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The AI opportunity for eGovernment in Luxembourg

The opportunity for the Luxembourgish Government to scale the benefits of AI

Generative AI has significant potential to enhance productivity in public administration in Luxembourg, creating 9% more value for money, equivalent to an annual contribution of EUR 400 million.

AI in public administration is a good place to start. This report explores the substantial potential of generative AI in Luxembourg's public administration, which is well-suited for early AI benefits with low risk.

Early AI adoption by the government can accelerate AI uptake across the economy by setting an example within existing regulations. Furthermore, the government has a crucial role to play in clarifying and simplifying the regulations governing AI use in Luxembourg.

What is eGovernment?

The European Commission defines [eGovernment](#) as:

“Effective digital public services which can provide a wide variety of benefits. These include more efficiency and savings for governments and businesses, increased transparency, and greater participation of citizens in political life.

[...] eGovernment involves more than just the tools: it involves rethinking organisations and processes and changing behaviour so that public services are delivered more efficiently to people.

Implemented well, eGovernment enables citizens, enterprises and organisations to carry out their interactions with government more easily, more quickly and at lower cost.”

The government must overcome five key barriers...



Lack of coordinated effort



Fear of breaking the rules



Lack of support



Regulatory uncertainty



Risk of vendor lock-in

Think 'task-based'



Cross-cutting tasks underpin most jobs in public administration. The top five tasks represent 75% of the potential. However, isolated investments leads to many pilots without scalable impact. The government should focus on key cross-cutting tasks to achieve economies of scale while addressing local needs. This requires a cross-institutional AI procurement plan with clear roles and responsibilities to ensure alignment and scalability.

Think 'risk-conscious'



Low-risk, internal AI applications constitute 20% of the economic potential. The fear of breaking rules in a complex regulatory environment is slowing AI adoption. Therefore, the government of Luxembourg should begin with the low-risk applications and gradually move to user-sensitive, externally-facing applications to unlock the remainder of the potential.

Think 'impact-oriented'



The implementation of AI solutions should be motivated by the needs of citizens and businesses, improving the user experience and reducing the time and hassle in their interactions with the public administration. Generative AI can reduce the administrative burden of companies of Luxembourg by EUR 100-120 million.



Create cloud clarity



A secure and competitive cloud infrastructure is crucial for cost-efficiently implementing advanced AI at scale. The Luxembourgish government acknowledges this and has established a partnership for a sovereign, disconnected cloud with Clarence—a joint venture between Proximus Luxembourg and LuxConnect that leverages Google Cloud technology.

Make smart procurement choices



Governments must carefully assess the risk of vendor lock-in and ensure an interoperable AI procurement framework. Vendor lock-in risk leads to suboptimal, inefficient and costly AI solutions in the public administration. 60% of surveyed government agencies in various EU countries report experiencing vendor lock-in effects.

Implement an ambitious AI strategy



To fully harness the AI potential, Luxembourg should set ambitious targets and create an actionable strategy with clear milestones. A new AI strategy, building on the ambitious foundation of the Strategic Vision of 2019, should address the new cross-cutting potentials of generative AI and ensure safe and efficient AI procurement.





Introduction

A large and untapped potential

-
- To realise the AI potential in the public administration, Luxembourg must overcome five key barriers



AI-supported public services result in enhanced accessibility and 24/7 availability. This will involve investments in AI projects that provide better, cheaper and faster public services while also stimulating positive social impacts.

Artificial Intelligence – A Strategic Vision for Luxembourg (2019)

AI can enhance the efficiency and quality of public services benefitting citizens, businesses and employees

The Strategic Vision for AI in Luxembourg highlights the potential of AI to...



Boost efficiency

In the process of administrative simplification, public administrations could utilise AI-based new technologies to offer more efficient and qualitative services to citizens living and working in Luxembourg.



Increase accessibility

AI-supported public services result in enhanced accessibility and 24/7 availability. This will involve investments in AI projects that provide better, cheaper and faster public services while also stimulating positive social impacts.



Improve transparency

The government of Luxembourg remains accountable and transparent in its applications of AI and digital tools. Its digital inclusion efforts aim to simplify public administration services and demystify the complexity of new digital applications by bringing them closer to citizens.



Enhance quality

AI has the potential to simplify citizen-government interactions. Society will benefit from access to improved, personalised public services, which will result in time-saving, increased transparency and more customer-oriented services.



Increase job satisfaction

AI-powered tools and intelligent software bots help [public employees] excel in their position and allocate time to making real connections, leaving [them] more fulfilled at work.



To realise these benefits, this analysis addresses five key barriers and outlines how to unlock the AI potential.

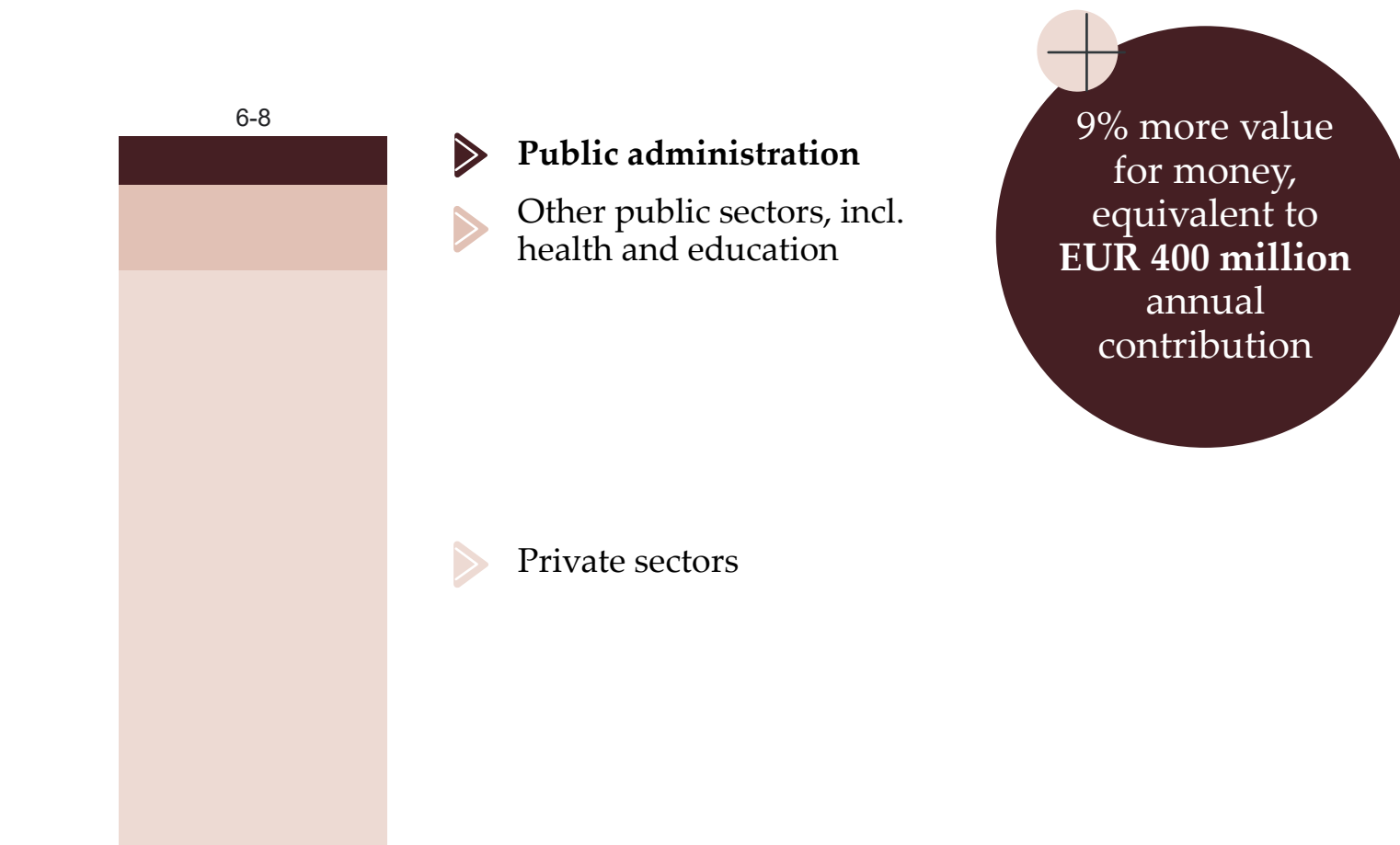
The Luxembourgish government can get 9% more value for money by adopting generative AI

Generative AI presents a significant economic opportunity for Luxembourg, potentially contributing 9% (EUR 6-8 billion) to GDP annually in ten years.

In public administration, generative AI can significantly enhance productivity and drive cost-efficiency. Widespread adoption of generative AI in public administration can create EUR 400 million in gross value added with the same resources. The potential is equivalent to 1.2% of public expenditure.

Demonstrating successful AI use in public administration will be key for unlocking the full economic potential of generative AI.

Economic potential of generative AI in Luxembourg EUR billion at widespread adoption



Note: The economic potential in public administration is measured in terms of gross value added (GVA). GVA is the standard measure of economic value at sector level and is a major part of the gross domestic product (GDP), which also includes net taxes. See appendix for details. "Public administration" refers to NACE sector O (Public administration and defence; compulsory social security) and comprises activities related to the administration of the state and the economic and social policy of the community, but not health, education and activities performed by private organisations, voluntary associations, or businesses providing similar services.
Source: Implement Economics based on the Luxembourgish Government, [Eurostat](#), O*NET and Briggs and Kodhani (2023).

Administration forms the backbone of the public sector

The public sector is an important part of Luxembourg's economy and society. [Public expenditure](#) is equivalent to 45% of Luxembourg's GDP. Further, the public sector accounts for around 24% of all jobs and delivers services benefiting citizens and businesses.

Public administration makes up around a quarter of public sector jobs. Their work has characteristics that allow it to benefit from generative AI, such as text heavy work, repetitive tasks and complex analysis.

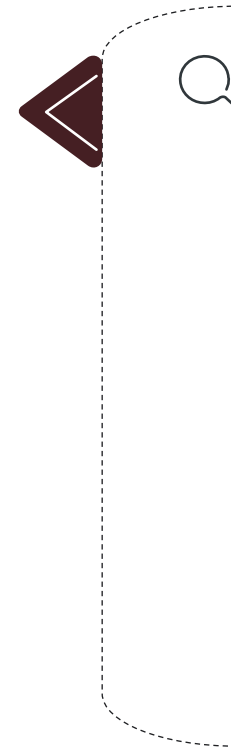
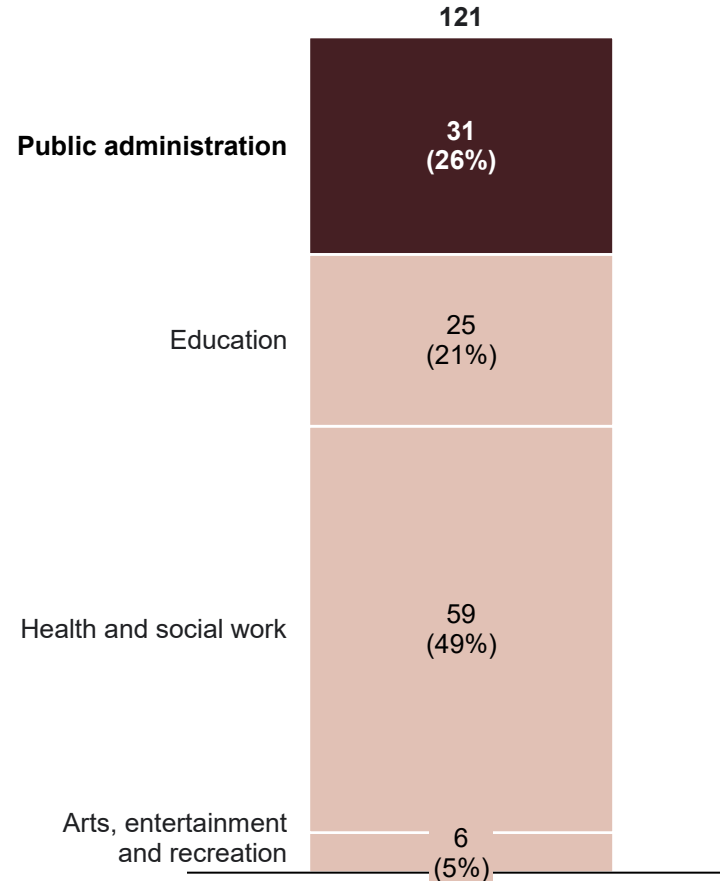
Public administration includes all levels of government and forms the administrative backbone of the public sector.



In order to ensure that citizens and administrations harness the benefits of AI-enabled solutions, Luxembourg will focus on [...] contributing to the development of AI solutions in order to build more efficient and personalized public administration services that serve all parts of society.

Artificial Intelligence – A Strategic Vision for Luxembourg (2019)

Employment in the public sector in Luxembourg Thousand employees, 2023



The public administration is the focus of this report. It provides value through key functions such as:

- **Citizen advisory:** Providing guidance on government services, legal rights, and administrative procedures.
- **Individual case handling:** Processing citizen applications for public services.
- **Finance and budgeting:** Managing public funds and disbursing benefits, subsidies and aid.
- **General governance and regulation:** Drafting, evaluating and implementing policies to address societal needs.

Note: Percentages may not sum to 100 due to rounding. Employment figures based on latest available data for this level of sectoral disaggregation from Eurostat (2023).
Source: Implement Economics based on [Eurostat](#) and STATEC

Most public administration jobs can be complemented by generative AI

Exposure to automation by generative AI in public administration in Luxembourg

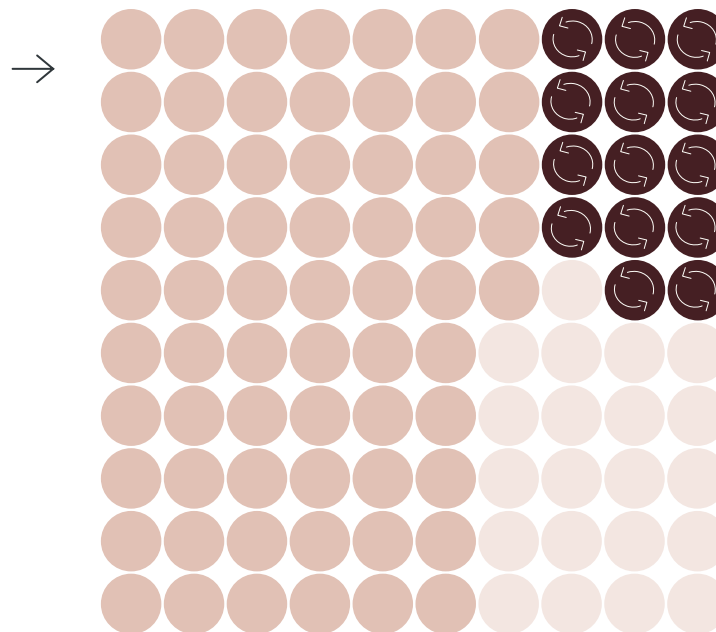
% of jobs in public administration

● Partial or full displacement ● AI as a complement ● No automation

66% or ~20,500 jobs are likely to be augmented by generative AI.

The technology will play an integral role in their daily work, making them more productive and freeing up time for other value-creating activities. This allows resources to be reallocated to areas within the public administration or other parts of the public sector where they are more needed.

Jobs include social workers, urban planners and general office clerks.



14% or ~4,500 jobs are estimated to be highly exposed to generative AI, leading to some job transitions.

These workers may experience a shift in responsibilities as generative AI automates over half of their tasks, with tools such as citizen facing chatbots handling general inquiries automatically, for example. This improves the speed and quality of administrative tasks, saving resources for the central and local governments.

Jobs include citizen service and legal functions, and budget analysts.

21% or ~6,500 jobs in public administration face little or no automation from generative AI.

These workers carry out manual or human-to-human work, including physical maintenance of public infrastructure and on-site inspections to ensure compliance and safety in public spaces.



The Luxembourgish government emphasises that “*the individual should be at the centre of all AI services we support in Luxembourg*” in the [Strategic Vision of 2019](#). Having human agency at the centre of AI adoption is essential to maximise the societal benefits. Civil servants must be upskilled to understand and use the new tools. Although the government has already taken steps to strengthen digital competencies through initiatives like the Digital Skills Bridge, further efforts are needed to address the specific challenges and opportunities of generative AI.

The Luxembourgish government has a good foundation to adopt AI

Luxembourg ranks high compared to peers on most indicators for government AI readiness.

The country ranks 10th in overall AI Preparedness as well as in the Tortoise Media [Global AI Index](#) with a score of 35 as compared to the EU27 average of 32. The index measures the depth of commitment from national governments to AI, based on investigating spending commitments and national strategies.

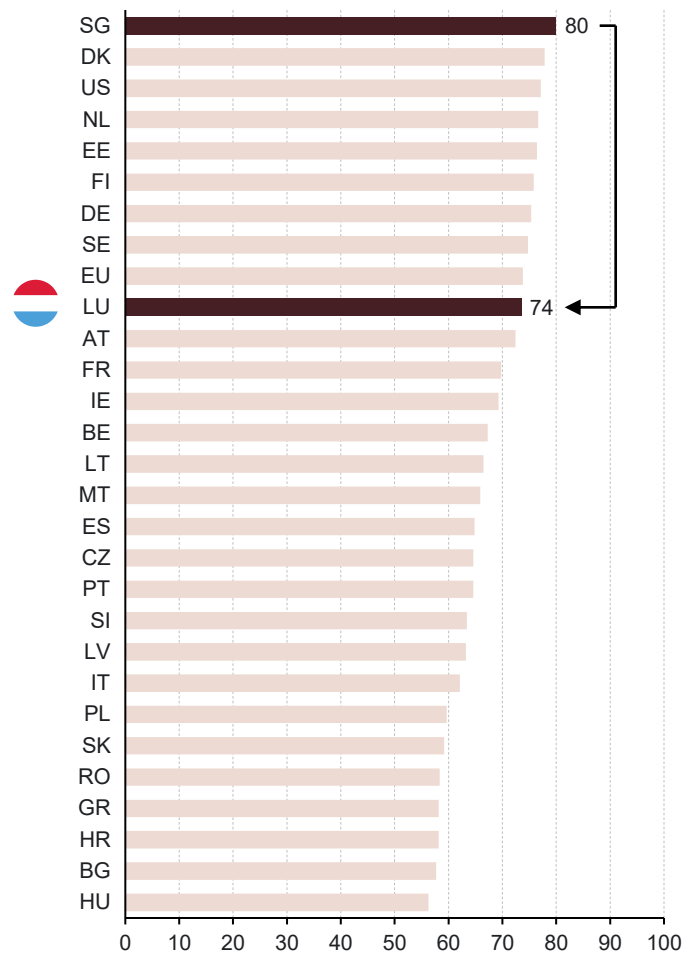
The EU has selected Luxembourg to operate one of the first European [AI factories](#). This provides momentum for Luxembourg to step forward.



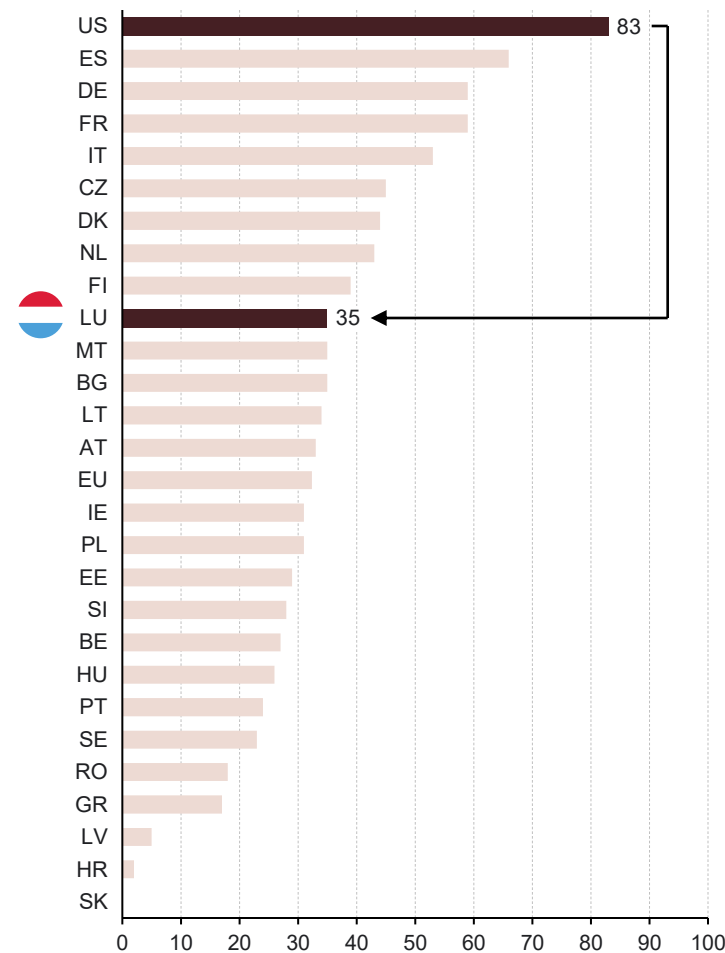
Luxembourg has already invested in key government initiatives related to eGovernment and multilingual solutions that serve as the groundwork for future AI applications.

Artificial Intelligence – A Strategic Vision for Luxembourg (2019)

AI Preparedness Index
IMF, April 2024 (Index max = 100)



AI Capacity Index, Government Strategy
Tortoise, 2024 (Index max = 100, global leader)



Five key barriers hamper progress in Luxembourg

This report draws on research from Luxembourg, leading Nordic countries, and the European Commission to identify five key barriers to be overcome for the AI adoption to be successful:

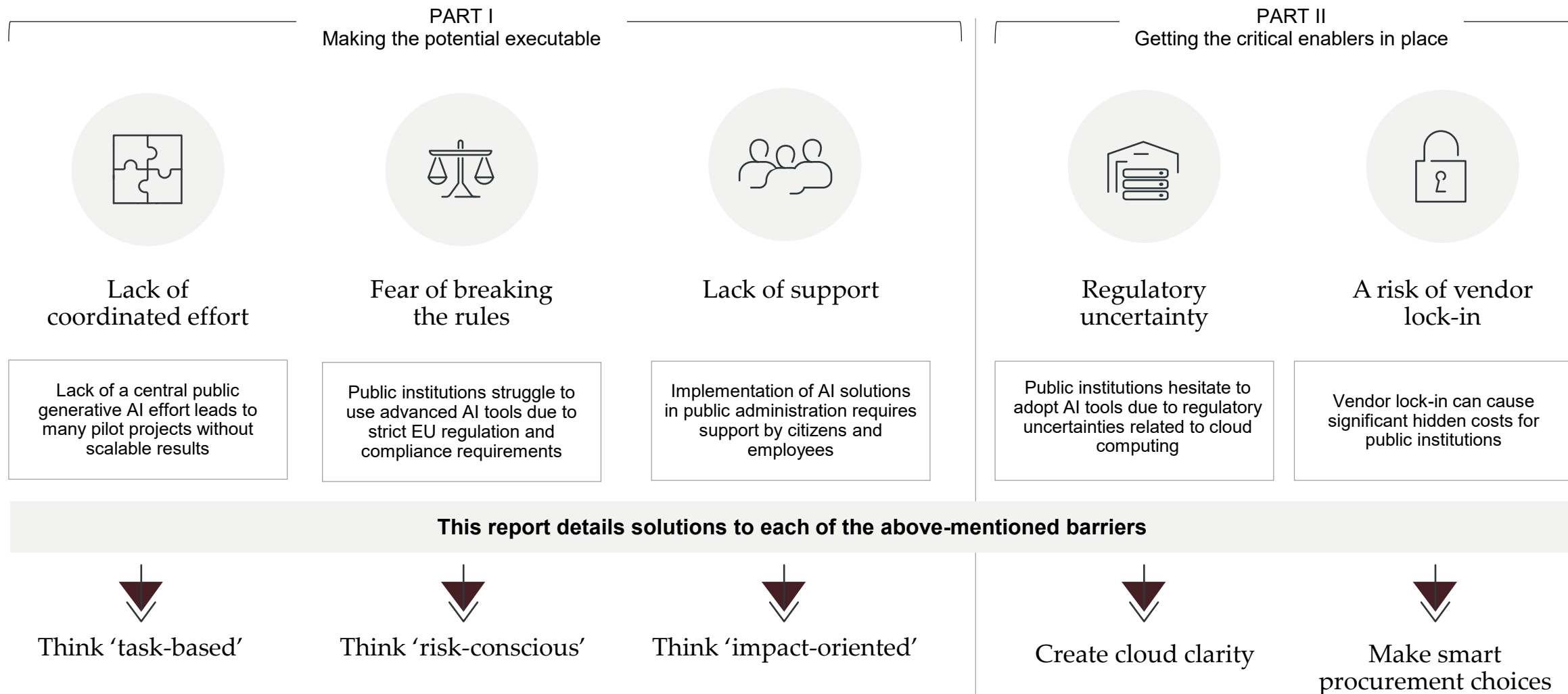
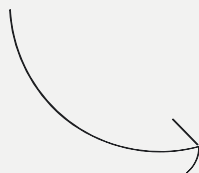


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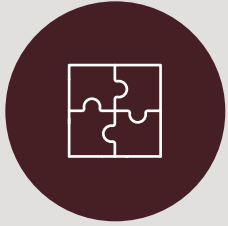
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Think 'task-based'



Think 'risk-conscious'



Think 'impact-oriented'

PART I

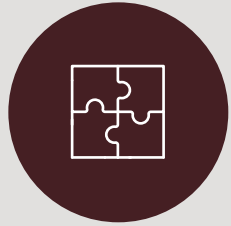
Making the potential executable

- > In designing a new national AI strategy, the government of Luxembourg should think '**task-based**', '**risk-conscious**' and '**impact-oriented**' to realise the potential of generative AI in public administration.



Digitalisation and the deployment of artificial intelligence (AI) are also essential to the ability of public administrations to deliver European public goods, for example in the field of health, justice, education, welfare, mobility and environmental protection.

[Mario Draghi](#) (2024)



PART I

Think 'task-based'

- Adopt a task-based framework to achieve scalability in AI solutions.

Lack of a central effort in implementing generative AI in the public sector results in uncoordinated pilot projects without scalable outcomes



Despite the great opportunity to benefit from AI use in public administration, a lack of centrally focused efforts presents three main challenges:



Isolated investments

Luxembourg's public sector benefits from strong coordinated initiatives such as the [AI4Gov](#) committee, which has helped foster experimental AI projects across various administrations. However, neither the AI4Gov nor the national AI strategy from 2019 explicitly address newer technologies—most notably, generative AI. As a result, individual public authorities continue to invest in isolated projects that remain disconnected from a unified, forward-looking framework.



Absence of common infrastructure

Luxembourg has made significant progress with its digital public services and robust IT systems, positioning itself as a regional leader in eGovernment. Yet, a fully unified generative AI infrastructure that seamlessly connects all public authorities remains elusive, forcing agencies to deploy bespoke solutions that, while effective on their own, lack the compatibility and standardisation necessary for broader interconnectivity.



Barriers to data sharing

Luxembourg is endowed with extensive public data resources available through platforms like Data.public.lu and MyGuichet.lu. Despite this advantage, significant legal and technical obstacles continue to impede efficient data sharing across public authorities. Stringent interpretations of data protection regulations coupled with legacy IT systems and non-standardised data formats, create persistent challenges. These barriers restrict the effective use of data for AI innovation, limiting the ability of public bodies to collaborate and derive collective benefits from their digital assets.

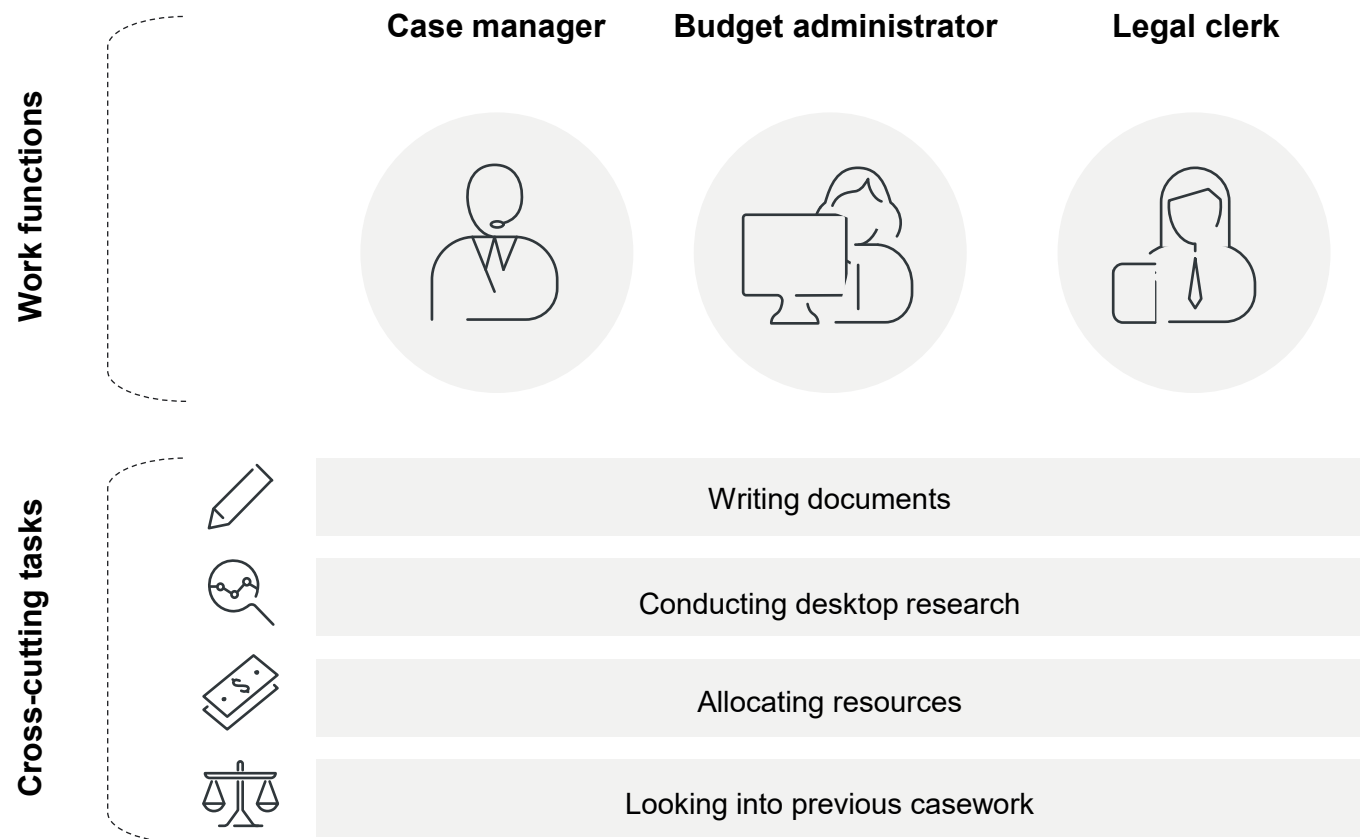
Cross-cutting tasks form the basis of most public administration jobs

The public sector is the largest employer in Luxembourg, with public administration employees making up around a quarter of the sector. Despite the diversity of the roles and fields of these employees, they carry out similar key tasks that follow comparable processes.

For example, tasks such as case handling are carried out by employees with varying job titles across multiple institutions.

To effectively implement AI in public administration, using a task-based framework that focuses on shared processes is essential for achieving scalable solutions.

Examples of work functions and cross-cutting tasks in public administration

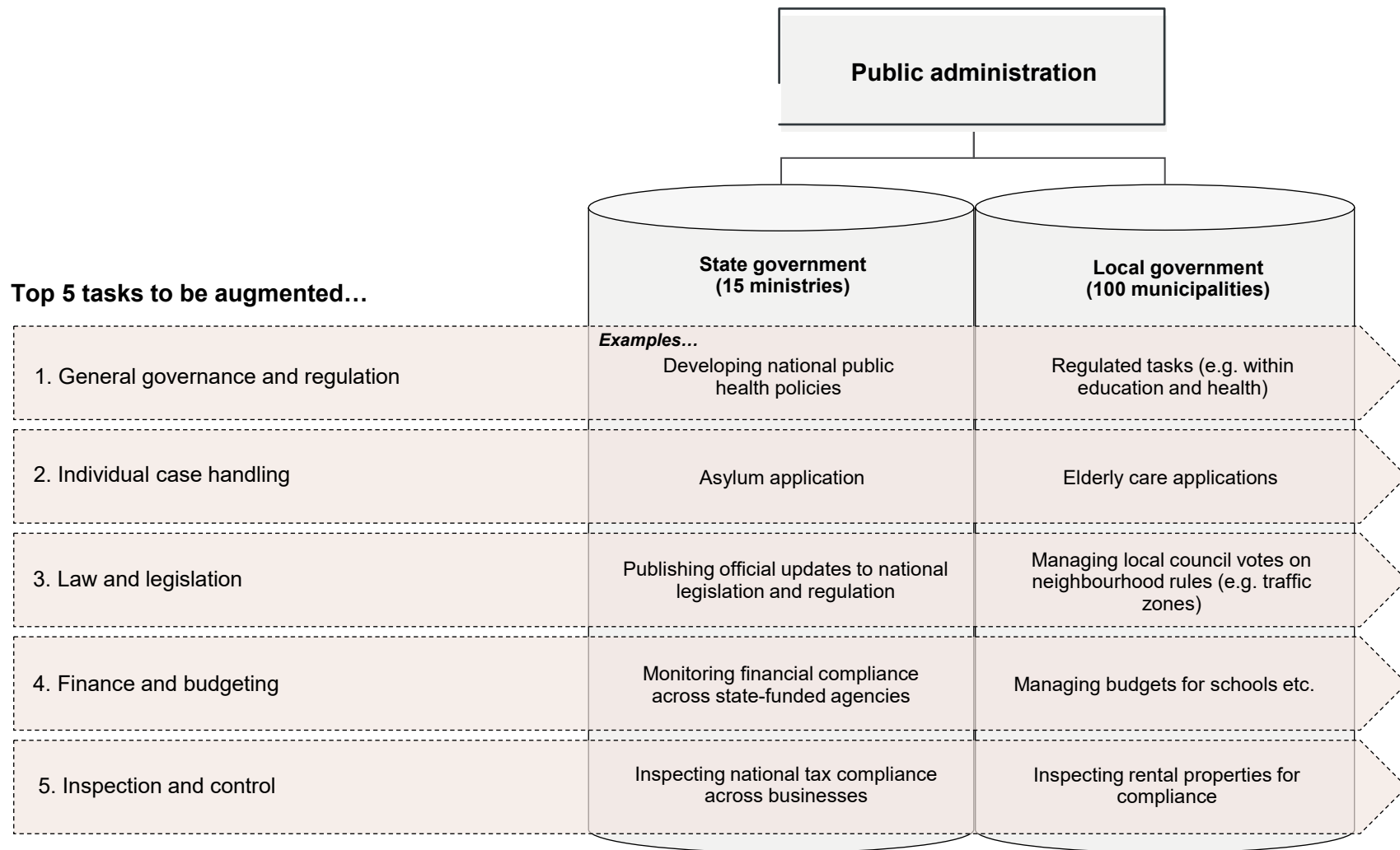


Generative AI has the potential to augment tasks performed across all public institutions in Luxembourg

The Luxembourgish public sector spans 15 ministries and 100 municipalities. Within the public sector, public administration makes up ~31,000 employees.

The tasks in public administration hold a large degree of similarity, creating an ideal opportunity to implement scalable AI solutions that can simultaneously benefit multiple public institutions, enhancing efficiency and collaboration.

Structure of the public administration in Luxembourg



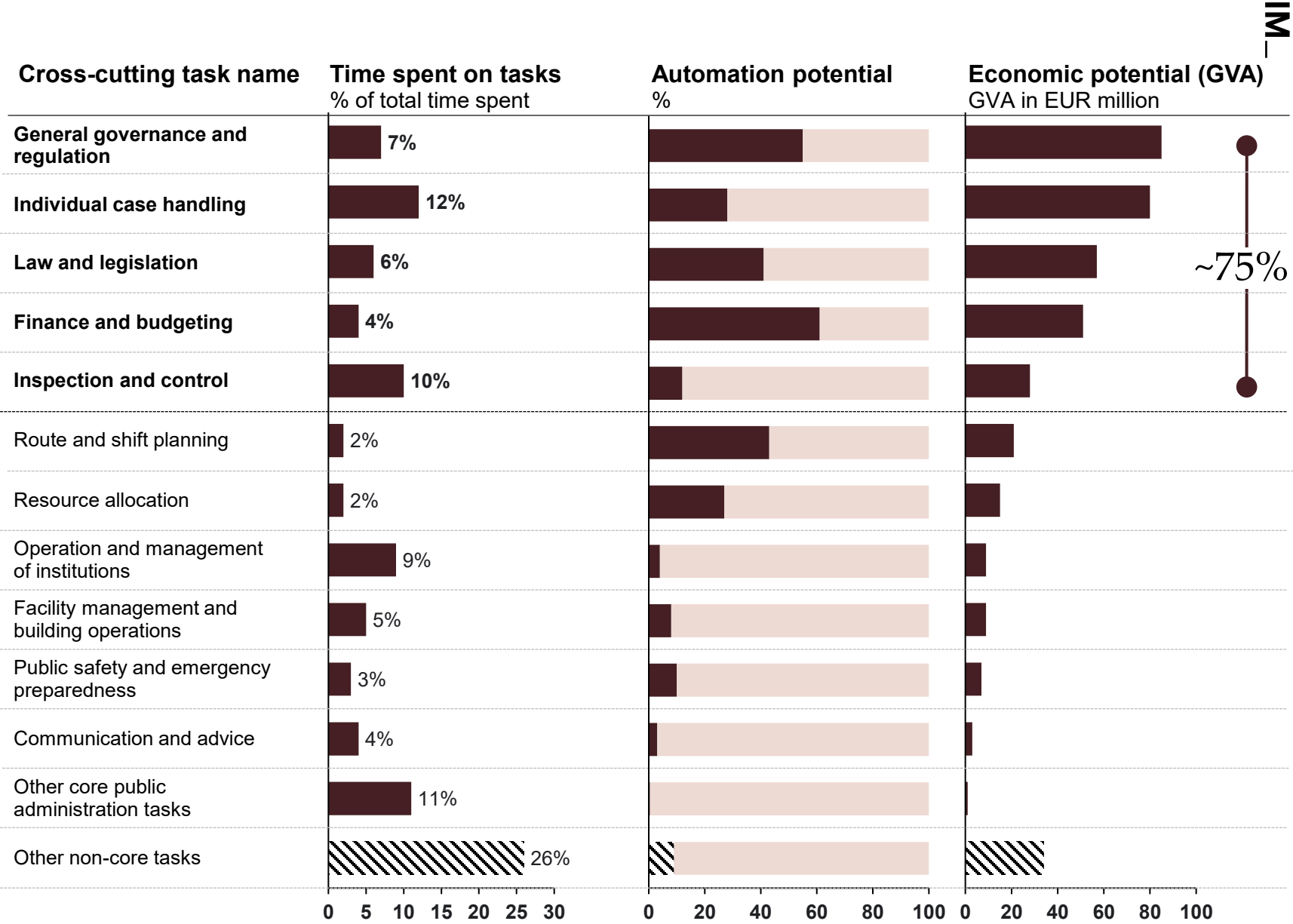
Focusing on the top five cross-cutting tasks could realise 75% of the potential

Implement Economics has analysed the potential of generative AI within public administration on a task-level, using employment data from the Luxembourg statistical authority and detailed occupation descriptions.

We find that the lion’s share of the potential in public administration is found within five major cross-cutting tasks:

- General governance and regulation
- Individual case handling
- Law and legislation
- Finance and budgeting
- Inspection and control

Although these tasks are estimated to make up around 40% of the time spent by Luxembourgish civil servants, they account for about 75% of the economic potential due to the high degree of automatability.



Note: Percentages may not sum to 100 due to rounding. There is much uncertainty around the capability and adoption timeline of generative AI. The estimation of the potential of AI across key cross-cutting tasks is based on an augmentation of Briggs & Kodnani (2023) with Luxembourgish employment data and an expert-assessed, exhaustive framework of the task composition within public administration, which is mapped to the rich database of task descriptions within O*NET. Our estimate is the isolated potential of generative AI at widespread adoption. The estimated boost from generative AI may not be fully additive to growth projections. The automation potential of cross-cutting tasks may vary from country to country due to the occupation composition of the workforce carrying out the tasks. Estimates are based on the most detailed employment data available for sector O in LU, imputed with employment distribution data for sector O in Belgium at the ISCO level 4. Source: Implement Economics based on O*NET, Briggs & Kodnani (2023), Eurostat, STATBEL and STATEC.

Generative AI can complement cross-cutting tasks in several aspects



General governance and regulation

Generative AI can automatically compare proposed rules against existing legislation to spot potential conflicts or compliance gaps as well as compiling relevant legal precedents to help agencies stay consistent with governance standards.



Individual case handling

Generative AI can review application forms for missing documentation, pinpoint follow-up questions that need input from the applicant, and route cases directly to the relevant department.



Law and legislation

Generative AI can assist in drafting legal texts, analysing legislative proposals, and identifying potential legal conflicts, helping lawmakers craft precise and well-aligned policies.



Finance and budgeting

Generative AI can detect budget overruns, identify potential cost-saving measures, and forecast revenue shortfalls, helping public administrators prioritise spending, optimise resource allocation, and maintain transparent financial oversight.



Inspection and control

Generative AI can identify anomalies, flag potential violations, and optimise inspection schedules based on risk. By analysing historical and real-time data, it helps inspectors focus on high-risk cases, streamlining compliance checks and enhancing regulatory enforcement.



Five cross-cutting tasks holds 75% of the economic potential

Achieving scalability while balancing local needs

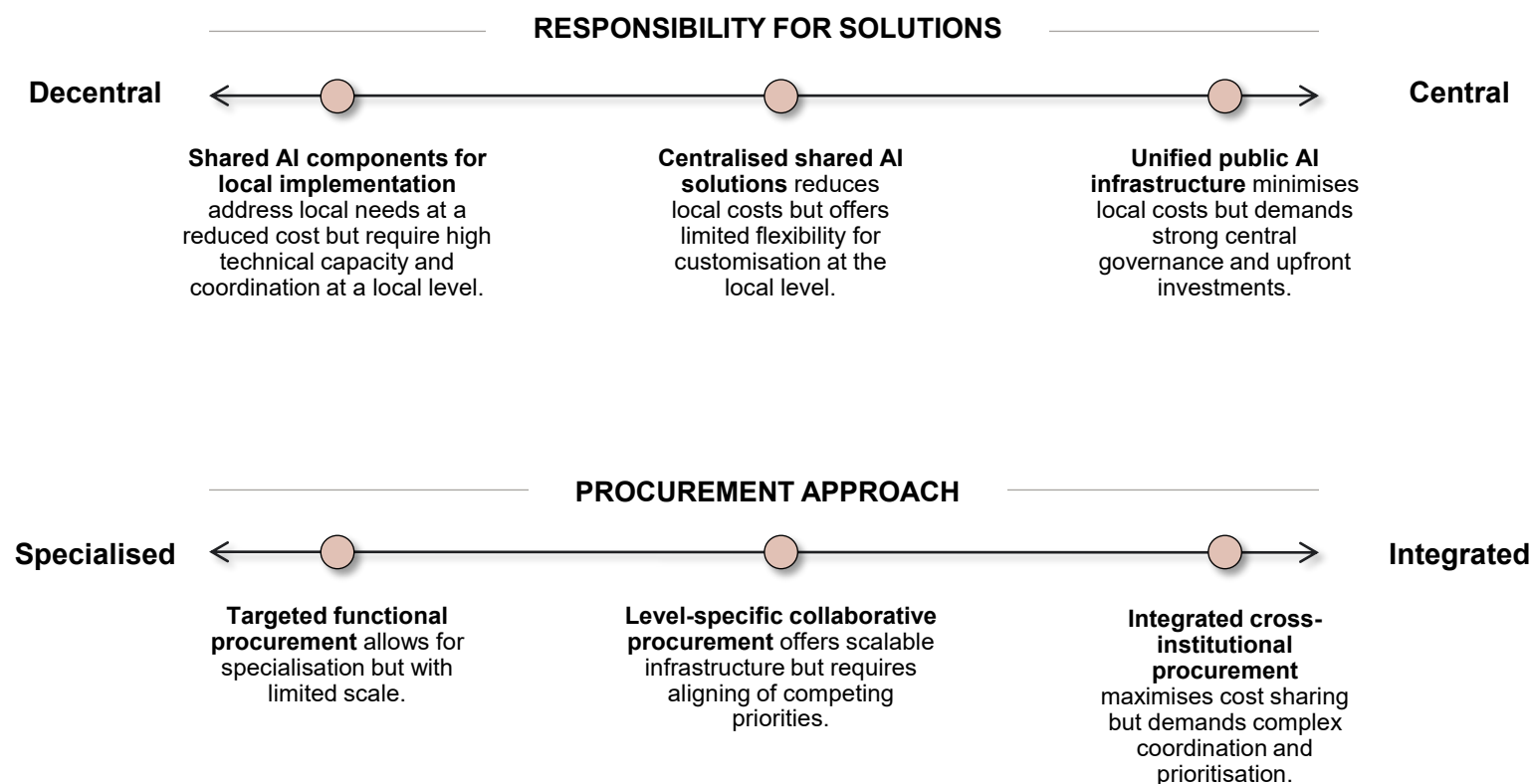
Approximately 75% of the potential lies in the top five key tasks shared across institutions. However, AI solutions must also address local needs to remain effective.

To maximise impact, public administrations should prioritise scalable solutions that avoid duplication while ensuring flexibility to meet local requirements.

The government should clearly define roles and responsibilities across levels of government to ensure alignment with users while ensuring scalability.

To address fragmented decision-making and reduce inefficiencies caused by siloed AI investments, strategic decisions should focus on cross-institutional AI procurement.

Strategic dimensions in public AI procurement





PART I

Think 'risk-conscious'

- Low-risk and internally-oriented use cases can realise 20% of the total AI potential in public administration.

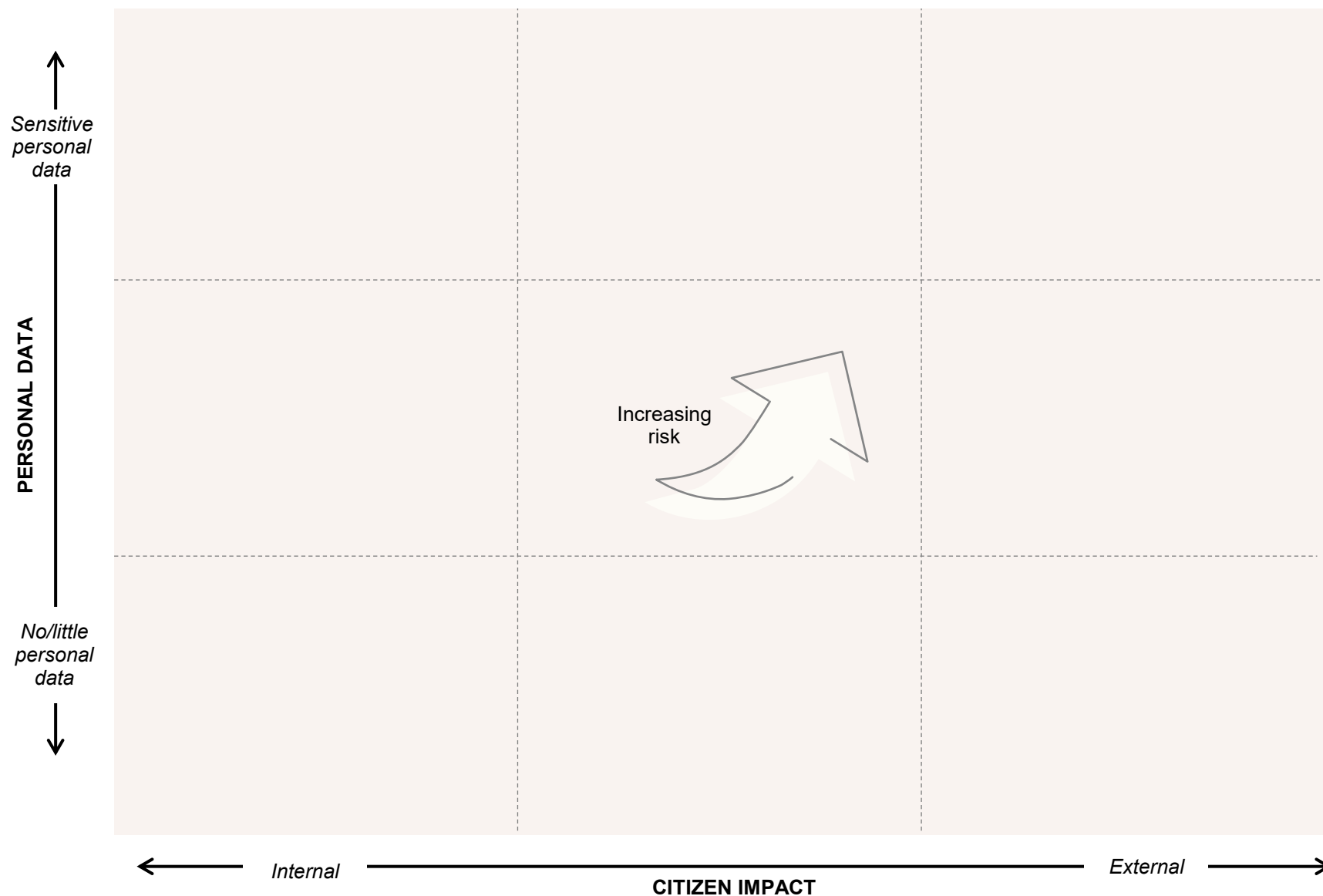
Public institutions are risk-averse and face a complex regulatory landscape

Implementing AI in public institutions is complicated by the existence of overlapping regulations, such as GDPR, the AI Act, and the AI Code of Practice, which can create uncertainty and inaction.

Leaders in public administration are aware of the risks. However, being overly risk-averse or failing to assess risks properly can lead to inaction.

There are a handful of low-risk applications of AI that do not use personal data and are internally-oriented. These are a good place to get started with tangible adoption of generative AI applications prior to addressing those that both use personal data and are externally-facing.

The regulatory challenges can be understood in terms of two dimensions of risk



Whether the AI solution is for internal workflows or external interactions, external use often faces stricter regulations.

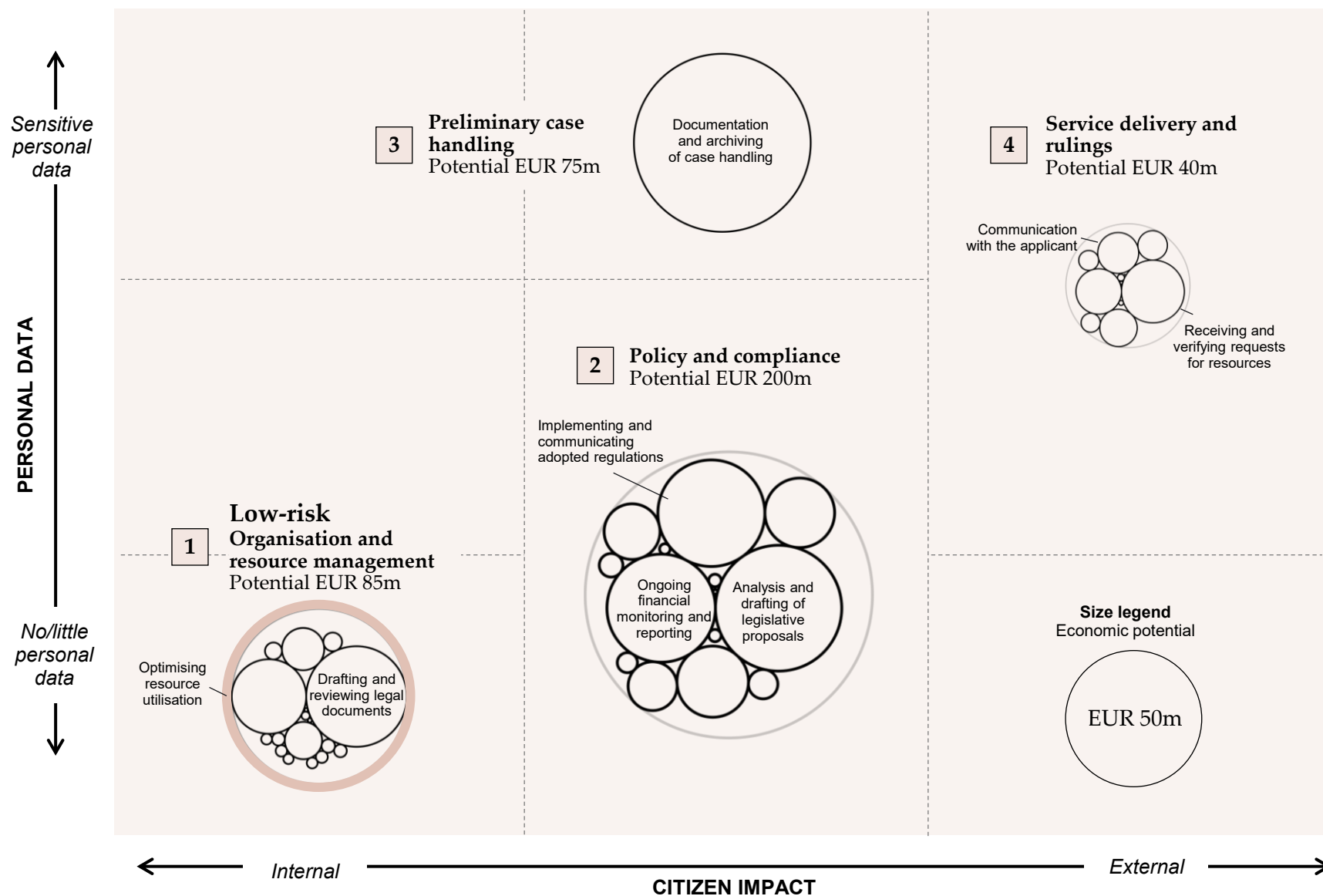
Low-risk AI applications account for 20% of the potential in public administration

The risk of key cross-cutting tasks is mapped across two dimensions:

- The degree of citizen impact (internally- vs. externally-oriented AI applications)
- The sensitivity and use of personal data

This mapping produces four clusters of potential AI applications that can be used as a roadmap towards AI adoption in public administration:

- 1. Organisation and resource management** applications, which are very low-risk and should be addressed in the coming years. Our analysis shows that **EUR ~85 million**, equivalent to 20% of the economic potential, lies in these low-risk, internal tasks.
- 2. Policy and compliance** applications that use some personal data but are not completely externally-oriented.
- 3. Preliminary case handling**, which uses considerable sensitive data but is not directly citizen- and business-facing.
- 4. Service delivery and rulings**, which are directly citizen- and business-facing and use considerable personal data.



Note: The estimation of the potential of AI across key cross-cutting tasks is based on an augmentation of Briggs & Kodnani (2023) with granular Luxembourgish employment data and an expert-assessed, exhaustive framework of the task composition within public administration, which is mapped to the rich database of task descriptions within O*NET. Estimates are based on the most detailed employment data available for sector O in LU, imputed with employment distribution data for sector O in Belgium at the ISCO level 4.
Source: Implement Economics based on O*NET, Briggs & Kodnani (2023), Eurostat, STATBEL and STATEC.

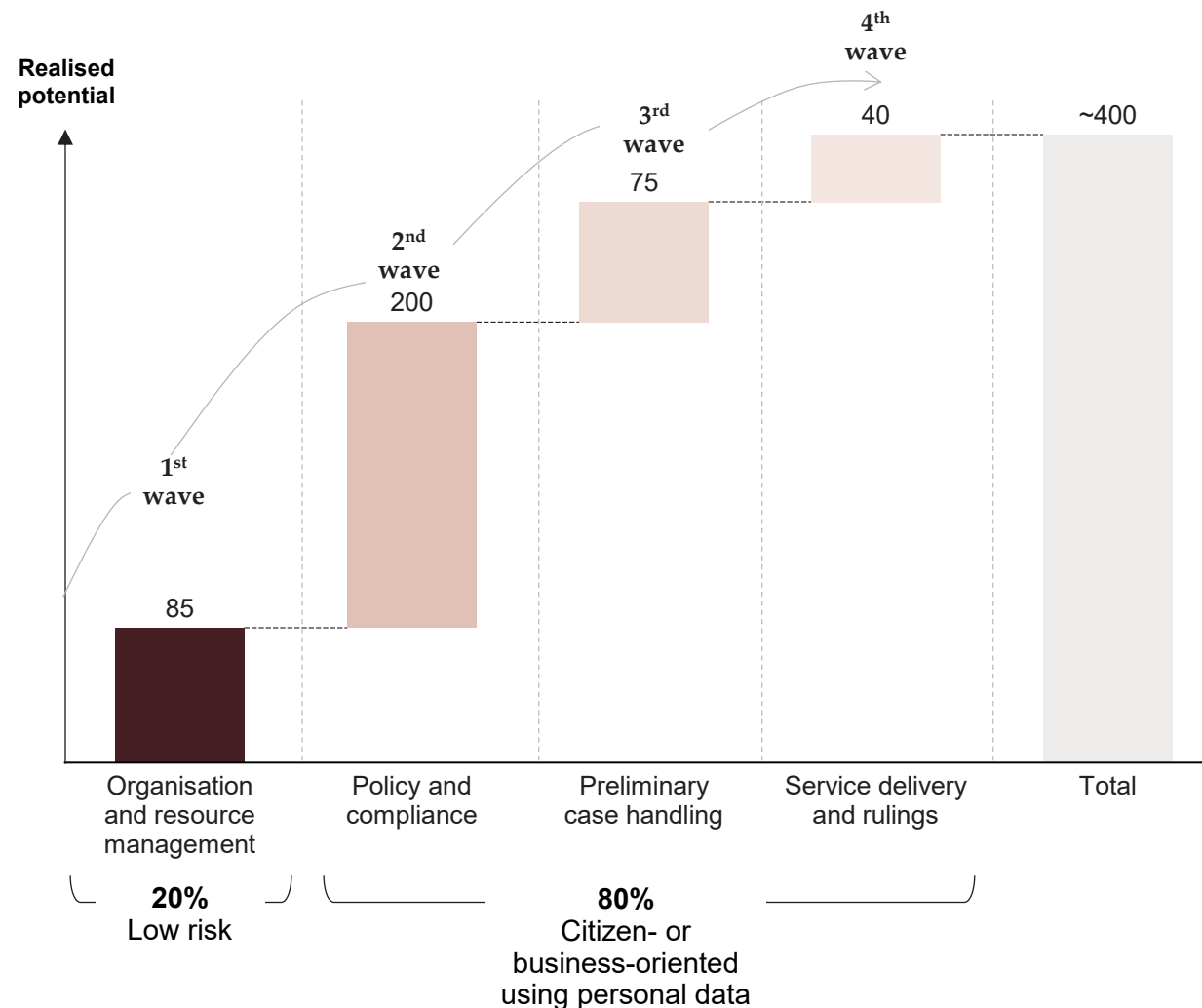
Start with the lowest risk and work up to tasks with high citizen impact

In a first wave, public authorities could consider implementing low-risk, internal AI applications that do not involve sensitive data. These initiatives offer valuable learning experiences and develop the AI capabilities needed for more complex, external-facing solutions.

Simultaneously, central government should ensure that critical enablers are in place to begin adoption of the 2nd and subsequent waves of advanced AI applications, which make up the remaining 80% of the potential.

While the greatest immediate potential for AI in public administration lies within internal administrative processes, the broader application of AI in citizen- and business-facing services holds transformative potential for the public sector as a whole.

Potential value creation from generative AI in public administration in Luxembourg EUR million at widespread adoption



Note: There is much uncertainty around the capability and adoption timeline of generative AI. The estimation of the potential of AI across key cross-cutting tasks is based on an augmentation of Briggs & Kodnani (2023) with granular Luxembourgish employment data and an expert-assessed, exhaustive framework of the task composition within public administration, which is mapped to the rich database of task descriptions within O*NET. Our estimate is the isolated potential of generative AI at widespread adoption. The estimated boost from generative AI may not be fully additive to growth projections. Estimates are based on the most detailed employment data available for sector O in LU, imputed with employment distribution data for sector O in Belgium at the ISCO level 4. Source: Implement Economics based on STATEC, STATBEL, O*NET, Briggs and Kodnani (2023).



PART I

Think ‘impact-oriented’

- Use cases directly or indirectly impacting citizens or businesses constitute 80% of the AI potential in public administration



AI-enabled solutions can contribute to better public services in a variety of ways. They become particularly obvious in citizens’ interactions with public authorities by providing improved, tailored public services.

Artificial Intelligence – A Strategic Vision for Luxembourg (2019)

The Luxembourgish government must ensure support for AI from their employees and citizens

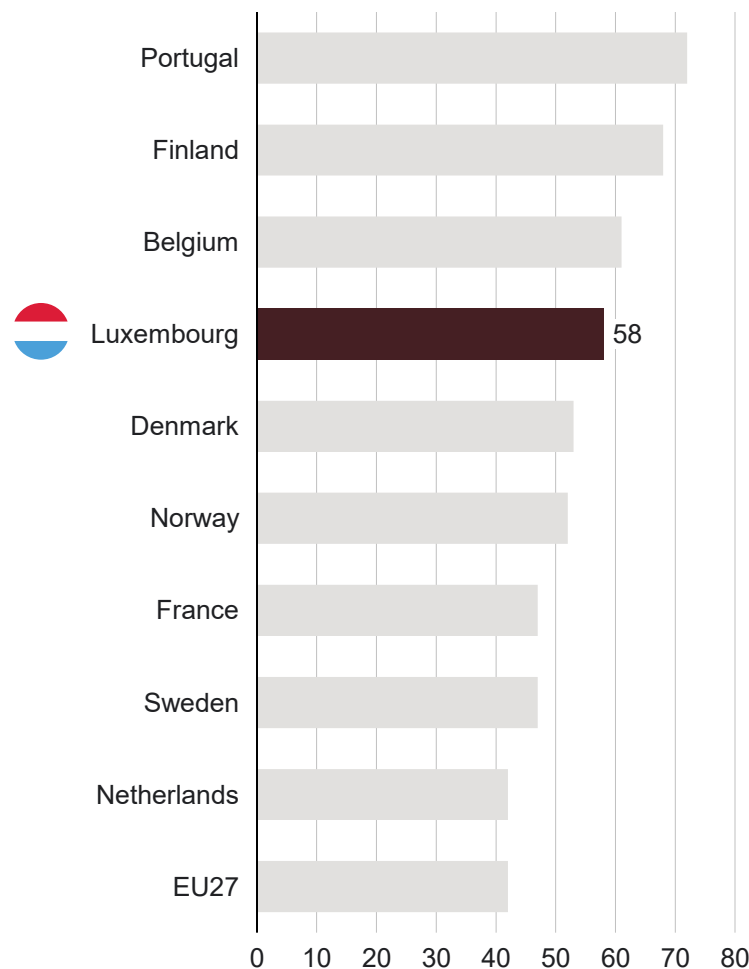
The majority (58%) of Luxembourgish citizens support the use of AI in public administration to enhance productivity.

However, public sector professionals remain sceptical about its impact on their own productivity. 38% of surveyed Luxembourgish public sector officials believe AI will complement their productivity, compared to 75% of the general workforce.

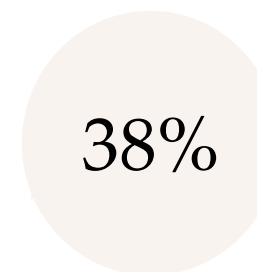
To realise the economic potential through successful implementation of AI, the Luxembourgish government need the confidence of their employees.

To maintain and increase public support for AI in government, it is crucial to implement AI applications with clear benefits for citizens and businesses in contrast to technical and narrow cost-cutting benefits.

Support in the use of AI to improve government processes %



...of surveyed Luxembourgish workers think that generative **AI tools** will help them be more productive

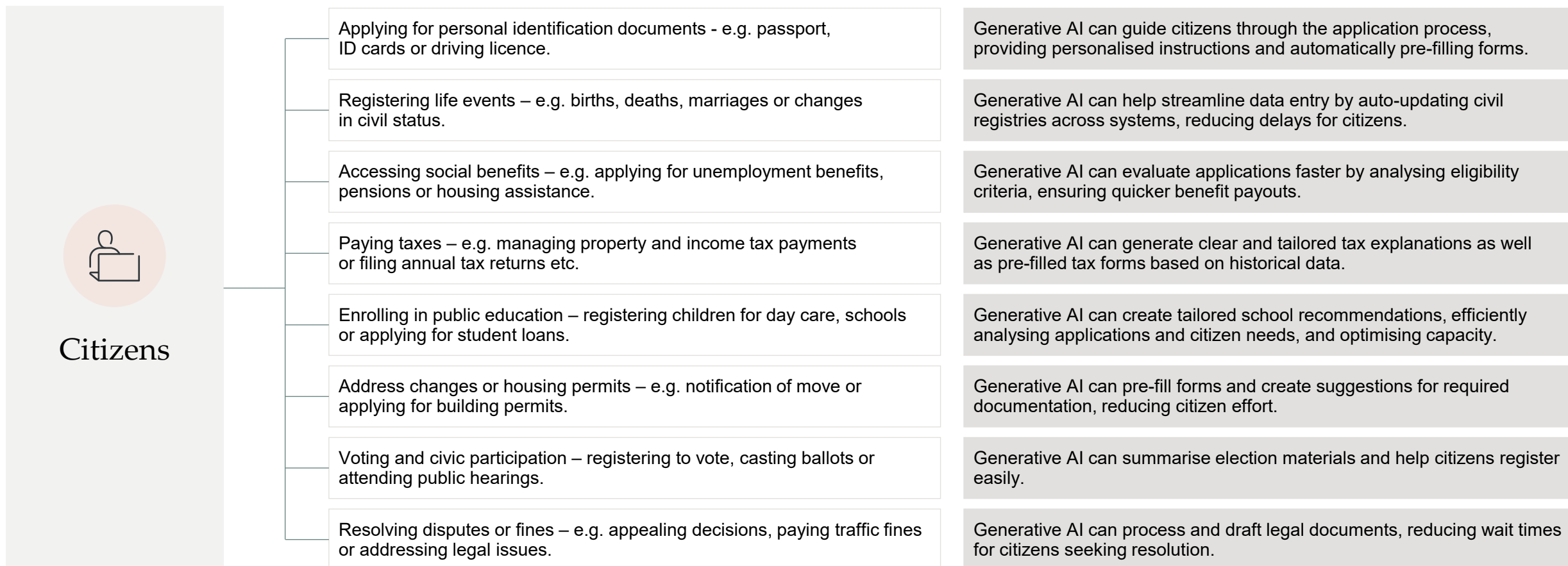


...of surveyed Luxembourgish **public sector** professionals think that generative **AI tools** will help them be more productive

Note: The respondents were asked whether they support AI tools being used to help process government and customer service requests faster.
Source: Implement Economics based on survey data from Public First on behalf of Google.

Generative AI can save time and hassle for citizens when interacting with public administration

➤ **By integrating generative AI into public administration, services can become faster, smarter and more accessible for citizens.**



Generative AI can simplify businesses interactions with public administration



By assisting in documentation, reporting and application processes, generative AI can save time and money for businesses when interacting with public administration.

Examples of interactions

Applying for government contracts – e.g. submitting tenders or meeting compliance criteria.

Obtaining or renewing permits – e.g. applying for operating licenses, construction permits, or health and safety certifications.

Applying for financial support – e.g. grants, subsidies, innovation funding, or support programmes.

Claiming financial rebates – e.g. claiming tax refunds or rebates.

Filing regulatory compliance reports – e.g. submitting required reports for business operations or audits.

Collaboration with employment services – e.g. accessing pool of jobseekers and participation in subsidised upskilling programmes.

Navigating pre-qualification processes – e.g. completing steps to demonstrate eligibility for specific programmes or services.

Submitting applications for certifications – e.g. applying for professional, compliance, or operational certifications.

Examples of how generative AI can improve interactions

Generative AI can provide tailored templates and compliance checklists to streamline bid preparation.

Generative AI can act as a virtual assistant, guiding users through form completion.

Generative AI can streamline funding applications by suggesting tailored inputs and ensuring alignment with programme criteria.

Generative AI can analyse receipts and flag eligible expenses, helping businesses maximise their rebate potential.

Generative AI can automate report creation, transforming raw data into polished submissions.

Generative AI can bridge the gap between businesses and jobseekers by matching skills to needs.

Generative AI can simplify eligibility checks, offering step-by-step guidance and pre-screening data for quick approvals.

Generative AI can help businesses assemble the perfect submission, identifying key documents and formatting tips.



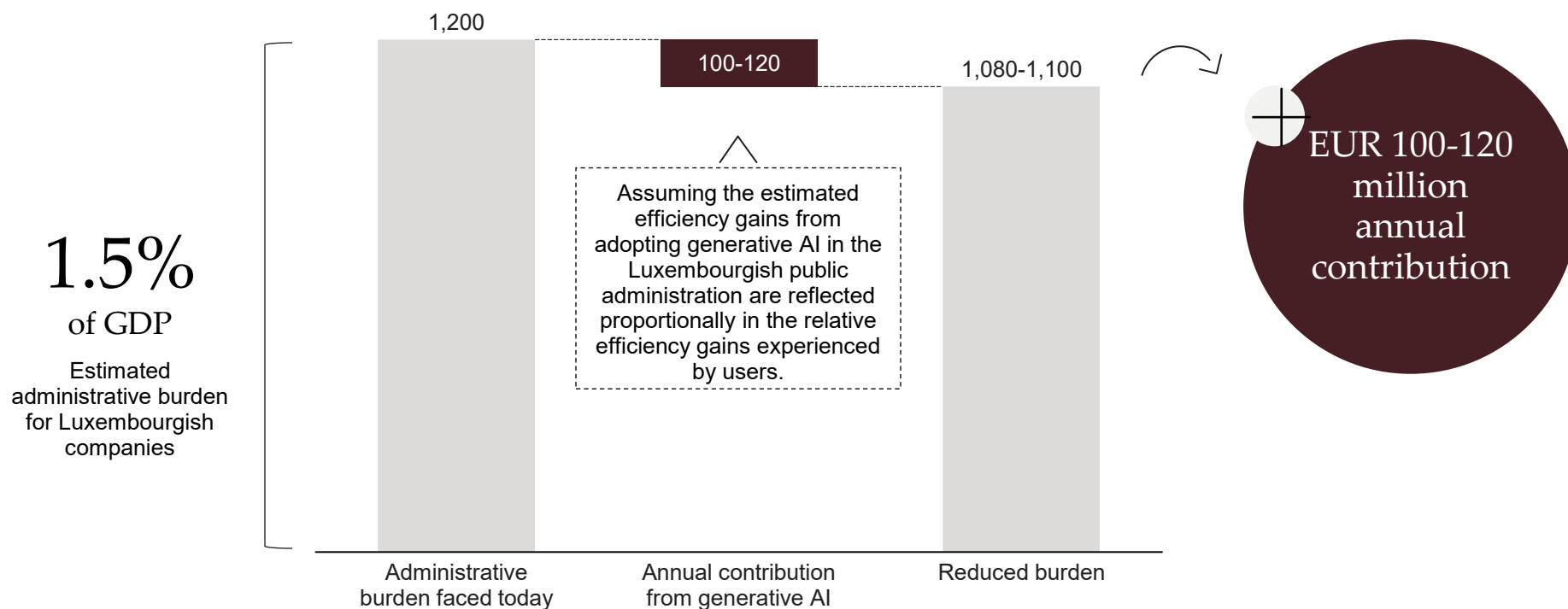
Businesses

Generative AI can reduce Luxembourgish companies' administrative burden by EUR 100-120 million

Luxembourgish companies are facing a significant administrative burden defined as the effort required to supply mandatory information under national and EU laws and regulations. Generative AI has the potential to significantly reduce this burden.

Administrative burden faced by Luxembourgish companies

EUR million at widespread adoption



Perspective



Beyond administrative cost savings, generative AI in public administration is expected to bring additional business impacts, such as:

- Freeing up resources for other value creating tasks.
- More efficient allocation of resources.
- Increased speed and flexibility in company processes.

Case: Luxembourg’s Guichet.lu now leverages an AI-powered assistant to cut workload and deliver faster, more personalised online citizen services



The challenge

- Complex administrative procedures
- Forms require manual filling by citizens
- Long waiting times for help



The solution

- A generative AI tool was deployed on Guichet.lu and MyGuichet.lu
- The system auto-generates personalised responses
- The solution pre-fills forms and supports multiple languages



The impact

- Enhanced citizen satisfaction through faster, more accurate, and user-friendly online services
- A reduced administrative workload has significantly shortened processing times, enabling public officials to focus on exceptional cases



Case: The Swedish Tax Agency has reduced waiting time on business registrations by 3.5 days, and an AI-powered chatbot is handling about 50% of its conversations outside opening hours



The challenge

- Long waiting times on phone and e-mail.
- Citizens and businesses could only contact during opening hours 9-15.
- Bottlenecks during tax deadlines.



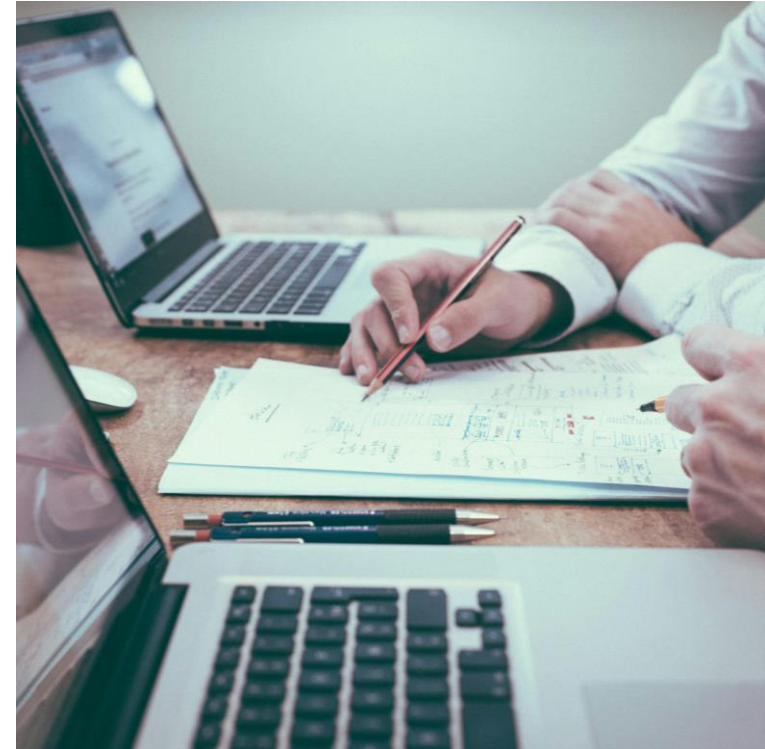
The solution

- Almost 30 AI services deployed.
- AI chatbot answering tax and personal record questions.
- 24/7 service to assist citizens and businesses any time.



The impact

- Chatbot handling ~500,000 conversations annually.
- ~50% of chatbot conversations answered outside opening hours.
- Waiting time for business registrations reduced by ~3.5 days.



Case: In Belgium, 92% of users are satisfied with the service from an AI-powered recruitment solution that improves job matching and saves time for citizens



The challenge

- Skills gap between workforce and employers' needs.
- Traditional recruitment process is time consuming and resource intensive.
- Lack of personalisation and customisation in job suggestions.



The solution

- AI generated suggestions for upskilling and training.
- Map out where there is the highest probability of finding work.
- Extensive personalisation and pre-filling of questionnaires.



The impact

- 92% of citizens are satisfied with their contact with the job centre.
- 80% reduction in time spent on job match questionnaires.



Case: Digital case handling has reduced waiting time on building permits for companies and citizens by more than 40% in Denmark’s Municipality of Copenhagen



The challenge

- Long waiting times on building permits.
- Complex legislation.
- Rising stock of unhandled cases.



The solution

- An AI assistant is used to navigate complex legislation.
- Documents drafted for case handlers using generative AI.
- Robots automatically execute parts of the case handling.



The impact

- Waiting time reduced by 4.5 months (more than 40%).
- Stock of unhandled cases reduced by more than 70%.
- Released time spent on guiding applicants in the most complex cases.



Case: Estonia has a bold vision for generative AI, and currently citizens and companies can use Bürokratt, a network of virtual assistants providing six different services across eight institutions



The ambition

- 90% of citizen requests should be handled by virtual assistants in 2026.
- 70% reduction of citizens' administrative burden by 2030.
- Digital government should be cloud-native by 2030.



The solution

- A network of virtual assistants built on a scalable architecture.
- Modular development based on continuous citizen feedback.
- Data security and privacy by design using a common data infrastructure.



The impact

- Six different services across eight institutions.
- Multichannel virtual assistants can be accessed via voice and text.
- Private developers can integrate and extend Bürokratt's capabilities.



Summary of part I

The government of Luxembourg is right to update its national AI strategy, and should ensure that its approach is ...



‘Task-based’



Prioritise cross-cutting tasks to achieve economies of scale while addressing local needs. Implement a cross-institutional AI procurement strategy with clear roles and responsibilities across government levels to ensure user alignment and scalability.



‘Risk-conscious’



Start with low-risk, internal AI solutions, and gradually move to more user-sensitive, external AI applications to realise the bulk of the potential.



‘Impact-oriented’



Concentrate on AI applications with real user impacts, i.e. solutions that reduce the time and hassle of citizens’ and businesses’ interactions with public administration.



Create cloud clarity



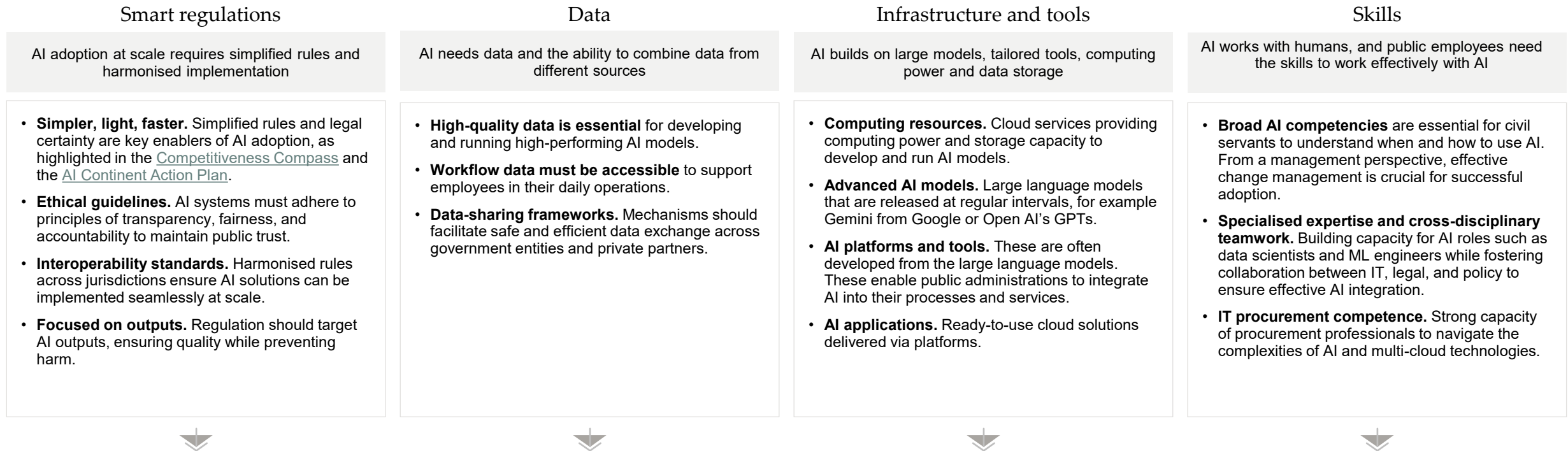
Make smart
procurement choices

PART II

Getting the critical enablers in place

Public administrations need to address critical barriers to enable the opportunity of generative AI

To benefit from state-of-the-art AI solutions, public administration relies on...



...yet two key barriers must be overcome to enable effective generative AI adoption in public administration:



Regulations create uncertainties around data usage and cloud computing



Specialised IT-requirements lead to a risk of vendor lock in

These two barriers are addressed on the next pages.



PART II

Create cloud clarity

- Privacy and security concerns can lead to misconceived preference for on-prem solutions.



Given the strategic importance and high complexity of this topic, Luxembourg is keen to invest in an enhanced AI friendly framework. This means looking at new regulation that can enable a functioning data marketplace, for example, in order to remove barriers to secure AI development.

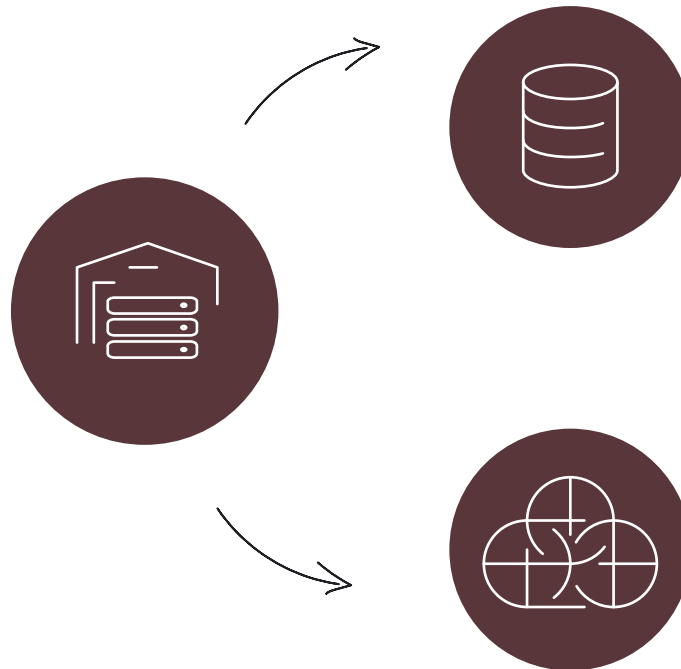
Artificial Intelligence – A Strategic Vision for Luxembourg (2019)

Public authorities face uncertainty in AI adoption due to conflicting EU data and cloud regulations

The EU enforces strict regulations to safeguard privacy and protect individual rights in AI and data usage...

...however, the complexity of these rules creates uncertainty, hindering public authorities from adopting AI solutions

EU regulations, such as GDPR and the AI Act, are designed to safeguard citizens' rights by enforcing strict compliance on personal data protection and ethical AI use, ensuring transparency, accountability, and fairness in digital systems.



Lack of clarity around data usage. The lack of clear guidelines on data use and inter-agency sharing creates hesitation, delaying innovation, and contributes to a fragmented AI landscape.

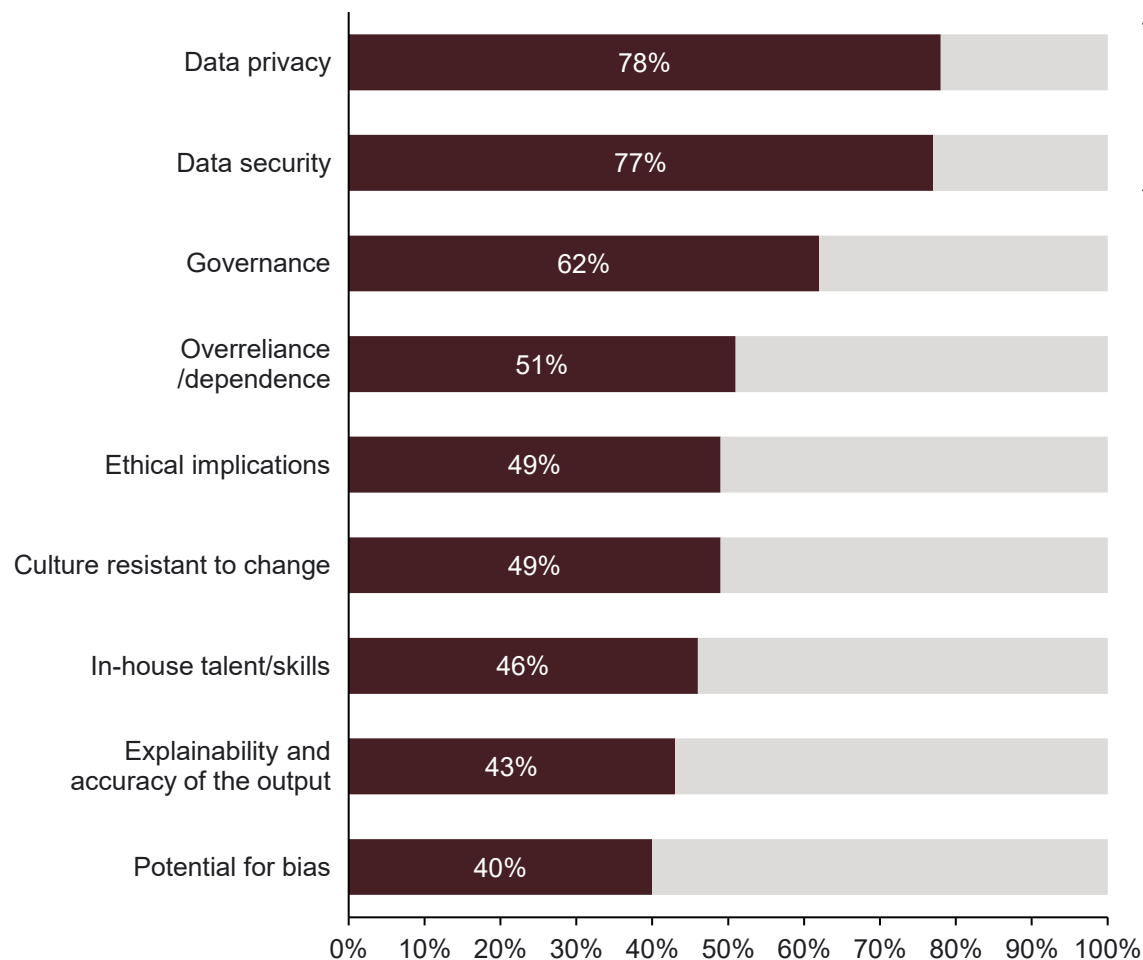
Uncertainty around cloud-based solutions. Fragmented and complex rules with unclear interpretations make it difficult for authorities to know whether widely used cloud infrastructure meets legal obligations. This lack of clarity often results in hesitation, costly delays, and the adoption of suboptimal solutions.

Authorities hesitate to adopt AI tools due to concerns over data privacy and security

European organisations are concerned about leveraging cloud-based AI tools and sharing data across multiple stakeholders due to stringent data privacy and security regulations.

However, sovereign cloud solutions like [Google Cloud](#) can address these challenges by ensuring data, operational, and software sovereignty, thus enabling secure data collaboration while maintaining compliance with European standards.

What are your concerns regarding the usage of generative AI in your organisation? % of respondents among government leaders globally



This highlights the critical role of AI infrastructure and tools in scaling generative AI solutions, and emphasises the need for proactive strategies to ensure responsible use.

Note: The survey was conducted by Coleman Parkes from February to April 2024, targeting 1,600 decision-makers in generative AI strategy or data analytics across government organisations and other key sectors globally. The results shown specifically reflect responses from government organisation respondents.
Source: Implement Economics based on SAS Institute (2024).

A secure and competitive cloud infrastructure is crucial for AI use at scale

AI infrastructure for public sector must be:

- **Efficiently scalable** to accommodate new solutions and fluctuations in demand.
- **Adaptable** to integrate emerging leading technologies and capable of operating on a multi-cloud level.
- **Secure**, ensuring data privacy and leveraging best-in-class cybersecurity capabilities to protect against the evolving threat landscape.
- **Interoperable**, enabling seamless collaboration and data exchange between authorities.

Given the high computational and specialised hardware requirements for state-of-the-art AI, adapting on-premise supercomputers is both prohibitively expensive and inefficient.

Widespread AI adoption in public administration depends on a secure, robust cloud infrastructure that meets these unique demands. Therefore, the most cost-efficient and scalable solutions are best sourced from specialised suppliers.

To achieve scalability, adaptability, security and interoperability the AI infrastructure must provide:



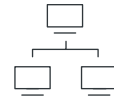
Compute capacity



Leading AI models



Data storage and pipelines



Network and connectivity



AI tools and applications



Security measures and monitoring



Considering the significant computing demands of AI solutions, establishing sufficient capacity on-premise would be prohibitively expensive and inefficient.

The Luxembourg government acknowledges the importance of cloud access and has established a partnership for a sovereign, disconnected cloud with Clarence—a joint venture between Proximus Luxembourg and LuxConnect that leverages Google Cloud technology.

Cloud provides a cost-effective AI infrastructure adaptable to technological advancements

To effectively use generative AI in public administration, substantial computing resources are needed. On-premise infrastructure demands significant upfront investment and risks becoming outdated before costs are recovered, locking institutions into current technology levels.

To ensure future-proofing and cost efficiency, Luxembourg should expand its cloud strategy to include private sovereign cloud solutions that provide continuous AI compute capacity, lower initial costs, and rapid adaptation to emerging AI technologies

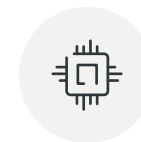
160%

Computer performance has improved by 160% in around two years, and AI is a fast-evolving technology that will require constant updates to compute capacity.

Example Luxembourgish Tax Chatbot



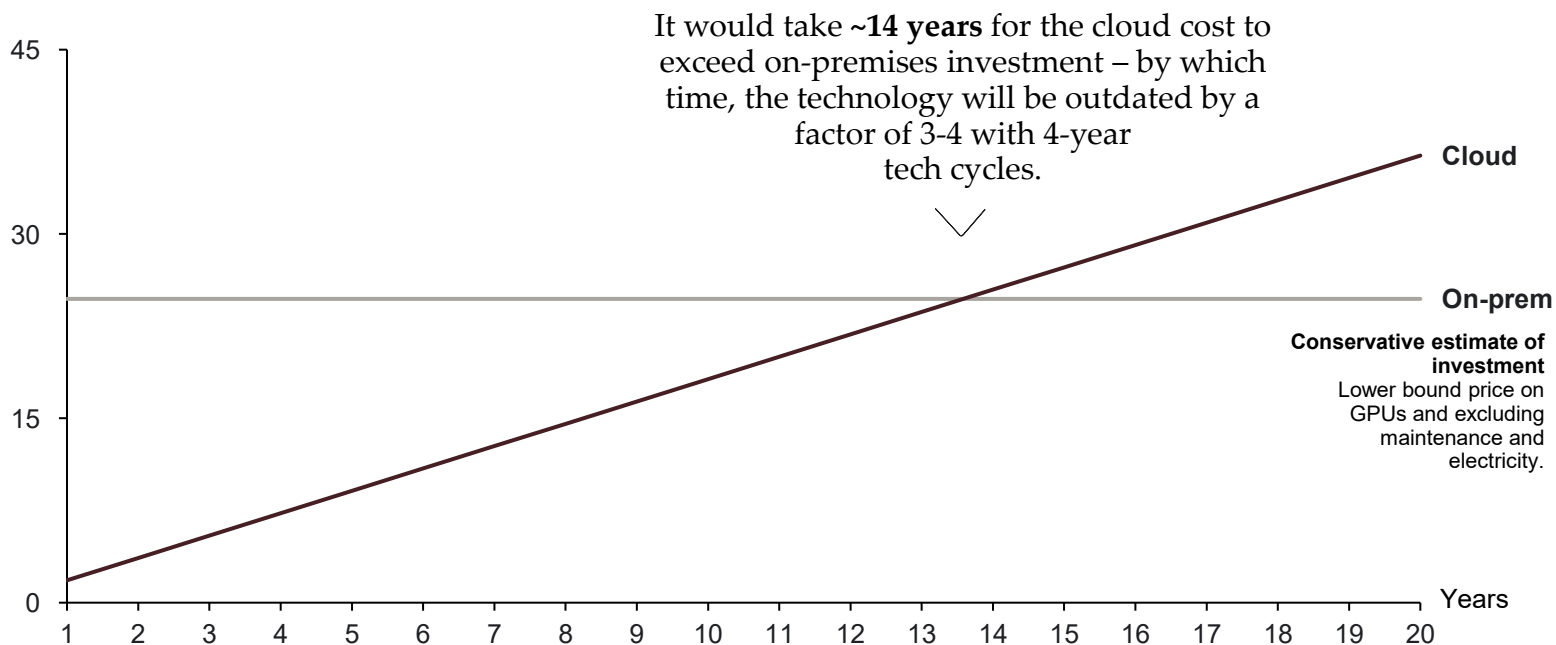
~220,000 citizen inquiries are handled by the Luxembourgish Tax Authority each year. These could be automated by an AI-based chatbot, either in the cloud or on-premise.



2-3 GPUs is needed to handle the average flow of requests, costing around of EUR ~25,000 for on-prem investment, compared to an average annual cost of EUR ~1,800 for a cloud service.

Accumulated costs for chatbot implementation (illustrative)

EUR thousand



Note: Inquiries are assumed to be evenly distributed across 16 hours a day and every day of the year, resulting in a constant load throughout the year. Each inquiry is estimated to average 750 words, with approximately two tokens per word, leading to a total of approximately 325 million tokens per year based on an annual volume of 220,000 inquiries. For cloud-based deployment, the cost is estimated at EUR 1,800 per year, derived from token processing and computational resource usage. For an on-premises setup, it is assumed that 220,000 inquiries per year translate to an average of 0.6 active inquiries per minute, assuming an even distribution 16 hours a day every week. Each active conversation requires four GPUs, and the estimated cost per high-end GPU, including VRAM and hardware, is EUR 10,000. This brings the total on-premises cost to approximately EUR 25,000. Achieving adequate performance for French-language processing would require a large language model, such as Llama70B, which demands 123 GB of VRAM per GPU for effective operation.

Source: Implement Economics based on [OpenAI](#), [Llama](#), and [Digital Decade \(2024\)](#).

Cloud provides the flexibility to scale with fluctuating demands

The demand for public AI applications varies significantly throughout the day and year. During peak periods, a high volume of tasks must be handled simultaneously, placing substantial pressure on AI infrastructure.

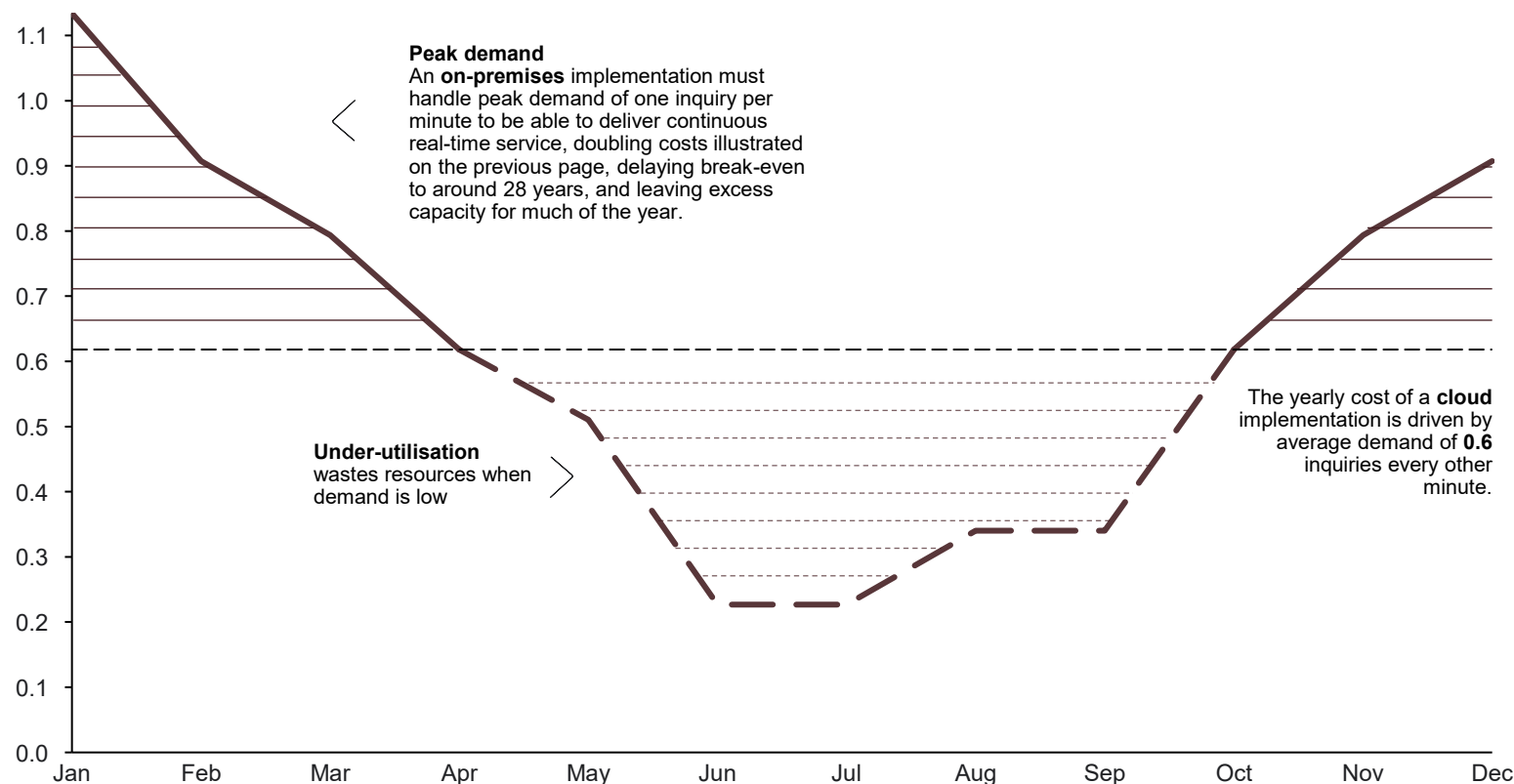
Cloud solutions offer flexible scalability, with costs tied to actual usage.

In contrast, an on-premises setup requires investment not only for average demand but also for peak capacity to avoid bottlenecks.

Example Tax Chatbot

Inquiries per month (illustrative)

Average inquiries per minute



Establish clear regulatory guidance and procurement practices for cloud-based tools to unlock the AI potential

The government of Luxembourg has already taken important steps with the [Clarence partnership](#), but must still work to establish a clear framework for secure and compliant cloud adoption, enabling public actors to adopt the most cutting-edge AI solutions at scale. Strengthening central coordination and establishing clear standards should ensure digital sovereignty, business continuity, and data protection in the public procurement and adoption of cloud-based tools and infrastructure.



Implement a centralised cloud strategy. Adopt a cohesive nationwide cloud policy applied consistently across all government levels, including local and decentralised entities. Centralised procurement guidance will ensure that security and compliance standards are universally applied.



Strengthen oversight and transparency. Clarify regulations to eliminate legal uncertainties and ensure public actors can adopt cloud services effectively and securely. Furthermore, transparent reporting practices should be established to provide a clear overview of cloud usage across public administrations without increasing oversight burdens.



Safeguard digital sovereignty and resilience. Governments should prioritise digital sovereignty by enforcing interoperability and planning exit strategies. Collective action ensures data localisation and safeguards critical public services from external risks.



Conduct and update risk assessments. Mitigate risks through government-wide risk assessments, evaluating sovereignty, service continuity, data protection, cost, and innovation. Regularly update assessments for all cloud services, adapting to evolving risks.



PART II

Make smart procurement choices

- To adopt AI at scale, the Luxembourgish government needs to re-invent the way they procure digital services to ensure flexibility, innovation and competition

Restrictive licensing terms hold back vendor switching

Public institutions frequently use specialised IT systems designed for specific needs, which limits their flexibility and makes adopting new technologies such as generative AI difficult. Vendor lock-in occurs when institutions rely on a few suppliers, restricting adaptability and causing [high costs](#) due to technology dependence.

Restrictive contractual terms make cloud switching and multi-cloud adoption more costly or even unviable. Several studies have examined this:

In a recent survey of +1,200 IT decision-makers across five European countries, [Savanta](#), a data intelligence company, finds evidence of restrictive licensing and other activities that inhibit market competition.

The [Competition & Markets Authority](#) in the UK provisionally found that restrictive licensing **harms competition** in cloud services.

In the EU, the Commission is [currently considering](#) investigating restrictive software licensing.

In a recent study, the German think tank [ZnT](#) finds that restrictive licensing imposes a significant financial burden, with transferring existing software licenses to third-party cloud services potentially costing up to 25% of annual expenditure.

Licensing issues in the public sector are also rife, with 6 in 10 organisations that have considered switching saying that a key reason why they didn't change IaaS providers was due to existing licensing terms.

We have also provisionally found that there are technical barriers and commercial barriers in the form of egress fees to switching and multi-cloud that harm competition in cloud services in the UK by locking customers into their initial choice of provider which may not reflect their evolving needs.

... restrictive licensing practices by dominant software and cloud providers are creating a financial burden, limiting choice, and hindering innovation.



60%

of surveyed IT decision makers in the public sector cited licensing restrictions as a key barrier to switching.

Note: Survey results for Social Market Foundation, [Savanta Survey](#) (respondents comprise N=1,241 IT decision-makers across UK, France, Germany, Netherlands and Spain – here summarised as representative for the EU27). The reports mentioned here further provide insightful estimates on the financial burden caused by vendor lock-in. However, these calculations rely on a number of assumptions making them unfit for direct conclusions.
Source: Implement Economics based on [Jenny, F. \(2023\)](#), [CMA \(2025\)](#), [SMF \(2024\)](#), [ZnT \(2025\)](#) and [Savanta \(2024\)](#).

Ensure flexibility and hybrid capabilities to meet evolving needs in public procurement

Governments must prioritise flexible procurement strategies to mitigate the risk of overreliance on a single provider, emphasising open data standards and interoperability to ensure long-term competition and adaptability. An AI procurement strategy should ensure that vendors meet key criteria, including:



Guarantee data security and compliance, ensuring adherence to national and EU laws (e.g., GDPR) while maintaining strict security protocols.



Offer scalable and flexible infrastructure, capable of adjusting resources based on the changing needs of public administration while ensuring reliable performance.



Align with public sector ethical standards, ensuring AI solutions promote fairness and transparency, and mitigate risks such as algorithmic bias.



Provide clear service level agreements with accountability, ensuring defined performance metrics, uptime guarantees, and fast response times for addressing service failures.



Ensure interoperability with existing systems, enabling seamless integration with current government IT infrastructure to reduce disruption and implementation costs.



Provide carbon footprint data using state-of-the-art data on the hour-by-hour carbon free energy for the operational emissions of the data centre.

Summary of part II

To address critical enablers, the government of Luxembourg should...



Create cloud clarity



Develop a clear framework for secure and adaptable cloud adoption by centralising strategies and improving oversight.
Regularly update risk assessments to ensure innovation, transparency, and resilience.



Make smart procurement choices



Optimise AI and cloud procurement by ensuring flexibility, scalability, and alignment with open standards to avoid vendor lock-in.
Strengthen the government's position by monitoring subscription costs, purchasing only necessary functionalities, and enforcing ethical, secure, and sustainable practices in contracts with vendors.



PART III

A bold vision for the government of Luxembourg



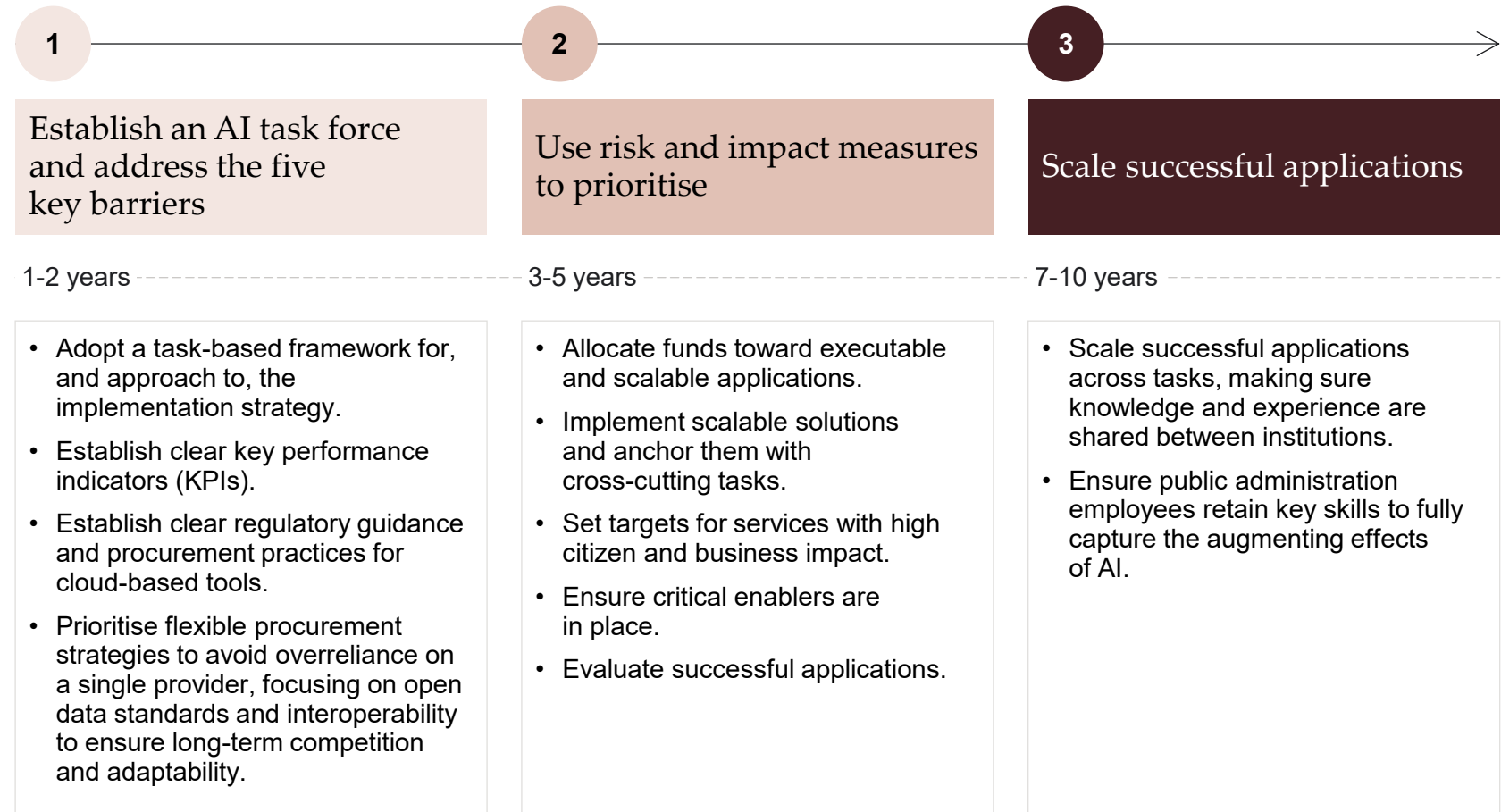
Set ambitious targets and make an actionable strategy with clear milestones

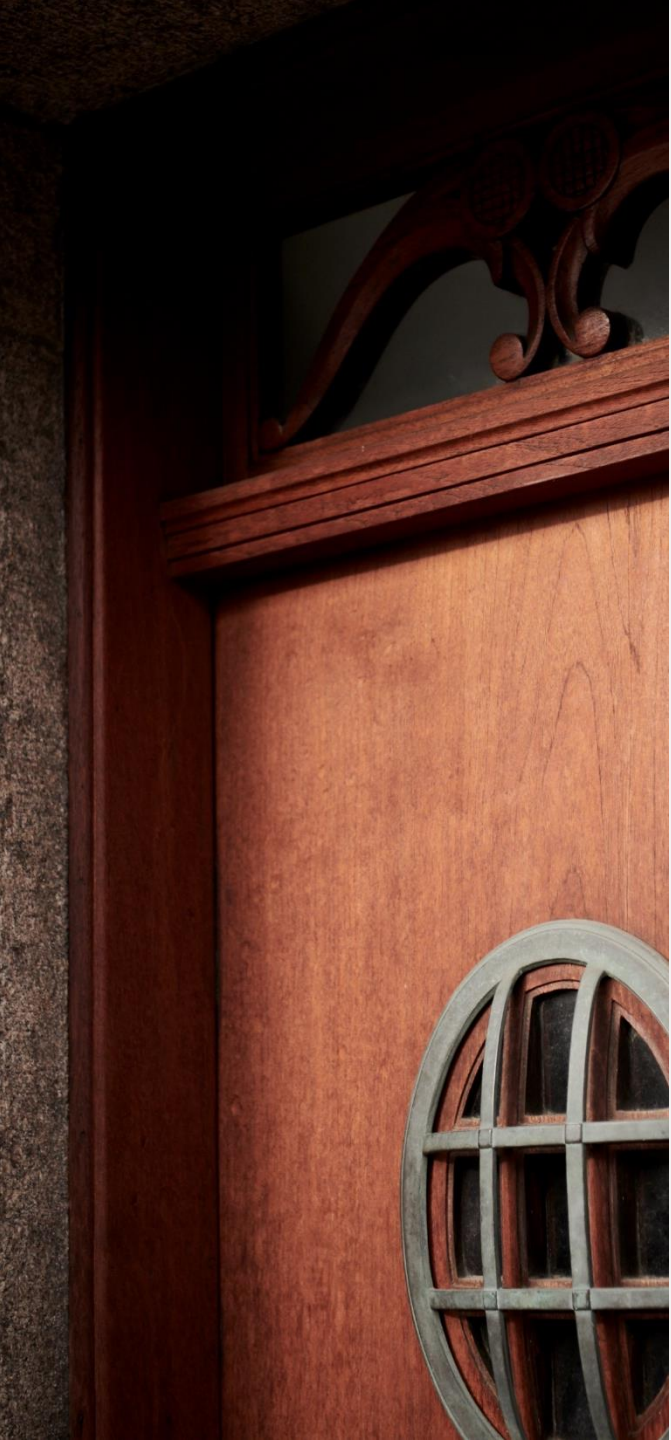
Luxembourg's [Strategic Vision for Artificial Intelligence](#), published in 2019, set an ambitious targets for harnessing AI across the economy and society. In addition, the Ministry of Digitisation is following the development of AI closely in the [AI4GOV](#) that coordinates and brings stakeholders together.

However, these early initiatives do not address the new challenges emerging from generative AI technologies. To fully exploit the opportunities – and mitigate the risks – of these rapidly evolving tools, Luxembourg must take new steps towards a central strategic approach.

Implement suggest that Luxembourg develops an updated AI strategy that applies risk and impact measures to address key barriers and harness the scalability of successful generative AI applications.

High-level roadmap for capturing the AI opportunity within public administration





Appendix

Modelling the potential impacts of AI on public administration

Overview of the methodological approach to calculating the exposure to and productivity impact from generative AI

1

Automation potential of work activities: The exposure to generative AI is calculated by breaking down the automation potential of unique task descriptions and their associated general work activity in the occupational task database O*NET. In line with Briggs and Kodnani (2023), the methodology assumes that 13 of 41 overall work activities (e.g. getting information, performing administrative activities etc.) can potentially be automated by generative AI, and in the base scenario we assume that tasks with a difficulty up to level 4 on the O*NET-delanded scale can be automated.

2

Mapping automation potential of work activities to occupations: First, the 41 work activities for 900 US occupations are mapped using importance-average activities for each occupation, providing an estimate of the share of each occupation's total workload that AI has the potential to automate. Secondly, this number is projected from US to European occupations through the European Commission's crosswalk between ESCO and O*NET and finally compiled into aggregated occupations (using the sub-occupation employment). This leaves us with the three shares that describe how big a share of the work activities for each occupation is expected to see: No automation, AI complement and Likely replacement. For public administration, we map detailed ISCO level 4 employment data anchored in Luxembourg to the above-mentioned taxonomy.

3

Quantifying productivity gains in public administration: Generative AI is assumed to affect the productivity of the work activities for each occupation as follows: The "No automation" share of work activities is assumed to be unaffected by generative AI. "AI complement" work activities experience a productivity boost from automation. "Likely replacement" is the share of work activities in a sector that is expected to be entirely automated/replaced. These workers are expected to be re-employed in slightly less productive jobs. The three effects are calculated in public administration in Luxembourg and scaled by the sector's value added to determine the full productivity potential/generation of new jobs from generative AI. Only part of the total long-run productivity increases from generative AI is expected to materialise in the economy during the initial ten-year period of technology adoption following an S-curve adoption trajectory.

4

Mapping the potential to cross-cutting tasks: The calculated potential is distributed across cross-cutting tasks within public administration by mapping detailed work activities to an expert-assessed and exhaustive framework that encompasses the work carried out within this sector.

- The method in this paper is in line with the methodology developed by Briggs and Kodnani (2023) in "The Potentially Large Effects of Artificial Intelligence on Economic Growth".
- The estimation of the potential of AI across key cross-cutting tasks (step 4) is based on an augmentation of Briggs & Kodnani (2023) with Luxembourgish employment data and an expert-assessed, exhaustive framework of the task composition within public administration, which is mapped to the rich database of task descriptions within O*NET.

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Disclaimer

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