

TALLINN UNIVERSITY OF TECHNOLOGY

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**Roles of Cities in AI Strategies: Insights from Amsterdam,
Barcelona, New York, and London**

Master's thesis

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I hereby declare that I have compiled the thesis independently and all works, important standpoints and data by other authors have been properly referenced and the same paper has not been previously presented for grading.

The document length is 14,805 words from the introduction to the end of the conclusion.

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ABSTRACT

Governments have a critical role in AI governance. There is a rising demand for governments to play a prominent role in order to maximize AI's economic potential at the same time minimize its undesirable societal effects. Although national governments direct the country's AI development and overall governance, local governments often promote uptake and impact when implementing AI initiatives and policies on the ground. With that, it is essential to understand their roles and responsibilities, which are crucial to ensure effective AI Strategy implementation. Hence, this research examines how local governments perceive their roles in implementing AI strategies. Using a sequential transformative mixed-method research design that combines qualitative latent content analysis and quantitative frequency count, this research aims to identify the roles of governments in AI governance. The researcher explored the Four Roles of Government Framework for this study and found that local governments emphasize their roles as regulators, enablers, leaders, and users in their local AI strategies. The cities of Amsterdam and New York positioned themselves as Leader-Enabler, while Barcelona positioned itself as Regulator, and London positioned itself as Enabler-Leader, each with specific goals and objectives. The study offers insights for other local governments to identify their roles and focus areas on AI governance. Local governments are urged to review their AI priorities, examine their roles and focus areas, and ensure that AI deployment benefits society and does not leave anyone behind.

Keywords: Artificial Intelligence, AI Strategy, Local Government, Cities, Roles, Technology Governance, Innovation Policy

I. INTRODUCTION

Nations are staking a claim for the most enhanced and most sophisticated systems powered by Artificial Intelligence. *“The race to develop Artificial Intelligence (AI) is gathering momentum...all countries, regardless of whether they are tech superpowers or not, will feel the effects of the AI revolution (Harari, 2019).”* Furthermore, *“whichever high-tech firm or government lab succeeds[s] ... will obtain a potentially world-dominating technology (Naudé & Dimitri, 2018, p. 369-370).”*

Nevertheless, what is this potentially dominating technology called AI? According to the European Commission High-Level Expert Group on Artificial Intelligence, *“Artificial Intelligence (AI) refers to systems that display intelligent behavior by analyzing their environment and taking actions – with some degree of autonomy – to achieve specific goals (European Commission, 2019, p. 1).”* Even with this type of sense rendering for AI, a distinct vagueness still surrounds how it is being operated and applied to society. Although it promises efficiency in terms of productivity and economic scaling, risks are imminent. Mainly, concerns have been raised about the ethical and social ramifications of AI use in multiple sections of human rights (Mantelero, 2018) (Rodrigues, 2020), healthcare (Gerke et al., 2020), social welfare (Ebina & Kinjo, 2021) (Oravec, 2018), justice (Greenleaf et al., 2018), education (Xia et al., 2022), and public administration (Etscheid, 2019). These areas use most AI-powered initiatives to tackle ‘wicked problems’ identified under these areas.

With this, governing institutions highly recognized the significant opportunities and apparent risks associated with AI. Countries acknowledge the realities of current and future AI advancements, the effects of AI-related opportunities, and how to address a new set of problems related to technology, society, and public policy that arise with the implementation of AI in a community (Fatima et al., 2020, p. 179). This community acknowledgement then led to over 70 AI ethics initiatives proposed by various national and regional governments, intergovernmental organizations, scientific research institutions, non-profit organizations, scientific and technological societies, and businesses worldwide (Xue & Pang, 2022, p. 46). Aside from such

ethical guidelines, governments tackled these concerns by formulating their whole-nation approach towards AI through their respective National AI strategies. In fact, there is a build-up in momentum by nations to formulate AI-targeted policies to maximize growth while mitigating the risks (Galindo et al., 2021) of AI. As stated in the Artificial Intelligence Index Report 2021 published by Stanford University, it has been recorded that the world's first national AI strategy was published by Canada in 2017 (Zhang et al., 2021, p.6) and to date, while writing this paper, 69 countries followed suit and published their own according to the OECD AI Observatory (2021). The availability of these published AI strategies is a decisive step taken by governments in setting the direction of AI as a technology and as a socio-economic tool as if giving validation of its inevitable wide diffusion in the everyday tasks of society. *“These national plans provide details of a country's strategy to harness the potential of AI and also indicate their approach towards economic, social, and policy-making paradigms related to AI technologies* (Fatima et al., 2021, p. 238).” These comprehensive and overarching policy frameworks provide an excellent roadmap to escalate the economic advantage of AI and govern its negative societal implications.

Furthermore, with the publication of these AI policy documents, the academic circle, especially scholars of governance and policy as well as innovation and technology, was provided with the opportunity to analyze these national AI strategies and publish academic studies. The common trend in these studies are papers which aim to provide insights into the various approaches taken by different countries to govern AI, specifically different hybrid governance frameworks (Radu, 2021), as well as identifying the significance of narratives and imaginaries in shaping national AI strategies, as well as the need for critical reflection on the underlying values and assumptions that support them (Bareis & Katzenbach, 2021). From a research perspective, the publication of these National AI strategies also sheds light on how governments understand AI and its expected usage in their respective areas of jurisdiction. The availability of these AI strategies also allowed the research field to study the normalization of the use of AI in society. Although limited, these research studies in AI contributed valuable insights into the goals, priorities, and implementation plans of various countries with regards to AI. They draw attention to the necessity of a thorough and coordinated approach to AI development, with the government taking the decisive lead in its promotion. Such findings can help policymakers and the public sector on how they can come about creating their own AI strategy if they are yet to develop one or amend the parts that need changing if they already have one.

1.1. Research Motivation

Governments play a vital role in the execution of any policies that affect their citizens. In terms of governing a highly transformative and emerging technology such as AI, there is an increasing demand for governments to play a more prominent role in the digital society, to maximize technology's potential, and to avoid or prevent undesirable outcomes (Kuziemski & Misuraca, 2020, p.1). Such expectations include leading the charge towards the successful governance of AI systems. The government is then placed into the front row in implementing AI strategies to propel the rapid advancement and extensive distribution of AI in the right direction (Cath et al., 2018). It is highly noted, though, that implementation requires multiple stakeholders, but there is no denying that governments facilitate a crucial linkage to all stakeholders. Talking about the importance of the lead role of government in AI governance, there is a multi-dimensional level that needs to be put into distinction - the national government and the local government.

Although national governments direct the country's overall development of AI usage, it is the local governments who are most active to bring impact into the overall National AI Strategy because *“cities and states are leading the charge in developing governance frameworks and implementing policies at a quicker, more direct, and more impactful level than their national counterparts because of the 'immediacy and proximity' of policy needs and responses* (Marcucci et al., 2022, p. 3).” National governments, frequently through the formation of national AI plans or initiatives, play a crucial role in determining the over-compassing strategy and direction for AI development in their country. As previously stated, these strategies establish goals for the growth of AI and specify the investments and regulations required to enable its adoption. However, local governments and private organizations frequently play a significant role in promoting the uptake and impact when implementing AI policies on the ground.

Local governments are crucial to the implementation of AI strategies for a variety of reasons, including their competence and familiarity in executing laws and programs at the local level, their familiarity to citizens' needs and the local economy, and their capacity to collaborate with these grassroots level stakeholders (Mikalef et al., 2022). The representation of the actual scenario is that *“local authorities and especially cities are unanimously regarded as leading actors in experimenting with AI technologies to cope with the various challenges materializing at urban and sub-regional levels* (Misuraca & Van Noordt, 2020).” This is incredibly logical if the city has an established prior innovation groundwork in reference to Smart City initiatives and availability of

a vibrant ICT community. In fact, *"local governments have been also deploying AI systems...in the context of smart city initiatives, where local governments implement digital data and technologies...to boost economic developments, enhancing the quality of life and improving the sustainability of the city* (Yigitcanlar et al., 2022, p. 2)."

In support of a growing number of city AI initiatives and projects, especially AI applications in smart city sectors such as healthcare, education, environment and waste management, mobility and smart transportation, agriculture, risk management, and security (Herath & Mittal, 2022, p. 18) (Rjab et al., 2023), few local governments, in fact, re-evaluated their smart city agenda and translated National AI strategies into a more localized context – their own City AI strategy. These localized AI strategies focus on governing the use and development of AI in their city of jurisdiction, tailored to address local contexts and needs. This interesting policy development is the focus of this research as the author attempts to understand the roles local governments play distinctive to that of the national government with regard to their own published local AI Strategies. The author of this paper believes that by understanding the role of the local government in the AI context, this research can attempt to serve as an insight to local governments in formulating their own local AI strategies and help them navigate the levels of responsibility with respect to AI implementation, resource allocations and priorities as well as facilitation of collaboration and engagement of local communities.

1.2. Research Problem and Objectives

AI Strategy research is an emerging field of study. However, more research resources have been focusing mainly on National AI strategies (Wilson, 2022) (Robinson, 2020) (Fatima et al., 2022). Studies focusing on local governments concerning AI have been few in recent years. These studies on AI and local governments mainly focus on insights into the socio-cognitive factors that shape the adoption and implementation of AI in local government contexts (Criado & O.de Zarate-Alcarazo, 2022) or the current state of AI adoption in smart cities emphasizing the need for a holistic and collaborative approach to AI implementation in urban contexts (Herath & Mittal, 2022). Previous research also discussed the AI capabilities of municipalities in Europe (Mikalef et al., 2022) or the role of AI in Smart City implementation (Manoharan et al., 2023).

Interestingly, there has been a study in terms of stakeholder roles in artificial intelligence projects (Miller, 2022) especially highlighting the internal and external stakeholders within individual AI project life cycles but not in terms of mapping roles of different stakeholders in the effective implementation of all-encompassing development projects such as AI strategies, precisely that of the role of the local government in support of its effective implementation. Essentially, the local governments are in charge of delivering AI services and enforcing AI socio-ethical ordinances at the local level. In contrast, national governments oversee the formulation of national AI and regulations. More so, the author of this paper believes that local governments are the facilitator between the national government and the local communities. Hence, the role of the local government should not be sidelined and must be highlighted in terms of the implementation of various AI strategies and projects. As they operate in their unique and able capacities, it is worth providing academic attention to them.

Since AI in the local city context is still emerging, this can be another reason why little spotlight has been given to local governments and AI. However, in recent years, with the publication of the local AI strategies of cities and the existence of a coalition of cities regarding AI governance, the possibility to study such topics has been provided. National governments and National AI strategies have already been intensively studied. Now, the challenge should be with local governments and the effective implementation of their local AI strategies. How do local governments position their roles in implementing their local AI strategies standalone from that of their National AI strategies? That is a good background question that challenged this study. However, there have been limited studies attempting to explore this as well as the identification and comprehension of the role of local authorities respective to the execution of their own published City's AI Strategy.

Therefore, the author of this paper intends to contribute to filling the knowledge gap in the literature on the roles of local governments in the context of their own crafted local AI strategies by providing critical inputs on answering the central question: *“How do local governments position their perceived roles in the implementation of their local AI strategies?”*

To help elaborate more on the main question, the following sub-research questions are further explored in the analysis of the study:

1. What are the roles local governments seek to perform in the context of their published local AI strategies?
2. How does each city's position differ from other cities in the group?

And to complement the findings and data results for the main question, this research will also indicate the areas of priority of the local governments with regard to AI governance and implementation.

Due to the early phase of the study relating to the roles of local governments in the implementation of AI strategies, this research follows a sequential transformative mixed-method research design (Creswell, 2009). This research design allows a two-phased approach to the exploration of the data “*with a theoretical lens...overlaying the sequential procedure* (Creswell, 2009, p. 196).” This research initially utilizes qualitative latent content analysis of the published strategy documents to identify the roles defined in the statements within the AI strategies of the cities. This study employs a deductive approach since *a priori* from an existing theoretical framework is present. Quantifying the qualitative data of the roles by frequency count then precedes the data collection.

More so, the author attempts to corroborate the identified roles from the sequential mixed method results from the policy materials. This part of the analysis then uses an inductive qualitative analysis to identify patterns that indicate the areas of priority of local governments in their AI strategies, which substantiate the identified roles. Utilizing a combination of these mixed methods provides a more thorough, comprehensive understanding of the roles and responsibilities of local governments in the implementation of AI strategies and an understanding of how these roles highlight the areas of priority with regard to the action plans illustrated in the AI strategies. More so, through these methods of analysis, there is an opportunity to effectively conduct a comparison between cities involved in this inquiry pertaining to the roles they deem to perform.

The rest of the research paper is organized as follows. Chapter II presents a review of related literature on the use of AI in local governments. Chapter III explains the four government roles as the conceptual framework for analyzing results to answer the research questions. Chapter IV links the methodology employed to guide the research inquiry effectively. Chapter V discusses the results and findings. At the same time, Chapter VI provides the summary conclusion and future recommendations for the research.

II. REVIEW OF RELATED LITERATURE

This chapter explores the earlier studies focusing on AI systems, the implementation of AI strategies, the contribution they bring in both policy and research areas, and the limitations they have in the context of the application within the local level. The next part is the status of AI adoption in the local government and the gap that needs to be covered pertaining to the local AI policies and the current representational studies of the roles of local governments in the implementation of AI strategies both at the national and local levels.

2.1. AI Systems and its Stakeholders

Defining AI has been a practice of evolution in itself for the past years. However, for the purpose of this particular research, the working definition that will be used is that AI is *“a system’s ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation* (Haenlein & Kaplan, 2019, p.1).” These are machine-based systems that are also sometimes referred to as Algorithmic Systems enabled by the usage of big data. In an attempt to put it simply, AI systems learn from the data inputted to them, and then they perform accurate predictions and decisions based on certain conditions set by their creators. To develop an AI, well-defined computer science methods must be utilized. Deep Learning, IoT (Internet of Things), Machine Learning, Natural Language Processing (NLP), and GPT (General Purpose Technology) are commonly associated with or categorized as AI systems. This paper does not deal with the technicalities of each mentioned system. However, it is vital to mention that these systems comprise all the technologies deemed to be governed and supported by AI strategies.

So, AI as a concept is rather complicated and highly technical. Moreover, there is also the question of who owns and sustains these systems, and when faced with ethical and legal dilemmas, who will then be held responsible? The accountability of implementing AI systems in society is a matter that needs utmost attention. That is the reason why identifying the stakeholders and understanding their respective roles can aid in the practical and responsible implementation of AI systems.

Miller (2022) contributes to this point in her study, identifying the main stakeholder groups in AI initiatives. There are nine roles in the development stage, five in the running stage, seven passive stakeholder groups, and five representative stakeholder groups. Only the development stakeholders can take into account the concerns of all stakeholders throughout the entire lifecycle (Ibid, 2022). Various studies show a pattern of roles, describing how they interact within the AI project. First one is the developers, who have technical capacities and are in charge of creating and building the AI system, whilst consumers are in charge of engaging with it and offering input. Regulators, mostly government institutions, are in charge of ensuring that the system conforms with applicable regulations and standards, while the general public is in charge of offering input and feedback on the system's use and impact (Weber et al., 2022) (Miller, 2022) (Güngör, 2020).

Clear role distinction and interpretation make it possible to ensure that AI systems are designed and used responsibly, effectively, and ethically. And by understanding the roles and responsibilities of various stakeholders and involving them in the conception, development and implementation of the AI project lifecycle.

In the same loop, roles in the implementation of AI systems are shared between private and public actors. However, mainly developed and bred within the private sector, people who understand AI systems in depth are most commonly from the private sphere – tech businesses and academia. What about the public sector? It is not reasonable to say, though, that the public sector has no knowledge about the operational capabilities of AI systems. Although having limited focused knowledge in comparison to those of their private sector counterparts, governments have been active users, sources, and supporters of AI systems (Maalla, 2021, p. 38-39) (Kankanhalli et al., 2019, p. 304). Even if they have limited technological knowledge of AI systems, they have technical expertise in the areas where AI systems are deployed in the public sector. Aware of organizational capacities and limitations, some governments have been establishing a highly expert group of computer science and data science consultants to work with them closely (Berryhill, 2019, p. 98-99) in a subsequent effort to (1) understand the potentials and risks of AI; (2) provide standards on regulatory measures to support its development and deployment as well as limit its societal damage; (3) utilize available AI systems to streamline government operations and reduce cost; and (4) allocate necessary resources to ensure its seamless diffusion.

The author of this research paper believes that the government, although still dependent on the private sector, governments around the world have already developed a foothold in terms of governing AI strategies. This foothold can be characterized by the ready availability of government plans, policies, and strategies explaining how governments view, intend to utilize and support AI systems. The most resounding one is the formulation of National AI strategies for countries. This comprehensive strategy provided legitimacy in the usage of AI systems toward socio-economic growth and a promise to regulate it with the interest of the whole society in mind. With the availability of published national AI strategies for the past few years, a growing body of literature has focused more on the aspect of goals, objectives, and implementation plans.

2.2. National AI Strategies

One key takeaway most of the time in published research about AI strategies is that AI is the technology that is essential in achieving an socio-technological utopia. In its most techno-deterministic sense, Artificial Intelligence (AI) is increasingly being considered to intertwine within the lives of people because of its potential to drive economic growth and welfare (Lu, 2021). The narrative evident in national AI strategies are very similar: they all present AI as a given and profoundly disruptive technological breakthrough that will radically affect society and politics (Bareis & Katzenbach, 2021, p. 975).

Yes, the potential of AI to solve critical societal problems is acknowledged. It can perform its function objectively and precisely if built upon quality data sets. However, it must also be acknowledged that objectivity and preciseness are highly compromised if the data is misleading. Its operational vagueness describes it as a black box. This is because *"it is not transparent as it can develop rules that are not documented"* (Geske & Leyer, 2022, p. 2). As a result, AI systems might be complex and challenging to comprehend. The model's decisions may be beyond developers' comprehension, and users may need help explaining or interpreting the results (Miller, 2022). Nevertheless, with the help of expert groups in AI, governments must be able to understand this and provide a good engagement narrative to legitimize the process of governing AI systems.

Interestingly, the study conducted by Fatima et al. (2022) argues that National AI plans are valuable tools for shaping AI development and governance. However, according to the same study of Fatima et al. (2022), AI strategies are frequently considered aspirational and may not necessarily

reflect the reality of AI development on the ground. Their research on the National AI strategies of 50 countries identified two key factors influencing AI strategy implementation: technological and human factors. Using these two variables, the authors create an AI strategy implementation matrix with four quadrants: "*Technology-Prepared, People-Prepared, Aspirational, and Leaders*" (Fatima et al., 2022, p. 384)." By placing countries on this matrix, the authors visually represent each country's strengths and weaknesses in implementing their national AI strategies. By doing so, this will guide governments to have an understanding of where they thrive or lack in order to allocate proper resources and modify capabilities to maximize the AI plans. While this is helpful, it is also good to know which areas AI initiatives are getting invested in. The Observer Research Foundation report by Saran, Natarajan, and Srikumar (2018) examines 12 countries and their AI strategies, demonstrating the various approaches different countries take to implement their national AI strategies. Some countries, for example, prioritize AI development in specific sectors such as healthcare or finance, whereas others focus on developing AI infrastructure or developing regulatory frameworks.

Evidently, different approaches are being taken by different countries with regard to their overall AI plans. In Europe, societal values are vital factors in building upon AI strategies. Most European countries, for example, have aligned their National AI Strategies with that of the European Commission's Coordinated Plan on Artificial Intelligence and OECD's AI Principles (OECD, 2019). It is essential that government institutions in Europe have put forth recommendations to formulate AI strategies based on human-centred values. Robinson (2020) examines how cultural values influence the development of Nordic national AI public policy strategies. This particular study points out that cultural values, particularly trust, transparency, and openness, play an important role in shaping Nordic AI strategies (Ibid, 2020). This study then effectively contributes to the understanding of the role of contextual and cultural values in the development of national AI strategies. Governments should do so as it is critical for them to ensure that these AI strategies are aligned with societal values and can promote responsible and ethical use of AI. If European nations have taken concrete policy steps to address concerns around biases and discrimination on AI, the United States has prioritized investment in artificial intelligence research and development, including through government funding and collaboration with private industry, according to the comparative study by Roberts et al. (2021).

Additionally, according to the report from the European Union (Van Roy et al., 2021) examining Member States in Europe, some countries include AI policies in broader digital transformation

strategies, while some policies relate to the COVID-19 pandemic and sustainable matters. Such countries include Bulgaria, Estonia, Hungary, Slovakia, Germany, and Spain. The report concludes that greater harmonization and coordination of national AI strategies across Europe is required to ensure their effectiveness in promoting AI development and responsible use (Ibid, 2021).

On the east side of the world, Gregory Allen (2019) examines China's AI strategy in depth, including its emphasis on AI as a critical driver of economic and military growth, its emphasis on fostering domestic innovation and core technology development, and its efforts to leverage AI for strategic and geopolitical goals. While the United Kingdom, like any other nation that puts broader prioritization on digital transformation and economic scaling through its Overall AI Strategy, ethical innovation in terms of regulation AI as well as methods of engagements for stakeholders to ensure AI diffusion are all significant challenges facing AI in the UK (Kazim et al., 2021).

All the preceding studies emphasize the importance of continued international collaboration and coordination among various stakeholders to ensure that AI development is consistent with societal values and priorities. And leading the charge for this is the National Government.

2.3. Role of the National Government in AI Governance

By default, the governance of AI has demanded governments to navigate its development and diffusion within the bounds of societal values and economic potentials. The shift towards transformative innovation policy has led to demands for the state to adopt a more entrepreneurial and directional function (Borrás & Edler, 2020). In all key policy areas, government institutions have a pivotal involvement throughout all aspects of the policy-making process and guarantee the enforcement of established policies (Mugwagwa et al., 2015, p.7). This participation applies to the policy stance of the government concerning AI systems too. However, it can be noted that the rapid evolution of AI policies and politics has been examined mainly from an ethical and philosophical standpoint, with less focus placed on the influence of policy and governance, despite its crucial significance in determining technological advancements (Ulnicane et al., 2022, p. 30).

There are few but significant studies that highlight the role of the state in AI implementation. According to Djefal et al., the government is accountable for ensuring that the benefits of AI are

distributed equitably throughout society and for addressing any negative impacts that AI may have on vulnerable groups or society as a whole (2022). This capacity sets the state or the national government as the number one watchdog for AI systems. The author of this paper believes that being in charge of the legislation and legal frameworks that govern any radically changing technologies in society is the primary default role of the government with regard to the governance of AI systems. It should also highlight the commanding role of government leadership and commitment to AI adoption are critical factors in driving cultural change and fostering an environment conducive to experimentation and innovation (Madan & Ashok, 2023). Governments, in this regard, act as the primary supporter and funding agent that drives research and enhancement of AI systems. As the primary governing body, national governments play a crucial role, including agenda setting, establishing ethical principles, and providing oversight to ensure that AI systems are consistent with public values and legal requirements (Kuziemski & Misuraca, 2020). In addition to that, governments establish legitimacy and public trust concerning the use of AI systems. The government can promote transparency, accountability, and public participation by incorporating diverse stakeholders in developing and implementing strategies, which can assist in establishing trust and legitimacy. And lastly, the national governments provide the long-term vision and sustainability for attaining policy objectives with regard to AI. These long-term visions on AI are then cascaded in all government instrumentalities and ultimately transferred into the most basic unit of the government – the local governments.

2.4. AI in Local Governments

Research related to AI in local governments has mainly focused on the role of AI in cities with regards to its use in a variety of city operations and projects.

A study conducted in Italy focused on the use of artificial intelligence in strategic performance management systems (SPMS) in local governments (Leoni et al., 2021). The research suggests that AI has the potential to transform the way local governments manage and evaluate performance. However, these technologies ethical, legal, and social implications must be carefully considered (Ibid, 2021).

In addition, the capabilities of local governments have also been subject to academic inquiry. Mikalef et al. (2022) focused on the determinants for European municipalities in enabling AI

capabilities in government agencies. According to the study, several factors influence AI adoption, including the level of digitalization, the availability of financial resources, the maturity of the organizational culture, the capacity for innovation, and the employees' level of expertise and skills (Ibid, 2022).

Research findings in the local governments in Australia and the US revealed that the majority of city managers that was interviewed and surveyed see AI as a potentially helpful tool for improving service delivery and lowering costs. However, the need for more expertise and knowledge among the city employees was also identified as a significant barrier to AI adoption in local government (Yigitcanlar et al., 2022).

Since the area of study regarding AI implementation is an emerging field of academic research, there still needs to be more data that circulates around AI strategies in the context of local governments. That is why even the majority of the research has emphasized the importance of a collaborative approach in developing and implementing AI-based solutions in the public sector, including citizens, policymakers, and AI technology vendors. The importance of identifying the roles of each one is crucial to map out collaboration points to ensure effective implementation. Furthermore, the best start for that is to understand the key players within the grassroots, starting with the clear delineation of the roles and responsibilities of local governments with regards to AI implementation in their own area of jurisdiction.

III. CONCEPTUAL FRAMEWORK

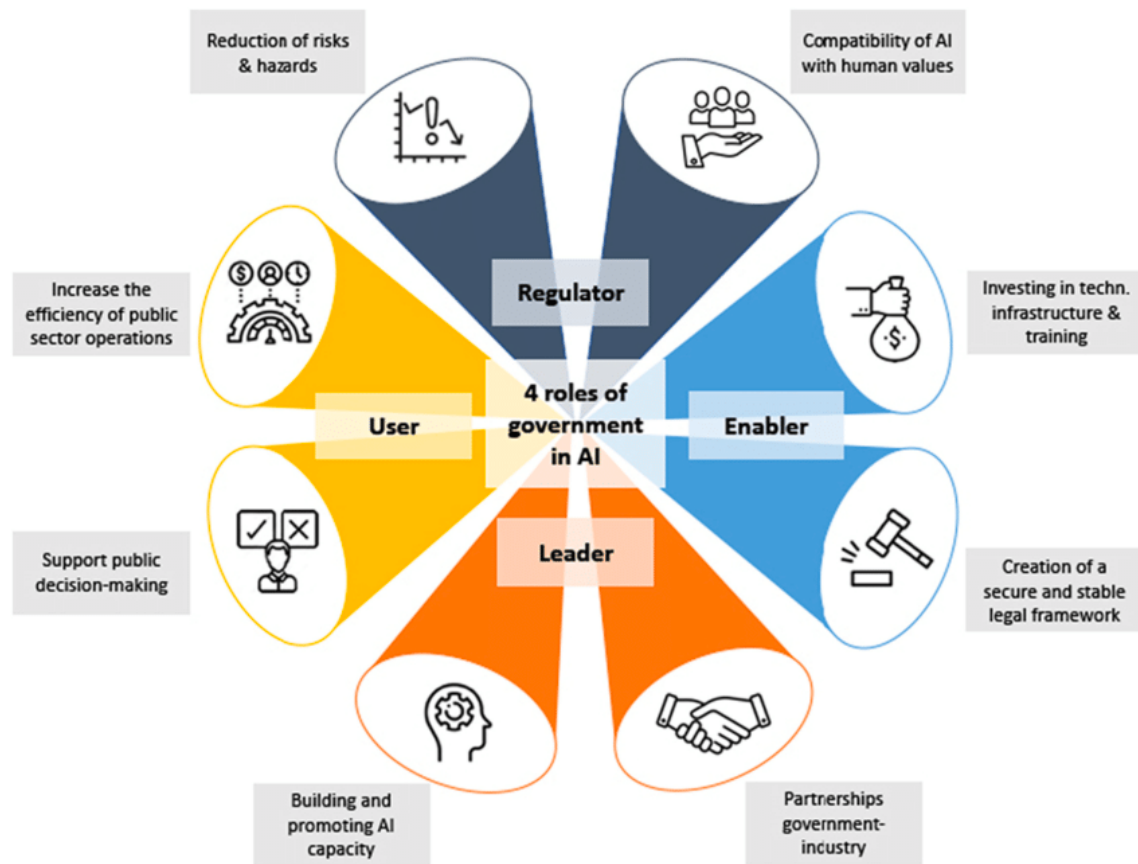
Gauging from the available studies on AI strategies in local governments, theoretical development with regard to the roles of local governments in the implementation of AI is somewhat limited. With this, this research study will employ the *Four Roles of Government in the AI Context* developed by Guenduez and Mettler (2022) as the theoretical framework that will guide the inquiry and analysis to answer the research questions of this study.

Complementary to the past literature above, there are 13 different roles of governments in socio-technical systems which are: “Observer, warner, mitigator, opportunist, facilitator, lead-user, enabler of societal engagement, gatekeeper, promoter, moderator, initiator, guarantor and watchdog (Borrás & Edler, 2020).” These mentioned roles can rather be suitable for a generalized national context. Hence, a more specific categorization of the role of governments fits the research design of this study. That is why Guenduez and Mettler’s 4 Roles of Government in the AI Context (2022) is best suited to the conduct of this research.

It should be mentioned, though, that Guenduez and Mettler arrived at the formulation of these 4 Roles of Government in the AI Context framework by analyzing available literature, including that of Borrás and Edler (2020) as well as works of multi-dimensional analysis of AI strategies by Fatima el at (2020) and governance framing research in AI Policy by Ulnicane et al. (2020) which are all culled from National AI strategies. The author of this research looked at possible frameworks that can provide a more localized context, but it can be inferred that from these previous researches, four prominent roles that governments seek to perform with regards to AI implementation (Guenduez & Mettler, 2022) suits the local government setting. These are (1) the regulator, who is expected to set legal and ethical frameworks in place to ensure that AI systems operate within the normative values of society. Another one is (2) the enabler, which is responsible for providing the best conditions for businesses and AI technology makers, users, and researchers to enhance their skills and ensure the availability of space to showcase the optimal end results. The next one is (3) the leader role, whereby the definition of its name leads the overall direction of the plan. This role also directs which field research and development on AI are profitable and practical

and facilitates stakeholder collaboration. And lastly, governments as (4) the user, which by the self-definition of it, is the primary end product consumer of the technology. All these identified roles are being used in the analysis of their application within the local context.

Figure 1. "4 Roles of Government in AI Context"



Source: Guenduez & Mettler (2022, 3) "Strategically constructed narratives on artificial intelligence: What stories are told in governmental artificial intelligence policies?"

3.1. Four Roles of Government in AI Context

The following section provides a more in-depth conversation about the four mentioned roles.

3.1.1. The Regulator

It has already been discussed in the earlier sections of this paper that the default role of governments, mainly states, is acting as the regulator in the implementation of any potentially radically changing society technology such as AI systems. As the regulator, "*the government ensures the compatibility of AI with societal values* (Guenduez & Mettler, 2022)." Governments

perform this function by crafting ethical and legal instrumentalities in place to ensure the "*promotion of safe and socially beneficial AI* (Baum, 2016)." This role is essential as setting legal and social guidelines means that by establishing ethical principles, it is to proactively reduce the potential risks and enhance the benefits associated with the adoption of AI (Ulnicane et al., 2020, p. 159) and ultimately protect human and digital rights. This role is tasked with navigating and looking after the risks associated with AI and reducing them in the most minimal sense to protect citizens from any form of bias, discrimination, and unfairness.

Although this role of governments as regulators seems to best fit the state governments as mentioned above, since they have overarching regulatory mandates and legal positions, this study explores if this role is also present in the AI Strategies of local governments, considering that they can also enact local ordinances and regulations. And if so, this study can then identify which type of legal steps local governments set forth in order to make AI systems "*compatible with social values and reduce risks and hazards* (Guenduez & Mettler, 2022)." Peeking into this role in the local context can provide a good insight into the extent how local governments support this role in ensuring the compatibility of AI systems with existing ethical, legal, and social normative frameworks that aim to protect both human and digital rights.

3.1.2. The Enabler

Governments also primarily act as AI enablers as they "*can dismantle, reduce, and minimize potential barriers, obstacles, and restrictions, supporting businesses and facilitating the use and diffusion of AI* (Guenduez & Mettler, 2022)." This argument makes sense taking in historical perspective; previous technological revolutions were in part "*aided by the government, in order to fully spread the new potential across the economy and its benefits across society* (Perez, 2012, p. 19) (Perez, 2012, p. 212)." This role of the government is also being realized through the active prioritization of public funds "*investing in domestic technical infrastructure and the training of citizens* (Guenduez & Mettler, 2022)." At first look, this seems to be the narrative that local governments try to highlight in their published AI strategies as they try to disseminate information on supporting and facilitating AI systems within the locality. It should also be acknowledged that AI strategies serve a myriad of economic purposes, ultimately positioning the city as a technological hub for AI.

In this paper, the author seeks to find out if local governments portray this role in their local AI strategy and identify how they are planning to (1) support local businesses that develop and use

AI and (2) invest in infrastructures and training to ensure eventual diffusion of AI in their locality. More so, this research can provide valuable inputs on how local governments support this enabler role and what priority tasks have been drafted in order to facilitate this role in the AI context.

3.1.3. The Leader

Guenduez and Mettler describe this role as how governments are "*actively involved in the research and development of AI-based applications* (Guenduez & Mettler, 2020, p. 3)" by collaborating with research groups, universities, and the private sector. They may venture into general domains of the military, cybersecurity, social welfare, or disaster management, but the government has been open also to AI research and development outside of such domains. This role also involves the promotion and facilitating of collaboration among stakeholders in the AI ecosystem. Aside from that, this role ensures that key stakeholders are well-capacitated with AI skills and knowledge to be able to access equal opportunities that AI technologies provide. This part of the leader role on AI capacities seems to also entwine on the upskilling that an enabler role supports. This entanglement of tasks within the roles is an interesting point of discussion in the analysis part of this paper. And an attempt if there is a possibility for a resolution.

In the context of cities, this paper analyzes the extent of this role with regard to local governments and how they shape collaboration to build and promote AI capacities in their locality as well as the existence of public-private partnerships.

3.1.4. The User

Research in AI has been possible with the use cases relating to the application of AI in government operations. More commonly highlighting the use of Artificial Intelligence in improving service delivery and operations of governments around the globe (Bailey & Barley, 2020, p. 1-2). With this, there has been a momentum building towards the push for the implementation of public 'administration by algorithms', significantly augmenting the decision-making of public servants (Veale & Brass, 2019).

The author of this paper then navigates existing local AI strategies to understand if this particular role is part of what local governments seek to perform in the implementation of their AI strategies. It is worth analyzing how local governments plan to increase the efficiency of public sector operations and how they expect to use AI systems to support public decision-making. This role is

crucial as to what extent the local government claims ownership and the sustainability of AI systems used in their City Hall operations.

After identifying if these roles are available in the published AI strategies of cities, the author of this research then tries to understand which role local governments seek to portray more in their local AI strategies by identifying how they position their perceived roles within the implementation of their local AI strategies. With the lack of research touching upon that, this research study then aims to contribute to providing a more suitable conceptual framework in analyzing the role of local governments in implementing AI strategies as well as providing insights on priority areas of governance that cities currently focus on which can be reflected on their policy documents. By identifying their areas of focus, this can validate how the identified roles support these areas of focus. More so, this can provide awareness of how aligned the roles of the local governments are with the areas of focus of their respective AI strategy. Although the latter is not mainly the highlight of this research, by understanding the areas of focus, there will be an opportunity for inference for the said matter.

IV. METHODOLOGY

This section of the paper discusses the research design used to understand how local governments position their perceived roles in their AI strategies. In order to arrive at that, the identification of the roles of the local governments that they perceive to perform based on their published local AI strategies must be developed first. Which this then allows the opportunity to understand how they position themselves based on these roles subsequently.

4.1. Research Design

Since the study of analyzing the role of local governments with regard to AI implementation is still an emerging study, this research paper will employ the sequential transformative mixed method research design (Creswell, 2009). This approach involves a step-by-step plan that follows a specific theoretical perspective or advocacy viewpoint, with results being combined and analyzed during the interpretation stage (Kroll & Neri, 2009, p. 43). Sequential transformative research design is a:

“Strategy in mixed methods research is a two-phase project with a theoretical lens...overlaying the procedures, with an initial phase (either quantitative or qualitative) followed by a second phase (either qualitative or quantitative) that builds on the earlier phase (Creswell, 2009, p. 195-196).”

Combining the qualitative method of content latent analysis in the policy documents and the quantitative numeric frequency analysis allows a systematic process of arriving at the results needed to facilitate discussion on understanding how cities position their perceived roles based on their AI strategies. Utilizing a mixed-method approach is practical in this particular study as it provides an avenue for a more complete representation that can improve the depiction and comprehension of the results of the research question (Wasti et al., 2022, p. 1176).

The said sequential transformative mixed-method design can be described in the notation below (Figure 2), which serves as a visual model for the procedure of this research.

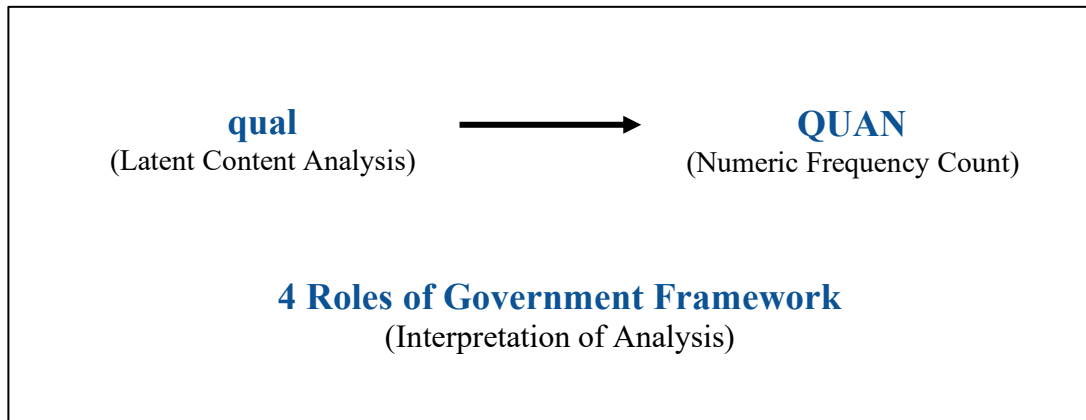


Figure 2. Sequential Transformative Mixed-method Notation

Source: Author's own notation adapted from Creswell (2009) notation design for sequential transformative approach

The notation (Figure 2) has been derived from the original sequential design of John Creswell (2009) in his book titled "*Research Design: Qualitative, quantitative, and mixed methods approaches* (Ibid, 2009)."

It is sequential because it will first utilize the qualitative method, as shown 'qual' in Figure 2, with Latent Content Analysis from the statements or words from the policy material. In the succeeding portion of this chapter, the discussion on the latent content analysis will be elaborated. Moving on, the arrow '→' indicates the order in which the data collection and analysis was arranged. So, after the latent content analysis, the quantitative approach of numeric frequency count comes next, which extends upon the results of the qualitative data. In addition, it is noticeable that the way in which 'qual' and 'QUAN' were written. This illustrates how the priority or emphasis of the method takes place. There is more weighted attention on the numeric frequency count as this relatively facilitates the process in which the author of this paper can arrive at the answer to the main question regarding the positioning of the perceived role of the cities based on their published AI strategies. And the framework that is used to guide the inquiry is placed inside the box to represent which perspective the analysis was drawn into. All elements are placed in a box to depict data collection and analysis (Creswell, 2009, p. 194).

In the proceeding sections, a more in-depth description of how the data sample selection (Corpus) was panned through. More so, an explanation on the conduct of the data collection and data analysis based on the sequential transformative research design is discussed.

4.2. Corpus

Local government case studies are selected based on the cities that have published their local AI strategies as of January 2023 based on the Global Observatory of Urban Artificial Intelligence (GOUAI). The research process of data sample selection started on February 1, 2023 and ended in March 15, 2023.

In the GOUAI's Atlas of Urban AI database < <https://gouai.cidob.org/atlas> > (Global Observatory of Urban Artificial Intelligence, 2023), as of writing, there are 55 cities with over 150 written AI initiatives available. From the GOUAI database, the author pre-screened the cities by filtering cities that have AI strategies and policies in place with a quick keyword input on the built-in filter options. The keyword used are: “strategy” and “policy”. By process of elimination, there are only six cities that have managed to publish their own local AI strategies. They are the cities of Amsterdam, Barcelona, Buenos Aires, London, New York, and Singapore.

Additional desktop research has been conducted to see if any other cities have published their one AI strategy. The author also navigated the AI Localism repository <<https://list.ailocalism.org>> (AI Localism Lab, 2023). However, with the use of built-in filtering functions such as “ALL” in *the Regions* field, “Innovation in Governance of AI”, “Policies”, and “ALL” in *the Focus* field as well as keyword search input “AI Strategy”, only three results have appeared which all corresponds to the GOUAI's Atlas of Urban AI database – two are from Barcelona, and the remaining one is New York. Furthermore, Dubai has come up from a reference of an AI expert. However, upon careful internet search, there are no publicly available AI strategy documents besides their website highlighting their AI Labs and AI Toolkit. Dubai, then has been excluded from the list.

From the six cities mentioned above, Buenos Aires has published its AI strategy in its own local language, Español, with no English translations. This then limits the comprehensive analysis of the AI Strategy of the City of Buenos Aires. Hence, Buenos Aires has also been excluded from the list of cities with AI Strategies. The author also considered Singapore. Be that as it may, Singapore

is a nation-city and has already been included in various National AI strategy research. Hence, the author of this paper has excluded Singapore from the selection. With that, the final corpus comprises four cities that have published their local AI strategy – Amsterdam, Barcelona, New York, and London.

4.3. Data Collection

Since the four cities have been identified and finalized, the documents have been processed prior to analysis. The published AI Strategy documents of identified case study local governments were extracted from their official government websites. These document materials were then subjected to content analysis and are considered as qualitative data for the research. Aside from the strategy documents, the cities were requested to participate in additional one-on-one interviews. However, there has been no affirmative answer to supplement the outcomes from the content analysis using semi-structured interviews. This was intended to be another qualitative data to include in order to strengthen the methodological approach.

The initial approach was sending invitation emails to the official email address of the City Governments, which are available on their official websites. A total of six initial emails were sent to the four identified cities through their official email contact addresses listed on their respective official government websites. Additionally, over 20 LinkedIn direct messages were sent to identified individuals in the department responsible for formulating the AI strategies. However, due to the unresponsiveness of the recipients, lack of interest and the unavailability of the main focal person responsible for the authorship of the published AI strategies, the interview schedules were not confirmed and ultimately not conducted for this research.

With the unavailability of qualitative interviews, the author then focused on the available strategy documents, all in PDF format and proceeded to the analysis of the documents.

Table 1. List of City AI Strategies

CITY	TITLE	TOTAL NO. OF PAGES
Amsterdam	Agenda AI: Amsterdam Intelligence	16 Pages
Barcelona	Mesura de Govern Intel·ligència Artificial (Government measure for the municipal algorithms and data strategy for ethical promotion of artificial intelligence)	42 Pages
New York	The New York City Artificial Intelligence Strategy	116 Pages
London	London: The AI Growth Capital of Europe	57 Pages

Source: Sicat (2023), author’s compiled list of AI strategies of Cities

4.3. Data Analysis

With the use of the qualitative latent content analysis, the author of this research has reviewed a total of 231 pages of written AI Strategy materials from the four identified cities. Content analysis is a research methodology that enables reliable and accurate deductions to be drawn from written or spoken material and applies them to their corresponding context of use (Krippendorff, 2019, p. 24). Social sciences researchers use qualitative content analysis to identify and investigate common themes or patterns in large amounts of textual data, such as policy documents.

4.3.1. Qualitative Content Analysis

For content analysis, according to Bengtsson (2016), four main stages have been identified - (1) decontextualization, (2) recontextualization, (3) categorization, and (4) compilation. The author of this paper utilized this process for the qualitative part of the research procedure.

Decontextualization is the initial step that the author of this paper employed in the analysis of the data. In here, each published AI strategy from the respective city was examined. The author has dissected *meaning units* from the sentences, statements, and paragraphs from each AI strategy and identified both surface structure (manifest meanings) and deep structure (latent meanings). “A meaning unit is the smallest unit that contains some of the insights the researcher needs, and it is the constellation of sentences or paragraphs containing aspects related to each other (Bengtsson, 2016, p. 11).” Since *a priori* is available courtesy of the four roles of government in AI framework, a deductive approach has been utilized in order to create a code list. In this process, it is said to take a sentence together with its context and rewrite it to be interpretable out of context

while preserving its meaning (Choi et al., 2021, p. 1). Hence, the identification of code. After identifying the meaning unit, each meaning unit is labelled by a code that fits the 4 Roles Framework.





The 4 Roles Framework has primary tasks identified to support the identification of roles. See Table 2 below. With the guide of the primary tasks of each role from the theoretical framework, a deductive coding system was done. As an example from the document, a meaning unit was identified and then translated into a smaller summative unit preserving its original context. After which, an examination of its alignment based on the primary task role was done. From there on, the meaning unit is then coded by color and role name (see Table 3). Blue with hex code: #4775AB represents the role of the Regulator. Yellow with hex code: #DCB94D represents the role of an Enabler. Red, with hex code: #8C1B10, represents the role of the Leader, while Green, with hex code: #76A359, represents the role of the User.

Table 2. The Roles and Primary Tasks Code

ROLE	IDENTIFIED TASK
Regulator	Reduction of Risks and Hazards
	Compatibility of AI with Human Values
Enabler	Investing in Technical Infrastructure and Training
	Creation of Secure and Stable Legal Framework
Leader	Partnerships Government-Industry
	Building and Promoting AI capacity
User	Increase the Efficiency of Public Sector Operations
	Support public decision-making

Source: Guenduez and Mettler (2022) Roles and Primary tasks derived from the 4 roles of government in AI context Framework

Table 3. Roles with Color Hex Codes

ROLE	COLOR	HEX CODE
Regulator		#4775AB
Enabler		#DCB94D
Leader		#8C1B10
User		#76A359

Source: Sicat (2023) the author’s color-coded system for analysis

For example, the meaning unit from the Amsterdam AI Strategy document: *“Protecting digital rights and improving equality of opportunities in Amsterdam’s algorithms (City of Amsterdam, nd, p.4).”* This was culled from the entire review of the strategy. This is then condensed to a more summative unit, *“Ensuring that digital rights are preserved, and equal opportunities are accessible for everyone (Author, 2023)”* by the author in her own words. Referring to the 4 Roles Framework, this statement is aligned with the task *“Compatibility of AI with Human Values” (Guenduez, 2022, p. 3)”* which supports the role Regulator. Hence, this meaning unit is coded with the color Blue and the role name Regulator as shown on the sample coding list manifest of the author of this paper shown in Table 4 below.

Table 4. Sample of coding manifest by the Author for Amsterdam

MEANING UNIT	SUMMATIVE MEANING	ROLE
Amsterdam is one of the initiators in a coalition of ‘cities for digital rights’. This coalition is one of the main items on the Agenda for the Digital City	Pioneer in AI Development	Leader
The use of AI for assignments within the City (AI for residents of Amsterdam)	Application of AI technologies for city operations servicing the residents.	User
Positioning and promoting of AI and Amsterdam to develop economic potential.	Position themselves as one of the pioneers of the use of AI.	Leader
Establishing ethical frameworks to prevent abuse and the exclusion of certain groups of people and to actively encourage inclusion – an aspect of Digital Rights.	Establish rightful ethical and legal mechanisms to ensure non-discriminatory usage of AI technologies and should serve all the residents.	Regulator
...pioneering force in promoting the development and deployment of artificial intelligence at a local level.	Become the "pioneering force" in the deployment and use of AI.	Leader
... improve the lives of Amsterdam’s residents by limiting the negative effects and enhancing the positive effects of AI.	Improving the lives of the residents of Amsterdam while limiting the risks and negative Impacts that Ai technologies constitute.	Regulator
Use AI within City of Amsterdam’s processes and for projects within the city	Application of AI technologies in the various processes and projects of the City Government.	User

Source: Sicat (2023) Sample of the coding manifest for Amsterdam as shown on Appendix 6

This thorough decontextualization step has been repeated multiple times until each AI strategy from the four cities has been covered and completed page per page. After that, the next stage commences.

The recontextualization stage comes next, in which the author of the paper re-read and reviewed the entire policy materials once again to analyze whether (1) the unmarked portions of the texts warranted a second look for coding and (2) if there are meaning units identified and coded were needed to be reviewed for elimination or re-coding. According to Bengtsson, the researcher requires going through a detachment process and filtering out extraneous information in this stage to ensure accuracy and relevance to the study's aims (2016, p. 12). This process provided the author

of this research to facilitate cleansing of the qualitative data and include only meaning units that help in answering the research problem. This step resulted in 552 total meaning units (Table 5).

Table 5. Number of Meaning units after recontextualization stage

CITY	NO. OF MEANING UNITS
Amsterdam	125
Barcelona	202
New York	200
London	25
TOTAL	552

Source: Sicat (2023) Author's Calculation after the recontextualization stage

Categorization is the step that comes next. Basically, this step has been made efficient with the help of the decontextualization stage, wherein both the task and the role has been already identified as codes via the utilization of summative condensed unit from the meaning units. However, from the completion of the identification of roles from the summative unit, prominent patterns emerged. This stage then allows an inductive approach to be utilized by the author to make sense of the prior codes and set emerging patterns into a category that aligns on the corroboration of such roles in the context of the areas of focus that the city governments have with regards to their AI strategies. This is part of the research objective. From the patterns, there have been eleven (11) areas of focus identified inductively (Table 6).

Table 6. Identified Areas of Focus

Collaborations and Partnerships
Efficient City Operations and Services
Economic Development and Competitiveness
Digital Rights Protection
Ethical, Legal, and Social Values Framework
Technical Training and Infrastructure
Transparency and Accountability
AI Ecosystem

Data Governance and Sharing
Citizen Engagement and Citizen Participation
Innovative and Responsible Procurement

Source: Sicat (2023) Author’s Identification from the Codes during the Categorization stage

And the last stage of the qualitative content analysis is the *compilation* stage. The data is analyzed and synthesized by summarizing the findings and identifying patterns and themes within this stage. The identified results should be interpreted in alignment of the research topic and the study's larger context. In here, “*the researcher can present a summary of themes, categories/sub-themes and sub-categories/sub-headings as a table to allow the reader to get a quick overview of the results (Bengtsson, 2016, p. 12).*” This stage is completed with the analysis schedule manifest (Table. 7).

Table. 7 Sample of Analysis Schedule of the Author for Barcelona

AI STRATEGY STATEMENT	SUMMATIVE MEANING	ROLE	AREA OF FOCUS	PAGE
guarantee the privacy and digital rights of citizens and ensure their data will not be used under any circumstances for social-control purposes.	Guaranteeing Privacy and protecting digital rights by ensuring that data are used ethically and correctly	Regulator	Digital Rights Protection	4
Barcelona is joining cities such as Amsterdam, New York, Helsinki, Toronto and Seattle in the construction of an urban artificial intelligence and emerging-technologies model, based on human rights and committed to a democratic digital society.	Joining international Coalition for responsible AI	Leader	Collaborations and Partnerships	5

Source: Sicat (2023) Analysis schedule manifest from Barcelona’s AI strategy

4.3.1. Quantitative Numeric Frequency Count

The second stage of the data analysis after the qualitative latent content analysis is the quantification of the hand coded data in order to arrive at the answer to the main research question. In this stage, the researcher of this study measured the roles by frequency count of references on the coded analysis schedule of each city AI strategy. A frequency count table was used to examine how many times each role -- Regulator, Enabler, Leader, User -- has appeared in the Analysis schedule manifest of each city. After tallying the frequency, the author of this research utilized the

pie chart to provide a visual representation of the roles. According to Manikandan (2011), once the data collection is done, the subsequent step is to arrange the data in a coherent manner that enables the identification of any patterns or trends that may exist in the data (p.54). This coherent manner can be in the form of visual graphics that provides an avenue for a visual understanding of the data and to support the analysis of the results. For this research, this availability of visual representation then allows an understanding of how local governments position their perceived roles in the implementation of their local AI strategies. Do they position themselves more as a Regulator or User or Leader or an Enabler? Providing a visual model can provide a good overview on answering the main question as well as cross-analyzing how each city varies in positioning from each other.

Furthermore, to corroborate these roles, the author of this research once again employs the frequency measure to evaluate which area of focus each city provides in their AI strategy. After which, a radar chart was generated to highlight the varying degrees of focus areas of each city.

4.4. Methodological Scope and Limitations

There are limitations to the methodological approach that was used in this research paper which should be discussed and acknowledged.

First, the scope of the research was focused on just four cities: Amsterdam, Barcelona, New York, and London because of the limited access to available repositories for AI strategies of cities. This results in the restriction of the external validity of this study, implying that the results may not be generalizable to other cities beyond the sample group since they must be cautiously evaluated considering respective contexts, conditions, and factors.

Second, due to the time and resources constraints as well as the non-responsiveness of targeted individuals, resulted in the cancellation of the conduct of semi-structured interviews, which was deemed to provide triangulation to the content analysis from the published documents. However, to still establish internal validity, the author of this research employed the inductive analysis technique to provide a methodological triangulation. *“Methodological triangulation has been found to be beneficial in providing confirmation of findings, more comprehensive data, increased validity, and enhanced understanding of the studied phenomenon (Bekhet & Zauszniewski, 2012, p. 41).”*

Third, the author of the research had opted to hand code while doing the analysis, aided by Excel spreadsheets to record the analysis schedule manifest. There is an option to conduct the content analysis with the use of software like Nvivo, Atlas.ti, or R, but the researcher has limited experience using the mentioned softwares. More so, an idea to use Python to aid the analysis and extract relative keywords was originally considered, but upon having a test with a sample paragraph from an AI strategy, the author realized that there are latent meanings in the strategy that cannot be analyzed by Python code. Hence, the hand-coding procedure was done by the author alone.

And lastly, the 4 Roles of Government in the AI context is a relatively new framework, and it has its own limitations, as have already been mentioned in Chapter III. With the usage of this framework, the roles are condensed and simplified. There is also an opportunity to critique the said framework and then provide possible future recommendations.

V. RESULTS AND DISCUSSION

In this chapter, the results of the analysis from the four identified case studies are laid out, answering the research question of how local governments position their perceived roles in the implementation of their local AI strategies. To organize the discussion, the author provides a review of the results done as a process and then, after which, provides results from each case study. And then a discussion on how these roles vary in different cities.

5.1 Amsterdam

Amsterdam is named to be the capital city of the Netherlands and comprises under 883,000 residents (Statista Research Department, 2023). In terms of the start-up scene, Amsterdam is currently ranked 14th globally according to the Global Start-up Ecosystem 2022 Report by Start-Up Genome (2022). This report then backs up the claim by the City Government of Amsterdam about their strong culture of innovation that they are banking on with regards to the implementation of their AI strategies.

The Agenda AI: Amsterdam Intelligence outlines their city's vision with regards to Artificial Intelligence with the aim "to promote a fair exchange of data, enabling us to improve people's lives using AI (which in this case not only stands for artificial intelligence but more specifically Amsterdam Intelligence) (City of Amsterdam, n.d, p. 3)." That is a good framing with regards to agenda-setting of AI in the City of Amsterdam. A good recall for a project name too. Agenda AI: Amsterdam Intelligence directs the City Government's actions with regards to the following:

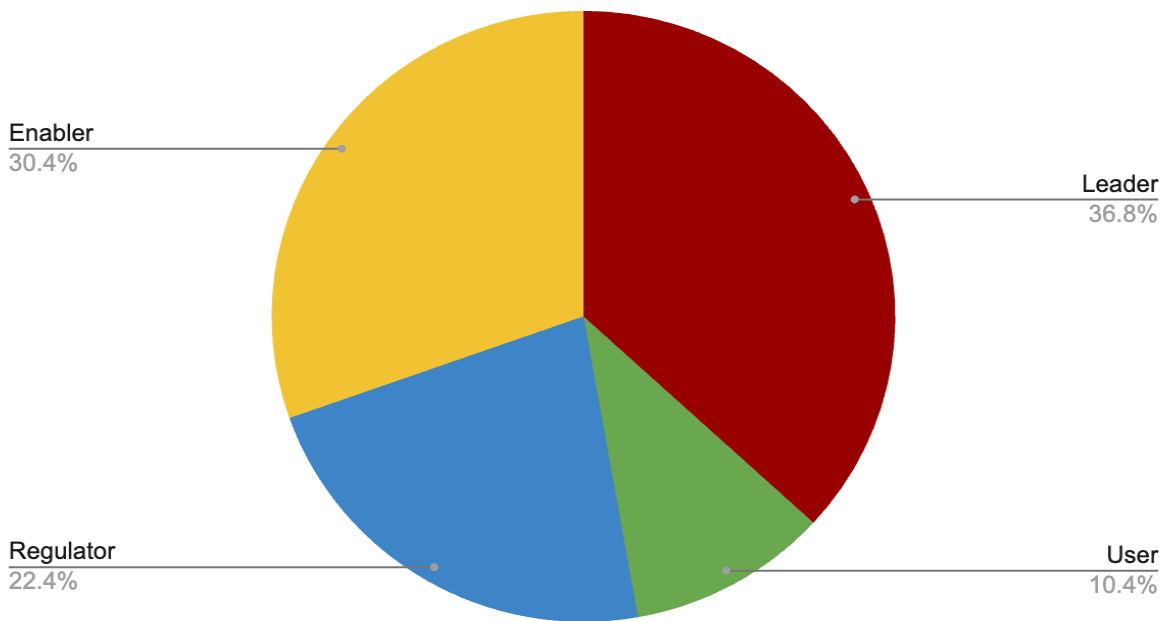
- Usage of AI applications for various public sector services within the City of Amsterdam
- Utilizing AI technology as a means to enhance economic growth and promote the city of Amsterdam

- Creation of ethical guidelines to prevent misuse of AI, ensure inclusion of all groups, and protect digital rights

From the above highlighted actions, 126 meaning units were extracted from the strategy statements (Appendix 6). As shown on Figure 3, Amsterdam perceived to perform the four roles of government - regulator, user, leader, and enabler. And based on the frequency count, out of these four roles, the City of Amsterdam positions itself more of a **Leader** in the context of AI getting 36.8% of the total frequency count. Interestingly, coming in secondary as a role of the local government is the role of an **Enabler** with 30.4%, which is -6.4% from that of the main role as a Leader. This gap is not significant, though and it can be inferred that the City Government of Amsterdam perceives itself as **Leader-Enabler** in the implementation of AI in the City.

Figure 3. Amsterdam Role Frequency Count

AMSTERDAM ROLE FREQUENCY COUNT



Source: Sicat (2023) Author's Pie Chart of Amsterdam Role Frequency Count

The result of the deductive analysis of the roles aligns with that of the statement that they have made in their strategy document. They said that "*Amsterdam aims to be a pioneering force in promoting the use of local level artificial intelligence with a holistic, action-oriented approach, covering activities and objectives* (City of Amsterdam, n.d, p. 7)." It should be recognized that the City of Amsterdam intentionally positions themselves as Leader-Enabler as they indeed have

maintained all throughout their published AI strategy the necessity to be the pioneers of a human-centered approach to AI governance.

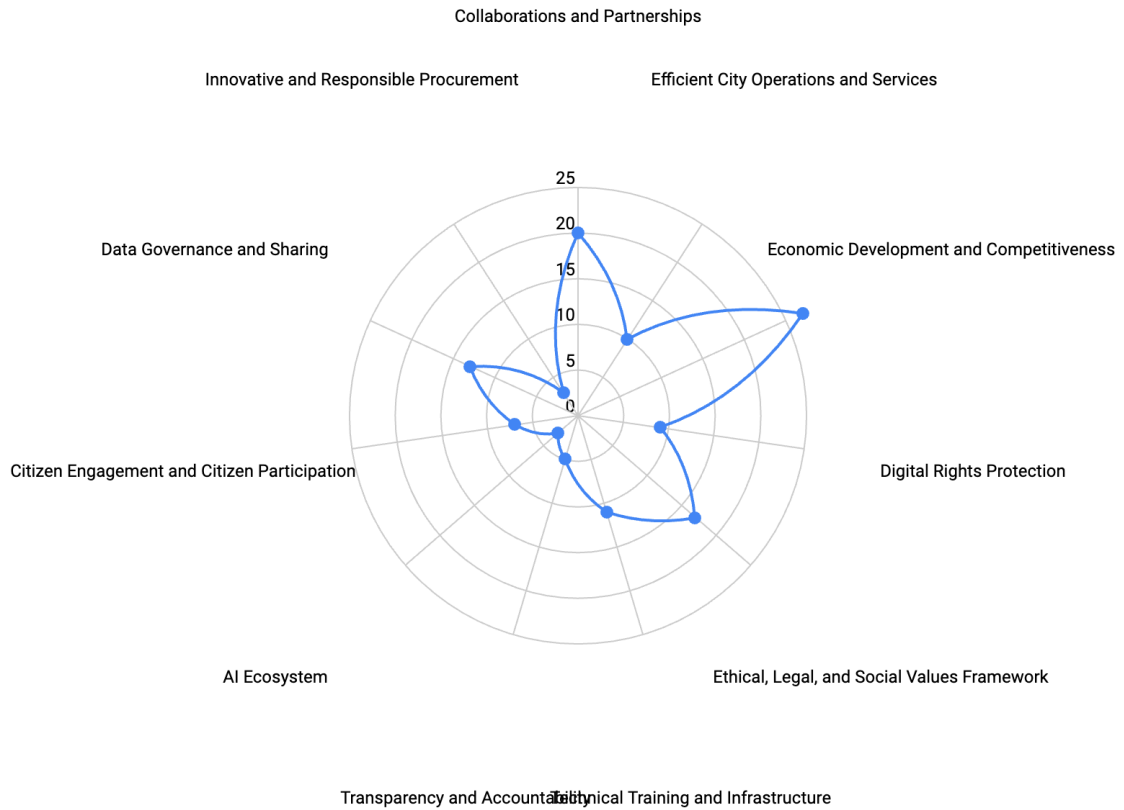
The author of this paper gauged that among the four cases that were studied for the purpose of this research work, Amsterdam has an almost equally distributed role as shown on their published AI strategy – again backing up their claim on a holistic approach in governing AI in their city. It is undeniable that they value the importance of addressing ethical issues of AI while ensuring that these radical technologies still benefit all parts of their community. They also put emphasis on the necessity of collaboration among various stakeholders, including the government, entrepreneurs, and research institutions. The City of Amsterdam also acknowledges that without a concrete action to ensure secure quality data infrastructure, will render their other actions ineffective. Hence, they have explicitly set actions to establish that. And by all means there is, the strategy builds on the potential economic benefits of artificial intelligence and provides actual initiatives to promote innovation and entrepreneurship in the city. This includes supporting local businesses and attracting international AI businesses to operate in Amsterdam.

Beyond simply recognizing the importance of digital rights, the policy might benefit from more concrete plans for securing the inclusion of excluded people in the development and application of AI. Interestingly, they just said that they will "*work out details of digital rights* (City of Amsterdam, p. 9)." This indicates that they are yet to set out more concrete plans on how they intend to propagate fairness and eradicate discrimination in the use of AI.

The Amsterdam AI strategy also lacks defined rules for assessing the impact of AI applications on the community, which may limit the ability to analyze the strategy's success and make necessary amendments. It would have been optimal to include indicators to assess the success of the actions taken to achieve the strategy's goal.

To validate the results of the deductive analysis for the role of Amsterdam, the research author conducted an inductive analysis on the focus area for Amsterdam. From the summative meanings, patterns emerged, as shown on Figure 4, focusing on Economic Development Competitiveness. They also put emphasis on actions to cover the focus area Collaborations and Partnerships. These particular areas are facilitated by the role of a Leader-Enabler. This then validates the Leader-Enabler role that the City Government of Amsterdam as to successfully work on the Economic Development Competitiveness area, they need to employ the tasks of Leader-Enabler.

Figure 4. Amsterdam Focus Area Radar Chart



Source: Sicat (2023) Author’s Radar Chart for the Focus Areas of Amsterdam

Aside from the two mentioned areas, Figure 4 also shows that the local government unit also focuses on Ethical, Legal and Social Values Framework as well as Data Governance and Sharing. This scattered areas of focus again backs up the objective of the City Government of Amsterdam to have a holistic approach to the governance of AI in the entire City of Amsterdam.

5.2. Barcelona

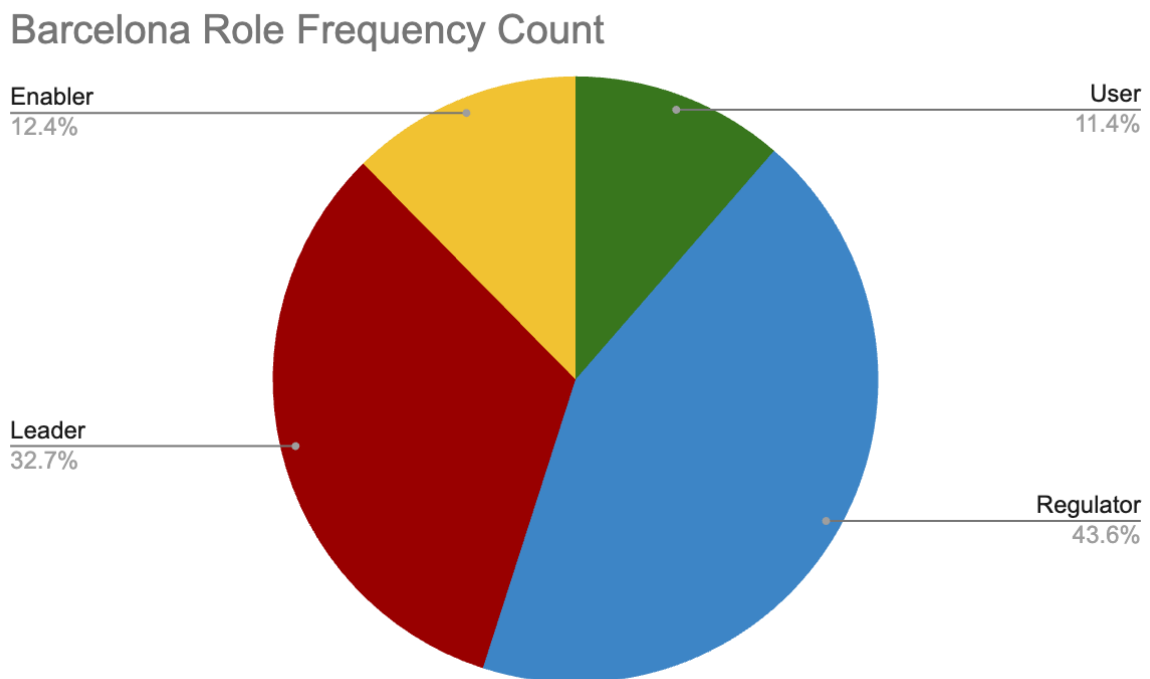
Barcelona, the largest city in Catalonia, has evolved as a locus of smart city governance, which pushed for its reputation as the technology and innovation center in Spain in recent years. According to their official website <barcelona.cat>, the Barcelona City Council is working hard to attract, retain, and support this group of talented, enterprising individuals who are highly skilled in digital skills and contribute to the city's competitiveness (Ajuntament de Barcelona, 2023).

In April 2021, the Barcelona City Council had published the Government measure for a municipal algorithms and data strategy for an ethical promotion of artificial intelligence. This serves as their AI strategy document directing the necessary steps that the City of Barcelona intends to achieve with regards to the governance of AI technologies within the city.

According to the AI strategy document, the overarching goal is for the city government and citizens to maintain and improve democratic monitoring of AI. This can be accomplished through transparency, which ensure that algorithmic models and their databases adhere to human rights and public-interest criteria. Furthermore, a clear responsibility structure must be established that holds both the government and commercial companies accountable for any damages or losses produced by AI-based solutions (Ajuntament de Barcelona, 2021).

The analysis of their AI strategy document provides insight that the Barcelona City Council perceives themselves in the **Regulator** role with 43.6% of the meaning units from 203 statements from their published AI strategy (Appendix 7) That accounts for under almost half of all the meaning units identified in the document.

Figure 5. Barcelona Role Frequency Count

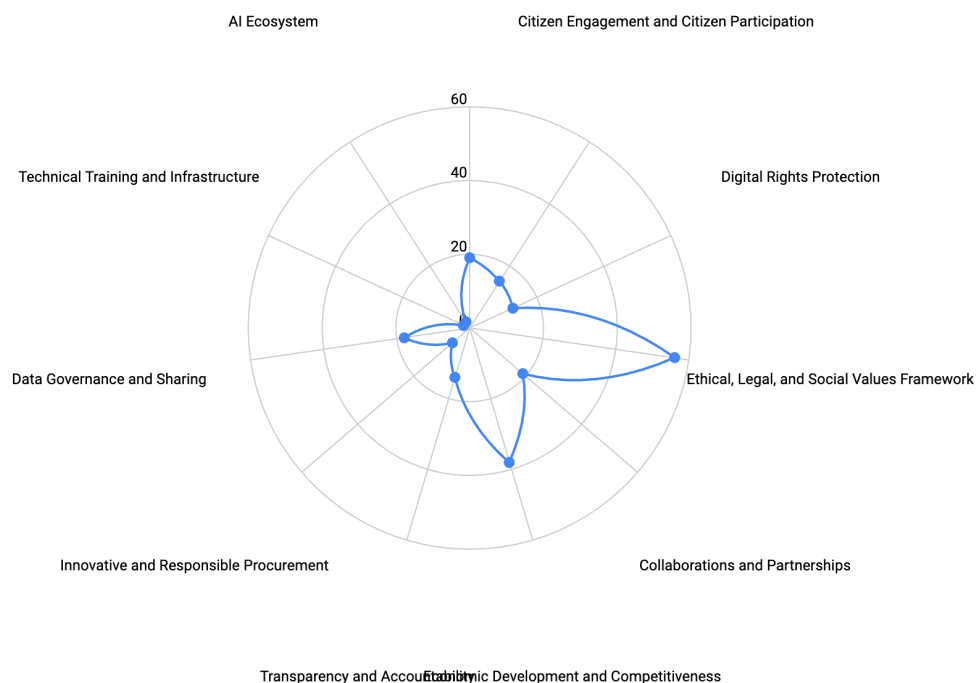


Source: Sicat (2023) Author's Pie Chart of Barcelona Role Frequency Count

This Regulator Role actually aligns with the references made in the document regarding the seven governing principles of Barcelona that needs to be followed throughout the whole document. According to Ajuntament de Barcelona, these seven principles have "to be followed in any technological application to ensure correct risk management, respect for digital rights and public responsibility (2021, p. 14)." These are “(1) human action and supervision, (2) technical robustness and security, (3) data privacy and governance, (4) transparency, (5) diversity, inclusion, and fairness, (6) social and environmental commitment; and lastly (7) responsibility, accountability, and democratic control (Ajuntament de Barcelona, 2021, p. 14)”.

Analysis of the strategy has also shown that Barcelona's AI strategy is centered on the ethical and responsible use of AI technology, with a focus on the development of AI that is transparent, explainable, and fair. Figure 6 has an area of focus on Ethical, Legal, and Social Values Framework. This serves as alignment to the Regulator Role that they seek to perform based on their AI strategy.

Figure 6. Barcelona Focus Area Radar Chart



Source: Sicat (2023) Author’s Radar Chart of Barcelona Area of Focus

The strategy also mentioned the significance of citizen participation in AI system design and deployment. However, the interesting part is that according to Annexe VII in the document, the AI strategy was conducted through interviews of the internal team and was later complemented by the external team of experts. This limited stakeholder engagement is ironic as they put emphasis on citizen engagement, but somehow, the strategy was designed by the city administration without considerable involvement from people, civil society organizations, or businesses.

An interesting finding though, is that Barcelona's secondary area of focus is the Economic Development and Competitiveness of their City with regards to AI. This is encouraging as Barcelona is still known as one of the centers of tech business and entrepreneurship in Spain.

It is commendable to mention also that among the four AI strategies analyzed for this study, it is Barcelona which has a concrete action plan along with a timetable of actions to be taken for the next three years with regards to the implementation of the actions.

5.3. New York

New York City is world-renowned as business, media, and innovation hub, with a thriving startup ecosystem and a number of established tech firms founded in the city. According to the Global Start-up Ecosystem 2022 Report by Start-Up Genome (2022), New York City ranks 2nd, tied with the City of London, in terms of competitive start-up ecosystem. They only ranked behind Silicon Valley in San Francisco.

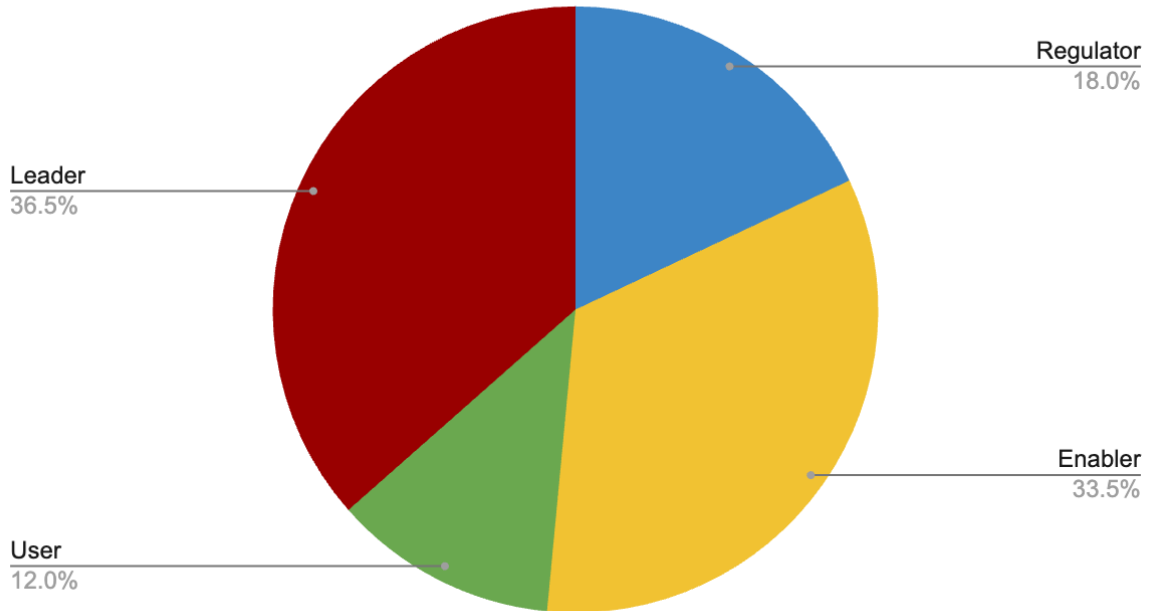
The City of New York has also made notable progress in AI governance, aided by the establishment of the Mayor's Office of the Chief Technology Officer, which spearheads technology-related initiatives and policies, particularly those relating to AI. This office was also responsible for the formulation and subsequent publication of the NYC AI Strategy in October 2021.

The NYC Strategy has been "*organized into five thematic areas that warrant increased City attention: data infrastructure, applications of AI, policy and governance, cross-sector partnerships, and business, education, and the workforce* (NYC Mayor's Office of the Chief Technology Officer (NYC CTO), 2021, p. 7)." To achieve this objective, based on the content

analysis, they seek to perform the role of a **Leader** as it garnered 36.5% of the frequency count from 200 meaning units identified from the AI Strategy.

Figure 7. New York Role Frequency Count

New York Role Frequency Count



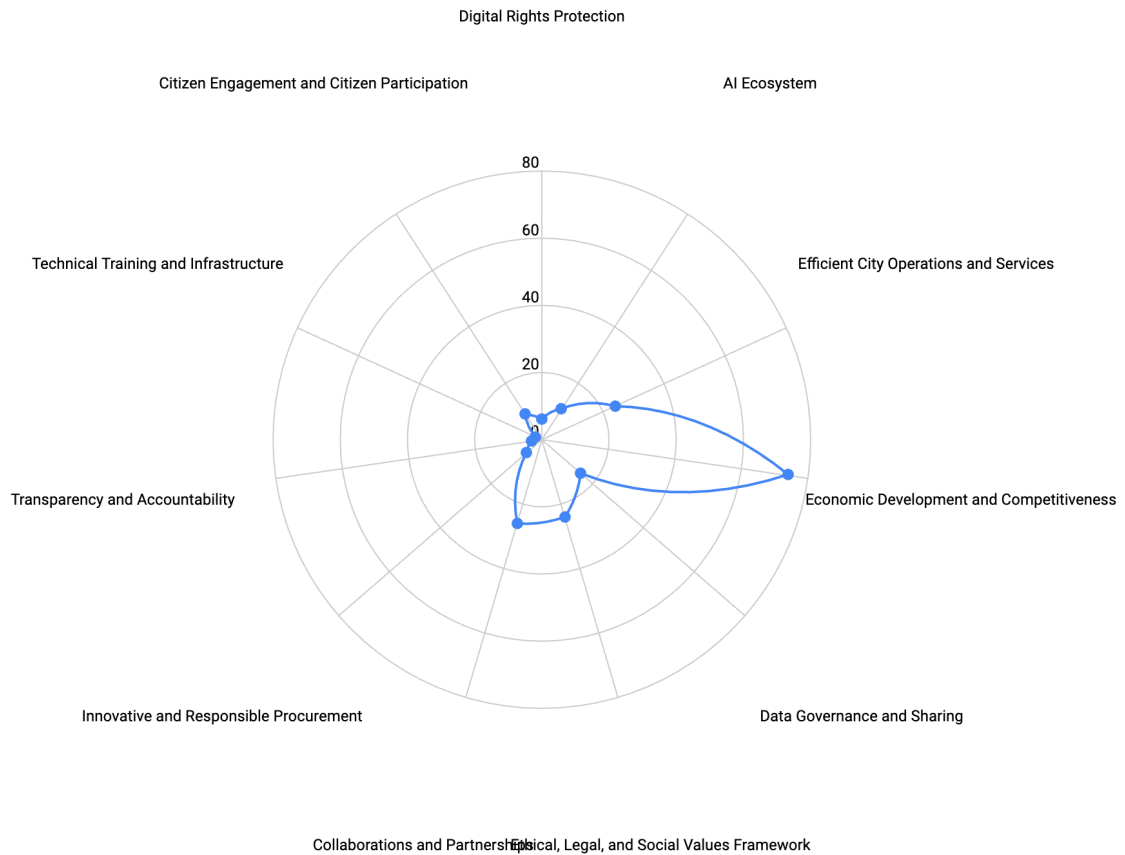
Source: Sicat (2023) Author’s Pie Chart of New York Role Frequency Count

Just coming in second is the role of an **Enabler**, which is 33.5% of the entire meaning units, and is just less than 5% lower than the primary role. With this, it can be deduced that New York City's role is also a **Leader-Enabler** like Amsterdam.

This Leader-Enabler role is specially aligned to that of what the United States Government mandates across its entire federal government, which is a coordinated program to *"accelerate AI research and application for the nation's economic prosperity and national security* (National AI Initiative Act of 2020 as cited in NYC Mayor’s Office of the Chief Technology Officer (NYC CTO), 2021, p. 11)”.

Verifying the NYC position as Leader-Enabler, shown in Figure 8, the inductive analysis conducted from the AI strategy, New York City's area of focus is by far margin scaling the economic development and competitiveness with regards to AI.

Figure 8. New York Focus Area Radar Chart



Source: Sicat (2023) Author’s Radar Chart of New York Area of Focus

The City of New York focuses on economic development and competitiveness in the context of AI because it recognizes the potential of AI to promote economic growth and job creation. They hope to boost the competitiveness of New York City's economy and stimulate innovation in a variety of areas, including finance, emergency services, and transportation, by investing in AI research and development. But they also highlighted how stakeholders, especially academic institutions can help in the effective implementation of the strategy.

The NYC policy also emphasizes the importance of ensuring equity in the deployment of AI technologies. The strategy expressly acknowledges the possible hazards of AI aggravating existing inequities and wants to ensure that AI enhances the lives of all New Yorkers, not the other way around. One way they said to address this is by building a quality data infrastructure that provides variations of data that can be used for AI technologies.

On other hand, while the strategy contains numerous action items, it is not always apparent how they will be implemented or funded. The NYC AI strategy also has a limited focus on ethical regulation compared to the other cities included in this research. This is reflected in the lower frequency count on ethical, legal, and social framework focus, as shown on Figure 8. If the New York City Government really wants to put the center of digital rights into the governance of AI technologies within the City of New York, it is apparent that they need to improve on this focus area and provide more concrete action steps towards ethical and responsible governance for AI systems for the New Yorkers.

5.4. London

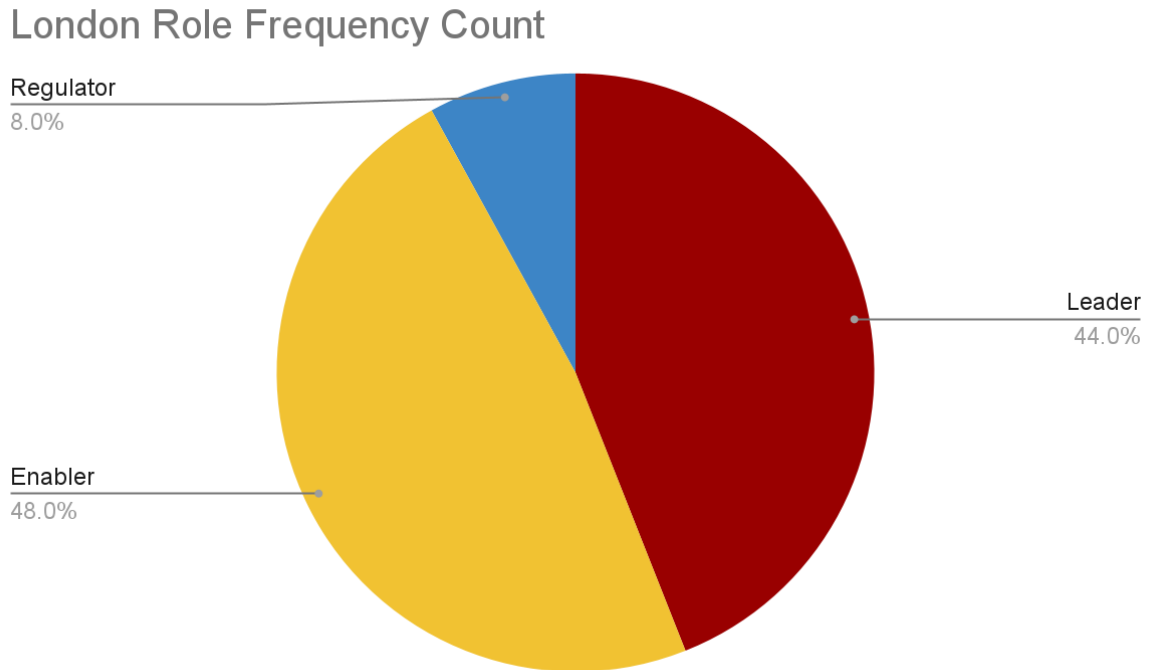
London is well-known for its vibrant global business community, which is appealing to tech businesses especially the start-up entrepreneurs. This tech community has expanded gradually over the last few decades earning London the second top seed of the most competitive start-up ecosystem in the world alongside New York (Startup Genome, 2022). It is regarded as one of Europe continent's top tech hubs, with a huge number of startups, tech companies, and venture capital firms operating in the capital of the United Kingdom.

With this, the City Government of London has always been in the spotlight to keep up and support this thriving and globally competitive start-up ecosystem, especially now for the demand for AI technologies. With this, the Mayor of London published an AI strategy for London City geared towards supporting this AI ecosystem and eventually cementing the position of London as the AI center of Europe, if not the world. This is an ambitious yet not really impossible feat.

To achieve this goal of the City of London, they seek to position themselves more as an **Enabler** in the context of AI. 48% of the meaning units culled from the AI strategy provides the role of an **Enabler**. This is almost half of the entire meaning units of the whole strategy document as shown on Figure 9. While 44% covers the role of a **Leader**. This then situates the role that the City of London seek to perform with regards to AI governance is an **Enabler-Leader** role. The most striking from the conduct of analysis in the case of London, they did not mention any single meaning unit that points to the role of a User. Hence, in their AI Strategy, they only have three (3) roles present in governing the development and deployment of AI systems within the City of

London. They are Enabler, Leader, and Regulator, which only accounts for less than 10% of the identified meaning units in the strategy.

Figure 9. London Role Frequency Count



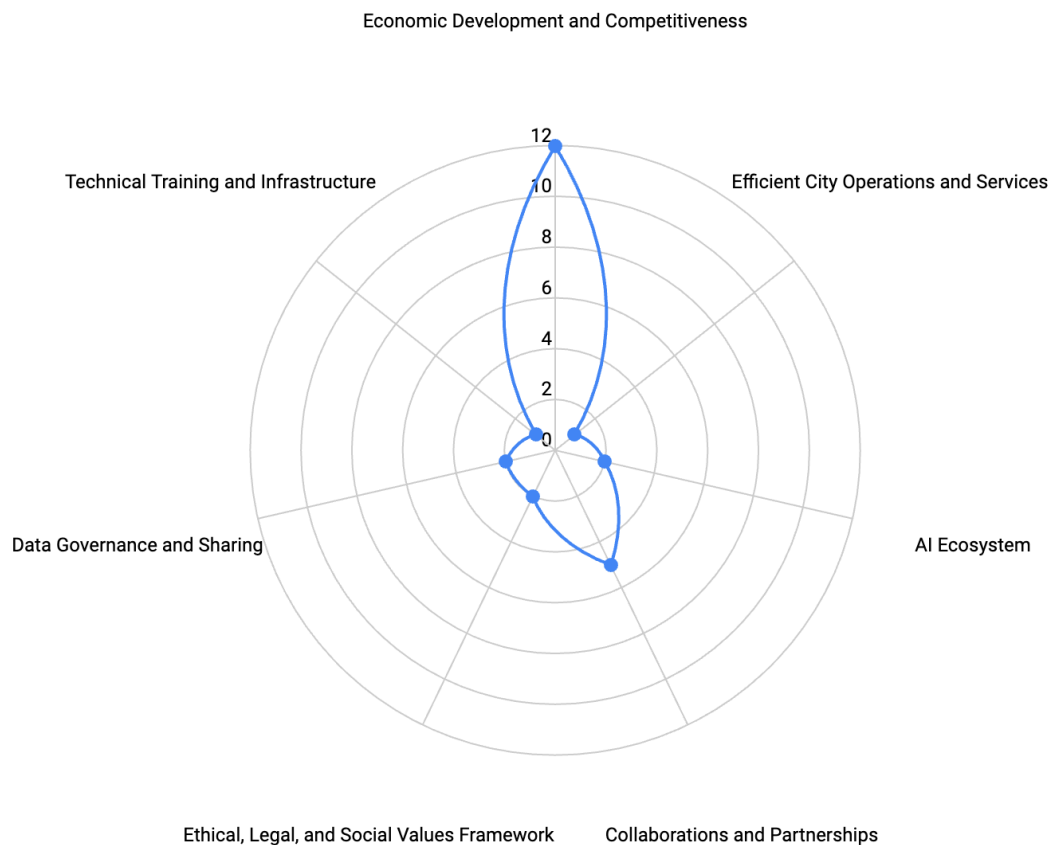
Source: Sicat (2023) Author’s Pie Chart of New York Role Frequency Count

The City of London aspires to be an **Enabler and Leader** in the implementation of its AI plan in order to stimulate innovation and economic growth in the city. The City of London aims to recruit businesses and entrepreneurs to the city and boost its competitiveness on the world stage by creating a safe setting that promotes the growth and execution of AI solutions. Truly positioning the City as the ‘AI Growth Capital of Europe.’ Furthermore, by assuming a leadership position, the City of London hopes to shape the development of AI by collaborating with industry expert groups and academia. They also align with the overall AI strategy of the whole United Kingdom in terms of the ethical guidelines set.

London’s AI strategy, comparable to that of the rest of the cities of Amsterdam, Barcelona, and New York is the only strategy among the group that was conducted by a commissioned private consultancy firm. That is why the entire strategy was filled with reports on the state of London on AI competitiveness in various sectors such as Health, Finance, Education, etc. This is especially insightful though, that can provide the City of London with grounding on where and how to tackle

gaps and opportunities with regards to AI. Although it can be noted that having an internal team from the city government provides a rather comprehensive input on regulating AI technologies and reducing risks and hazards associated with it.

Figure 10. London Focus Area Radar Chart



Source: Sicat (2023) Author’s Radar Chart of New York Area of Focus

Aligning with the **Enabler-Leader** role, the main area of focus for London is the economic Development and Competitiveness of the City as well as the focus on Collaboration and partnership. It is important that since this strategy has been conducted through collaboration among stakeholders from multiple sectors, this may boost buy-in with any mechanisms set forth to support economic growth of the business sector in London. And compared to all other AI strategies that were mentioned above, the City of London is the most evidence-based as the plan is founded on existing patterns and data investigation and analysis. Although, with these trends, it is noticeable though that the AI strategy has a diversity limitation. The diversity and representation of the strategy development process may have been constrained and focused mostly on the business community, thereby limiting the perspectives and ideas included in the plan, especially the

marginalized groups. Overall, the impression that the AI strategy of London leaves is that it is more of a report than a strategy. There is limited specificity as some of the strategy's recommendations may be vague, making it difficult to identify how they will be executed and assessed.

5.5 Discussions

Following the findings of the study, it can be interpreted that the 4 Roles of Government Framework from Guenduez and Mettler (2022) also provides suitability in identifying and understanding the roles of the context of AI in local government. This framework had contributed to understanding better the positioning of the cities of Amsterdam, Barcelona, New York, and London with regards to their AI strategies.

With this, the study had arrived at answering the sub-main question:

What are the roles local governments seek to perform in the context of their published local AI strategies?

The findings identified that the local governments have four roles – Regulator, Enabler, Leader, and User – in their AI strategies, with the exception of the City of London, which did not include the role of the user in their published AI strategy. This then implies that almost all the cities included in this study have intended to perform all four roles of government - regulator, enabler, leader, and user. These roles are all considered as roles of development stakeholders and provide a greater insight on how these cities support the lifecycle of AI projects, as what Miller (2022) had pointed out in her studies regarding identification of main stakeholders in AI initiatives which was earlier discussed in chapter II.

From the outset, local governments, in the study, highlight the importance of their role as regulators. This role allows them to ensure the safe and ethical use of technology such as AI. This can assist in safeguarding the rights of the citizens and prevent adverse impacts from misuse. As regulators, they are considered as watchdogs ensuring “*that individual agents in a sociotechnical system comply with particular collectively defined norms* (Borrás & Edler, 2020, p. 7).”

As enablers, local governments illustrated their capabilities to offer resources, infrastructure, and technical and legal assistance to stimulate innovation and the development of emerging technology of AI. Being a “*facilitator of a necessary innovation ecosystem in achieving the desired development...* (Soli-Pöntinen & Saariluoma, 2022, p. 10),” they serve as a massive support within their local AI ecosystem, as what the findings of this study show.

Third, as leaders, local governments aim to shape the development and use of AI by setting pioneering standards and advocating responsible practices that correspond with community values and needs. As well as facilitate strong stakeholder collaboration that helps drive socio-economic growth. This leader role also works well with that of the enabler role ensuring that the right capacities are provided to the stakeholders.

Finally, as users of AI systems, local governments seek to streamline delivery of public services, and boost efficiency within the City Hall that ultimately improve the overall quality of life of their residents.

Although the cities have presented the four roles in their AI strategies and they aim to have a holistic approach to governing AI, findings in this study show that each city has their own agenda and aim as they go about with their plans in governing AI. This led to answering the main research question:

“How do local governments position their perceived roles in the implementation of their local AI strategies?”

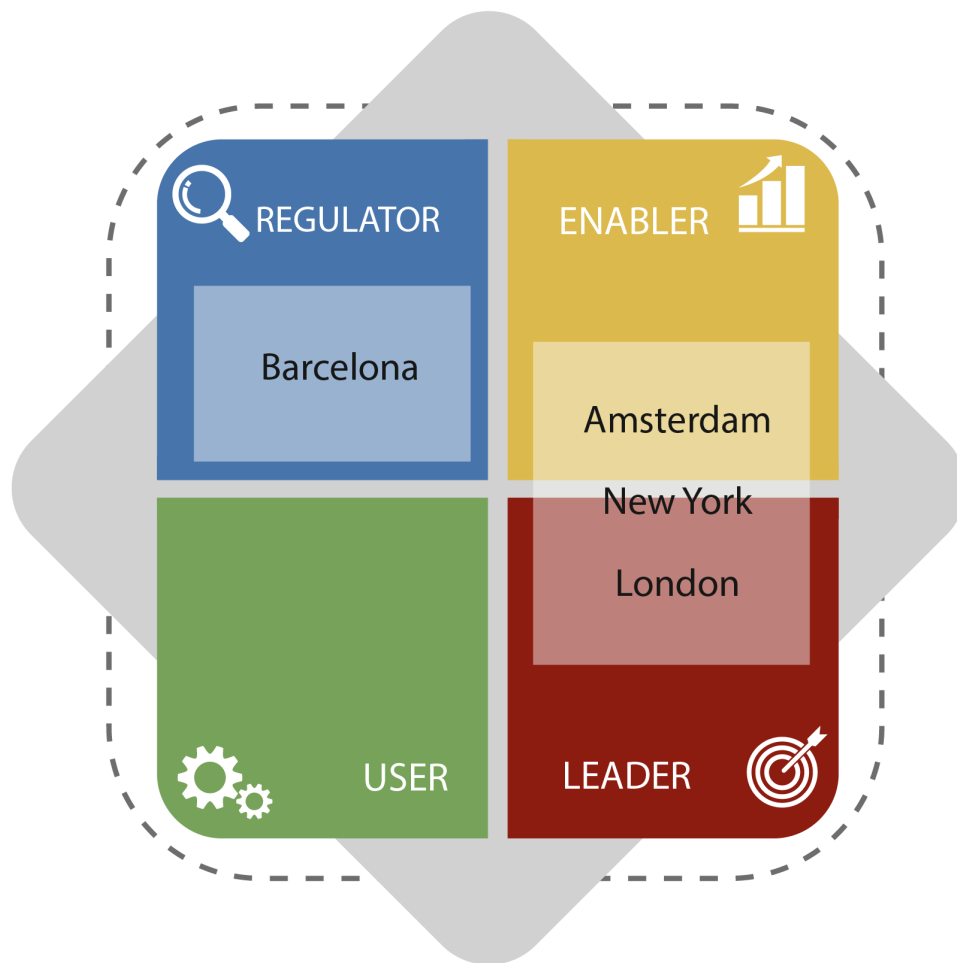
Amsterdam and New York, based on results of this research, position themselves as **Leader-Enabler** and both highlighted their actions to invest in technical training and infrastructure. These two cities also provide the importance of partnering with variety of stakeholders to promote and effectively deploy responsible AI systems.

Barcelona on the other hand, solidly positions themselves as **Regulator** with regards to the governance of AI in their city. All throughout their AI strategy, the focus on ensuring compatibility of AI with human values has been the main fundamentals of all plans of action. They put importance on the reduction of risks and hazards with the deployment of AI technologies by providing mechanisms for accountability and transparency.

And last but not the list, London position themselves as **Enabler-Leader**. The task of investing in technical infrastructure and training is the most consistent in the entire AI strategy. The entire strategy of London has a unique business growth agenda in it as it highlights more efforts on providing support to the tech companies that develop or use AI. With that London prioritizes being an Enabler more than any other role as it aims to be world-renowned leader in accommodating AI focused businesses and entrepreneurs.

The following Figure 11 below has illustrated how each cities position themselves with respect to the four roles of government. The illustration below is the revised conceptual framework analysis of the author of this research based on the findings of the research guided by the original four roles of government framework by Guenduez and Mettler (2022).

Figure 11. Role Positioning of Cities



Source: Sicat (2023) Author’s Role Positioning of Cities analysis derived from Guenduez and Mettler 4 Roles of Government Framework

From the Figure 11 above, the last sub research question has also been addressed:

“How does each city’s position differ from other cities in the group?”

There have been similarities in positioning, as the findings have shown. Amsterdam, New York, and London were all on the same page where they position themselves leaning in between Leader and Enabler roles -- with London exceptionally leaning toward the Enabler role more than the Leader role. At the same time, Barcelona sits with conviction on the Regulator scale. The four cities have all mentioned that they intend to govern AI holistically, but their role positioning has rendered relatively weak evidence for this aim of theirs. This, then, is an insight that they can revisit if they consider amending their current AI City Agenda. They should provide a more balanced approach. That is because having versatility in role performance allows local governments to have a comprehensive and balanced approach to AI governance.

If the cities intend to revisit their AI strategies in the near future, they should also assess their current areas of focus. The findings of this research have also provided the opportunity to understand the areas of focus of the cities with regards to their AI strategies and plans. It was found out that all cities have a high value regard on the focus area of governing AI to contribute to the economic development and competitiveness of their cities. This focus area almost comes first and second in the focus areas of all the cities analyzed in this study.

Although all cities have noted that they aspire to safeguard ethical use of AI systems in their locality, Amsterdam and Barcelona are the only cities that have significant AI strategy meaning units that align with this task. This can be because these two cities are based in Europe, where ethical and responsible use of trustworthy AI (European Commission, 2019) has been a core policy foundation in all European member states, which coincidentally aligns with the study conducted by Van Roy et al., (2021) which was initially discussed in the earlier part of this paper.

The case studies also raised the trend among cities about the need to establish innovative procurement mechanisms to ensure transparent and ethical AI systems if they are used and deployed under City Government initiatives. This depiction of the trend is actually insightful as the procurement process must adhere to legal and ethical standards, ensuring that public funds are spent transparently and with accountability. The purpose of these innovative procurement practices is to obtain the necessary AI technologies and services for the government and its taxpayers at the greatest possible price that aligns with the ethical and transparent principles of AI.

Additionally, the cities have also mentioned the importance of having a secure and open data sharing mechanisms. This is particularly important to ensure that AI systems are built upon quality data sets in order to prevent bias and discrimination among minority groups of the population.

One critical note to mention, though, is that the four strategies reviewed for this study are very idealistic and political in nature. This observation relates to what Fatima et al. (2022) state in their study in the context of National AI strategies. The reviewed documents for cities are not concrete in terms of the availability of success indicators. Hence, having a political will is not enough. They need more structured action plans so local governments can assess the success of the specified aims and objectives in each AI strategy document.

Gauging from all of these vital insights, this study contributes to the field of research exploring the importance of the different roles of the local government in the governance of AI in cities. More so, from the policy perspective, this study offers local governments valuable policy guidance on the development of their own AI strategies by examining the roles and engagement of leading globally renowned local governments in AI governance. It can serve as a reference point, aiding local governments in fulfilling their responsibilities related to AI deployment, community resource allocation, priority-setting in the local economy, capacity building, and fostering strong community participation and collaboration.

VI. CONCLUSION

The study focused on the roles that local governments play in the context of artificial intelligence (AI) and how they position themselves in their own crafted local AI strategies. The study used the “4 Roles of Government Framework” by Guenduez and Mettler (2022) and identified that the four roles of governments – Regulator, Enabler, Leader, and User – were present in the AI strategies of Amsterdam, Barcelona, New York, and London, with the exception of London, which did not include the role of the user in their published AI strategy.

More so, the study found that local governments highlight the importance of their role as regulators, offering resources as enablers, shaping the economic development and promotion of AI as leaders, and improving public services as users.

Each city had their own agenda and aims as they went about their plans to govern AI. The study found that Amsterdam and New York positioned themselves as Leader-Enabler, with Barcelona as Regulator and London as Enabler-Leader. The study also found that all cities had a high regard for the economic development and competitiveness of their cities but that only Amsterdam and Barcelona had significant AI strategy meaning units related to the ethical use of AI systems, which aligns with the core policy foundation of all European member states.

Moving forward, it is without denying that Artificial Intelligence (AI) technology has created new potential for local governments to improve public services and boost socio-economic growth. With that, local governments should revisit their AI priorities to examine their roles and areas of focus and work on a more balanced approach to AI governance, ensuring that its deployment contributes to the greater good without leaving no one behind.

This study was subjected to limitations as it only has four cities as its primary focus. Hence, the findings should not be generalized as each city has its own respective contexts to consider. Regardless, providing insights for other local governments regarding the identification of roles

and focus areas is still a possible contribution of this research. Additionally, this research only used the published documents to analyze the roles of the local governments concerning AI governance. This study provides an opportunity for future research to conduct a qualitative interview to examine the results. Aside from utilizing mixed methodology, future research can employ a focused qualitative methodology to provide more in-depth insights into the roles of governments. On the other hand, a concentrated quantitative methodology can provide a more correlational understanding of the roles and the supportive tasks that aligns with the roles as per the 4 Roles of Government in AI context Framework. Furthermore, speaking of the framework, it is also worth considering expanding the tasks associated with the roles to provide a more extensive categorization of roles for governments as part of the future research directions.

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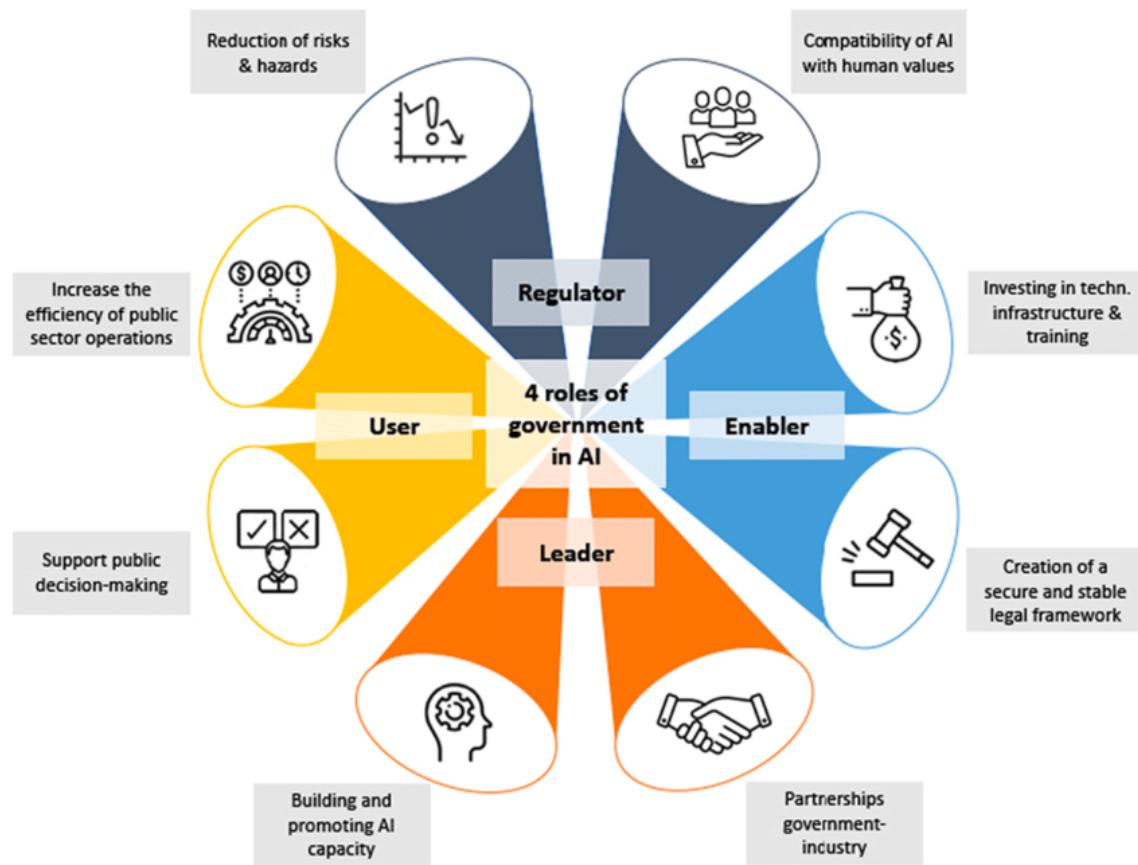
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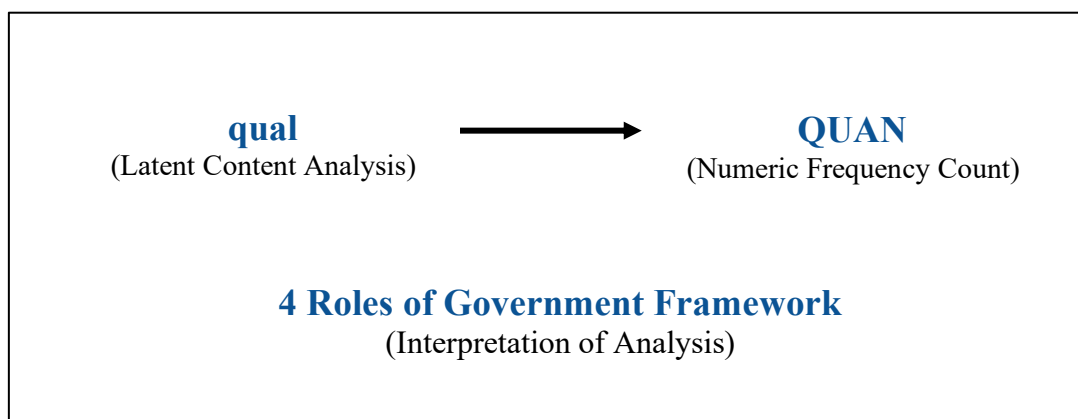
APPENDICES

Appendix 1. The 4 Roles of Government in AI Context



Source: Guenduez & Mettler (2022, 3) “Strategically constructed narratives on artificial intelligence: What stories are told in governmental artificial intelligence policies?”

Appendix 2. Sequential Transformative Mixed-method Notation



Source:

Author's own notation adapted from Creswell (2009) notation design for sequential transformative approach

Appendix 3. List of City AI Strategies

CITY	TITLE	TOTAL NO. OF PAGES
Amsterdam	Agenda AI: Amsterdam Intelligence	16 Pages
Barcelona	Mesura de Govern Intel·ligència Artificial (Government measure for the municipal algorithms and data strategy for ethical promotion of artificial intelligence)	42 Pages
New York	The New York City Artificial Intelligence Strategy	116 Pages
London	London: The AI Growth Capital of Europe	57 Pages





Source: Sicat (2023), author's compiled list of AI strategies of Cities

Appendix 4. The Roles and Primary Tasks Code

ROLE	IDENTIFIED TASK
Regulator	Reduction of Risks and Hazards
	Compatibility of AI with Human Values
Enabler	Investing in Technical Infrastructure and Training
	Creation of Secure and Stable Legal Framework
Leader	Partnerships Government-Industry
	Building and Promoting AI capacity
User	Increase the Efficiency of Public Sector Operations
	Support public decision-making

Source: Guenduez and Mettler (2022) Roles and Primary tasks derived from the 4 roles of government in AI context Framework

Appendix 5. The Roles and Primary Tasks Code

ROLE	COLOR	HEX CODE
Regulator		#4775AB
Enabler		#DCB94D
Leader		#8C1B10
User		#76A359

Source: Sicat (2023) the author's color-coded system for analysis

Appendix 6. Amsterdam Analysis Schedule Manifest

<i>AI STRATEGY STATEMENT</i>	<i>ROLE</i>	<i>TASK</i>	<i>AREA OF FOCUS</i>	<i>PAGE</i>
<i>Amsterdam is one of the initiators in a coalition of 'cities for digital rights'. This coalition is one of the main items on the Agenda for the Digital City</i>	Leader	Pioneer in AI Development	Collaborations and Partnerships	3
<i>The use of AI for assignments within the City (AI for residents of Amsterdam)</i>	User	Application of AI technologies for city operations servicing the residents.	Efficient City Operations and Services	4
<i>Positioning and promoting of AI and Amsterdam to develop economic potential.</i>	Leader	Position themselves as one of the pioneers of the use of AI.	Economic Development and Competitiveness	4
<i>Establishing ethical frameworks to prevent abuse and the exclusion of certain groups of people and to actively encourage inclusion – an aspect of Digital Rights.</i>	Regulator	Establish rightful ethical and legal mechanisms to ensure non-discriminatory usage of AI technologies and should serve all the residents.	Digital Rights Protection	4
<i>...pioneering force in promoting the development and deployment of artificial intelligence at a local level.</i>	Leader	Become the "pioneering force" in the deployment and use of AI.	Economic Development and Competitiveness	4
<i>... improve the lives of Amsterdam's residents by limiting the negative effects and enhancing the positive effects of AI.</i>	Regulator	Improving the lives of the residents of Amsterdam while limiting the risks and negative Impacts that Ai technologies constitute.	Ethical, Legal, and Social Values Framework	4
<i>Use AI within City of Amsterdam's processes and for projects within the city</i>	User	Application of AI technologies in the various processes and projects of the City Government.	Efficient City Operations and Services	4
<i>Consolidate cooperation with the technical community, other local authorities, the market and the world of science</i>	Leader	Partner with the highly technical groups within the community to facilitate the development and Deployment of AI Technologies.	Collaborations and Partnerships	4
<i>Develop AI competences and infrastructure within the City</i>	Enabler	Develop key infrastructures to facilitate AI diffusion	Technical Training and Infrastructure	4
<i>Reduce discriminatory algorithms and develop more transparent algorithms within the City itsel.</i>	Regulator	Reduce discriminatory nature of algorithms and ensure transparency	Transparency and Accountability	4
<i>Promoting and developing an ecosystem, developing and recruiting talent.</i>	Enabler	Developing ecosystem and resource pool	AI Ecosystem	4

<i>Creating awareness of and facilitating the sharing of knowledge about AI.</i>	Leader	Promoting AI awareness and Facilitating the knowledge sharing	Citizen Engagement and Citizen Participation	4
<i>Promoting targeted community building to boost innovation.</i>	Leader	Community Building and linking key groups	Citizen Engagement and Citizen Participation	4
<i>Working to develop talent, and assisting in the process of developing and recruiting AI talent.</i>	Enabler	Investing in the development of talents	Technical Training and Infrastructure	4
<i>Helping Amsterdam's AI companies expand at home and abroad.</i>	Enabler	Creation of bed to jump start competitive Amsterdam AI businesses	Economic Development and Competitiveness	4
<i>Finding accommodation for AI start-ups and innovative SMEs.</i>	Enabler	Welcoming Foreign AI investments and businesses	Economic Development and Competitiveness	4
<i>Protecting digital rights and improving equality of opportunities in Amsterdam's algorithms.</i>	Regulator	Ensuring that digital rights are preserved and equal opportunities are accessible for everyone	Digital Rights Protection	4
<i>AI is subject to social, economic and ethical frameworks.</i>	Regulator	Strengthening ethical and legal frameworks	Ethical, Legal, and Social Values Framework	4
<i>To set a good example regarding digital rights as a city.</i>	Regulator	Promoter of Digital Rights	Digital Rights Protection	4
<i>To set a good example regarding digital rights as a city.</i>	Leader	Become the benchmark for digital rights as a City	Digital Rights Protection	4
<i>To ensure transparency regarding the effects of AI on the city and perspectives for possible action in this respect</i>	Regulator	Ensure Transparent AI Systems	Transparency and Accountability	4
<i>Data on the city must be available to the city.</i>	Enabler	Ensuring that data sharing is easy and accessible	Data Governance and Sharing	4
<i>Increase usability, availability and value of public data.</i>	Enabler	Ensuring that data are of quality condition to use for AI systems.	Data Governance and Sharing	4
<i>Increase usability, availability and value of scientific data and commercial data pioneering role as a city [in AI]</i>	Enabler	Increasing data usability from private sector	Data Governance and Sharing	4
<i>apply AI in an ethical manner.</i>	Leader	Pioneer AI City	Economic Development and Competitiveness	4
	Regulator	Ensuring Ethical AI	Ethical, Legal, and Social Values Framework	4
<i>role is the active protection of the digital rights of Amsterdam's residents.</i>	Regulator	Active Protection of the Digital rights of the residents of Amsterdam	Digital Rights Protection	5

<i>This technology is developing rapidly, and that means the city needs to act as a pioneer.</i>	Leader	Address the need to act as a pioneer	Economic Development and Competitiveness	5
<i>Amsterdam values – such as freedom and inclusion – need to be protected.</i>	Regulator	Protect Amsterdam values of freedom and inclusion	Ethical, Legal, and Social Values Framework	5
<i>partners in the Amsterdam coalition ‘AI Technology for People’ will be investing a billion euros in machine learning, hybrid intelligence and explainable AI.</i>	Leader	Facilitating public and private partnerships for the development of AI	Collaborations and Partnerships	5
<i>built-in safeguards for responsible application: AI technology for people.</i>	Regulator	Ensuring the responsible application of AI technologies	Ethical, Legal, and Social Values Framework	5
<i>Developing social, legal and ethical frameworks, acceptance among citizens and an inclusive approach.</i>	Regulator	Developing ethical Frameworks for AI technologies accepted by the residents with an inclusive approach	Ethical, Legal, and Social Values Framework	6
<i>Facilitating access to data and data exchange.</i>	Enabler	Ensuring data exchange by facilitating it effectively	Data Governance and Sharing	6
<i>Increasing the availability of talented developers and other AI talent (through education, retraining, talent development)</i>	Enabler	Investing in AI talents	Technical Training and Infrastructure	6
<i>Promoting world-class fundamental and applied AI knowledge</i>	Leader	Promote Applied AI knowledge	Economic Development and Competitiveness	6
<i>Facilitating and organizing strong cooperation among chain partners with regard to AI applications in business sectors and tackling social challenges.</i>	Leader	Facilitating key stakeholders partnership	Collaborations and Partnerships	6
<i>requires experts to translate the potential of technology into solutions for the challenges faced by the city.</i>	Leader	Calling in Expert opinions	Collaborations and Partnerships	6
<i>pioneering force in promoting the use at local level of artificial intelligence.</i>	Leader	Pioneering force in the use of AI in the local level	Economic Development and Competitiveness	7
<i>putting technology in service of Amsterdam’s residents</i>	User	Servicing the residents with the use of AI	Efficient City Operations and Services	7
<i>Promoting and developing an ecosystem, developing and recruiting talent.</i>	Enabler	Creating a supportive ecosystem and investing in infrastructure and talents	AI Ecosystem	7
<i>protecting digital rights</i>	Regulator	protecting Digital Rights	Digital Rights Protection	7

<i>creating greater equality of opportunities in Amsterdam's algorithms (as used by the City, partners, contractors, suppliers and market and government actors that have an influence on the lives of Amsterdam's residents)</i>	Enabler	Creating equal opportunities for businesses developing AI to be competitive	Economic Development and Competitiveness	7
<i>making data on the city available to the city</i>	Enabler	making data available	Data Governance and Sharing	7
<i>[AI systems] need to be developed with Amsterdam's public values in mind.</i>	Regulator	Ensuring the alignment of Amsterdam public values	Ethical, Legal, and Social Values Framework	7
<i>stronger positioning of Amsterdam as an AI city.</i>	Leader	Positioning of Amsterdam as AI City	Economic Development and Competitiveness	7
<i>when new applications are acquired, sufficient up-to-date knowledge of AI remains scarce, and it is not clear what effect companies, often commissioned by us, have on the city's algorithms.</i>	Enabler	Investing in AI knowledge and talents within the city government	Technical Training and Infrastructure	7
<i>as the use of artificial intelligence to improve the City Pass (Stadspas) and to combat fraud, are currently being explored.</i>	User	Specific use of AI to improve the City Stedpass	Efficient City Operations and Services	7
<i>more expertise is needed within the city government organization.</i>	Enabler	Improving Knowledge within the City Government	Technical Training and Infrastructure	7
<i>development is increasingly featuring AI, and as a City, we have insufficient knowledge on the topic.</i>	Enabler	investment on AI knowledge for the City	Technical Training and Infrastructure	7
<i>innovation and technology by actively promoting technical communities and guaranteeing economic security for Amsterdam.</i>	Leader	Guaranteeing authority to promote competitive AI in key economic groups and technical authorities (tech companies)	Economic Development and Competitiveness	9
<i>promotion of AI for residents of Amsterdam by putting together an in-house development team and initiating innovative purchasing processes.</i>	Leader	Initiating innovative purchasing processes	Innovative and Responsible Procurement	9
<i>encourage projects that reveal the drawbacks of AI.</i>	Regulator	Encouraging projects that provide insight on the negative effect of AI	Ethical, Legal, and Social Values Framework	9
<i>create conditions in which AI can be used responsibly.</i>	Regulator	Creating conditions to develop responsible AI	Ethical, Legal, and Social Values Framework	9
<i>a user and developer of concrete applications that create added value for residents.</i>	User	User and developer of Concrete AI technologies	Efficient City Operations and Services	9
<i>The City of Amsterdam wants to use data and technology to improve and streamline services and make them cheaper.</i>	User	Streamline City operations	Efficient City Operations and Services	9
<i>find smart urban solutions for the services and challenges of the City of Amsterdam.</i>	User	Finding Urban solutions to the cities challenges	Efficient City Operations and Services	9

<i>Use AI in City of Amsterdam processes and for projects in the city</i>	User	Use of AI to improve City Government's processes and Projects	Efficient City Operations and Services	9
<i>Current AI knowledge enables the use of prototypes to reveal possibilities.</i>	Enabler	Investing in AI knowledge and expertise with the city Government	Technical Training and Infrastructure	9
<i>development of the AI team in cooperation with knowledge institutions, focusing on speeding up possibilities for applying AI in large-scale tasks concerning matters such as maintaining or repairing the city's quay walls, tackling subversive activities and poverty and other tasks with a societal impact.</i>	Leader	promoting the partnership with City and AI private labs in the city to improve Government projects	Collaborations and Partnerships	9
<i>Consolidate cooperation with the technical community, other local authorities, the market and the world of science</i>	Leader	Consolidate Cooperation within ket stakeholders	Collaborations and Partnerships	9
<i>AI with Impact projects</i>	User	Use of AI for Impact projects	Efficient City Operations and Services	9
<i>AI in the public sector' working group (Netherlands AI coalition)</i>	Leader	Facilitataing partnerships and coalition	Collaborations and Partnerships	9
<i>Urban assignment challenges through communities such as PyData and Kaggle.</i>	Leader	Facilitating Technical Assignments	Collaborations and Partnerships	9
<i>AI in Start-up in Residence and the European House of Skills and AI4cities projects.</i>	Leader	Linking Amsterdam to a global network of AI cities coalition	Collaborations and Partnerships	9
<i>Develop AI competences and infrastructure within the City</i>	Enabler	Developing AI competencies and infrastructure	Economic Development and Competitiveness	9
<i>Investing in technical infrastructure at an early stage (as part of the i-domain administrative instruction), such as data acquisition, preparing data for use, new machine learning techniques, access to hardware and computational power and a safe working environment, and knowledge representation.</i>	Enabler	Investing in Technical Infrastructure	Technical Training and Infrastructure	9
<i>Investing in knowledge about AI in the legal, purchasing and audit departments</i>	Enabler	Investing in AI talent and knowledge for key departments	Technical Training and Infrastructure	9
<i>Have every civil servant take the National AI Course to acquire basic knowledge of AI.</i>	Enabler	Civil servants take AI Competency course	Technical Training and Infrastructure	9
<i>Create less discriminatory and more transparent algorithms for use in the City itself.</i>	Regulator	Creating non discriminatory and transparent AI sytems.	Transparency and Accountability	9
<i>Work out details of digital rights.</i>	Regulator	Figure out details how to protect digital rights	Digital Rights Protection	9

<i>Positioning and promoting Amsterdam.</i>	Leader	They want to be known as a model AI City	Economic Development and Competitiveness	10
<i>AI features consistently high on political agendas and affects a whole range of sectors and developments. Substantial investments are expected in AI, including on a European level.</i>	Enabler	Influence highly in Political Agenda and investments are available	Economic Development and Competitiveness	10
<i>We aim to raise the Netherlands' status in the field of AI and to play a pioneering role in this regard. Amsterdam's AI values could set an example for the rest of the world.</i>	Leader	Setting Amsterdam as the pioneer in AI while preserving the Amsterdam Values	Economic Development and Competitiveness	10
<i>position Amsterdam as an important AI city in Europe. We will do this by cooperating with knowledge institutions, the business community and the government.</i>	Leader	Position Amsterdam as the Important AI City in Europe by partnering with key knowledge groups and business communities.	Economic Development and Competitiveness	10
<i>Developing and attracting AI talent is often cited as a top priority.</i>	Enabler	Developing and attracting AI talent	Technical Training and Infrastructure	10
<i>making Dutch companies aware of AI and help them keep pace with AI developments.</i>	Enabler	Help Dutch companies become aware and be in the pace with AI developments	Economic Development and Competitiveness	10
<i>It is vital that the government develops its role as a promoter.</i>	Leader	Act as the promoter and linkages to ensure that businesses are up to date to AI technology developments	Citizen Engagement and Citizen Participation	10
<i>City of Amsterdam to commit itself fully to reinforcing the regional AI ecosystem.</i>	Enabler	Enforcing the regional AI ecosystem	AI Ecosystem	10
<i>Ensure innovative entrepreneurs get off the ground, that start-ups can grow, and companies from the Netherlands and abroad can settle in Amsterdam successfully.</i>	Enabler	Giving the right support to the businesses	Economic Development and Competitiveness	10
<i>Consolidation of cooperation between the various parties involved.</i>	Leader	Consolidating cooperation between stakeholders	Collaborations and Partnerships	11
<i>build on Amsterdam's profile as a region that excels in crossovers and innovation.</i>	Leader	Building Amsterdam that excel in the crossroads of AI development	Economic Development and Competitiveness	11
<i>Ensures that home-grown talent, for example from local universities, does not leave and move to other countries.</i>	Enabler	Ensuring that homegrown talent is supported and maintained.	Economic Development and Competitiveness	11
<i>There is no shortage of opportunities for forging connections between the relevant actors such as universities, big companies, research institutions and accelerators with start-ups and scale-ups.</i>	Leader	Forging Connections between the businesses, universities, and research groups.	Collaborations and Partnerships	11
<i>One area in which AI can make a real difference is health.</i>	User	Usage of AI in Health programs	Efficient City Operations and Services	11

<i>we are building on Amsterdam's profile as a Life Sciences hub with a focus on AI and Data Sciences. In other words, Smart Health Amsterdam, data for life."</i>	Leader	Become an important city to position the use of AI in Health Sciences	Economic Development and Competitiveness	11
<i>Protect our values from other values imposed by AI.</i>	Regulator	Protect the values imposed by AI systems	Ethical, Legal, and Social Values Framework	12
<i>Influence the AI that is used in Amsterdam. One example of this is to make sure that the deployment and use of AI does not lead to new kinds of poverty and exclusion over the next decade, or have a negative impact on the living, working and recreational environment in Amsterdam.</i>	Regulator	Ensuring that AI systems deployed do not become new source of unethical and inhumane treatments of different groups of the community	Ethical, Legal, and Social Values Framework	12
<i>not be reserved exclusively for certain target groups while excluding others. We want to minimize scope for misuse of AI. We want to become more alert to indirect control and manipulation.</i>	Regulator	Ensuring that AI systems deployed do not become new source of unethical and inhumane treatments of different groups of the community	Ethical, Legal, and Social Values Framework	12
<i>consult with our contractors, partners and users in Amsterdam on an equal footing.</i>	Leader	Consulting with contractors and users in Amsterdam to ensure equal footing	Innovative and Responsible Procurement	12
<i>gaining knowledge and increasing transparency and setting up a system of enforcement regarding the use of AI</i>	Regulator	Increasing Transparency and set up clear systems of enforcement for AI systems	Transparency and Accountability	12
<i>If we are to exert influence on AI in Amsterdam, action will need to be taken at national and European level.</i>	Leader	Influence on AI Values	Economic Development and Competitiveness	12
<i>Amsterdam's AI values could set an example for the rest of the world.</i>	Leader	Setting Amsterdam values as an example fro the whole world	Economic Development and Competitiveness	12
<i>AI does not lead to new kinds of poverty and exclusion over the next decade, or have a negative impact on the living,</i>	Regulator	Ensuring that exclusion is not porpagated by the AI values	Ethical, Legal, and Social Values Framework	12
<i>The City of Amsterdam (in cooperation with the University of Amsterdam) is one of a number of municipalities that have developed and produced AI models.</i>	Leader	Develop AI models in partnership with university and research groups	Collaborations and Partnerships	12
<i>This helps the City to deal more quickly and efficiently with nuisance experienced by citizens and feedback is more user-friendly.</i>	User	AI used for effective and efficient feedback mechanisms in the city	Citizen Engagement and Citizen Participation	12
<i>The City of Amsterdam communicates openly with its residents about how the model works, and performs checks in terms of ethics.</i>	User	Improve citizen participation and engagement	Citizen Engagement and Citizen Participation	12
<i>Social, economic and ethical frameworks are needed to ensure that all the algorithms permitted in Amsterdam are fair.</i>	Regulator	Putting AI ethical frameworks in place	Ethical, Legal, and Social Values Framework	12

<p><i>Our aim is to have a coherent policy on algorithms, to ensure the City has an overview of the algorithms that are used by means of an internal register for algorithms.</i></p> <p><i>consult a public algorithm register, objection procedure, engage in a participation process and give/receive feedback during development in the preliminary phase.</i></p> <p><i>maintains control of the use and purchase of algorithms thanks to a control framework and set purchasing requirements and conditions.</i></p> <p><i>University of Amsterdam (ICAI) and the European innovation organization EIT Digital, the City of Amsterdam aims to establish a Civic AI Lab</i></p> <p><i>investigate how AI can be used to combat inequality in the city and, conversely, prevent increasing inequality.</i></p> <p><i>the lab's mission is to develop and promote AI technology to connect, support and involve citizens and communities, including those on the margins of society.</i></p> <p><i>The lab employs PhD candidates to work on relevant, data-rich projects initiated by the public or private party they are cooperating with, in this case the City of Amsterdam and the European innovation organization EIT Digital.</i></p> <p><i>"We will join the national initiative to develop an algorithm register. In addition, we will establish a process with accompanying tools for purchasing, developing, deploying, managing and controlling algorithms (AI life cycle). "</i></p> <p><i>Inter-administrative AI with Impact project</i></p> <p><i>Audits of AI used within the organization</i></p> <p><i>Fair algorithms project</i></p>	Leader	Ensuring Coherent policy in place for governing AI systems	Economic Development and Competitiveness	12
	User	Improving public consultation and decision making for citizens	Citizen Engagement and Citizen Participation	12
	Leader	Set control over purchasing of the use of AI	Innovative and Responsible Procurement	12
	Leader	Partnering with research groups and universities to build Civic AI lab.	Collaborations and Partnerships	12
	Regulator	Ensuring ethical models are effective and studied correctly before deployment	Ethical, Legal, and Social Values Framework	12
	Leader	Ensuring safe space to support AI systems in different Socio-economic areas in the city	Citizen Engagement and Citizen Participation	12
	Leader	Strengthening research driven work in AI deployment with the facilitation of highly skilled students	Collaborations and Partnerships	12
	Leader	Joining the initiatives in the promotion and use of AI	Collaborations and Partnerships	14
	Enabler	Investing in AI knowledge with the City Instrumentalities	Economic Development and Competitiveness	14
	Enabler	Investing in AI knowledge with the City Instrumentalities	Economic Development and Competitiveness	14
Enabler	Investing in AI knowledge with the City Instrumentalities	Ethical, Legal, and Social Values Framework	14	

<i>Influence on the national and EU agenda for AI, based on experience gained by cities via the coalition of cities for digital rights, Eurocities, Association of Netherlands Municipalities (VNG)/ Ministry of Foreign Affairs (BZK)/Ministry of Economic Affairs and Climate Policy (EZK)</i>	Leader	Influencing the national and EU agenda in A by being a pioneer city	Collaborations and Partnerships	14
<i>Digital rights & AI x portfolios: setting a good example as a city.</i>	Leader	Setting a good example as leader city in AI	Digital Rights Protection	14
<i>We will provide AI solutions and policy that reduce dependence on the big technical companies and prevent AI from contributing to inequality.</i>	Regulator	Preventing the dependence on Big technical companies and preventing the spread of inequality with the use of AI systems	Ethical, Legal, and Social Values Framework	14
<i>We will create transparent and non-discriminatory algorithms, and present ethical considerations to the College of the Mayor and alderpersons and the City council.</i>	Regulator	Creation of Transparent AI Frameworks	Transparency and Accountability	14
<i>We will organize an exploration with the City council to see how the council can go about realizing AI in compliance with digital rights and in cooperation with supervisory bodies such as the Court of Audit, Ombudsman, ACAM and the Amsterdam Personal Data Commission.</i>	Regulator	Exploring the compliance with data and digital rights	Digital Rights Protection	14
<i>Understanding of the effects of AI on the city and perspectives for action</i>	Leader	Supporting Research groups to understand the effects of AI and encouraging them to build models for effective and ethical use of AI	Collaborations and Partnerships	14
<i>Civic AI Lab with ICAI (Combating digital inequality through insight into inequality resulting from the use of AI in the city, and working on alternative AI that can be used)</i>	Leader	Supporting AI research groups and the academia	Collaborations and Partnerships	14
<i>Follow-up investigation into the impact, desirability and possibilities for regulating face recognition</i>	Leader	Supporting the research for the use of AI in facial recognition	Collaborations and Partnerships	14
<i>Preconditions, such as access to data</i>	Enabler	Setting up mechanisms to ensure easy access to data	Data Governance and Sharing	14
<i>Amsterdam wants to align itself with the strategy and actions of the European Commission on the European single data market to generate opportunities for businesses and ensure that data sovereignty continues to play an important role in the design of the single data market.</i>	Enabler	Ensure alignment of actions with that of the higher bodies such as the EU level	Economic Development and Competitiveness	14

<i>Increase usability, availability and value of public data</i>	Enabler	Increase usability of data	Data Governance and Sharing	14
<i>This is part of the administrative instruction of the i-domain, such as the continued development of data.amsterdam.nl</i>	Enabler	Access to i-domains	Data Governance and Sharing	14
<i>The information commissioner promotes the accelerated public provision of data</i>	Enabler	Enabler: Acceleration of provision of public data	Data Governance and Sharing	14
<i>Increase usability, availability and value of scientific data and commercial data</i>	Enabler	Improving the quality of available data	Data Governance and Sharing	14
<i>Help to develop a PPP data exchange platform (such as AMDEX)</i>	Leader	Help Develop PPP Partnerships	Data Governance and Sharing	14
<i>Promote data exchange within sectors, such as life science and health and mobility.</i>	Enabler	Promote Data Exchange among sectors	Data Governance and Sharing	14
<i>Explore the possibilities of making data on the city available to the city. For example, through data commons, regulations and purchasing.</i>	Enabler	Explore how to make data available through data common etc.	Data Governance and Sharing	14

Source: Sicat (2023) Roles and Primary tasks derived from the 4 roles of government in AI context Framework

Appendix 7. Barcelona Analysis Schedule Manifest

<i>AI STRATEGY STATEMENT</i>	<i>SUMMATIVE MEANING</i>	<i>ROLE</i>	<i>AREA OF FOCUS</i>	<i>PAGE</i>
<i>Several of the City Council's areas are carrying out pilot tests to help to make municipal services more efficient and proactive.</i>	Using AI to Improve City operations and processes	User	Efficient City Operations and Services	4
<i>thermal cameras monitoring beach occupancy levels, which have made it possible to ensure compliance with COVID-19 capacity restrictions.</i>	Use of Thermal Cameras to comply with COVID protocols	User	Efficient City Operations and Services	4
<i>subject classifications of complaints and suggestions sent by city residents through the City Council's electronic mailbox.</i>	Using AI for citizen engagements	User	Citizen Engagement and Citizen Participation	4
<i>guarantee the privacy and digital rights of citizens and ensure their data will not be used under any circumstances for social-control purposes.</i>	Guaranteeing Privacy and protecting digital rights by ensuring that data are used ethically and correctly	Regulator	Digital Rights Protection	4
<i>add the criterion of ensuring that the AI deployed from now on from or with the City Council – whether in the automation of decisions affecting citizens or in the processes for designing, implementing and monitoring public policies – respect the digital rights of the city's residents.</i>	Respecting Digital rights of the residents	Regulator	Digital Rights Protection	4
<i>ethical promotion of AI</i>	Promoting Ethical of AI	Regulator	Ethical, Legal, and Social Values Framework	5
<i>Barcelona City Council will have a regulatory framework for the first time for the application of AI within this institution.</i>	Establishing a regularory Framework fo rthe first time	Regulator	Ethical, Legal, and Social Values Framework	5
<i>Barcelona is joining cities such as Amsterdam, New York, Helsinki, Toronto and Seattle in the construction of an urban artificial intelligence and emerging-technologies model, based on human rights and committed to a democratic digital society.</i>	Joining international Coalition for responsible AI	Leader	Collaborations and Partnerships	5
<i>approved an institutional declaration on 26 June 2020, expressing support for an ethical and trustworthy municipal technical model.</i>	Approve declaration supporting ethical and trsutworthy municipal technical moder for AI	Regulator	Ethical, Legal, and Social Values Framework	5
<i>This technological- humanism-based model aims to facilitate scientific advances,</i>	Passing of legal framework facilitating sicientific advances of Ai	Enabler	Economic Development and Competitiveness	5
<i>preserve the city's technological leadership</i>	Ensure barcelona's technological Leadership In AI	Leader	Economic Development and Competitiveness	5
<i>guarantee new digital rights for citizens and their participation in the monitoring of the use that is made of technologies in the public sector.</i>	Guarateeing protection of digital rights	Regulator	Digital Rights Protection	5

<i>is committed to a fair digital transition that safeguards citizens' rights</i>	Safeguard Citizen's rights	Regulator	Ethical, Legal, and Social Values Framework	5
<i>promotes the city's progress and adaptation to the global technological revolution of the 21st century. promoting human-rights-based AI</i>	Promote Barcelona's progress and adoption of AI	Leader	Economic Development and Competitiveness	5
	Promoting Human Rights AI	Regulator	Ethical, Legal, and Social Values Framework	5
<i>establishing governance and management mechanisms,</i>	Establishing Governance Frameworks and management systems for AI	Regulator	Ethical, Legal, and Social Values Framework	5
<i>creation of a public register of algorithms and the implementation of the corresponding audits to assess their risks. developing the cornerstones for applying emerging technologies, especially AI, in Barcelona City Council, helping to safeguard citizens' rights in the face of the automation of the decisions that affect them.</i>	Creating of Public registers	User	Efficient City Operations and Services	5
	Developing Cornerstone for applying digital technologies	Leader	Economic Development and Competitiveness	5
	Helping to safeguard citizens' rights in the face of the automation of the decisions that affect them.	Regulator	Ethical, Legal, and Social Values Framework	5
<i>applying emerging technologies based on human rights will help to bring about stronger public services and better institutional and democratic quality, Maintaining and increasing democratic monitoring of AI by public institutions and citizens.</i>	Applying Technology based on human rights	Regulator	Ethical, Legal, and Social Values Framework	6
	Maintaining and increasing democratic Monitoring of AI technologies	Regulator	Ethical, Legal, and Social Values Framework	6
<i>Ensuring through transparency and auditability that the algorithmic models and the databases they are applied from follow human-rights and public-interest criteria. Clarifying the liability regime for any harm or loss that may arise from the creation and use of AI-based solutions not just by the Administration but also by companies and developers. benchmark digital city</i>	Ensuring Transparency and Accountability of AI technologies	Regulator	Transparency and Accountability	6
	Clarifying the risks and harms that is potential of AI systems not just by the Government but of that from developers and creators	Regulator	Transparency and Accountability	6
<i>establishment of several innovation hubs.</i>	Benchmark to be a digital city	Leader	Economic Development and Competitiveness	7
	establishment of different innovation hubs	Enabler	Economic Development and Competitiveness	7
<i>Barcelona City Council is working to maintain the city's digital capital status in Europe and the world, turning technological disruptions into opportunities, bringing society the advantages of technology, such as tools for helping in the progress and achievement of</i>	maintaining the digital city status	Leader	Economic Development and Competitiveness	7

<i>the Agenda 2030's sustainable development goals.</i>	Passing of the Agreement for barcelona highlighting the need to strengthen the digital competency of Barcelona as a city	Regulator	Ethical, Legal, and Social Values Framework	7
<i>the city a global and local centre of reflection on humanism'. A technological humanism understood as a human-centred technological development model which reduces social inequalities and safeguards human rights and where technology is at the service of the people and general interests.</i>	Aligning technological humanism ensuring policies are in line with human values	Regulator	Ethical, Legal, and Social Values Framework	7
<i>Barcelona is opting for a fair and inclusive digital transition that acts as a level of opportunities rather than a creator of new inequalities. Technological humanism, then, is the basis of the digital policies for the 2019-2023 municipal term of office: it is here that Barcelona City Council has continued non-stop to build alliances to integrate technological humanism into European and global policies, and to champion the essential role of cities to ensure a fair digital transition, application of digital intelligence.</i>	Ensuring Digital technologies with that of the digital intelligence to be in line with technological humanism which is ethical	Regulator	Ethical, Legal, and Social Values Framework	7
<i>International position in the digital rights arena is conveyed above all through the Coalition of Cities for Digital Rights, on a global scale, and the Eurocities Knowledge Society Forum, on the EU scale.</i>	Being part of Coalition ensuring digital rights	Leader	Digital Rights Protection	7
<i>Safeguards citizens' digital rights and exports its model to the rest of the world, promote a digital era that contributes towards progress and which leaves no one behind.</i>	Safeguard the citizen's digital rights	Regulator	Digital Rights Protection	8
<i>Promotion of Digital Transformation within the City Council and to the entire city</i>	Ensuring that no one gets left behind	Leader	Economic Development and Competitiveness	8
<i>guaranteeing citizens' fundamental rights and freedoms, in line with the Agenda 2030's sustainable development goals.</i>	Promotion of Digital Transformation within the City Council and to the entire city	Leader	Economic Development and Competitiveness	8
<i>Initiatives should always be geared towards promoting and guaranteeing an effective equality of its citizens and the groups it is integrated into, by preventing any kind of discrimination and safeguarding fundamental rights.</i>	Guarantee digital rights and alignment to 2030 SDGs	Regulator	Digital Rights Protection	8
<i>harmonise data-protection, privacy and transparency regulations with automated procedures provided for in the basic legislation and the right for public decisions not to be totally automated and adopted without any human control, aspects in which AI has a special effect.</i>	Ensuring that initiatives do not promote discrimination	Regulator	Ethical, Legal, and Social Values Framework	8
<i>Promoting the digital transition in Barcelona through the use of emerging technologies and, more specifically, of AI, as a tool for social progress and under the principles of technological humanism, putting citizens and their rights at the centre.</i>	Harmonize data protection and transparency regulations	Regulator	Ethical, Legal, and Social Values Framework	8
	promotion of AI technologies towards progress	Leader	Economic Development and Competitiveness	8

<i>Promoting an open, inclusive and resilient city model, where technology is always at the service of citizens and has a positive social effect.</i>	Promoting open and resilient digital model geared towards ensuring the positive effects on the lives of the citizens	Leader	Economic Development and Competitiveness	9
<i>seeking public and private commitment, and establishing coordination and participation mechanisms for making progress in the good governance of the city's digital future.</i>	Seeking Public commitment and establishing coordination and participation mechanisms for all key stakeholders	Leader	Collaborations and Partnerships	9
<i>Promoting Barcelona's leadership in other national and international institutions, in the area of technological humanism, digital transition and, more specifically, in the use of open and democratic emerging technologies for the common good.</i>	Promoting themselves as the leader in the promotion of ethical use of digital technologies such as AI	Leader	Economic Development and Competitiveness	9
<i>using AI as a tool for improving public services while guaranteeing that the development, deployment and use of AI meets trustworthy-technology requirements.</i>	Using AI to improve public services	User	Efficient City Operations and Services	9
<i>Promoting AI as a tool for advancing towards smart, more effective public service</i>	Promoting AI as effective governance tools in tackling societal challenges	Leader	Economic Development and Competitiveness	9
<i>Establishing internal governance mechanisms to guarantee human rights as a cornerstone of digital development and ensuring citizen-participation processes for the monitoring and continuous improvement of these mechanisms.</i>	Establishing Internal governance mechanisms and ethical frameworks for the use of AI	Regulator	Ethical, Legal, and Social Values Framework	9
<i>Promoting AI-development models that are transparent and auditable by fostering free technologies and software and open knowledge.</i>	Promoting AI systems that are transparent and auditable	Regulator	Transparency and Accountability	9
<i>Developing technical tools for guaranteeing respect for human rights in designing, privacy, the right to understand decision-making, mitigating data and algorithm biases and ensuring human supervision in automated machine decisions, when these affect people.</i>	Develop technical tools for ensuring the proper governance needed to supervise AI systems that adhere to human rights	Regulator	Ethical, Legal, and Social Values Framework	9
<i>e-Government establishes that public authorities have to promote an e-Government model based, among other things, on the incorporation of electronic media in their ordinary activity to improve the accessibility, transparency, effectiveness, efficiency and quality of the provision of services to citizens, as well as internal management.</i>	Ensuring legal framework supports the promotion of access to AI technologies	Enabler	Economic Development and Competitiveness	10
<i>this municipal algorithm and data strategy for an ethical promotion of AI is in line with current regulations and recommendations in force on regional, national and international levels:</i>	Aligning the strategy to that of the regional, national and international levels of recommendation and frameworks	Leader	Collaborations and Partnerships	10

<i>Barcelona City Council, in exercising its municipal powers granted and established in the current regulations, is acting in compliance with the Institutional Declaration for technological humanism and trustworthy and ethical technologies in Barcelona City Council approved at the Full Municipal Council Meeting of June 2020.</i>	Establishing regulations that ensure the compliance to Institutional Declaration for technological humanism and trustworthy and ethical technologies in Barcelona	Regulator	Ethical, Legal, and Social Values Framework	11
<i>AI-related technologies...have an indisputable potential for transforming municipal activities, both internal and relating to citizens.</i>	Usage of AI technologies for transforming municipal activities	User	Efficient City Operations and Services	11
<i>Co-production of public policies.</i>	Production of public policies supporting AI systems	Leader	Economic Development and Competitiveness	11
<i>Internal municipal management.</i>	Producing internal management systems to support AI systems	Leader	Economic Development and Competitiveness	11
<i>Provision of public services.</i>	provision of City services using AI	User	Efficient City Operations and Services	11
<i>Designing and building AI-based systems.</i>	Designing and building AI systems	Enabler	Economic Development and Competitiveness	11
<i>Public procurement of systems/solutions based on AI technologies.</i>	Procuring AI based systems/solutions	Leader	Innovative and Responsible Procurement	11
<i>enable municipal managers to understand the city's changing needs better, have a more accurate diagnosis of challenges and collect data to assess the impact of public policies,</i>	Supporting decision making processes	User	Efficient City Operations and Services	11
<i>improving citizen participation and promoting a more direct democracy by helping</i>	Increase citizen participation	Leader	Citizen Engagement and Citizen Participation	11
<i>AI, then, will make it possible to adopt new approaches based on analyses of large quantities of information provided through citizen collaboration, of data containing the guidelines and patterns that define urban life (how people move about, interact, use services and enjoy the city).</i>	Use of AI to improve citizen collaboration	User	Citizen Engagement and Citizen Participation	11
<i>Big data analysis through smart systems will help to improve and speed up, for example, mobility policies, although it will also have a positive impact on the most efficient management of many other areas such as housing, culture, sustainability and the fight against inequalities.</i>	use of big data to speed up decision making processes	User	Efficient City Operations and Services	12

<i>Emerging technologies will enable a significant qualitative and quantitative leap to be made towards a more efficient administration, improving processes and simplifying internal procedures.</i>	use AI to speed up and simplify internal processes	User	Efficient City Operations and Services	12
<i>contributing to the steady automation of tasks linked to administrative processes</i>	Steady automation of administrative tasks to increase savings and productivity	User	Efficient City Operations and Services	12
<i>AI will enable very significant progress to be made towards an administration offering services centred on citizens' real needs by optimising the range of services on offer, citizen assistance and citizen participation,</i>	Use of AI for citizen needs	User	Efficient City Operations and Services	12
<i>guaranteeing an ethical and responsible use of such technologies is most evident</i>	Guaranteeing ethical and responsible use of AI systems	Regulator	Ethical, Legal, and Social Values Framework	12
<i>enable the implementation of proactive and more personalised services, something that will make it possible to offer new services to groups that are currently under- assisted.</i>	Enable Proactive and personalized services for the citizens	User	Efficient City Operations and Services	12
<i>Citizen help and information services will be able to assess the introduction of chatbots as a supplement to communications channels</i>	AI will optimize and supplement communication channels for citizens	User	Citizen Engagement and Citizen Participation	12
<i>Building AI-based solutions takes account of an extensive series of activities: from understanding the problem to be solved to implementing the solution, not to mention the identification and building of knowledge models, the design of machine-learning algorithms, the identification and preparation of data, the development of web services and integration with existing systems.</i>	Setting up systems to accommodate the implementation of AI systems	Enabler	Economic Development and Competitiveness	12
<i>advisable for the human-rights aspect of technology to be taken into account at every stage of this process to avoid any creation or worsening of inequalities.</i>	Ensuring that AI systems do not promote inequalities among citizens	Regulator	Ethical, Legal, and Social Values Framework	12
<i>Public tenders for AI-based systems or solutions will have to guarantee that, besides complying with regulations relating to public procurement,</i>	Ensuring proper public tenders for AI based systems	Leader	Innovative and Responsible Procurement	13
<i>meet the ethical values expressed in this strategy, as well as the rules/regulations/instructions that arise from them.</i>	Incorporating ethical requirements in the procurement of AI systems	Regulator	Ethical, Legal, and Social Values Framework	13

<i>Any use of AI in administrative processes must always guarantee the traceability and explainability of any decision that affects people.</i>	Guarantee traceability and explainability of AI systems	Regulator	Transparency and Accountability	13
<i>Seven governing principles that have to be followed in any technological application to ensure correct risk management, respect for digital rights and public responsibility:</i>	Setting up 7 Governance principles to be followed in the application of AI systems	Regulator	Ethical, Legal, and Social Values Framework	14
<i>Keeping them to a minimum will require suitable risk management.</i>	Keeping the use of AI in minimum that is suitable for risk management	Regulator	Ethical, Legal, and Social Values Framework	14
<i>The City Council will be launching the necessary management mechanisms for the risks associated with the application of these technologies by correcting biases in the data and algorithms to protect against the reproduction of the types of discrimination that have so far occurred, as well as prevent the appearance of new forms of discrimination,</i>	Launching necessary management mechanisms and policies to prevent the spread of discriminations	Regulator	Ethical, Legal, and Social Values Framework	14
<i>preserving privacy and the right to understand automated decisions</i>	Preserve and protect the digital rights of the citizens	Regulator	Ethical, Legal, and Social Values Framework	14
<i>ensuring that the final decision is always taken by a professional and not just an automated algorithm.</i>	Ensure that the final decision will be made by professional and not by the Algorithm	Regulator	Ethical, Legal, and Social Values Framework	14
<i>Any technological application that the City Council launches must comply at the very least and at the same time with the following determining factors, which define a trustworthy technology: that it is legal, that it respects human rights, that it is robust, democratic and auditable.</i>	Comply on measures to ensure trustworthy AI	Regulator	Ethical, Legal, and Social Values Framework	14
<i>seven governing principles (henceforth GP) have been established which have to be followed in every technological application, above all those based on AI, to ensure correct risk management, respect for digital rights and public responsibility (see text box).</i>	Creating 7 governing principles to ensure ethical AI	Regulator	Digital Rights Protection	14
<i>automated learning or similar techniques allow algorithms to take automated decisions.</i>	using AI to help in decision making but guided by humans	User	Efficient City Operations and Services	14
<i>the greater the risk, the more the supervision</i>	Ensuring that the greater the risk, the greater the supervision	Regulator	Ethical, Legal, and Social Values Framework	15

<i>Smart systems launched by Barcelona City Council must be secure, trustworthy and sufficiently robust at every stage of the technology's life cycle.</i>	Minimizing risks of manipulation of data by ensuring technical robustness and security	Regulator	Ethical, Legal, and Social Values Framework	15
<i>resistant to cyber-attacks and more subtle attempts to manipulate data or algorithms,</i>	Resiliency on cyber-attacks	Regulator	Digital Rights Protection	15
<i>a preventive approach to risks is crucial here for the purposes of minimising any unintentional and unexpected harm.</i>	Minimize risks and unexpected harm	Regulator	Digital Rights Protection	15
<i>periodic impact assessments need to be made and subject to validations before, during and after the AI is applied.</i>	Practicing periodic impact assessment in governing AI systems	Regulator	Transparency and Accountability	15
<i>Data privacy and protection must be guaranteed at every stage of the life cycle of the technologies used – from design and by default.</i>	Guarantee Data Protection and Governance in the entire lifecycle	Regulator	Digital Rights Protection	15
<i>Data must not be used for harming or discriminating against people or causing any prejudice.</i>	Data used in AI systems must not be discriminatory	Regulator	Ethical, Legal, and Social Values Framework	15
<i>That these personal data – at any stage of the life cycle – will be processed fairly and transparently.</i>	Personal Data must be processed transparently and fairly	Regulator	Transparency and Accountability	15
<i>data gathered must be for explicit and specified purposes.</i>	Gathering of Data must be explicit reason.	Regulator	Transparency and Accountability	15
<i>must be accurate and kept up to date.</i>	preserving the accuracy and relevance of the data	Regulator	Transparency and Accountability	15
<i>must be conserved so that they enable the identification of the persons concerned during a period no longer than necessary.</i>	Preserving Data to ensure identification for consent	Regulator	Data Governance and Sharing	15
<i>Citizens must be told of their personal data stored.</i>	Informing citizens the use of their personal data explicitly	Regulator	Data Governance and Sharing	15
<i>Anonymisation processes must ensure the prevention of reversible data dissociation.</i>	Setting in place data anonymization processes	Regulator	Data Governance and Sharing	15
<i>quality and integrity of the data must be strengthened at all times</i>	Preserving the quality and integrity of data	Regulator	Data Governance and Sharing	16
<i>open access, wherever possible and in accordance with the GDPR17.</i>	Ensuring open access to rightfully extracted data	Enabler	Data Governance and Sharing	16
<i>Barcelona City Council will publish and make quality public data available</i>	Publish data and ensure availability of quality data	Enabler	Data Governance and Sharing	16
<i>improve the access of local research groups to evidence-based information that helps to develop better solutions,</i>	Improve the access mechanisms for relevant groups developing and researching data	Enabler	Data Governance and Sharing	16

<i>promoting the production and donation of public and private data, as a fundamental right of the people, following the digital-rights criteria mentioned here.</i>	promote the production and sharing of quality data to develop trustworthy AI systems	Enabler	Data Governance and Sharing	16
<i>Barcelona City Council must explain the origins of the data and carry out assessments to mitigate their biases.</i>	Explain all the time the intended use of the collected data	Regulator	Ethical, Legal, and Social Values Framework	16
<i>the requirements must be met for guaranteeing smart systems based on high-quality data sets. In other words, biases, inaccuracies, errors and/or mistakes must be kept to a minimum. This has to be dealt with before training a smart system with any data sets.</i>	Setting up requirements to guarantee Ai systems are with high quality data and ensure the inavailability of inaccuracies and errors or mistakes that can lead to discriminatory outcomes	Regulator	Ethical, Legal, and Social Values Framework	16
<i>data sets must be tested and documented at each step, including planning, training, tests and deployment.</i>	Ensure Data Integrity at all times	Regulator	Data Governance and Sharing	16
<i>Transparency must be used to prevent any abuse of 'legitimate consent' and to minimise potential risks arising from opacity.</i>	Uphold transparency in the use of AI systems	Regulator	Transparency and Accountability	16
<i>Barcelona City Council must guarantee the traceability of smart systems, record and document not just automated decisions but the rest of the process too</i>	Guarantee traceability and ensure documentation of every step	Regulator	Transparency and Accountability	16
<i>opening, giving access to the codes of the algorithms that it develops internally and which it applies in public policies.</i>	Opening and giving access to codes that are used to develop AI systems internally to the public and were used for public policies	Enabler	Data Governance and Sharing	16
<i>The transparency of the data must be guaranteed, as well as the reason for implementing a smart system in a public service.</i>	Transparency of Data and intention of usage must always be clear to the city	Regulator	Transparency and Accountability	16
<i>Users will have to be able to identify the technology as well as the people responsible for its implementation.</i>	Guarantee accountability by identifying the correct system owners	Regulator	Transparency and Accountability	16
<i>Barcelona City Council will have to describe the capacities of the AI system it is responsible for as well as its limitations, in particular, to the users or parties involved.</i>	Should always describe the capacity and limitations of the AI used.	Regulator	Transparency and Accountability	16
<i>For the purposes of preventing and mitigating any risks of discrimination, no technological application that Barcelona City Council is responsible for must lead to or commit any discrimination</i>	Ensure that the AI systems are not propagating discrimination	Regulator	Ethical, Legal, and Social Values Framework	16

<i>ensure diversity and fairness, Barcelona City Council must adopt mechanisms to ensure citizen participation (based on one-off consultations with the parties concerned who may be directly or indirectly affected by a smart system during its life cycle).</i>	Ensure diversity and fairness within the application of AI systems used by the City Government	Regulator	Ethical, Legal, and Social Values Framework	17
<i>Digital accessibility will also have to be guaranteed through a universal-design approach for people with a disability.</i>	Ensure digital accessibility especially for the differently abled	Regulator	Ethical, Legal, and Social Values Framework	17
<i>Smart systems need to be an aid to making progress in sustainability, social equality and economic prosperity, and contribute to not leaving anyone behind.</i>	AI systems must be aligned with SDGs	Leader	Economic Development and Competitiveness	17
<i>The impact of algorithms and smart systems must be seen as well from a global perspective and be at the service of the democratic governance championed by the city of Barcelona.</i>	Champion democratic governance with the use of AI systems	Leader	Economic Development and Competitiveness	17
<i>The mechanisms must be established to ensure the responsibility and accountability of the AI and its results, both before and after its incorporation.</i>	Establish mechanisms to ensure responsible, accountable and democratically attuned AI systems	Regulator	Ethical, Legal, and Social Values Framework	17
<i>enable public consultations of assessment reports to ensure trust in the technology incorporated.</i>	Enable public consultation and partnership to ensure trust in the AI systems	Leader	Citizen Engagement and Citizen Participation	17
<i>Barcelona City Council must likewise provide the necessary resources for rapidly and appropriately making good any harm that any citizen may have suffered during the development, deployment or use of the AI systems affecting them.</i>	Provide necessary resources to support victims of deployment or development of AI	Regulator	Ethical, Legal, and Social Values Framework	17
<i>The municipal government will in any case ensure that the design and implementation of AI systems with effects in the city's community or civic area enjoy the participation of the communities or groups concerned, within the framework of the governance measures established in Section 4(1) of this government measure.</i>	Ensure that AI systems governed responsibly	Regulator	Ethical, Legal, and Social Values Framework	17
<i>ethical boost to artificial intelligence that needs to become the level of digital transformation at Barcelona City Council provides for a series of actions which the municipal government regards as a priority for dealing with the deployment of AI.</i>	Putting ethical values of the development and deployment of AI systems at top priority of the city government	Regulator	Ethical, Legal, and Social Values Framework	17
<i>Action for promoting AI in Barcelona City Council.</i>	promote AI systems in the City	Leader	Economic Development and Competitiveness	18

<i>Implementing pilot projects.</i>	Implement Pilot projects	User	Efficient City Operations and Services	18
<i>Creating a municipal register of AI algorithms.</i>	Create Municipal registers	User	Citizen Engagement and Citizen Participation	18
<i>Inventory of possible AI services and needs at Barcelona City Council.</i>	Create inventory of possible AI services and the needs to deploy them	User	Efficient City Operations and Services	18
<i>Reviewing the regulatory framework for applying AI in Barcelona City Council.</i>	Review Regulatory Framework	Regulator	Ethical, Legal, and Social Values Framework	18
<i>Defining work methodologies and protocols.</i>	Define work methodologies and protocols	Regulator	Ethical, Legal, and Social Values Framework	18
<i>Publication of a guide for applying AI in Barcelona City Council.</i>	Publishing the guide in the use of AI	Regulator	Ethical, Legal, and Social Values Framework	18
<i>Data-based administrative procedure.</i>	Ensuring data-based administrative procedures	Regulator	Ethical, Legal, and Social Values Framework	18
<i>Clauses for the tendering of AI-based solutions.</i>	Setting up clauses to guide procurement of AI systems	Leader	Innovative and Responsible Procurement	18
<i>Internal communication.</i>	Strengthen internal communications that promote AI	Leader	Economic Development and Competitiveness	18
<i>Internal training.</i>	Conduct Internal training for civil servants with the use of AI	Enabler	Technical Training and Infrastructure	18
<i>Promoting spaces for reflection and debate on the impact of artificial intelligence on public services.</i>	Promote and facilitate healthy debates and discussions regarding the impact of AI systems	Leader	Citizen Engagement and Citizen Participation	18
<i>Promoting and using data as a public asset.</i>	Promoting and using data as public asset	Enabler	Data Governance and Sharing	18
<i>Alliances and collaborations with the local-AI ecosystem.</i>	Strengthening collaborations and partnerships with key stakeholders	Leader	Collaborations and Partnerships	18
<i>International action for an urban AI model based on human rights.</i>	Ensuring AI systems are operating within the bounds of human rights	Regulator	Ethical, Legal, and Social Values Framework	18
<i>Establishing the International Urban Artificial Intelligence Observatory.</i>	Pioneer the establishment of IUAIO	Leader	Collaborations and Partnerships	18
<i>Cross-cutting commission for promoting an ethical AI in Barcelona City Council.</i>	Establish Commission that will handle the promotion of ethical AI in the City	Leader	Economic Development and Competitiveness	18

<i>Creation of an advisory board of experts in AI, ethics and digital rights at Barcelona City Council.</i>	Creation of Advisory board to oversee any concerna related to AI	Leader	Collaborations and Partnerships	18
<i>City Agreement for Promoting Technological Humanism in the city of Barcelona.</i>	Ensuring the promotion of techonological humanism with the use of AI	Regulator	Ethical, Legal, and Social Values Framework	18
<i>making an exhaustive catalogue of these systems: the applications will be identified where a smart system is already presently being used – whether partly or wholly implemented – and a detailed description will be made of the smart system.</i>	Creating an exhaustive catalogue of already establishe AI systems	Leader	Economic Development and Competitiveness	18
<i>tenders will be identified where they incorporate a smart system into their technical requirements.</i>	Defining tenders for the procurement of ethical AI systems	Leader	Innovative and Responsible Procurement	18
<i>This initial catalogue will be used for diagnosing the state of the issue relating to the promotion of human- rights-based AI at Barcelona City Council.</i>	Diagnose the organization of its state with the alignment to human-based values on the use of AI systems	Regulator	Ethical, Legal, and Social Values Framework	18
<i>AI technologies at the City Council are already being used at the pilot stage19 to improve social services by helping social officers to find the most appropriate solutions for each problem or by contributing to the assessment of the quality of the social services.</i>	Use AI technologies to improve social services	User	Efficient City Operations and Services	19
<i>helping to create a catalogue of labels for identifying the people responsible for graffiti in the city’s public spaces.</i>	Use of AI to cataloague people reponsible for graffitis in public spaces	User	Efficient City Operations and Services	19
<i>New IRIS uses AI to help with classifying by subject any messages sent by city residents and therefore reducing errors in file allocations.</i>	Use of AI to improve City Communications	User	Efficient City Operations and Services	19
<i>applications are being studied in the area of the municipal tax office and</i>	Possibility to use AI in tax office	User	Efficient City Operations and Services	19
<i>Creating a municipal register of AI algorithms, current and future, that have an impact on municipal procedures and services to ensure their transparency and explainability.</i>	Create Municipal register of AI systems in the city	Regulator	Transparency and Accountability	19
<i>An inventory of administrative processes, both internal and citizen services, will be drawn up, where AI can be beneficial. Once the services have been classed, the inventory will be used for designing Barcelona City Council’s digital transformation plan, which includes promoting digital-rights-based AI.</i>	Inventory of AI systems can help design policies and plans	Enabler	Data Governance and Sharing	19

<i>enable us to carry out a preliminary study on the impact of AI at Barcelona City Council.</i>	Creating preliminary study of potential AI services in the city	Leader	Economic Development and Competitiveness	19
<i>Reviewing the regulatory framework for applying AI in Barcelona City Council.</i>	Reviewing the regulatory Framework of Barcelona with regards to AI	Regulator	Ethical, Legal, and Social Values Framework	20
<i>AI coordination will be reviewed and work carried out on regulatory adaptation to cover the identified loopholes, prevent AI-related violations of human rights and promote the adoption of these technologies in accordance with the principles explained in this government measure.</i>	Identify loopholes on the regulatory framework and prevent AI-related violations on human rights	Regulator	Ethical, Legal, and Social Values Framework	20
<i>permitted uses of the data at the City Council's disposal on citizens and companies for offering proactive AI-based services will also be reviewed, in accordance with the Personal Data Protection Act and the EU Regulation.</i>	Permitted use of data by private companies will be reviewed	Regulator	Digital Rights Protection	20
<i>define the work methodologies and internal protocols following the international regulations and recommendations</i>	Defining Internal methodologies with regards to AI Governance	Regulator	Ethical, Legal, and Social Values Framework	20
<i>will incorporate the approach based on the risk of the application that the smart system</i>	Incorporate approach based on risk management frameworks and protocols	Regulator	Ethical, Legal, and Social Values Framework	20
<i>will incorporate the approach based on the risk of the application that the smart system</i>	Draft Instructions which will establish the applicable protocols for designing and building AI systems	Regulator	Ethical, Legal, and Social Values Framework	20
<i>approval of the specifications or contracts forming the subject matter of this design and construction.</i>	approval of the specifications or contracts forming the subject matter of this design and construction.	Leader	Innovative and Responsible Procurement	20
<i>technical guide will be created detailing and exemplifying all the processes and aspects that have to be taken into account for promoting an ethical AI in Barcelona City Council.</i>	Technical Guide for all the usage and purchase of AI systems within the city government	Regulator	Ethical, Legal, and Social Values Framework	20
<i>facilitate data collection, disaggregation and quality through information systems, platforms and automatisation.</i>	Facilitate proper collection and use of data	Enabler	Data Governance and Sharing	21

<i>creation of comparable parameters that enable interoperability with all the other information systems and sources, as well as internal and, where possible, external statistical information.</i>	Creating quality data framework to ensure interoperability of AI systems with other systems	Enabler	Technical Training and Infrastructure	21
<i>include clauses relating to digital rights in the tendering of AI-based solutions.</i>	Include clauses for tendering AI-based solutions	Regulator	Digital Rights Protection	21
<i>facilitate the work of the technical and executive bodies in public-contract drafting, as a supplement to the guide on AI application in Barcelona City Council, public procurement clauses will be drafted to ensure compliance with the governing principles described in this government measure.</i>	Ensuring that procurement is in compliance with the governing principles.	Leader	Innovative and Responsible Procurement	21
<i>draft an internal communication plan, taking the already existing internal communication channels into account, to establish a section for introducing and promoting exchanges of knowledge on AI and emerging technologies as tools for transforming public services towards a new proactive, personalised Administration that puts digital rights at the centre.</i>	Draft internal communication plan to facilitate the cascading of knowledge and capacity towards AI among city employees	Leader	Economic Development and Competitiveness	21
<i>The City Council needs to have expertise in emerging technologies to avoid being totally subsidiary to external action and to be capable of maintaining its supervisory powers.</i>	Conduct internal training to develop AI capabilities within the city government	Enabler	Economic Development and Competitiveness	21
<i>promoting the skills acquisition of municipal workers so that they become active subjects capable of contributing to the public-service co-creation processes where such technologies can have a disruptive effect.</i>	Promote skills acquisition for Civil servants	Enabler	Economic Development and Competitiveness	21
<i>training plan for municipal workers based on several training itineraries will be devised and incorporated to that end to explain the capacities of AI, the risks and the possibilities of its application in the public Administration and service for citizens in accordance with the principles and values stated in this measure.</i>	Creation of Training plan for city employees	Enabler	Economic Development and Competitiveness	21
<i>internal training will also provide for the training of Barcelona City Council's executives and advanced training for members of the driving group</i>	Internal Training for leadership positions too	Enabler	Economic Development and Competitiveness	22
<i>existing communication channels with citizens to strengthen the governing principles on transparency and right to information.</i>	Strengthen communication with citizens with regards to information.	Leader	Citizen Engagement and Citizen Participation	22

	their concerns on AI systems			
<i>to provide information and resolve queries and disputes over the use of AI in public services and to contribute to the democratisation of universal access to knowledge and innovation.</i>	promote information and provide space to resolve concerns and queries	Leader	Citizen Engagement and Citizen Participation	22
<i>resolving disputes that the social players may pose relating to the use of AI systems in the public services provided by Barcelona City Council.</i>	Resolve disputes with citizens regarding their concerns with AI systems	Regulator	Ethical, Legal, and Social Values Framework	22
<i>Promoting spaces for reflection and debate on the impact of artificial intelligence on public services</i>	Providing a safe space to debate and discuss AI related discussions	Leader	Citizen Engagement and Citizen Participation	22
<i>encouraging a city debate on the influence of digital technologies on our lives and society, especially from the ethical and humanist point of view.</i>	Encourage debate with the use of AI	Leader	Citizen Engagement and Citizen Participation	22
<i>facilitating, together with other players from the city's techno-ethical ecosystem, more spaces for reflection on the purpose and benefits of AI for citizens.</i>	Facilitate collaborating and communication between different stakeholders of AI ecosystem	Enabler	AI Ecosystem	22
<i>availability, quality and use of data.</i>	Ensure availability of quality data	Enabler	Data Governance and Sharing	22
<i>Developing 'Common Data' as a public digital infrastructure and promoting the use of urban data for the common good.</i>	developing Common data infrastructure	Enabler	Data Governance and Sharing	22
<i>Promoting the social appropriation and reuse of publicly available open data sets, so that new useful knowledge can be generated for assessing the city's development.</i>	promoting open access to quality data	Enabler	Data Governance and Sharing	22
<i>Collaborating with European institutions to launch a new European data governance model for the public good.</i>	Collaborating with EU institutions for the use and governance of AI	Leader	Collaborations and Partnerships	22
<i>Promoting the definition and adopting of open-data standards for local governments.</i>	promotion of Open data standards	Leader	Economic Development and Competitiveness	22
<i>Studying the bases for establishing comprehensive data-exchange agreements between companies and the City Council (B2G).</i>	Establish data exchange models between private groups	Enabler	Data Governance and Sharing	22
<i>Designing a new framework for regulating the harnessing of data and municipal information by companies dedicated to exploiting data for financial purposes.</i>	Designing new framework to harness ethical use of data for algorithms	Regulator	Data Governance and Sharing	22

<i>map of the local players of the knowledge ecosystem and the scientific infrastructures with potential for AI will be generated, and revitalisation and collaboration initiatives will be promoted.</i>	Map key stakeholders and collaborate with them	Leader	Collaborations and Partnerships	23
<i>Joint work will be carried out with the world of AI research and managers of scientific infrastructures to boost applied research and technological-innovation projects in the public sector.</i>	Partner with AI research and Managers	Leader	Collaborations and Partnerships	23
<i>co-creation of AI-based services that meet contemporary social and urban challenges.</i>	Crear Public-private Partnerships	Leader	Collaborations and Partnerships	23
<i>playing an important role for years in international discussion forums on the technological transition, its ethical implications and the impact on citizens. Our city has often established road maps copied by many other cities worldwide.</i>	Pioneering the ethical model for the use of AI systems in city level	Leader	Economic Development and Competitiveness	23
<i>These international forums are also platforms for working with European institutions to achieve favourable legislative and funding frameworks in cities and at the same time provide excellent channels for presenting what is being done in Barcelona, strengthening the city's innovative and socially responsible role.</i>	Positioning Barcelona as a key innovative city with regards to ethical AI development	Leader	Economic Development and Competitiveness	23
<i>Intensifying its focus of international action on the use of AI-based solutions</i>	Intensifying alignment to international frameworks	Leader	Collaborations and Partnerships	23
<i>International action for an urban human-rights-based AI model will continue to be run, on a European level, through the Eurocities Knowledge Society Forum, and, on a global level, through the Cities Coalition for Digital Rights.</i>	Continued collaboration with International groups	Leader	Collaborations and Partnerships	23
<i>promoting the creation of the International Urban Artificial Intelligence Observatory, in collaboration with the CIDOB and under the auspices of the Cities Coalition for Digital Rights.</i>	becoming part of the international coalition of leader cities with regards to AI	Leader	Citizen Engagement and Citizen Participation	23
<i>Governance tools will be activated for the purpose of launching the government measure to ensure the correct coordination of efforts, access to knowledge and compliance with the proposed goals.</i>	Ensure coordination within key stakeholders	Leader	Collaborations and Partnerships	24
<i>Creation of a cross-cutting commission for promoting an ethical AI</i>	Creation of commission handling AI related concerns and operations	Leader	Citizen Engagement and Citizen Participation	24

<i>Creating an advisory council of experts in AI and technological humanism at Barcelona City Council, which integrates the city's main experts in the field.</i>	Creating expert groups	Leader	Collaborations and Partnerships	24
<i>Launching a citizen-participation body in the form of a city agreement for promoting technological humanism, to align the innovation ecosystem with technological humanism values and ethical AI and to seek out new challenges and opportunities.</i>	Ensuring that AI systems are in line with the technological humanism principles	Leader	Citizen Engagement and Citizen Participation	24
<i>A cross-cutting commission will be set up, made up of representatives from the departments or manager's offices of all the City Council's areas, to guide the strategy of incorporating an ethical AI into Barcelona City Council, monitoring its level of performance and collectively taking on the challenges as they come.</i>	Set up commission promoting ethical AI to guide strategy and own the implementation of AI related projects	Leader	Collaborations and Partnerships	24
<i>Validating AI-based systems for application in the City Council at the suggestion of the driving group</i>	Validate AI-based systems for the city government	Regulator	Ethical, Legal, and Social Values Framework	24
<i>Resolving the disputes that may arise from the application of AI algorithms in internal processes and public services provided by Barcelona City Council and subsidiary bodies.</i>	resolve disputes relating to AI systems	Regulator	Ethical, Legal, and Social Values Framework	24
<i>Ensuring that the process for adopting AI in Barcelona City Council is cross-cutting nature and offers a systemic vision.</i>	Ensuring people are well represented in designing AI systems	Leader	Economic Development and Competitiveness	24
<i>Ensuring that citizens have their say in the process for designing and implementing AI-based services.</i>	Ensuring people are well represented in designing AI systems	Leader	Citizen Engagement and Citizen Participation	24
<i>Ensuring that the actions carried out are geared towards reducing the gender digital gap.</i>	Ensuring that the Actions are geared towards reducing gender digital gap	Regulator	Ethical, Legal, and Social Values Framework	24
<i>An advisory board will be created, made up of experts in AI, ethics and digital rights, from several of the city's research and knowledge institutions</i>	Create Advisory Boards	Regulator	Digital Rights Protection	24
<i>A participatory body will be launched, in the form of a city agreement for promoting technological humanism,</i>	Promote Technological Humanism via City Agreement	Regulator	Ethical, Legal, and Social Values Framework	25
<i>aligning the innovative ecosystem and municipal action with an ethical AI,</i>	aligning the innovative ecosystem and municipal action with an ethical AI	Enabler	AI Ecosystem	25
<i>Launching Barcelona City Council's Algorithms and Data Strategy</i>	launching the AI and data strategy to the public	Leader	Economic Development and Competitiveness	27

<i>This ethical AI driving group will be responsible for coordinating and promoting ethical AI in Barcelona City Council.</i>	promoting and coordinating effort towards AI systems development and deployment	Leader	Collaborations and Partnerships	27
<i>advising and approving smart systems or automated services that are put into practice and which affect people.</i>	Advising and approving smart systems	Leader	Economic Development and Competitiveness	27
<i>Devising the plan for deploying AI in the City Council.</i>	Devise and amend the AI plan accordingly	Leader	Economic Development and Competitiveness	27
<i>Facilitating and implementing the proposed governance actions in the government measure.</i>	Facilitating and implementing the proposed governance actions in the government measure.	Leader	Collaborations and Partnerships	27
<i>Supervising the application/use of AI algorithms in internal processes and in the management and provision of public services.</i>	Supervise the use of AI and the internal processes governing it	Leader	Economic Development and Competitiveness	27
<i>Requesting opinions from external experts in AI, ethics and digital rights should ethics-related disputes arise that justify it.</i>	Invite expert if dispute arises	Leader	Collaborations and Partnerships	27
<i>Coordinating with the City Council's various areas, the various municipal bodies with competence in these legal areas, municipal data, data protection, transparency, participation, communication with citizens, Internal Communication and Staff Development and Assistance, to ensure the correct implementation of the actions provided for in this measure.</i>	coordinate different concerned bodies to ensure ethical use of data and AI systems	Leader	Collaborations and Partnerships	27

Source: Sicat (2023) Roles and Primary tasks derived from the 4 roles of government in AI context Framework

Appendix 8. New York Analysis Schedule Manifest

<i>AI STRATEGY STATEMENT</i>	<i>ROLE</i>	<i>TASK</i>	<i>AREA OF FOCUS</i>	<i>PAGE</i>
<p><i>City of New York believes that an ecosystem approach grounded in digital rights is necessary to maximize benefits, minimize harms, and ensure the responsible application of AI. shape and should continue to guide the local AI ecosystem, each grounded in the sheer scale and diversity of the local economy and its participants. use of AI can be a powerful tool to adapt services and infrastructure to better serve the public</i></p> <p><i>AI presents new opportunities for the city’s businesses and new job prospects for residents, and it can offer the potential for a better quality of life for all. establishing a Citywide data strategy;</i></p> <p><i>building on existing governance structures to encourage responsible and effective use;</i></p> <p><i>building capacity and expertise within government</i></p> <p><i>identifying and pursuing ways in which AI can be used for social benefit;</i></p> <p><i>encouraging and facilitating external partnerships with academia, industrial research labs, businesses, non-profits, and communities;</i></p> <p><i>ensuring private sector use of AI technology respects the rights of New Yorkers;</i></p> <p><i>supporting equitable access to opportunity.</i></p> <p><i>It is the City’s job to help cultivate this ecosystem to work towards shared goals of public good. To maximize the net positive impact for New Yorkers, it is necessary to ensure that public- and private-sector decision-makers and the general public are literate in what AI actually is and what it is not, as well as in key considerations around its use. This Strategy aims to lay a foundation for a healthy AI ecosystem in New York City. Initial effort prioritizes establishing a baseline of information about AI to help local and regional decision-</i></p>	Regulator	Using an ecosystem approach grounded in digital rights to ensure responsible AI	Digital Rights Protection	6
	Enabler	Share and guide the local AI ecosystem	AI Ecosystem	6
	User	Use of AI to better serve the public	Efficient City Operations and Services	6
	Leader	Use of AI to create new jobs and opportunities to the public	Economic Development and Competitiveness	7
	Enabler	establishing a Citywide data strategy;	Data Governance and Sharing	7
	Regulator	Using existing governance framework to encourage use of responsible and effective AI	Ethical, Legal, and Social Values Framework	7
	Enabler	Building Expert AI capacities internally	Economic Development and Competitiveness	7
	Leader	Use of AI for social benefit	Economic Development and Competitiveness	7
	Leader	Facilitating Partnership and collaboration among stakeholders	Collaborations and Partnerships	7
	Regulator	Ensuring that Private sector respects the rights of residents	Ethical, Legal, and Social Values Framework	7
	Enabler	Supporting equitable access to opportunity with the use of AI	Economic Development and Competitiveness	7
	Enabler	Cultivating the AI ecosystem within the city	AI Ecosystem	7
	Leader	Building AI capacities within the city government	Economic Development and Competitiveness	9
	Enabler	laying the groundwork for the NYC AI ecosystem	AI Ecosystem	9
	Leader	Initiating the understanding and awareness of AI among key stakeholders	Economic Development and Competitiveness	9

<p><i>makers work from an accurate and shared understanding of the technology and the issues it presents; outlining key components and characteristics of New York City’s AI ecosystem today; and framing a set of areas of opportunity for City action. The City must recognize the potential in these technologies and the momentum behind their ongoing development and use, and it must work to ensure AI use across society upholds and strengthens human rights, civil liberties, and democratic principles; offers equitable opportunity; and is governed appropriately.</i></p> <p><i>In approaching the topic of AI, New York City must be measured, responsive, informed, and humble. thoughtful use of AI can be a powerful tool to adapt existing City services and infrastructure to better serve the public in terms of economic opportunity, social equity, sustainability, and more. it is important for the City to proactively participate in and respond to the opportunities and challenges AI presents from a balanced stance. The City recognizes the realistic potential of AI and the momentum behind its ongoing development and use, and it must work to ensure that as these technologies are used increasingly across society they uphold and strengthen human rights, civil liberties, and democratic principles; offer equitable opportunity;</i></p> <p><i>governed by informed, interdisciplinary collaboration. The broad aim of this Strategy is to lay a foundation for a healthy cross-sector AI ecosystem in New York City. initial effort prioritizes establishing a baseline of information about AI to help ensure local and regional decision-makers are working from an accurate and shared understanding of the technology and the issues it presents; outlining key components and characteristics of New York City’s AI ecosystem today; framing a set of areas of opportunity for City action</i></p> <p><i>it provides a detailed discussion of key ethical considerations and describes how to think about issues like</i></p>				
	Leader	Setting the direction of AI in the city	Economic Development and Competitiveness	9
	Regulator	Ensuring that the use and development of AI is aligned with human values and rights	Ethical, Legal, and Social Values Framework	9
	Leader	Setting the tone and values in the approach in governing AI in the city	Economic Development and Competitiveness	9
	User	AI to adapt in existing city services and infrastructure to better serve the public	Efficient City Operations and Services	10
	Leader	Being proactive in the opportunities and challenges of AI to NYC	Economic Development and Competitiveness	11
	Regulator	Ensuring that AI technologies uphold and strengthen human rights and democratic principles	Ethical, Legal, and Social Values Framework	11
	Enabler	Ensure that AI offers equitable opportunity	Economic Development and Competitiveness	11
	Leader	Forming interdisciplinary collaboration	Collaborations and Partnerships	11
	Enabler	Forming a cross sector AI ecosystem within NYC	AI Ecosystem	12
	Leader	Establishing shared and agreed definition and understanding about AI among key stakeholders	Economic Development and Competitiveness	12
	Leader	Outline key components of the AI system	AI Ecosystem	12
	Leader	Framing the set of Areas of opportunities for local government action plan	Economic Development and Competitiveness	12
	Regulator	Providing discussion for ethical consideration and demands accountability and	Ethical, Legal, and Social Values Framework	17

<i>accountability, fairness and non-discrimination, community engagement, and ethical trade-offs.</i>		fainess and navigating ethical trade-offs		
<i>in policymaking about how AI applications do or will impact New Yorkers in their domain</i>	Regulator	Carefully considering the impact of AI technologies to NYC residents	Ethical, Legal, and Social Values Framework	17
<i>informing or educating consumer or workers about those impacts</i>	Leader	Educating Key stakeholders about the impact of AI	Economic Development and Competitiveness	17
<i>building and deploying AI to streamline agency operations to be more responsive</i>	User	Use of AI to streamline City Operations	Efficient City Operations and Services	17
<i>evaluating vendors for technology procurements, among others.</i>	Leader	Evaluating vendors for technology procurements	Innovative and Responsible Procurement	17
<i>AI potentially arises in policymaking about Taxi companies</i>	Leader	Use of AI to improve policymaking in the transport sector	Economic Development and Competitiveness	17
<i>Building and deploying AI education and public engagement campaigns for TLC-Licensed Drivers as they interact with AI systems</i>	Leader	Capacitating public awareness campaigns for AI systems	Economic Development and Competitiveness	17
<i>NYC Cyber Command is engaged in City policymaking but also both builds and procures AI systems.</i>	Leader	Leads in drafting policies but also creat AI systems internally	Economic Development and Competitiveness	18
<i>NYC Cyber Command is engaged in City policymaking but also both builds and procures AI systems.</i>	Leader	Ensuring procurement requirements are set and adhered to	Innovative and Responsible Procurement	18
<i>when considering practical use, even if there are commercial systems available or a third-party vendor can be hired, it is critical to have sufficient understanding to select the right product or vendor, to ask the right questions, to tell whether the specific use case is appropriate, and to think through the ethical, policy, and governance issues that arise</i>	Regulator	Setting guidelines when a third-party vendor will be invited in and ensuring that ethical guidelines are being highly adhered to.	Ethical, Legal, and Social Values Framework	18
<i>AI systems are used to automate or streamline in-ternal processes, such as classifying customer support requests to route them to the correct department, filling out or parsing forms, detecting anomalous behavior like fraud or cyber intrusions, or screening, hiring, or evaluating employees.</i>	User	use of AI to improve and streamline administrative City Hall operations	Efficient City Operations and Services	18
<i>In education, AI can be used to detect plagiarism, personalize lessons for students, or monitor engagement with online learning. AI is used in housing and home lending, from biometric or facial recog- nition systems used to secure buildings to systems that determine whether or with what terms mortgages should be approved.</i>	User	use of AI in variety of sectors in the community	Efficient City Operations and Services	18
<i>It is also used to assess health insurance claims and to help screen patients into different types of care programs.</i>	User	Use AI in improving Health Services	Efficient City Operations and Services	19

<i>the criminal courts system uses an AI-based tool to provide a release assessment determining which individuals can be released before trial;</i>	User	Use of AI in the criminal justice system	Efficient City Operations and Services	19
<i>police department uses facial recognition technology to identify suspects and other systems to detect patterns in crime</i>	User	Application of AI system in the Police Force	Efficient City Operations and Services	19
<i>social service agencies use systems to prioritize cases for human review</i>	User	Use of AI in the Social Welfare Sector	Efficient City Operations and Services	19
<i>AI used for reducing the risk of lead poisoning</i>	User	Use of AI in reducing health risks of citizens	Efficient City Operations and Services	19
<i>improving educational outcomes for students at risk of not graduating from school on time,</i>	User	Use of AI in the education system	Efficient City Operations and Services	20
<i>improving health and safety conditions in rental housing</i>	User	Improving Health and Safety on rental homes	Efficient City Operations and Services	20
<i>identifying and diagnosing errors in human physicians' decisions about testing patients for heart conditions</i>	User	Use of AI in the Health Sector	Efficient City Operations and Services	20
<i>Building a Healthy AI Ecosystem for NYC</i>	Enabler	Building an AI ecosystem	AI Ecosystem	21
<i>The broad goal of this Strategy is to ensure New York City is equipped to meet the opportunities and challenges AI presents with robust and holistic steps that will support a healthy local ecosystem</i>	Enabler	Supporting the local AI ecosystem	AI Ecosystem	21
<i>Decision-makers across sectors are informed about what AI is and how it works, and are well-equipped to weigh the range of technical, social, and ethical considerations that come into play in its use.</i>	Enabler	Equipping decision-makers of AI knowledge and capacities	Economic Development and Competitiveness	21
<i>Government use of AI is productive...</i>	User	Use of AI by the city government increases productivity	Efficient City Operations and Services	21
<i>Government use of AI is ... fair, and accountable.</i>	Regulator	Ensuring that the use Ai by the government is fair and accountable	Transparency and Accountability	21
<i>It incorporates public engagement where needed, and takes care to avoid unintended consequences of policies, which is a particular risk in this complex and rapidly evolving area.</i>	Regulator	ensuring that AI policies align with public values and dealing the consequences of the outcome of its usage	Ethical, Legal, and Social Values Framework	21
<i>Industry and other organizations, such as hospitals, schools, and universities use AI responsibly, with careful attention to ethical considerations like fairness, accountability, and privacy.</i>	Regulator	Governing the usage of AI of other sectors of the community with ethical guidelines	Ethical, Legal, and Social Values Framework	21

<i>teams work to incorporate diverse views, both in terms of individual demographics and disciplinary and domain expertise.</i>	Leader	Ensuring that diverse views are incorporated in the policymaking for governing AI systems	Economic Development and Competitiveness	21
<i>Small businesses have an equitable opportunity to participate and grow in the local ecosystem.</i>	Enabler	Ensuring that local businesses are given the opportunity to grow on the local AI system	Economic Development and Competitiveness	21
<i>Residents are protected from harm (including disparate impact), empowered to participate in informed decision-making, and have appropriate ways of holding institutions accountable.</i>	Regulator	Ensuring that residents are protected from any harm and provide mechanisms for accountability of AI systems	Ethical, Legal, and Social Values Framework	21
<i>Residents are also prepared for workforce disruptions and have equitable opportunities to participate in a changing workforce.</i>	Enabler	Preparing residents for Workforce disruptions and re-skilling them to have equal opportunities to participate in AI-enabled economic growth	Technical Training and Infrastructure	21
<i>Cross-sector collaboration is actively promoted to foster learning, innovation, and responsible use.</i>	Leader	Promote cross-sectoral collaboration	Collaborations and Partnerships	21
<i>An ecosystem approach accounts for the full range of stakeholders interacting with the topic of AI and aims to account for a range of contextual factors that shape the local ecosystem as a whole.</i>	Enabler	Mapping the AI ecosystems and studying the multi-faceted factors that impacts them with regards to AI	AI Ecosystem	22
<i>The city's economy is large and diverse, both of which offer unique opportunities for growth in AI.</i>	Leader	Utilizing the unique opportunities of growth that NYC provides for AI technologies	Economic Development and Competitiveness	23
<i>New York City has a thriving tech sector and investment in AI is established and growing.</i>	Enabler	Facilitating the flow of investments for AI businesses	Economic Development and Competitiveness	25
<i>The city has robust educational infrastructure in place to support ongoing AI literacy and skill-building needs, and particular investment in place in public- and public-interest resources .</i>	Enabler	Utilizing the existing educational infrastructure to support AI literacy and skills training	Economic Development and Competitiveness	28
<i>through which students can work in agencies across City government as applica- tion and web developers, data analysts, technical support, and oth- er roles</i>	Enabler	Allowing AI students to work in the city governments in various AI related roles	Economic Development and Competitiveness	29
<i>City government is poised for leadership and impact.</i>	Leader	Positioning the city government as leader in governing AI systems	Economic Development and Competitiveness	31

<i>City government itself offers both a strong foundation for leadership in AI policy and governance</i>	Leader	Positioning the city government as leader in governing AI systems	Economic Development and Competitiveness	31
<i>Significant opportunity to innovate in the responsible use of AI for the public good.</i>	Enabler	Providing the space to innovate with regards to AI technologies	Economic Development and Competitiveness	31
<i>Significant opportunity to innovate in the responsible use of AI for the public good.</i>	Enabler	Supporting innovation of AI technologies that are responsible and caters to the public good	Economic Development and Competitiveness	31
<i>the City can launch initiatives with significant impact, and offer important lessons to municipalities across the globe [in the context of the use of AI]</i>	Leader	Positioning the city government as leader in governing AI systems	Economic Development and Competitiveness	31
<i>New York City government is made up of almost 150 agencies and offices that have or will have a wide range of roles and perspectives on AI and the local ecosystem.</i>	Leader	Acknowledging that they have a wide range of roles and perspective to perform in the local AI system	AI Ecosystem	32
<i>roles can include governing data</i>	Enabler	Governing data	Data Governance and Sharing	32
<i>Use of AI</i>	User	Use of AI	Efficient City Operations and Services	32
<i>addressing AI's use and impacts across society, interacting with or educating residents, and focusing on jobs, economic development, and business opportunities.</i>	Leader	mapping how AI improve the lives of the residents	Economic Development and Competitiveness	32
<i>Review of systems, procurement, privacy policies, data agreements, and other topics in the vein.</i>	Regulator	Creating system for oversight of City use	Ethical, Legal, and Social Values Framework	33
<i>Administrative and legislative actions such as rulemaking, executive orders, or laws. Policy details and implementation...</i>	Regulator	Ensuring the policy and legislation are in place	Ethical, Legal, and Social Values Framework	33
<i>Processes and practices used to manage data assets and make them usable; some work on citywide infrastructure while others focus on agency specific work</i>	Enabler	Creating standard data management practices within the organization	Data Governance and Sharing	33
<i>Direct use of AI, ML, data science, or other related approaches. Agencies marked with an asterisk use "algorithmic tools" per AMPO's 2020 Summary of Agency Compliance Reporting.</i>	User	Using AI with work operations	Efficient City Operations and Services	33
<i>Includes agencies and offices that include performing analysis using data science and data tools as one of their primary responsibilities</i>	User	Integrating AI systems within work processes to improve city services	Efficient City Operations and Services	33

<i>Building Internal city capacity on AI or related subjects via partnerships, staff training, and other approaches</i>	Enabler	Building and promoting AI capacity	Economic Development and Competitiveness	33
<i>Designing and managing education and training opportunities of various kinds for New Yorkers in AI and AI-related subjects and skills.</i>	Enabler	Investing in technical skills for New Yorkers	Economic Development and Competitiveness	33
<i>Protecting New Yorkers'human, civil, and digital rights with respect to AI and related technologies</i>	Regulator	Protecting the citizen's digital rights	Digital Rights Protection	33
<i>Direct Communication and engagement with the public about AI and related topics</i>	Leader	Strengthen communication with citizens with regards to their concerns on AI systems	Citizen Engagement and Citizen Participation	33
<i>Supporting opportunities for local businesses and working towards the City's broader economic development goals as they relate to AI, including work on talent and hiring Pipeline</i>	Enabler	Supporting businesses in their growth opportunities in relation to AI	Economic Development and Competitiveness	33
<i>As the City refines its approach to AI, and builds capacity in the space, further development of the particular actions the City takes will be needed.</i>	Enabler	Strengthening the City Governments internal AI capacity	Economic Development and Competitiveness	37
<i>it is critical that the City begin to take holistic action to address the AI-driven transformations already underway, it is also important to maintain humility and be agile in the face of this uncertainty, and it will be important for the City to regularly review and update this Strategy.</i>	Leader	Acknowledging that the AI strategy should be agile and adaptive to the changes of the AI technologies	Economic Development and Competitiveness	37
<i>New York City's existing approach to data is wide-ranging, if fragmented, and can be built upon to support both AI applications and other important improvements.</i>	Enabler	Securing a strong data infrastructure for the city to support AI systems implementation	Data Governance and Sharing	38
<i>Some of the key strategic areas one would want to consider include data collection, acquisition, procurement, standards, cleaning, sharing, ownership, access, usage agreements, warehousing, and analytics; digital rights concerns, such as privacy and security, re- late to many of these.</i>	Enabler	Ensuring clear guidelines in the governance of data from data collection, procurement, ownership, access and even its adherence to digital rights	Data Governance and Sharing	38
<i>collecting and curating data thoughtfully is a foundational first step to any responsible AI initiative.</i>	Regulator	Ensuring that data management aligns with the human values and human rights	Ethical, Legal, and Social Values Framework	39

<i>Similarly, it is important to ensure that data, once collected, is stored in a “machine readable” form that is conducive to its use (as opposed to paper or other unstructured forms), and that it follows certain data standards so it can be related to other datasets or shared with others to facilitate a wide range of uses.</i>	Regulator	Ensuring that data collected are of quality and that it adheres to data accepted standards	Ethical, Legal, and Social Values Framework	39
<i>important to attend to steps needed to share data across agencies, particularly for those agencies that have frequent needs in this regard. Where steps such as data sharing agreements or appropriate consent are not in place, interagency data sharing can take far longer than necessary and prevent benefits from reaching New Yorkers in a timely manner, or at all.</i>	Enabler	Initiating and building mechanisms to allow data sharing between key stakeholdersI	Data Governance and Sharing	39
<i>The use of data sharing agreements is an important part of the City’s overall data management infrastructure.</i>	Enabler	Facilitating the data sharing agreements	Data Governance and Sharing	41
<i>master framework agreement that all City agencies have signed, which specifies many of the required privacy, data security, and other terms appropriate for multi-agency data sharing agreements.</i>	Regulator	Ensuring that the master data sharing framework adheres to specific privacy and data security guidelines	Data Governance and Sharing	41
<i>Establish a Citywide data strategy and foster consistency among agency-specific strategies.</i>	Enabler	Establish a Citywide data strategy to ensure quality data for AI systems	Data Governance and Sharing	42
<i>Establish a Citywide data strategy and foster consistency among agency-specific strategies.</i>	Enabler	Establishing city wide data strategy to ensure alignment of all units of the city with regards to ensuring quality data for AI systems	Data Governance and Sharing	42
<i>Identify common agency pain points and create centralized guidance and template documents that agencies can rely on in their efforts.</i>	Leader	Supporting different agencies by creating common guidance can increase agency confidence and streamline their operations, while also helping agencies avoid mistakes and steer clear of risks.	Economic Development and Competitiveness	44
<i>Cultivate more data engineering focus and expertise across City agencies.</i>	Enabler	Promote data engineering talents to compliment the AI talent capacities within the city government	Economic Development and Competitiveness	44

<i>A very common mistake is to hire data scientists or AI experts without having first invested in requisite data engineering and infrastructure, because the former rely on the latter.</i>	Enabler	Acknowledging that there might be human resource hiring mistakes. Hence, addressing it.	Economic Development and Competitiveness	44
<i>Continue to improve standards for and links between the data sent into NYC Open Data to make it more reliable and usable.</i>	Enabler	Ensuring that data management standards are revisited and improve over time	Data Governance and Sharing	44
<i>Improved documentation helps to ensure that datasets are presented in context, are less likely to be misinterpreted by users, and can help facilitate ethical use.⁶</i>	Regulator	Ensure that data sets are used and interpreted within ethical standards	Data Governance and Sharing	45
<i>Many opportunities exist to make good use of AI in City government, but most agencies will require support to identify, assess, and realize them.</i>	Leader	Helping the different agencies of the city maximize the opportunities brought by AI systems	Economic Development and Competitiveness	45
<i>Cyber Command uses custom machine learning systems built in-house and hosted on Google Cloud Platform⁶⁸ to collect very large-scale datasets on network activity that are used to flag anomalous behavior via binary classification models.</i>	User	Uses AI systems to organize cyber Commands and strengthen cyber security infrastructure and operations	Efficient City Operations and Services	46
<i>DCAS IT built an ML model (using Google's TensorFlow) trained on millions of historic billing records, weather data, and facility information — including year built, square footage, and usage types. The variety in the training data allows the model to factor in the time of year and ambient temperature and to generalize from similar buildings.</i>	User	Uses AI systems to manage utility bills within the entire city government and detect anomaly on the incurred bills — preventing misappropriation of funds and saving the agency millions of dollars per year	Efficient City Operations and Services	47
<i>even where the purely technical aspects are more straightforward, it is nevertheless important to ensure that the use case does not raise digital rights concerns.</i>	Regulator	Ensuring that the used AI systems are still protecting and maintaining digital rights	Digital Rights Protection	48
<i>“Pretrial risk assessment” refers to the process of determining a defendant’s risk of failure to appear or to commit other violations that occur prior to a trial. Though this has historically been done by human judges, predictive models are increasingly used to inform these assessments.</i>	User	Use of AI systems in pre-trial risk assessments	Efficient City Operations and Services	48

<i>great potential for unfairness and harm, one must approach the area with significant concern over the ethics and other behavior of the system</i>	Regulator	Ensuring that ethical guidelines are being adhered into in governing the AI systems used for pre-trial risk assessments	Ethical, Legal, and Social Values Framework	48
<i>systems can be successfully used to measure, identify, and mitigate human biases in existing processes, as long as the project is approached thoughtfully</i>	Regulator	usage of AI systems to mitigate human biases in decision making	Ethical, Legal, and Social Values Framework	50
<i>Such sensitive projects can benefit from agencies collaborating with external experts and there is value in experts creating institutions with different institutional goals and organizational structures than traditional academia, which typically focuses on publications and proofs-of-concept rather than partnerships and direct impact.</i>	Leader	Encouraging collaboration and partnership to ensure accountable and fair AI systems	Collaborations and Partnerships	50
<i>uses of machine learning can help surface trade-offs</i>	Regulator	Helping identify trade-offs that should be considered	Ethical, Legal, and Social Values Framework	50
<i>Deciding to use this system in practice required identifying a clear baseline and making a determination that, even if the new system is imperfect, the impacts on actual people are a significant improvement.</i>	Regulator	Identifying necessary impacts and risks in using such systems	Ethical, Legal, and Social Values Framework	50
<i>This project – which involves large-scale noise monitoring – leverages the latest in ML, data analysis, the Internet of Things, and citizen science reporting to more effectively monitor, analyze, and mitigate urban noise pollution</i>	User	Incorporating AI model (ML) in mitigating urban noise	Efficient City Operations and Services	50
<i>the privacy of the audio recordings is an obvious concern to those considering New Yorkers’ digital rights, and the project includes a framework to address this.</i>	Regulator	Ensuring that privacy rights were considered in the implementation of this project through an ethical framework within the project	Ethical, Legal, and Social Values Framework	51
<i>SONYC shares data with the City via APIs and the Recovery Data Partnership and supports local communities in improving noise conditions.</i>	User	Use of AI improve noise conditions in identified communities	Efficient City Operations and Services	51
<i>High school admissions, matching, and other algorithmic approaches</i>	User	Usage of AI in the education sector	Efficient City Operations and Services	52

<i>Two recent pilot projects — both of which use ML models called convolutional neural networks, which are common in computer vision applications — aim to identify the absence or presence of staircases in front of buildings, which is helpful in verifying whether or not buildings have an occupied basement, and to identify whether a store is vacant or not.</i>	User	Use of AI for neighborhood assessments of buildings and to understand changing commercial landscape in the city essential for city planning and development	Efficient City Operations and Services	52
<i>Select a set of agencies to conduct an internal review for potential AI applications based on template examples.</i>	Leader	Creation of internal interdisciplinary team to review potential AI projects and provide recommendation on how to proceed with the AI system implementation	Collaborations and Partnerships	53
<i>This should include recommending partnerships with external teams or experts that could help execute the projects, as well as helping to navigate policy considerations and ethical risks.</i>	Leader	Encouraging external expert partnership with regards to AI to ensure ethical and policy considerations are in place for the usage of AI systems City departments	Collaborations and Partnerships	53
<i>Bring together agency technical leadership with experience using AI methods and create practical guidance materials for Citywide use.</i>	Leader	building city agency capacity by creating a agencywide technical team to serve as the in-house experts which will give recommendations how aother offices can utilize AI systems in their operations	Collaborations and Partnerships	54
<i>Support agencies' ability to work with standard ML software and hardware.</i>	Enabler	Supporting AI capacities within the entire city government workforce by proving technical AI learning programs	Technical Training and Infrastructure	54
<i>There is opportunity to build on existing structures and policy developments as the City moves toward greater maturity in its governance of AI.</i>	Leader	Building on existing policy frameworks to govern AI systems better	Economic Development and Competitiveness	55
<i>The City must adopt a holistic, iterative, interdisciplinary, evidence-driven, and technically grounded approach to policymaking in AI to reduce the possibility of inconsistency, gaps, or conflict across individual efforts and avoid, to the extent possible, unintended negative consequences.</i>	Regulator	ensuring a holistic approach to be don in policy making to reduce risks and hazards theat comes with the use of AI technologies	Ethical, Legal, and Social Values Framework	55

<i>The decision to build systems in-house or to rely on vendor products or services can have a significant impact on the visibility and control the City has in the systems it employs. There are unique considerations when contracting AI versus other technologies,</i>	Leader	Securing clear and concrete set of procurement rules with regards to the procurement and contracting with regards to AI systems used for the city	Innovative and Responsible Procurement	56
<i>this Strategy raised the potential value of new, central shared resources to help agencies navigate some of the unique issues that arise in procuring datasets or AI technologies, for several reasons</i>	Leader	Creating a centralized procurement decision mechanisms to support the procuremnt of AI systems within the city government	Innovative and Responsible Procurement	56
<i>include building and maintaining institutional expertise,</i>	Enabler	Building institutional expertise	Economic Development and Competitiveness	56
<i>offering tools to support rigorous evaluation of (often unfounded or exaggerated) vendor claims about their use of “AI,”</i>	Leader	provide evaluation tools towards AI vendors	Innovative and Responsible Procurement	56
<i>helping streamline agency efforts via, for example, offering an “AI rider” that could be added to contracts to help tackle concerns about malfunctioning or even unethical AI systems</i>	Leader	adding a clause on the procurement contract that ensures accountability from vendors when AI systems became unethical and started malfunctioning	Innovative and Responsible Procurement	56
<i>NYC Opportunity has requested that vendors provide “plain language documentation” about the underlying logic of their coding that can be understood by a broad audience.</i>	Regulator	Asking from vendors to provide simple documentation to ensure understandability and transparency of the AI system	Transparency and Accountability	56
<i>Created the position of Algorithms Management and Policy Officer in the Mayor’s Office of Operations. This new position was charged with developing a policy framework and set of management practices centered around fair and responsible use of “algorithmic tools” by City agencies</i>	Leader	Creation of Algorithms management and Policy Officer to develop policy framework and set of management practices centered around fair and responsible use of AI systems	Economic Development and Competitiveness	57
<i>Key among those management practices are protocols around assessing tools, providing members of the public with channels for inquiry and complaint, and critically, establishing public reporting and transparency processes, all of which relate closely to the opportunities identified later in this section.</i>	Leader	Creating citizen engagements and participation mechanisms to ensure transparency and fairness in the use of AI systems and to allow citizens to lodge their concerns freely towards the use of Ai in the city	Citizen Engagement and Citizen Participation	57

<i>This is a first-in-the-nation report on government use of algorithmic tools, with participation from the nearly 100 agencies and offices covered by Executive Order 50, and will serve both as a critical foundation for ongoing work within New York City as well as a model and inspiration for other cities around the world.</i>	Leader	Positioning themselves as the pioneer in publishing agency compliance report about the use of AI in the city government	Economic Development and Competitiveness	57
<i>The AMPO builds on a broader ethos of responsible data governance and use within the City,</i>	Regulator	Ensuring ethical use and collection of data for AI systems	Ethical, Legal, and Social Values Framework	57
<i>NYC CTO published an Internet of Things (IoT) Strategy for New York City</i>	Leader	published the IoT strategy aside from the overall strategy	Economic Development and Competitiveness	58
<i>This unique nexus of organizations and talent across sectors positions the City to adopt and adapt participatory approaches in AI.</i>	Leader	Utilizing the existing vibrant city participation ecosystems for the awareness and discussion on AI	Collaborations and Partnerships	59
<i>The complexity of these systems will require new, innovative methods to enable robust and meaningful participation.</i>	Leader	Acknowledging that stakeholder buy in is essential for new and innovative of citizen participation for the use of AI in the City	Citizen Engagement and Citizen Participation	59
<i>The fact that public engagement in AI is at a very early stage presents an excellent opportunity for New York City to creatively explore and help define this space, but these initiatives should be approached in an experimental spirit.</i>	Leader	Positions themselves as pioneer in exploring public engagement approached with regards to AI	Citizen Engagement and Citizen Participation	59
<i>The City can establish an internal working group to support a holistic and coordinated approach to AI policymaking and procurement, consisting of both agencies procuring AI and those focused on technology policy.</i>	Leader	Establish focal team to ensure coordinated action with regards to AI within the City Government	Economic Development and Competitiveness	59
<i>it is important that the City has robust and meaningful visibility into each system it employs by understanding how it works, how accurate it is, under what conditions, and how its performance was initially evaluated.</i>	Regulator	Ensure Robust visibility and transparency of internal AI systems	Transparency and Accountability	59

<i>Agencies should have a clear understanding of the uses and limitations of system outputs, train staff members that interact with the systems to recognize situations when errors are likely, and monitor for performance changes over time.</i>	Enabler	Encouraging Agencies and its staff to enhance their AI capacities to oversee implementation of AI systems	Economic Development and Competitiveness	59
<i>there is a unique and acute need to incorporate ongoing monitoring of deployed systems — whether procured or built in-house — rather than on one-time upfront reviews, even if those are more exhaustive.</i>	Regulator	Ensure ongoing regular review of deployed systems to check if their purpose and functionalities are still the same and they are not violating any human and digital rights.	Ethical, Legal, and Social Values Framework	60
<i>The City can build on existing programs and partnerships to engage New York City's rich local community of civic technologists and community organizations to innovate in public participation in the design, use, governance, and policymaking related to AI systems.</i>	Leader	Adapt models for community engagement and participatory approaches with regards to AI systems	Citizen Engagement and Citizen Participation	61
<i>The City's capacity to make use of AI can also be productively enhanced through partnerships with a range of external groups.</i>	Leader	Facilitating the partnerships with various key stakeholders in the AI ecosystem	Collaborations and Partnerships	61
<i>Although Town+Gown describes itself as being focused on the built environment, the program can serve as a broader model for academic collaborations that can also be targeted to areas such as data science and AI</i>	Leader	Partnering with existing Academic research groups to enhance AI research	Collaborations and Partnerships	62
<i>there are a number of local research labs at universities (or groups of universities) aimed at working on problems in the public interest, many of which intersect with AI</i>	Leader	Supporting existing academic groups to strengthen AI research	Collaborations and Partnerships	64
<i>attract top AI talent from around the world to live and work in New York City.</i>	Enabler	Attract top AI talent from around the world to live and work in NYC	Economic Development and Competitiveness	65
<i>secure proposals for the development and operation of the NYC Center for Responsible Artificial Intelligence (AI), an innovation, collaboration, and applied research space designed to support the creation of responsible data science and AI in New York City</i>	Leader	Support and partner with key research stakeholders for Responsible Artificial Intelligence	Collaborations and Partnerships	65

<i>serve as a nexus and driver of responsible innovation for the city's growing AI ecosystem, building on New York City's reputation as a leader of inclusive and ethical implementation of cutting-edge technologies.</i>	Enabler	Supporting key stakeholders and promoting the NYC's position as the leader for responsible and ethical use of AI in cities	AI Ecosystem	65
<i>These objectives were to be achieved through a physical space housing four key activities that integrate ethics as a core component of AI and data applications</i>	Enabler	help in the establishment of a physical space for the center of responsible AI in NYC	Economic Development and Competitiveness	65
<i>The City planned to partner with local and global leaders to invest up to \$7 million to support these programs that would ensure innovations in data and AI technologies benefit New Yorkers.</i>	Enabler	Investing to support in the promotion of responsible AI systems	Economic Development and Competitiveness	65
<i>Designate a central City team to match agency needs to academic institution capacity and support ongoing partnerships.</i>	Leader	Create a central point of contact within the City would significantly ease administrative burden both for external stakeholders and City agencies,	Collaborations and Partnerships	66
<i>The City can take advantage of New York City's rich local research and practitioner community and expand its capacity to use and plan for AI by fostering partnership opportunities with external experts.</i>	Leader	Foster partnership opportunities with external experts.	Collaborations and Partnerships	66
<i>To strengthen and deepen relationships and mission-alignment across departments, and sectors, the City can act as a convener within the local ecosystem — gathering researchers, civic tech and advocacy groups, industry practitioners, and community groups to share work in a bi-directional way, and discuss emerging issues and opportunities.</i>	Leader	Create ongoing structures for engagement across different groups in the city's AI ecosystem as well as with City agencies.	Collaborations and Partnerships	67
<i>The City could consider providing physical space and convening the local ML community to participate in these conferences together, as these could evolve into major gatherings that organically benefit the overall ecosystem in a variety of ways.</i>	Leader	Providing a space for AI conferences and stakeholder participation	Citizen Engagement and Citizen Participation	67

<i>There are multiple local efforts in place to develop the local AI workforce, and the city is home to strong institutions and programs that can be leveraged for this effort; strategic and operational coordination of these efforts can boost their impact.</i>	Enabler	Utilizing already established mechanisms to support increase in AI workforce	Economic Development and Competitiveness	68
<i>preparing New Yorkers to thrive in workplaces and roles impacted by AI growth in all of these various ways.⁸⁵</i>	Enabler	Preparing residents for the disruption of workforce by AI systems	Economic Development and Competitiveness	68
<i>AI is relevant in the City's approach to K-12 education, digital literacy programming, reskilling initiatives, internship programs, post-secondary training, and many other efforts.</i>	Enabler	Investing in re-skilling and developing AI talents	Economic Development and Competitiveness	68
<i>the past year has incentivized many companies to do more automation, which can impact both job security and job quality — across both white-collar and blue-collar roles.</i>	Enabler	Incentivising businesses and workers that uses automation	Economic Development and Competitiveness	68
<i>Across the City's efforts, it will be critical to address inequities that exist in terms of both the impact AI is having in the workplace, and in terms of access to information, skills, and opportunity.</i>	Regulator	Addressing inequalities caused by automations while providing equal access and opportunities for everyone	Ethical, Legal, and Social Values Framework	68
<i>reskilling or upskilling existing and mid-career workers is a key need as well as an important tool for fostering "bi-lingualism" in the local ecosystem.</i>	Enabler	investing in Re-skilling and upskilling initiatives to contribute to the local ecosystem	Economic Development and Competitiveness	69
<i>Supporting the development of individuals and teams that combine technical skills with domain expertise can also be an impactful way to both effectively and responsibly leverage AI.</i>	Enabler	investing in Re-skilling and upskilling initiatives to contribute to the local ecosystem	Economic Development and Competitiveness	69
<i>The City's own workforce is not exempt from this broader transformation, and will have an ongoing need to develop and maintain the skills to use, govern, and plan for AI effectively and responsibly.</i>	Enabler	Building and Promoting AI capacities within the City government	Economic Development and Competitiveness	69
<i>New York City has a robust infrastructure in place for education and training that can be leveraged for these efforts — from its public schools, to its leading universities, to its community-based training programs.</i>	Enabler	Utilizing the NYC's existing education infrastructure to promote AI capacities among the youth	Economic Development and Competitiveness	69

<i>There is opportunity to better connect the myriad programs in place to ensure that residents can progressively develop skills and access resources as they move toward and through employment opportunities and that employers have ready access to diverse talent. Hispanic Black Asian White</i>	Enabler	Providing mechanisms to develop AI talents	Economic Development and Competitiveness	69
<i>The program offers training for teachers and administrators, as well as curriculum materials that can be integrated according to individual schools' goals — with a broad focus on foundational skills and concepts, including data and algorithms, among others</i>	Enabler	Investing on programs to train teachers and students so they can gain foundational skills for AI	Economic Development and Competitiveness	70
<i>The City's Tech Talent Pipeline (TTP) engages with local tech industry stakeholders to understand their workforce needs and establish an inclusive pipeline of New Yorkers equipped to fill them.</i>	Enabler	Supporting the tech industry to understand needs AI talents and work to supply them	Economic Development and Competitiveness	70
<i>This includes developing training programs, working to increase the number of CUNY Computer Science graduates, and connecting New Yorkers to tech internships and jobs.</i>	Enabler	Investing in training programs for students and connecting them to tech jobs and internships	Economic Development and Competitiveness	70
<i>Many CUNY schools have also offered training through the Tech-in-Residence Corps, a collaboration with TTP to bring industry practitioners into schools to develop courses and teach in-demand skills needed to enter the workforce</i>	Leader	Collaborating with the academia to develop tech related courses and trainings	Collaborations and Partnerships	70
<i>TTP's focus in addressing AI-related needs to date has been on the delivery of industry-aligned advanced courses such as Foundational AI, Data Science, Machine Learning, Deep Learning, Ethical AI, Natural Language Processing, research capstone projects, and more.</i>	Enabler	addressing industry aligned AI skills	Economic Development and Competitiveness	70

<i>MODA's Analytics Exchange (AnEx) is an internal community of practice that convenes quarterly to provide City analytics professionals with opportunities to showcase their work, learn new skills, and discuss shared interests and concerns.</i>	Enabler	Facilitating City Professional Development Program to upskill city employees with AI capacities	Economic Development and Competitiveness	72
<i>The City of New York can play an important policy role in promoting positive approaches to AI in the local private sector and in protecting New Yorkers in their interactions with it.</i>	Regulator	Promoting positive approach in AI for private sector while ensuring that their operations align with human values to protect residents from any negative consequences from the deployment of AI	Economic Development and Competitiveness	74
<i>The City has existing engagements with other municipalities across the country, and world, aimed at sharing best practices, and identifying opportunities for alignment and collaboration.</i>	Leader	Maintaining existing collaboration with the international community to share best practices and opportunities in governing AI systems	Collaborations and Partnerships	74
<i>The City also has long-established structures and programs to protect New Yorkers as consumers and workers, and promote small business interests, including those of minority and women-owned business enterprises (M/WBEs).</i>	Leader	Utilizing current structures to protect consumers and protect the interests of SMEs minority with regards to AI	Economic Development and Competitiveness	74
<i>the City is developing robust technology policy capacity across a range of offices,</i>	Enabler	Developing technology policy capacity for city employees	Economic Development and Competitiveness	74
<i>There is opportunity to bring these capacities together, as AI and related technologies increasingly impact New Yorkers in these areas, to ensure City actions stay current with the technology's development and industry practices on an ongoing basis.</i>	Leader		Collaborations and Partnerships	74
<i>Monitor workforce trends and needs on an ongoing basis, and strategically support existing or build new programs.</i>	Enabler	establish a robust, ongoing source of data about the state of AI use and its impacts on the city's workforce.	Data Governance and Sharing	74

<i>Paired with continued industry engagement through the Tech Talent Pipeline and other efforts, such data can support the City's work to design programs that are responsive to evolving industry needs and practices, anticipate and plan for job and skill displacement, and effectively address equity and underrepresentation in the local AI workforce.</i>	Enabler	Establish programs to support reskilling and job displacements with regards to AI	Economic Development and Competitiveness	74
<i>follow-on actions from the National AI Initiative study.</i>	Leader	Alignment of initiatives with that of the National AI strategy	Collaborations and Partnerships	74
<i>The City can, further, engage in targeted research efforts to better understand AI impacts and residents' and workers' experiences and expectations in key areas of concern.</i>	Leader	Engage and initiate targeted research efforts to understand AI and its impact to workers	Collaborations and Partnerships	75
<i>The City can also work to ensure the programs it supports are strategically aligned, and that there is continuity among individual offerings, so that learners have clear pathways to progressively build their skills, and ultimately obtain and advance in jobs.</i>	Enabler	Building and promoting continued AI capacities	Economic Development and Competitiveness	75
<i>particular attention should be given to identifying and addressing upskilling or re-skilling needs, and to retaining existing workers, and their domain expertise.</i>	Enabler	identifying and addressing upskilling or re-skilling needs and retaining domain expertise	Economic Development and Competitiveness	75
<i>the City can continue to leverage its robust investment in K-12 Computer Science education to build the foundational skills and competencies needed for the next generation of AI use, while seeking insight on emerging needs via internal and external efforts.</i>	Enabler	Investing in technical infrastructures and training for AI especially on the education of the youth	Economic Development and Competitiveness	75
<i>Increase involvement of minorities, women, and historically underrepresented groups in AI.</i>	Leader	Ensure equal representation of groups with regards in the AI ecosystem and its subsequent deployment	Economic Development and Competitiveness	75
<i>The City should keep a keen eye toward equity and inclusion, and toward supporting pathways that build and uphold New Yorkers' social and economic well-being.</i>	Leader	Ensuring that equity in opportunities are in placed especially to the minority groups with regards to AI use	Economic Development and Competitiveness	75

<i>The City can continue to build on existing efforts through CUNY, the Tech Talent Pipeline, the Break Through Tech program, and others, to support diversity and inclusion in New York City's AI workforce.</i>	Leader	Continue with existing partnership to build programs that support AI skills development and support diversity and inclusion	Collaborations and Partnerships	75
<i>the City's Charter was updated to increase the discretionary award limit for M/WBE contracts from \$150,000 to \$500,000 — easing procurement of M/WBE vendors for City agencies</i>	Enabler	Invest in infrastructures to ease the procurement of tech vendors from the vulnerable groups	Economic Development and Competitiveness	75
<i>The City can expand on existing programs to increase both agency leadership and staff capacity to responsibly leverage AI.</i>	Enabler	Build internal staff capacity to assess, use, and work with AI topics.	Economic Development and Competitiveness	76
<i>appropriate set of City experts with experience in AI, including, for example, NYC CTO, AMPO, and Cyber Command, should work with agencies to clarify distinctions between AI, ML, statistics, and other terms, and establish a common framework of understanding, to avoid ad-hoc processes and approaches arising in different agencies.</i>	Leader	Ensure alignment and coordination with regards to AI knowledges and efforts	Collaborations and Partnerships	76
<i>build on existing networks like MODA's Analytics Exchange and should proactively identify opportunities to expand Citywide professional development resources.</i>	Leader	use existing internal network to build professional development programs for city employees with regards to AI	Collaborations and Partnerships	76
<i>The City can explore opportunities to develop or leverage data on AI's impact on the local workforce and engage stakeholders toward addressing AI-related concerns in broader planning for the future of work — both inside and outside of City government.</i>	Leader	develop or leverage data on AI's impact on the local workforce and engage stakeholders toward addressing AI-related concern	Citizen Engagement and Citizen Participation	76
<i>The City could also further develop how it protects the digital rights of consumers, workers, small businesses, and more with respect to AI.</i>	Regulator	Protect New Yorkers' digital rights.	Digital Rights Protection	76
<i>The City can pair technical and technology policy agencies with agencies with responsibilities in consumer, worker, and small business protection, both to assess private sector use of AI and related technologies and to identify and address emerging issues.</i>	Leader	Encourage collaboration between agencies to merge technological and technical expertise to develop programs aligned to the needs and values of residents using AI	Collaborations and Partnerships	76

<i>City should regularly engage with local research and advocacy organizations to build knowledge and capacity in this area.</i>	Leader	Engage local and advocacy groups to enhance capacity and knowledge in AI	Citizen Engagement and Citizen Participation	76
<i>the City can explore ways to supplement its existing structures with the appropriate expertise and resources.</i>	Enabler	Explore ways supplement structures in place for AI expertise and resources	Economic Development and Competitiveness	76
<i>The City will continue to work to identify common agency pain points, including needs for centralized guidance and template documents that agencies can rely on in their efforts. In addition, the City will work to improve data standards and practical usability of data, as well as address digital rights issues, where relevant.</i>	Enabler	Modernize Data Infrastructure	Data Governance and Sharing	79
<i>The City will convene agencies that are already using AI to distill practical lessons learned for the benefit of one another and agencies at more nascent stages.</i>	Leader	Encourage collaboration within internal agencies to identify and pursue opportunities that AI provides	Collaborations and Partnerships	79
<i>Strengthen City capacity to ensure effective and responsible use of AI, including robust public engagement.</i>	Regulator	Ensure Responsible use of AI	Ethical, Legal, and Social Values Framework	79
<i>benefit from a more iterative, experimental approach that includes external collaborations, will develop strategies to provide relevant AI training and education within City government, and will explore opportunities to pilot participatory and other approaches.</i>	Leader	promote public Engagement to increase AI capacities and Awareness	Citizen Engagement and Citizen Participation	79
<i>The City will convene key agency stakeholders with relevant experience in establishing productive academic and applied research partnerships.</i>	Leader	Grow productive external partnerships to support AI knowledge and deployment	Collaborations and Partnerships	79
<i>The City will explore opportunities to develop or leverage data on AI's impact on the local workforce and engage stakeholders toward addressing AI-related concerns in broader planning for the future of work — both inside and outside of City government</i>	Enabler	develop or leverage data on AI's impact on the local workforce and engage stakeholders toward addressing AI-related concerns	Data Governance and Sharing	79
<i>The City will further develop how it protects the digital rights of consumers, workers, small businesses, and more with respect to AI.</i>	Regulator	Protect New Yorkers' digital rights and foster equitable opportunity across the ecosystem.	Digital Rights Protection	79

<p><i>The City of New York believes that an approach grounded in digital rights is necessary to maximize its benefits, minimize its harms, and ensure its responsible application.</i></p>	Regulator	Ensuring that the city approach is grounded in protecting digital rights	Digital Rights Protection	82
<p><i>To build a healthy AI ecosystem for New York City, local decision-makers must work with a clear understanding of the technology and key practical and ethical considerations around its design, use, and governance.</i></p>	Enabler	Equipping the decision makers about AI knowledge	AI Ecosystem	107

Source: Sicat (2023) Roles and Primary tasks derived from the 4 roles of government in AI context Framework

Appendix 9. London Analysis Schedule Manifest

<i>AI STRATEGY STATEMENT</i>	<i>ROLE</i>	<i>TASK</i>	<i>AREA OF FOCUS</i>	<i>PAGE</i>
<i>ensure both that London is at the forefront of developing and capitalising on these new technologies,</i>	Leader	Positioning London in the Forefront of developing and capitalizing on AI technologies	Economic Development and Competitiveness	5
<i>London is the AI capital of Europe,</i>	Leader	Views London as the AI capital of Europe	Efficient City Operations and Services	5
<i>our supportive and welcoming tech ecosystem is the best place to build and scale an AI company.</i>	Enabler	Maintaining a supporting and welcoming ecosystem to build and scale AI businesses	AI Ecosystem	5
<i>our city is at the forefront of a global revolution in AI and data science.</i>	Leader	Positioning London as the leader in AI Revolution	Economic Development and Competitiveness	5
<i>we have a strong pipeline of AI innovation and an academic and investment base geared for the long term.</i>	Enabler	Utilizing strong existing pipeline of innovation and investments for long term support for AI	Economic Development and Competitiveness	5
<i>London clearly provides companies of all sizes with the right mix of ingredients for success.</i>	Enabler	Claims that London as a city provides AI companies the right path towards growth and success	Economic Development and Competitiveness	5
<i>It sets the foundations for future innovation through five missions and outlines the Mayor's commitment to better digital services, open data, connectivity, digital inclusion, cyber-security and innovation - and City Hall's plan for the growth of the city to more than 11 million by 2050.</i>	Enabler	Sets the foundation to ensure AI is well supported for diffusion through strategic investments and policy actions from the City Hall	Economic Development and Competitiveness	18
<i>The Mayor's roadmap has a strong focus on city data standards and data sharing, and ultimately will rely on partnerships with universities and London's world class AI sector:</i>	Leader	Partnering with universities and private sector to ensure data standards are in place and data sharing is encouraged	Collaborations and Partnerships	18
<i>More user-designed services – through leadership in design, common standards, inclusion, and diversity as well as the Mayor's Civic Innovation Challenge</i>	Leader	Ensuring more user-designed services for the people of London via AI	Economic Development and Competitiveness	18
<i>Striking a new deal for city data – a new London Office of Data Analytics (LODA) programme and building trust in how data is used</i>	Leader	Creation of a new role to ensure responsible and proper use of data	Economic Development and Competitiveness	18
<i>World class connectivity and smarter streets – a new Connected London programme and a new generation of smart infrastructure</i>	Enabler	Investing in Smarter infrastructures that will ultimately help the diffusion of AI	Economic Development and Competitiveness	19
<i>Enhancing digital leadership and skills – promoting better data skills and leadership to make public services more open to innovation</i>	Enabler	Building and promoting digital skills that can support AI development within the city	Economic Development and Competitiveness	19

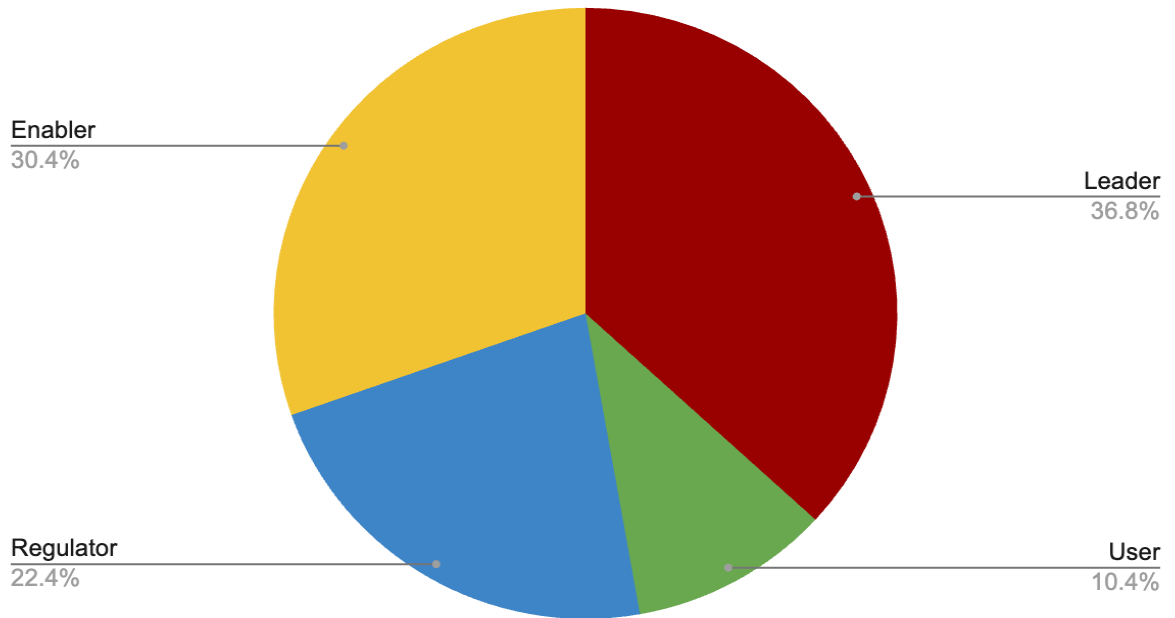
<i>Improving city wide collaboration – more seamless work with boroughs, the NHS, universities and the tech sector</i>	Leader	Improving partnership and collaboration with academe, and the private sector to support AI research and development	Collaborations and Partnerships	19
<i>London is well placed as the AI growth capital of Europe and has the foundations to maximise the substantial economic benefits of AI over the long term.</i>	Leader	Portrays London as a leader in the Global AI growth because of its existing foundation to maximize its economic benefit in the long term	Economic Development and Competitiveness	26
<i>a long-term commitment to AI ethic</i>	Regulator	maintains the long term commitment to ensure ethical AI	Ethical, Legal, and Social Values Framework	26
<i>a long-term commitment to...research & education.</i>	Leader	Maintains the long-term commitment to support AI research and education	Collaborations and Partnerships	26
<i>Longterm institutional Support for AI: £950m AI Sector Deal; £9m Centre for Data Ethics and Innovation; Government Office for Artificial Intelligence; AI and Data Grand Challenge to transform health- care; Action plan to unlock £20bn of “patient capital” over the next 10 years</i>	Enabler	Investing financially in the long term to Support development of AI	Economic Development and Competitiveness	27
<i>An opportunity exists for close collaboration with other AI cities, including Cambridge, Bristol, Manchester, and Oxford, to act as a key engine of growth for the UK economy</i>	Leader	Collaborating with other cities to maximize AI growth in the entire nation	Collaborations and Partnerships	28
<i>London provides an attractive and supportive environment for AI</i>	Enabler	Provides an attractive and safe environment to support AI businesses	Economic Development and Competitiveness	44
<i>The large AI ecosystem developing in London reflects the attractive and supportive environment the city provides for entrepreneurs, startups and employees</i>	Enabler	Provides an attractive and safe environment to support AI businesses	AI Ecosystem	44
<i>The Mayor of London’s forthcoming ‘A Smarter London Together’ initiative promotes a new deal for city data to facilitate city-wide partnerships for effective and safe data sharing.</i>	Leader	Facilitating city-wide partnership for data sharing	Collaborations and Partnerships	66
<i>The London Datastore, a free and open data-sharing portal from the Mayor of London, provides anyone with open access to over 700 datasets on London.</i>	Enabler	Facilitating Open access of quality data sets to support AI development	Data Governance and Sharing	93
<i>the office of the Chief Digital Officer, is committed to opening up data for research and application development.</i>	Enabler	Opening up data for research and application development.	Data Governance and Sharing	94
<i>London is investing in AI ethics expertise</i>	Enabler	Investing in experts to ensure ethical use of AI	Technical Training and Infrastructure	94
<i>London is seizing the opportunity to shape the future development of AI</i>	Regulator	Ensuring that AI ethics is at the core of AI research and development	Ethical, Legal, and Social Values Framework	94

*ethics and develop AI applications with
ethics at their core.*

Source: Sicat (2023) Roles and Primary tasks derived from the 4 roles of government in AI context Framework

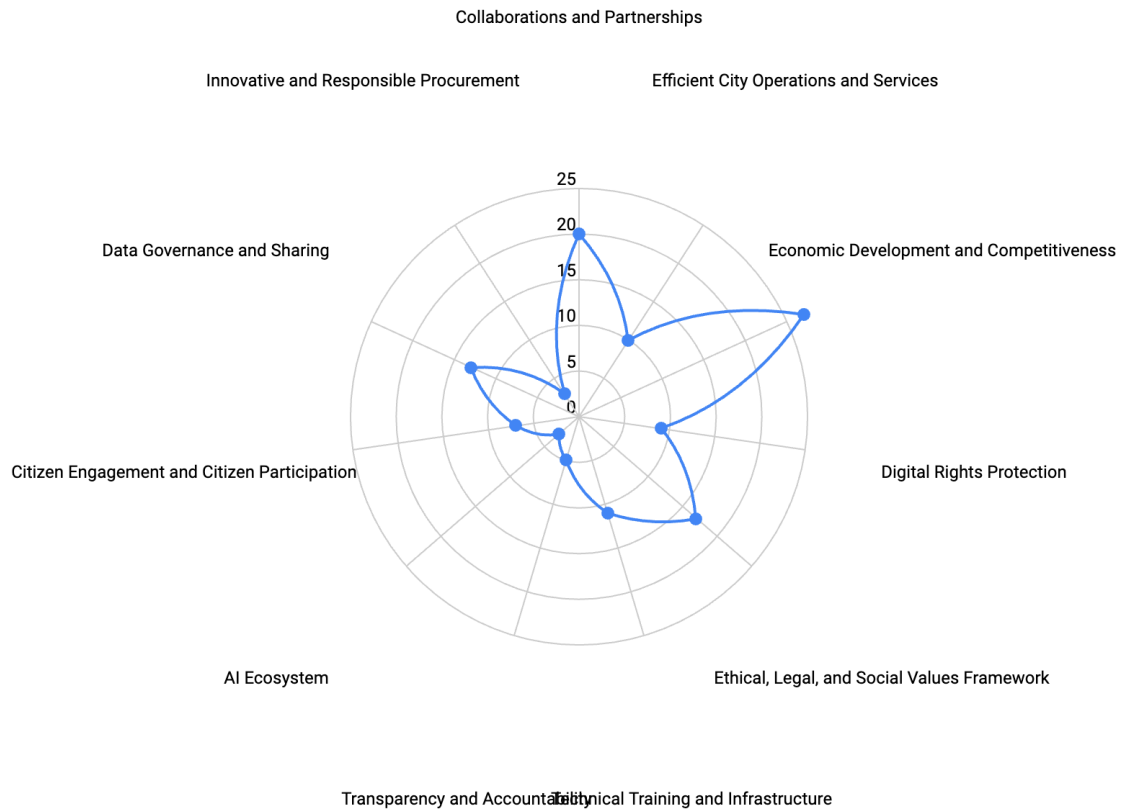
Appendix 10. Amsterdam Role Frequency Count

AMSTERDAM ROLE FREQUENCY COUNT



Source: Sicat (2023) Author's Pie Chart of Amsterdam Role Frequency Count

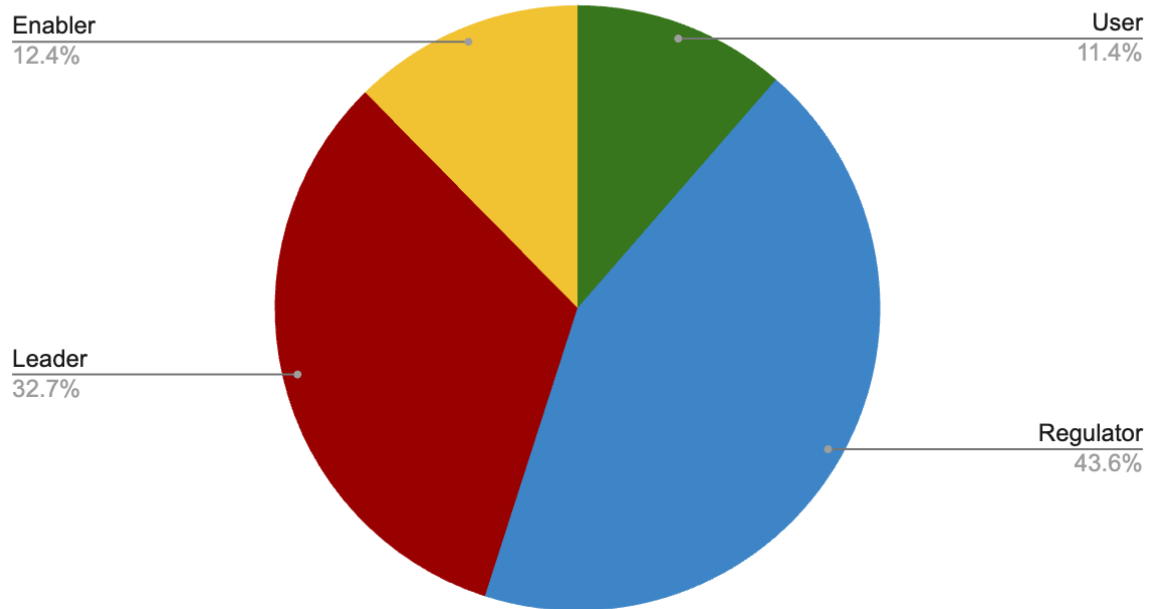
Appendix 11. Amsterdam Focus Area Radar Chart



Source: Sicat (2023) Author's Radar Chart for the Focus Areas of Amsterdam

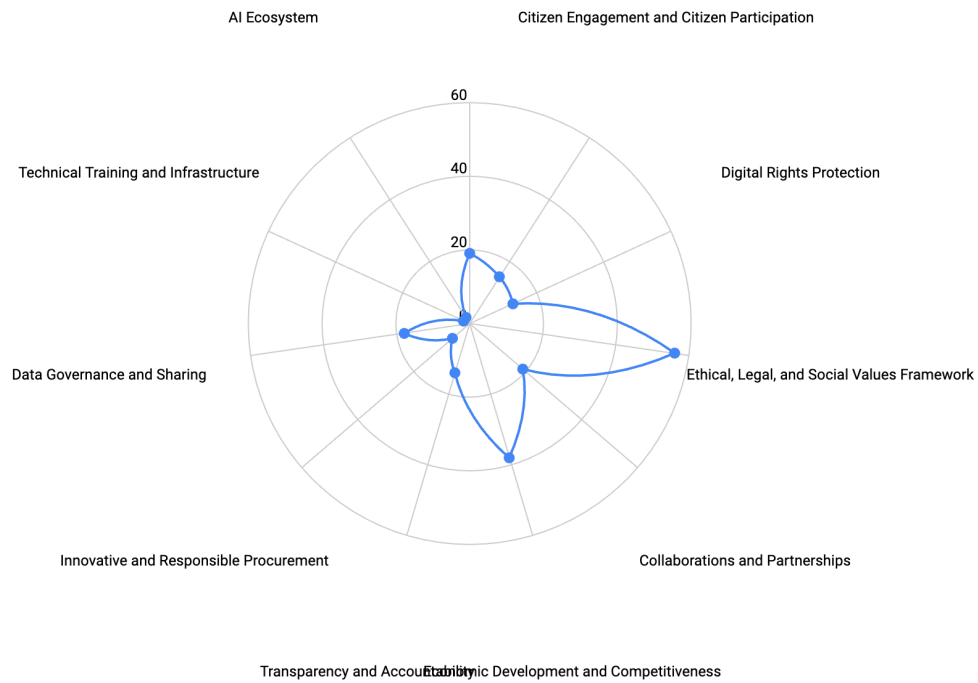
Appendix 12. Barcelona Role Frequency Count

Barcelona Role Frequency Count



Source: Sicat (2023) Author's Pie Chart of Barcelona Role Frequency Count

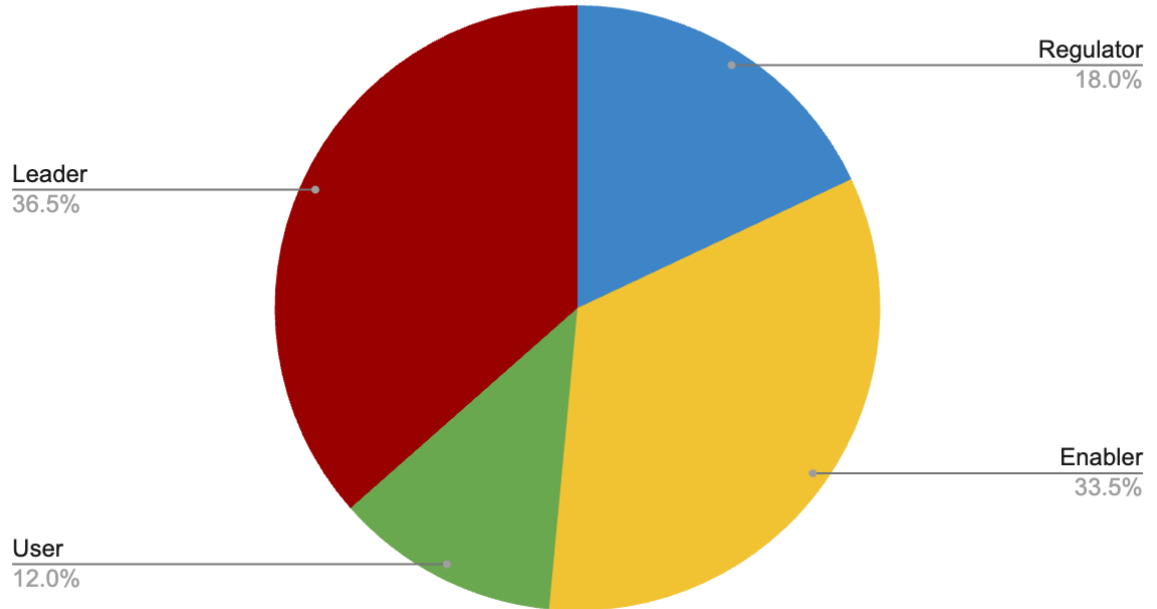
Appendix 13. Barcelona Focus Area Radar Chart



Source: Sicat (2023) Author's Radar Chart of Barcelona Area of Focus

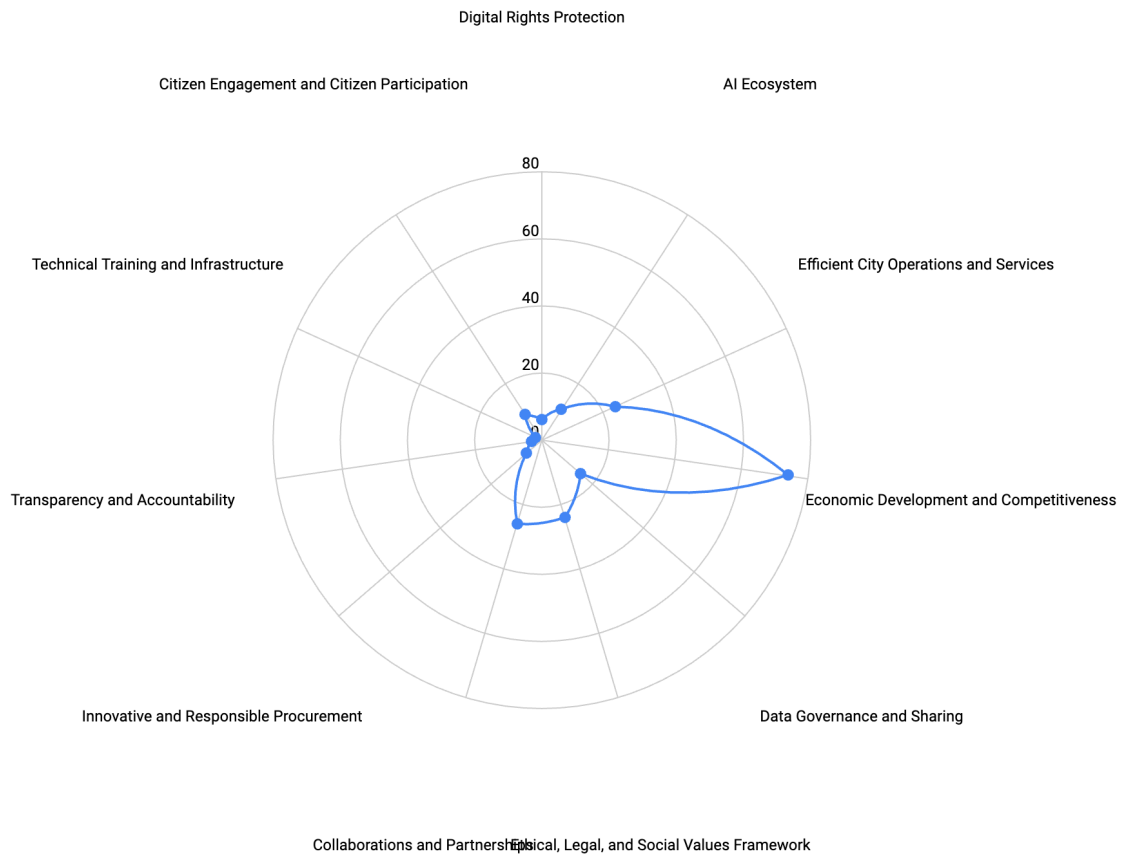
Appendix 14. New York Role Frequency Count

New York Role Frequency Count



Source: Sicat (2023) Author's Pie Chart of New York Role Frequency Count

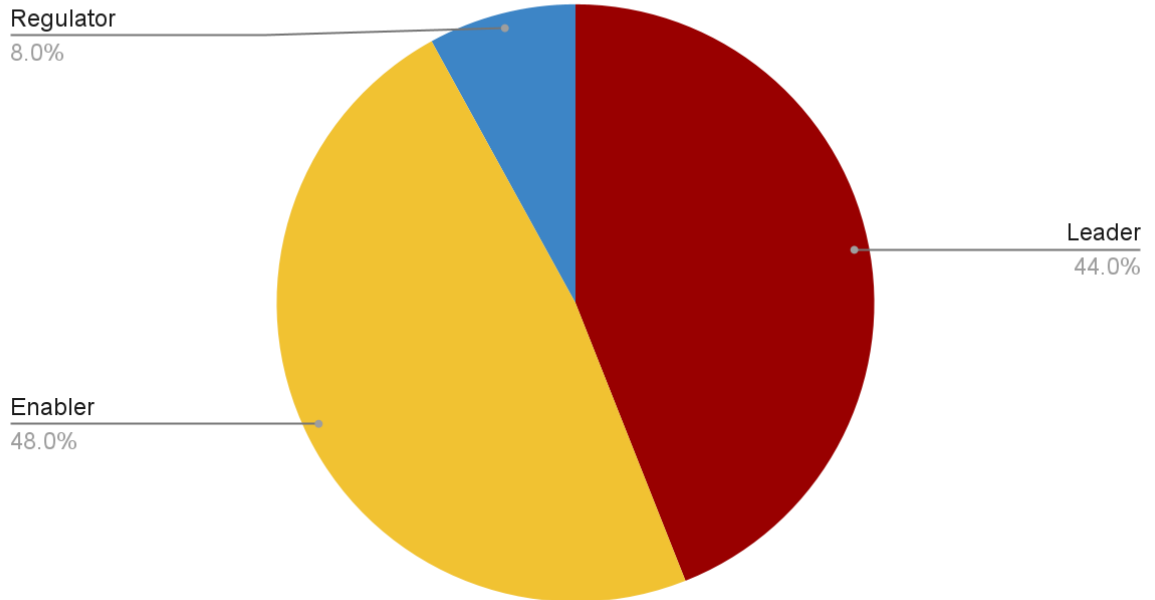
Appendix 15. New York Focus Area Radar Chart



Source: Sicat (2023) Author's Radar Chart of New York Area of Focus

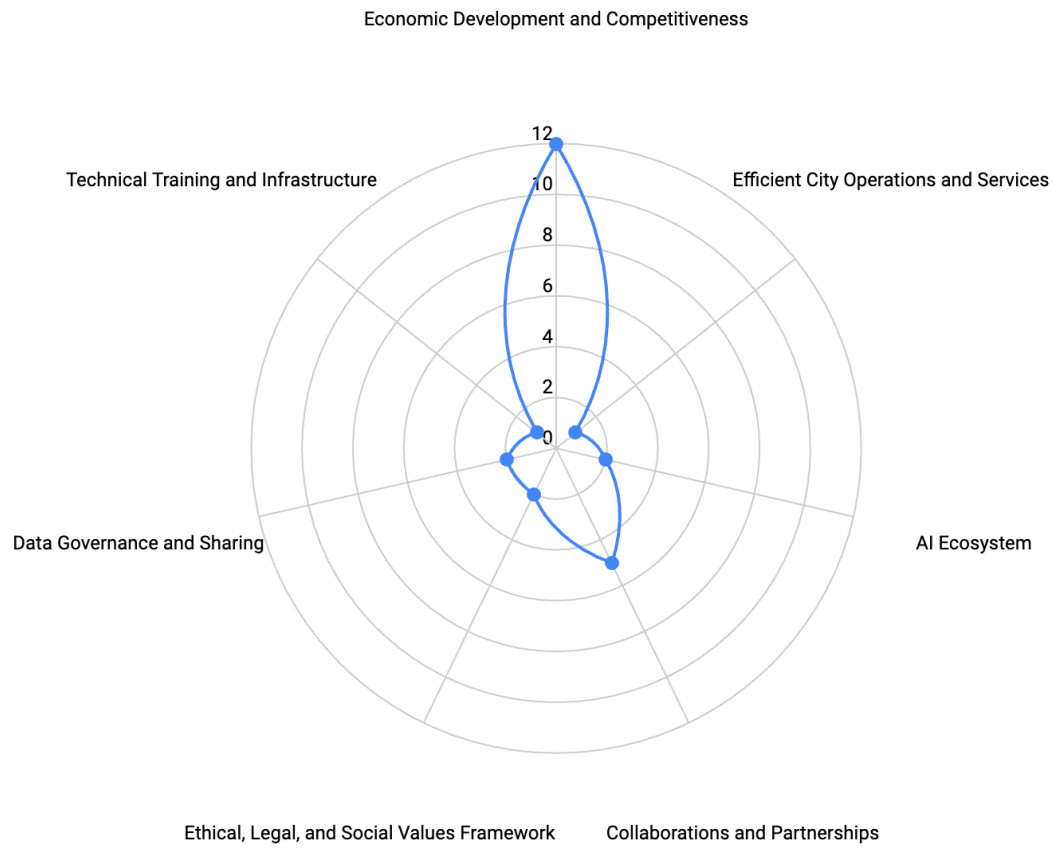
Appendix 16. London Role Frequency Count

London Role Frequency Count



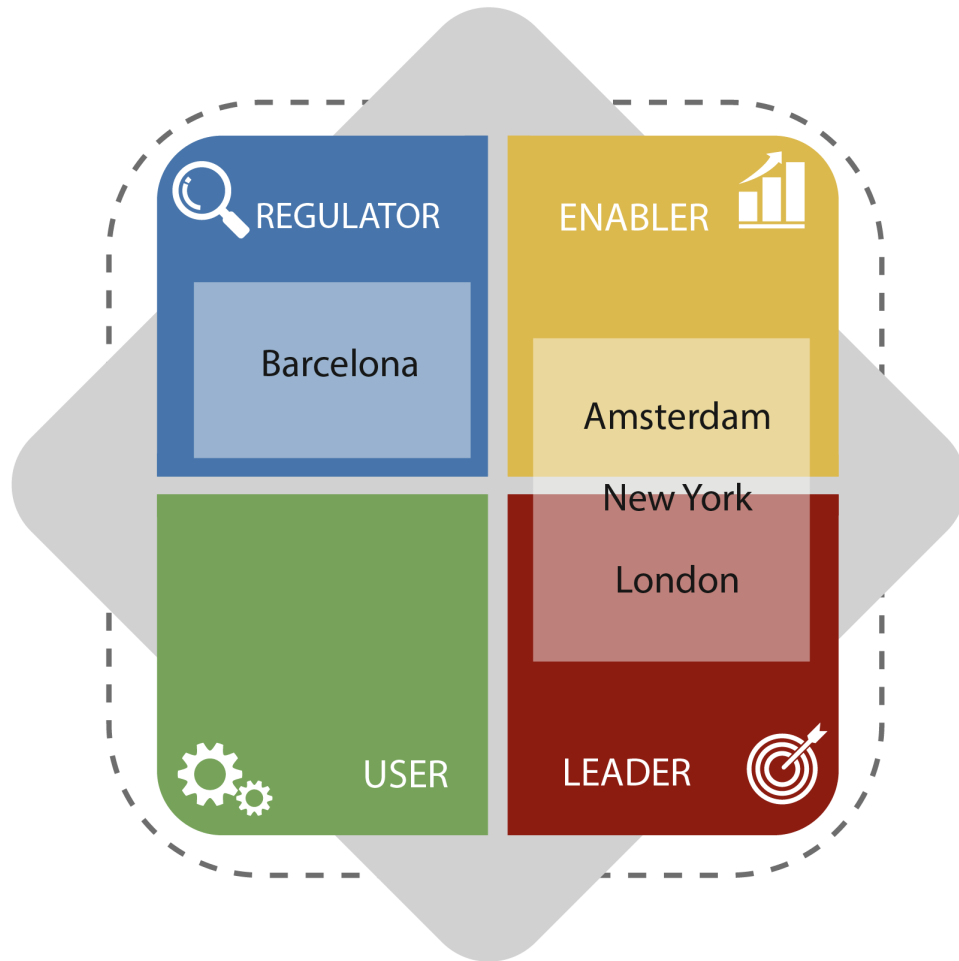
Source: Sicat (2023) Author's Pie Chart of New York Role Frequency Count

Appendix 17. London Focus Area Radar Chart



Source: Sicat (2023) Author's Radar Chart of New York Area of Focus

Appendix 18. Role Positioning of Cities



Source: Sicat (2023) Author's Role Positioning of Cities analysis derived from Guenduez and Mettler 4 Roles of Government Framework

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