducted in early 2021 and was guided by a systematic search strategy that included selecting a database, developing a search query, filtration and, finally, screening. Data for the bibliometric analysis were collected from the Web of Science Core Collection on 1 June 2021. A total of 15,629 documents were found that were then filtered by language, document type and subject domains (see Table 1). In the end, the bibliographic records of the remaining 8,747 documents were selected for the bibliometric analysis.

Table 1: Search query

Search Query	Filters	Results
TS=("digital Literacy" OR "Information literacy" OR "Big data literacy" OR "Civic engagement literacy" OR "Cultural competency literacy" OR "Cybercrime literacy" OR "Digital scams literacy" OR "Fake news literacy" OR "Financial literacy" OR "Scientific literacy" OR "Media literacy" OR "Digital health literacy" OR "Digital etiquettes literacy" OR "Social Literacy" OR "Civic literacy" OR "Gender literacy" OR "Legal literacy" OR "Hate crimes literacy" OR "Religious literacy" OR "Eco-Spiritual literacy" OR "Emotional literacy" OR "Political literacy" OR "Human Rights Literacy" OR "social literacy")	Total	15,629
	Year 2012–2021	12,449
	Language: English only	11,151
	Type of resources: articles, reviews, conference proceedings, book and book chapters	10,282
	Excluded subject domain: pure sciences, medical and health studies	8,747

The data were collected from all subject disciplines except medical and health sciences. The selected subject categories included education, educational research, information science, library science, business, economics, computer science, communication, social sciences, engineering, science technology, environmental sciences, ecology, linguistics, government, law, religion, history, philosophy of science, sociology, public administration, social work, arts, humanities, development studies, family studies, social issues, telecommunications, geography, literature, cultural studies, area studies, art, international relations, operations, research management science, urban studies and rehabilitation. The reason for including all social sciences and humanities subjects was to capture the maximum scope and depth of the literature published on different types of literacies.

The bibliometric analysis was run on the title, abstract and author keywords using VOSviewer software. The authors focused on two types of analysis – the year-wise publication trends (see Figure 2) and thematic analysis (see Figure 3 and Table 2) – to present the landscape of research published on different types of literacies. Next, the authors searched for the specific themes within the searched results to identify the most relevant studies for the literature review. The authors searched 'smart city' or 'smart cities', 'libraries', 'stakeholders' and 'standards' within these searched results. Because of the novelty of these topics, there were not many relevant results. Therefore, the authors searched each term individually and, where needed, also conducted backward and forward searches. The authors also searched for the global standards and programs to guide stakeholders in providing information literacies training (see Table 4).
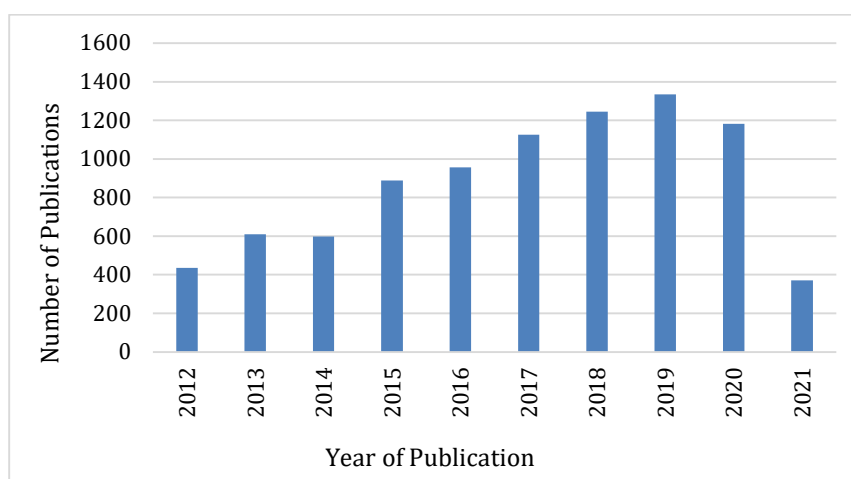
Figure 2. Publications over the years (2012–2021)

TYPES OF LITERACIES

'Literacy' is a popular term for expressing a range of skill sets that citizens should have to survive and thrive in the digital world. There is widespread agreement among educators and the public about the importance of traditional and fundamental building blocks underpinning learning processes. The 4 C's of 21st-century skills are critical thinking, creativity, collaboration and communication (Kivunja, 2015). Citizens in the digital age need to develop such skills as flexibility, initiative, social skills and productivity. Humans also learn through various informal routes such as from other fellow humans, from the environment and from open discussion with peers during formal education processes. Explanations of the various models of literacy also help us to understand the nature, breadth and complexity of the literacy phenomenon. Street and Street (1984) discussed two models to encompass the diversity of literacy. The first is the 'autonomous' model of literacy, which formulates its argument from the assumption that literacy in itself autonomously affects other social and cognitive practices (Street & Street, 1984). Participating individuals can cultivate these capabilities, which would otherwise remain underdeveloped. This model takes literacy as a technology that possesses an exceptional capacity to change human societies and is the primary quality that separates so-called developed and underdeveloped nations. In contrast, the second model is ideological in nature, which suggests that literacy practices are always embedded within a more extensive set of ideologies. In other words, literacy is not elevated as an autonomous technology that results in advanced forms of cognitive processing; instead, it is one of many ways to access learning (Deshler et al., 2012; Maclellan, 2008).

The thematic analysis of the literature resulted in a wide range of literacies (see Table 2); hence, the authors subdivided all these conceptual groupings into four themes. The first subtheme consists of information, communication and digital literacies. This theme includes digital literacy, social media literacy, data literacy (Prado & Marzal, 2013), digital media literacy, news literacy, news media literacy, content literacy, domain knowledge, new literacies, mobile information literacy, scientific literacy (Henriksen & Frøyland, 2000), text features literacy, content literacy, visual literacy (Rice, 1988), computer literacy, academic literacy, media information literacy, mobile information literacy and digital storytelling. The second subcluster of literacies is a set of cognition and cognitive literacies that are required for critical thinking and decision-making. These literacies carry great importance within smart cities because they serve as a foundation of the value and norms related to the smart community. The third set of literacies is related to socioeconomic aspects of smart cities, namely, debt literacy, financial literacy, legal literacy, copyright literacy, workplace information literacy, health information literacy, health literacy, digital health literacy and e-health. Finally, the sociocultural literacies include family literacy, religious literacy, civic literacy, political literacy, news media literacy and environmental literacy.
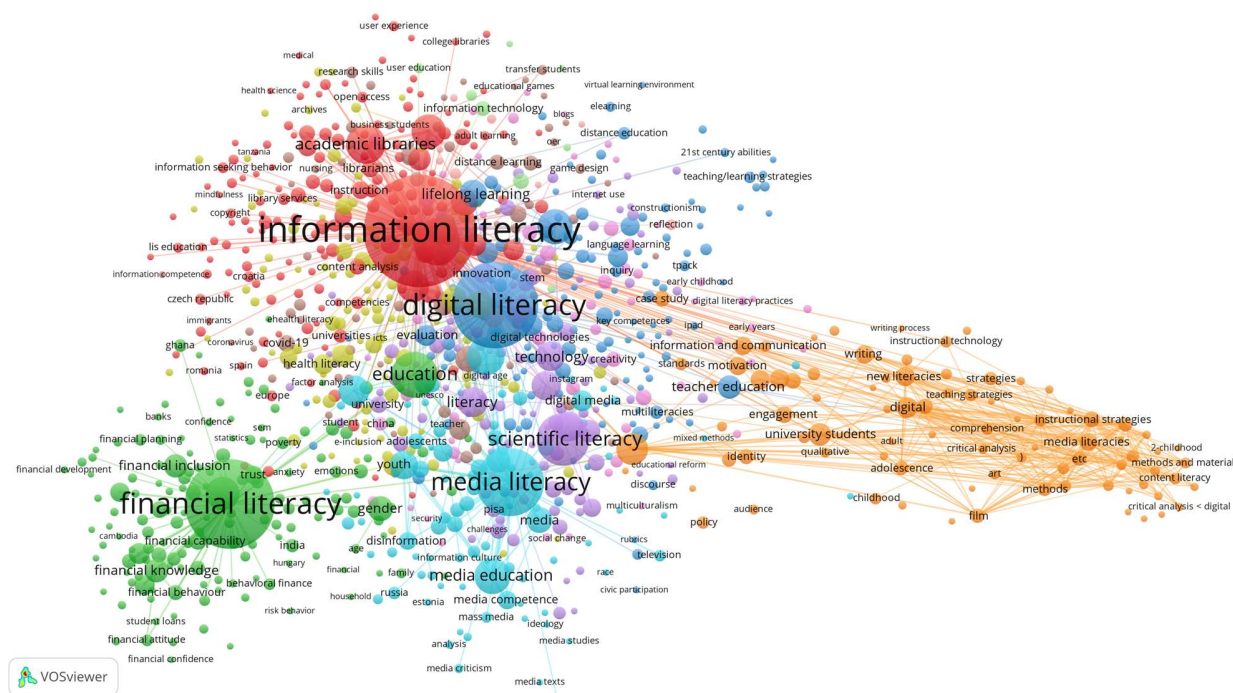
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Figure 3. Thematic analysis of literacies

Table 2. Thematic analysis of literacies and competencies

Main Themes	Subthemes and Emerging Keywords
Types of literacy	*Information, communication and digital literacies:* information literacy, technology literacy, digital literacy, social media literacy, data literacy, digital media literacy, news literacy, news media literacy, content literacy, domain knowledge, new literacies, mobile information literacy, scientific literacy, text features literacy, content literacy, visual literacy, computer literacy, academic literacy, media information literacy, mobile information literacy, digital storytelling
	Cognition and cognitive literacies: critical literacy, critical information literacy, critical digital literacy, critical media literacy, emotional literacy, transliteracy, disciplinary literacy, multimodal literacy, critical digital literacy, critical media literacy, data visualisation literacy, comprehension literacy, disciplinary literacy
	Socioeconomic literacies: debt literacy, financial literacy, legal literacy, copyright literacy, workplace information literacy, health information literacy, health literacy, digital health literacy, e-health
	Sociocultural literacies: family literacy, religious literacy, civic literacy, political literacy, news media literacy, environmental literacy
Libraries, archives and museums (LAM) and information learning	*LAM:* academic libraries, college libraries, digital libraries, embedded librarians, librarians, librarianship, library and information science, archives, museums, library anxiety, library instruction, school libraries, teacher librarians, university libraries, public libraries, academic library, embedded librarianship, faculty-librarian collaboration
	Types of services and sources: library instruction, library outreach, curriculum integration, distance education, educational innovation, game-based learning, learning communities, libguides, lifelong learning, technology-enhanced learning, information literacy instruction, discovery tools, electronic resources, education and training, learning commons, online

	tutorials, open access, outreach, user, experience, virtual reference, learning management system
	Information learning: information behaviour, information experience, information needs, information poverty, information practice, information practices, information search, information research, information retrieval, information seeking behaviour, information services, information sources, informed learning, health information seeking behaviour, information fluency, information access, information credibility, information, ethics, information evaluation, information management, intellectual property,
Stakeholders	Teachers, librarians, archivists, museologists, students, families, Generation Z, millennials, males, women, young adults, pre-service teachers, adults, youth, elderly, teenagers, digital immigrants, children, primary schools, colleges, universities, governments, e-government, legislation, policy, care providers

LIBRARIES, ARCHIVES AND MUSEUMS AND INFORMATION LEARNING

In Table 2, the second cluster on LAM and information learning contains keywords demonstrating several topical headings. This cluster also indicates several types of LAM institutions, including universities, colleges, schools, public and digital libraries, archives and museums. That information and cultural heritage professionals such as teachers, librarians, archivists and museologists are responsible for promoting user collaboration and engagement has been mentioned. Regardless of the type of LAM institution, every service conducts pro-learning activities, such as library instructions, outreach service engagement, digital services across wider geographic areas, virtual reference on a 24/7 basis, online tutorials and virtual tours. To effectively showcase their learning resources, LAM institutions choose different products and approaches. For example, libraries provide library guides, access to a variety of discovery tools and catalogues for e-resources. Museums are offering more and more virtual experiences, user engagement and community collaborations, such as crowdsourcing, to support cultural literacy (Christensen et al., 2016; Jarreau et al., 2019). Similarly, archivists are focusing more on digitally enhanced, virtually accessible information and learning spaces (Carini, 2016) to increase archival literacy. The keywords showed a greater emphasis on learning through game-based learning, learning and specialised communities, information literacy instructions, learning management systems and lifelong learning. Despite the overwhelming thematic coverage within the scholarly literature, LAM still need to understand the domain of learning within smart cities. The keywords under learning cluster show the prominence of information behaviour, information experience, information needs, information poverty, information practice, information practices, information search, information research, information retrieval and health information seeking behaviour. Schöpfel (2018) proposed a new model for smart libraries that includes optimising existing ICT services, a new integration approach of people learning through participation, and a governance model through networking. Jarosz and Kutay (2017) discussed the integration of archives into course learning and information literacy objectives mainly to support contextual subject knowledge and critical thinking. Carini (2016) emphasised the importance of the primary source literacy, that is, archival literacy, for historical context and historical thinking, and the possibilities of library entities including archives in their information literacy training and standards. However, in the age of competition, it is not easy for libraries to fulfil the needs of smart citizens because these new service provisions face various practical challenges. Yerden et al. (2021) outlined some of these challenges faced by libraries in becoming effective stakeholders within smart cities. These challenges include limited budgets, limited technology infrastructure and skills (Parry et al., 2018), lack of leadership and staff turnover. The concept of smart cities falls within various subject domains; hence, it is also a scholarly challenge to claim 'precise ownership' of any aspect within the learning and education process. Like other subject disciplines and professions, libraries face resistance when signifying what their real contributions could be within future smart cities. In the case of e-learning, various scholarly disagreements have emerged within the literature, where various subjective disciplines claimed custodianship of the e-learning processes. Summarising the history of e-learning, Moore et al. (2011) distinguished between e-learning, online learning and distance learning, while at the same time

highlighting that the phenomenon of e-learning jointly belongs to various academic disciplines. It is logical that such identity battles will also occur within the thematic sphere of information learning within smart cities because different educational agencies provide and support the learning process. Success and the prevalence of the e-learning factor has demonstrated that proactive stakeholder engagement and working jointly are fundamental prerequisites for achieving learning objectives.

STAKEHOLDERS

The stakeholders for the literacies are as important as the technology and platforms. The keyword analysis identified the titles of the various individuals and organisations that can be considered the stakeholders of literacy practices. The first is the people, who can serve as trainers such as librarians and teachers, and the second is a dynamic and random grouping of the trainees, who include people of different age groups – children, teenagers, youth, adults and elderly; different genders – male and female; and people categorised by their digital capabilities – digital immigrants, digital natives, Generation Z and millennials. The stakeholders can also be identified by their roles, namely, family, parents and caregivers, when they support other individuals in their learning (Arthanat et al., 2019; Goulding et al., 2018). Other types of stakeholders are organisations, such as educational institutions (Campbell & Kresyman, 2015), libraries (Martínez-Rocha et al., 2018), governments, and legislation, rules and policies (Kemp et al., 2021) that ensure the provision of information literacy. Other stakeholders are policymakers, researchers, technology developers and the tech industry (Nicolini & Haupt, 2019).

COMPETENCIES FOR SMART CITIES

The emerging applications for smart communities, smart units, smart cities and smart houses are offering promising benefits for their citizens. The thematic analysis of the literature provided keywords in abundance, which is why these numerous keywords were further divided into three themes: competencies, benefits and challenges for smart citizens (see Table 3). These include civic engagement (Cazden et al., 1996; Keegan, 2021), knowledge sharing, co-creation, social inclusion (Reisdorf & Groselj, 2017), human capital, well-being and sustainable development through digital transformation of practices, processes and policies. However, despite the well-articulated benefits of smart cities, the challenges for its people are a great area of concern for the authorities and policymakers. Awareness and training of both the information professionals (Liao et al., 2018; Marty, 2006; Parry et al., 2018; Peacock, 2004; Schwartz, 2018) and the users (Arthanat et al., 2019; Wolff et al., 2015) are the biggest challenges within these smart cities. The people living in smart cities require multidimensional awareness of the concepts, resources, rights and responsibilities. There is a significant risk that if all these challenges are not well addressed, instead of the promised equality and inclusion, there will be wider digital, social, civic and financial exclusion for the citizens. Consequently, these disadvantaged smart city citizens will not be able to understand the fast-changing technological landscape and will be at risk of being left out. There are also growing threats in areas such as privacy, information disorder (i.e. misinformation, fake news, disinformation) (Damasceno, 2021; Qutab et al., 2019), information security and cyberbullying. Various demographic, cultural, economic, societal and geographical factors will contribute to this gap.

Table 3. Thematic analysis of competencies for smart cities and challenges

Main Themes	Emerging Keywords
Competencies	Knowledge sharing, digital transformation, information literacy competency, digital literacy skills, academic integrity, academic performance, accountability, data management, digital competencies, faculty development, leadership, personal information management, scholarly communication, self-directed learning, serious gaming, cognitive ability, communication skills, decision-making, authentic assessment, financial decision-making, ubiquitous learning, virtual learning environment, consumer health information, active ageing, inquiry-

	based learning, problem-based learning, project-based learning, conceptual understanding, knowledge management
Benefits	Civic engagement, knowledge society, human capital, social capital, well-being, sustainable development, social change, social inclusion, public participation, community engagement, data protection, digital citizenship, digital identity, digital culture, digital practices, digital safety, intersectionality, social capital, co-creation, co-design, information culture, information society, participatory culture, social network, citizen science, global citizenship, self-efficacy, communities of practice, pedagogical content knowledge, knowledge transfer
Challenges	Awareness, inequality, public policy, regulation, multimodality, social exclusion, digital exclusion, financial exclusion, gender gap, globalisation, personality, persuasion, credibility, demographic factors, social injustice, socio-scientific issues, digital immigrants, digital natives, social responsibility, multiculturalism, multilingualism, metaliteracy, information disorder, cyberbullying, privacy, propaganda, identity, security, conspiracy theories, surveillance

STANDARDS AND PROGRAMS FOR METALITERACY

In the LAM sector, information literacy provision is delivered through various programs for children, adults and older citizens. This section discusses the authors' analysis of a few renowned standards and programs from the LAM sector, governments and the tech industry for individuals and organisations. In 2011, the Council for Economic Education presented the National Standards for Financial Literacy to improve economic and personal finance education in six areas: earning an income, buying goods and services, saving, using credit, financial investing, and protecting and insuring (Bosshardt & Walstad, 2014). Crisp and Dinham (2020) examined the United Kingdom's (UK) National Occupational Standards to identify the degree of workplace literacy and found more than 60 per cent of the standards were vague regarding performance criteria. The American Library Association is a prominent stakeholder among libraries in providing guidance for information literacy standards and frameworks. The information literacy standards for higher education and schools of the Association of College and Research Libraries (ARCL) and the American Association of School Librarians are widely used by libraries and academic institutions around the world (Ahlfeld, 2019). ARCL has also extended the use of other types of literacies, namely, visual literacy standards for higher education that can be incorporated into a general information literacy framework (Schwartz, 2018). The Australian and New Zealand Institute for Information Literacy (Peacock, 2004) provides guidelines for information literacy in six iterative standards. These standards include the skills of an information literate person, being capable of recognising needs, finding information effectively and efficiently, critical evaluation of information, construction of new concepts, and understanding and acknowledgment of cultural, ethical, economic, legal and social issues surrounding the use of information. The CILIP Information Literacy Group (Coonan et al., 2018) focuses on information literacy in five key contexts: everyday usage, citizenship, education, workplace and health. The Society of College, National and University Libraries has presented an information literacy model for higher education based on individuals' core skills, competencies, attitudes and behaviours (Bent & Stubbings, 2011). The International Federation of Library Associations and Institutions (Lau, 2006) has suggested a range of competencies for librarians as the key stakeholders of information literacy for lifelong learning.

Table 4. Types of standards and programs offered by different organisation on metaliteracies

Organisations	Type	Standards and Programs	Scope
Council for Economic Education	Government	National Standards for Financial Literacy	Financial literacy
United Kingdom	Government	National Occupational Standards	Workplace religious literacy
American Library Association	Library association	Association of College and Research Libraries standards and frameworks:	Higher education information literacy

		Visual Literacy Competency Standards	
		Information Literacy Standards for Science and Engineering/Technology	College and research libraries
		American Association of School Librarians Standards Framework	School information literacy
CILIP		Information Literacy Group	Information literacy for everyone
SCONUL		SCONUL Seven Pillars of Information Literacy	Higher education
Australian and New Zealand Institute for Information Literacy		Australian and New Zealand Information Literacy Framework	Information literacy for everyone
International Federation of Library Associations and Institutions		Information literacy for lifelong learning by Information Literacy Section	Information literacy
Google	Tech industry	Digital Responsibility The Applied Digital Skills	Digital literacy programs
Facebook		Digital Opportunities Bullying Prevention Hub	
Microsoft		Hub Online Safety Microsoft YouthSpark	

GAPS IN THE LIBRARIES, ARCHIVES AND MUSEUMS INFORMATION LITERACY PROGRAMS

This research has conceived of LAM as a single sector but it certainly comprises different types of institutions, which serve distinct communities and user bases; therefore, significant variance exists within the objectives of information literacy products and services within the LAM landscape. For example, in the UK, school librarians have to conduct library periods for students but their contributions are taken as being in the area of literacy support (Merga, 2020). In some countries, school libraries hire teacher librarians, thus emphasising teaching qualifications and skills as an essential requirement for this role. On the other hand, Johnston (2015) argued that, in practice, school librarians serve as instructional technology specialists. This notion of technology teaching by librarians also conflicts with the role of IT teacher. Further, university libraries have to support advance-level specialist teaching, learning and research. Information literacy at the university level is fundamentally different because it deals with concepts such as academic freedom, plagiarism, copyright and open access. Wang et al. (2021) outlined the diversity of duties and role profiles for instructional librarians within universities. It is evident from the scholarly literature that libraries offer contextualised information literacy for their users; therefore, claiming the ownership of lifelong learning support would require a new generation of library workforces who could deliver this gigantic task.

In recent decades, public libraries have served the wider communal audience by offering training and support in various areas, such as employment support services, IT and numeracy skills, language improvement skills, reading clubs, reading clubs related to health and well-being, support for the older population to cope with mobile technologies and support for school homework. Smith et al. (2020) argued that the diversity of information literacy objectives is one of the stressors and burnout predictors within public library workforces. Reduction in funding across the public sector in different countries has also resulted in thin capacity within public libraries. Winberry and Potnis (2021) advised that purposeful partnerships between public libraries and other institutions and agencies are essential to generate social innovations and lifelong learning support. A review of the literature on libraries clearly establishes that the wide-ranging and core information literacy offer is impossible to deliver by a single library. Various examples can be cited. First, training on mobile technologies could be offered within public libraries for the older community, but such trainings are not normally offered by college or university libraries. This means that it is automatically assumed that all of the younger population are mobile and technology savvy.

Such assumptions on their skills level can be easily challenged within multinational and multicultural contexts, where different segments of communities have shown different behaviours in using technologies. Moreover, such training is not just about using the technology but also about critically evaluating the nature of information.

Saunders et al. (2017) highlighted that significant gaps exist within information literacy outcomes among students. Such research confirms the notion that the level of achieved skills can vary significantly following library-delivered information literacy training (Chinn, 2006) because teaching methods, content and the quality of the resource person as well as access to learning resources can vary, which affects the information literacy outcomes. Literature on information literacy within libraries also outlines that huge perception gaps exist between scholars and practitioners on information literacy programs. Various studies have highlighted the gaps within information seeking and information literacy programs of libraries, museums and archives, which include standards, staff skills and technology innovation (Borda & Bowen, 2017; Julien & Williamson, 2011; Parry et al., 2018). Therefore, it is inevitable that information seeking behaviours should also be investigated comprehensively before devising any information literacy programs within smart cities. It can be concluded that to achieve lifelong information literacy skills, a macro-level analysis of smart cities and their educational opportunities is essential because outcome gaps exist in the LAM sector for genuine reasons, such as fluctuations in resource provision, the skills sets of the library workforce and the specific operational contexts of libraries.

DISCUSSION AND FUTURE RESEARCH DIRECTION

There is a great diversity among literacy researchers' definitions of the concept of literacy. Since 2010, academic theories on the new literacies, multiliteracies and metaliteracies (Koltay, 2015; Schwartz, 2018) have been widely discussed in the literature. The concept of multiliteracies refers to the belief that individuals in a modern society need to learn how to construct knowledge from multiple sources and modes of representation (Deshler et al., 2012). The authors of this study found some significant aspects from the thematic analysis of the existing literature that can help us to understand the role of LAM within smart cities. These include:

1. A wide range of literacies cannot be explained with the notion of information literacy. The authors suggest using the term metaliteracy or multiliteracy instead. This suggested change to the terminology will facilitate LAM professionals to expand the horizons for prospective implications.

2. Inevitably, the LAM sector will face competition from the technology and entertainment industries within smart cities because most communal, educational and operational activities will be conducted through digital platforms. At the same time, this is a great opportunity for the LAM sector to position its future role in order to survive and thrive in smart communities and cities. There is a need to extend this debate by identifying the types of required literacies for the various members of society.

3. The stakeholders, as identified within the scholarly literature, include trainers, trainees, organisations and policies. Some other possible stakeholders are the technology industry, social norms, social media and socioeconomic influences. There is a need to explore this area and, after a thorough impact assessment, to identify the stakeholders, clearly defining their roles and their responsibilities within the topical area of metaliteracy.

4. The literacy needs of smart city citizens will remain unfulfilled, according to the literature. The concept of high performance by digitally proficient individuals in smart cities has been widely discussed. However, authors need to recognise that the needs of digital immigrants will be different from the needs of digital natives and Generation Z. The digital native generations are proficient in the use of technology, but this generation may lack understanding of the values, norms and social implications related to productive technology use.

5. The literature provides guidance on the role of LAM in smart cities and the potential advantages and challenges for libraries. The topical scope of this literature needs to be expanded because the

authors have found that discussions regarding the notion of information literacy while future smart cities will require the policy parameters for the required metaliteracies.

6. The standards and training programs offered by the LAM community also need to be revised to meet the needs of smart citizens, smart communities and smart cities.

7. LAM, as a sector, is experiencing an unprecedented transformation from print-driven library services to digitally compatible resources and services. The popularity of the online resources within libraries has significantly affected the service models, and depending on the sector, libraries currently offer a hybrid library service model, through which a variety of clientele are being served. More research is required to scholastically establish which broad LAM service model can effectively contribute within smart cities.

8. Partnerships and joint working arrangements with other stakeholders have helped LAM as a sector to achieve its objectives. More research is needed to establish credible evidence on what types of partnerships are required, what the best-practice case studies are, and which principles and takeaway lessons can be carried forward into the scholarly literature on smart cities.

9. The concept of smart cities fundamentally falls into the remit of interdisciplinary research; hence, future research collaborations among scholars and practitioners from different disciplines will facilitate future research directions to answer the interwoven and multilateral research questions. Scholarship within a single academic discipline can answer some of the questions but cannot suggest a more comprehensive response to future research questions.

10. It should not be assumed that unlimited financial budgets will be available within smart cities for the LAM sector. More research is required to determine which service models will be financially viable for resources and service provision. Currently, the LAM sector is facing financial challenges because of the increasing costs of online educational resources.

11. An increase in cyber warfare and privacy breaches within security-proof technology products has shaken the public's confidence in the transparency and privacy-offering capability of modern technologies. More research is required on the future skill sets required to obtain the trust of smart city citizens.

12. Society perceives libraries as learning support units, collaborative learning spaces, creativity-boosting avenues and custodians of legacy knowledge. In this regard, LAM are considered a support service and not the lead service in offering education or learning. More research on what types of support-oriented tasks can be delivered by LAM within smart cities will provide useful insights.

13. Service and resource provisions within smart cities will be evaluated on the basis of service usage data, thereby unconsciously encouraging data-driven decision-making. However, LAM are also considered the custodians of ethics and values within society. Research on determining the right balance between ethical values (qualitative yardstick) and data-driven decisions (quantitative in nature predominantly) would help the administration and policymaking parameters for smart cities.

14. The concept of lifelong learning has various segments, phases and levels in its life cycle; thus, it is a complex phenomenon. Any smart city policy with a single perspective may not be sufficient to commit to the cause of supporting lifelong learners. Future research on multiphase learning support by a single support service is required because, currently, LAM are catering to their clientele on the basis of different libraries, diverse resources and workforces varying in skill levels. In smart cities, inclusive LAM service provision could possibly be designed on the basis of different age groups or varying skill levels. A simple, unilateral service provision cannot satisfy the divergent service needs.

15. Evidence-based education and research is required to prepare the future workforce for LAM to serve in smart cities. Stakeholders should be approached to have candid dialogues regarding which topical areas contain skills gaps and how these skills shortages can be reversed.

There is a need to explore the above-mentioned topical areas to better understand the constructs of metaliteracy and the roles that the LAM sector can play in future smart cities.

LIMITATIONS OF THIS RESEARCH

Following are the limitations of this research:

1. This research is based on a bibliometric analysis, which generated a wide range of concepts. It is not possible to encompass all the themes within one chapter; therefore, the authors took a holistic approach to explain overarching themes.
2. The topical boundaries of the concept of the smart city are well defined within the scholarly literature despite their underlying complex and interdisciplinary factors. However, the literature selected for this research represents various contexts, including archives, museums and different types of libraries from different countries and cultures. It may appear that the research questions are being answered on the basis of wisdom accumulated from various situations investigated by various scholars. The large-scale literature review helped to outline the topical areas through a macro-level topical analysis, but this approach may not prove to be useable in a micro-level investigation into a single set of concepts.
3. The parameters of the literature selection can always be questioned. Some criteria such as literature in the English language only can easily miss the global-level perspective. The widespread adoption of technologies in Asian countries has the capacity to offer useful intelligence on smart cities. Scholarly coverage of that literature may not necessarily be available in English. Future research with multilingual coverage may prove to be prudent.
4. Arguments on and the evidence-based validity of the proposed framework are also beyond the scope of this research.
5. Scholarly evidence on information literacy provision, training outcomes and workforce skills levels have been treated as a single unit, but the LAM service sector is designed to serve distinct objectives. There is a need to investigate the sector holistically instead of specifically. This seems relevant in the age of intuitional partnerships and growing discussion on the concept of the LAM or GLAM sector.

A PROPOSED FRAMEWORK FOR LIBRARIES, ARCHIVES AND MUSEUMS

The thematic analysis indicated a range of challenges for smart cities that require attention and are a potential area of interest for the LAM sector. On the basis of their analysis of existing research (Jacobson, 2015; Mackey & Jacobson, 2011), and the practices and standards, the authors have proposed a conceptual framework for smart LAM within smart cities.

This suggested framework contains four major topical domains, with related conceptual entities grouped within them. The four main topical domains are standards, technology, literacies and partnerships. Within the first layer of the wheel diagram, these four domains reflect interdependence and interconnectivity. Each domain has subtopical entities representing different stakeholders, factors or specific phenomena. The standards comprise three subconcepts: contents, multiple digital users and metaliteracy. Understandably, such topical entities can also be associated with further activities or subcategories, but those niche concepts could not be included in the framework. The standards domain encompasses LAM sector-wide standards agreed by the professional associations and bodies that formulate the basis of ethical positions. Translations of these standards into operational activities also surface legal questions and a wish list of the expectations of LAM for their stakeholders. Technology contains four subconcepts: information and communication technologies, creative technologies, educational technologies and, finally, disruptive technologies. This categorisation of the technologies aims to reflect the different purposes and groups of stakeholders within the context of smart cities. For example, disruptive technology refers to those applications that have the capacity to fundamentally alter routines. In contrast, creative technologies encompass the applications aiming to stimulate imaginations within smart city citizens.
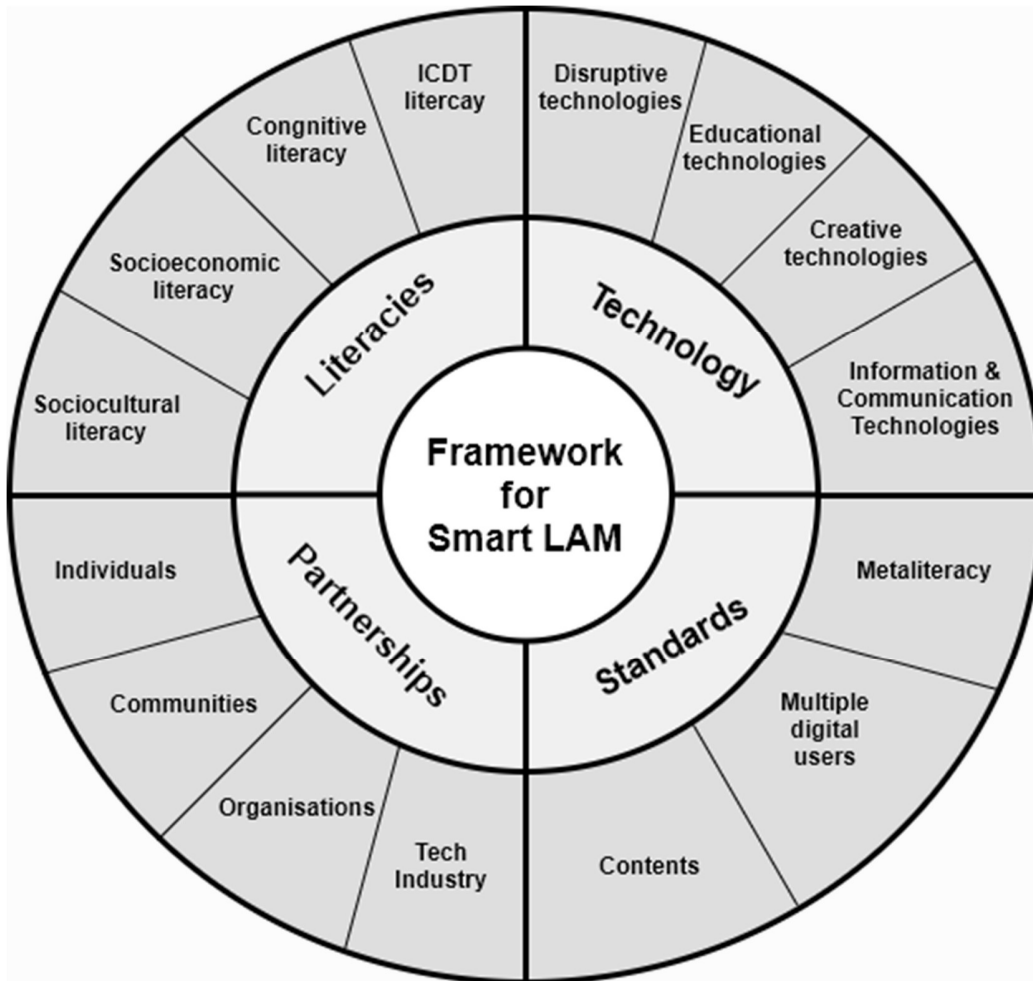
Figure 4. A framework for smart libraries, archives and museums

The topical domain of literacies contains sociocultural literacy (Jarosz & Kutay, 2017; Stasulane, 2019), socioeconomic literacy, cognitive literacy and ICTD literacy. This group of literacies aims to serve all smart citizens, keeping in view their diverse training needs and learning preferences. The topical theme of partnership groups together individuals, communities, organisations and the tech industry. All of these subconcepts are interrelated and, by acting together, fulfil one significant component for the smart city citizen. The analysis of the scholarly literature on the selected subjective terms, the review of the internationally accepted professional standards and the careful imagination of outcomes and competencies all contributed to the design of this framework. The explanation of the topical domains and subtopical entities are meant to be interpreted flexibly so that the framework remains relevant for various contexts.

IMPLICATIONS AND CONCLUSION

This research has provided an overview of the range of different literacies required for survival in smart cities and the roles the LAM sector can play in this regard. The digital transformation of society is like a larger ecosystem that consists of various entities, stakeholders and processes. Each entity has a role to play, yet it also depends on other entities to co-survive. The LAM sector within a smart city is also an example of such an interdependent entity. This study aimed to initiate discussion among LAM professionals to identify the requirements of smart communities and smart cities and for them to revisit their own roles and

responsibilities. Topical areas of the framework have been kept generic intentionally so that this framework also remains relevant for non-LAM professions.

The translation and implementation of scholarly theories in practical life, and the timescale required to reflectively refine them, have been an area of debate within academic literature. Various disciplines have extensively argued and duly highlighted the gap between professional theory and practice. Hatlevik (2012) suggested that the reflective and research skills of researchers as well as practitioners are the cornerstone in bridging the gap between theory and practice. De Neufville (1983) acknowledged that the gap between theory and practice will continue to widen unless practitioners start sharing their frustrations, problems, anomalies and reflective thoughts in scholarly literature and academics consult proactively with practitioners, when designing the curricula for courses. A review of such seminal research clearly suggests that working in partnership is essential if any subject discipline aims to solve current or future research problems within the academic discipline. Likewise, LAM as a sector should focus on boosting future partnerships within both literary and operational spheres, if it aims to have an impactful place in the future-facing concept of smart cities.

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