



Big Policy Canvas

Design and Implementation of Needs and Trends Assessment Framework

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List of Acronyms

Abbreviation / acronym	Description
AHP	Analytic Hierarchy Process
EC	European Commission
Dx.y	Deliverable number y belonging to WP x
MCDM	Multi-Criteria Decision Making
TRL	Technology Readiness Level
WHO	World Health Organization
WP	Work Package

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Executive Summary

The deliverable at hand is released within the context of Work Package 3 “Public Administrations’ Needs and Trends Identification and Assessment” and particularly relates to Task 3.2 “Design and Implementation of Needs and Trends Assessment Framework”. Following an approach, centred around the analysis and comparison of each application domain’s Demand and Supply, its objective is to provide the aforementioned framework, and thereby the methodology for:

- Assessing and prioritising public administrations’ existing and emerging needs (Axis I);
- Assessing and prioritising respectively existing and emerging trends, related to policy making (Axis II);
- Prioritising specific fields to be focused on, based on carefully selected criteria (Axis III);
- Reporting on the outcomes of its application with regard to axes I and II.

The determination of Demand counts more specifically with the determination of the number of needs and trends in each application domain, and the assessment of their criticality or intensity respectively. The determination of Supply, on the other hand, presupposes the identification of the number of assets in each application and the calculation of their score, as the aggregate of the factors “technology readiness level”, “implementation/customisation cost”, “ease of use”, “open license availability”, generated through the Analytic Hierarchy Process (AHP) multi-criteria decision making method. The comparison among Demand and Supply for each application field serves the prioritisation of application domains, and thereby, the identification of those of greater interest, importance, urgency or capability for innovation.

Axes I and II, thereby the assessment of both needs and trends, involves the mapping of the aforementioned elements against policy domains and policy cycle stages, as well as the calculation of a score that reflects either the needs’ criticality or the trends’ intensity. Axis III of the Assessment Framework targets the prioritisation of application fields. The latter is based on two dimensions of evaluation for each application field, one that has to do with the Demand side (the needs and trends identified) and the other dealing with the Supply side (the assets recorded), and their combination in a ratio.

The Big Policy Canvas Assessment Framework was applied on a total of 28 needs (9 strategical, 7 organisational, 6 technical, 4 informational and 2 legal needs) and 28 trends (8 technological, 12 conceptual and 8 societal). Application of Framework Axis III is foreseen in the follow-up deliverable of the document at hand, namely deliverable D3.3.

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1 Introduction

1.1 Purpose of the document

Big Policy Canvas is guided by the vision to transform the public sector into an effective, efficient, consistent and evidence-based policy making structure. In this respect, it lays particular emphasis on the potential of Big Data technology for the design, development and implementation of effective, evidence-based and precise policies and targets the development of an ever evolving methodological framework, backed up by an active community, for the rapid identification and assessment of actual public sector needs, as well as relevant emerging trends that may be respectively accommodated or promoted by the exploitation of the specific technology. It further targets the identification of relevant methods, tools, technologies and applications that are similarly capable of being used in a Big Data environment and pursues to couple these with the aforementioned identified needs and trends. The goal is to formulate a panorama of the public sector and consequently the policy making procedure disruption opportunities' landscape, thus bringing forward application domains, where such opportunities are higher, due to either a domain's great interest and high importance for the public sector, the accumulation in it of highly urgent and important needs or the identification of a great potential for innovation.

Along the above lines, a key task within the Big Policy Canvas project is the assessment of the public administrations' needs and the related trends, the evaluation accordingly of the public sector Big Data readiness in terms of the relevant methods, tools, technologies and applications available, either in the public sector itself or the private sector, and of course the prioritisation of public sector application fields, so as to identify areas for intervention towards materialising the project vision.

The present deliverable is released within the context of Work Package 3 "Public Administrations' Needs and Trends Identification and Assessment" and is in particular associated with Task 3.2 "Design and Implementation of Needs and Trends Assessment Framework". The latter has strong links with Task 3.1 and the identification of needs and trends, impacting public administrations and the policy making process in specific, and targets the conceptualisation and development of a framework for the evaluation of such needs and trends, and thereby its actual application on the findings of Task 3.1. Along the above lines, the objective of the present deliverable is to provide the aforementioned framework, and thereby the methodology for:

- I. Assessing and prioritising public administrations' existing and emerging needs (Axis I),
- II. Assessing and prioritising respectively existing and emerging trends, related to policy making (Axis II),
- III. Prioritising specific fields to be focused on, based on carefully selected criteria (Axis III),

as well as to report on the outcomes of its application with regard to axes I and II.

The Big Policy Canvas Needs' and Trends' Assessment Framework, which has already been presented to the BPC Experts' Committee in the context of an online kick-off meeting with the members of the latter, is primarily intended to serve the aforementioned goals within the project, but may also be

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considered as a self-standing methodological aid that can be used to support the public sector’s and individual public administrations’ transformation into transparent, trustful and evidence-based entities. In case needed, the Needs’ and Trends’ Assessment Framework will be revised and updated in the context of deliverable “D3.3 – Needs and Trends Assessment with a multidisciplinary perspective”, where Axis III application outcomes will also be reported.

1.2 Relation to other project work

Task 3.2, and thereby deliverable D3.2, stands as the continuation of Task 3.1, which has dealt with the identification and analysis of existing and emerging needs as well as relevant trends, impacting European public administrations. Task 3.2 goes a step further with regard to the analysis of these needs and trends, as it concerns not only the design and implementation of a needs’ and trends’ assessment framework, but also the actual application of the latter on the identified items. Deliverable D3.2, which is the direct output of Task 3.2, reports on the outcomes of these activities, i.e. the assessment framework development and application.

Task 3.2 and the respective deliverable are further associated with Task 3.3, which targets the completion of the assessment framework application on the final list of identified needs and trends, as well as the incorporation of the Big Data perspective in the assessment analysis.

Last but not least, Task 3.2 (and thus Deliverable D3.2) has dependencies with Work Package 4, as it is anticipated to draw input on the technological and methodological assets that can serve public administrations’ needs and related trends from Task 4.1, as well as potentially set the frame for the organisation of the Knowledge Base contents with respect to the specific items, namely the needs and trends, within Task 4.2. Overall, the BPC Assessment Framework is intended to act as the means for coupling needs and trends with assets and thereby for identifying areas, i.e. application domains for intervention. Figure 1 below illustrates Task 3.2 and thereby D3.2 relations to other project tasks.

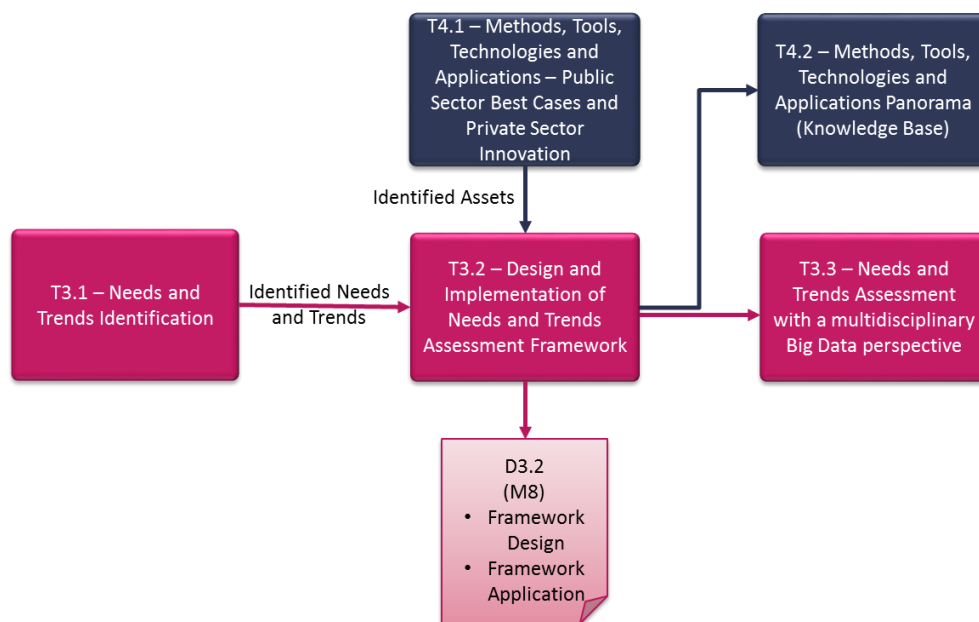


Figure 1: Relation to other project work

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1.3 Structure of the document

The rest of this document is structured as follows:

- **Chapter 2** presents some background information, i.e. exposes the assessment framework’s rationale, as well as its foundations on related previous works and developments.
- **Chapter 3** goes into greater detail with regard to the framework methodology, bringing forward its three axes of application, enumerating i. Assessment and Prioritisation of Needs, ii. Assessment and Prioritisation of Trends, and iii. Prioritisation of Application Fields.
- **Chapter 4** then proceeds with the framework’s actual application on the identified needs and trends, i.e. on the implementation of Axes I and II.
- **Chapter 5** finally summarises the contents of the deliverable and reports relevant conclusions.

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2 Background

2.1 Framework Rationale

The Big Policy Canvas Needs and Trends Assessment Framework is essentially a methodology for mapping needs and trends to application domains, as well as for assessing the former in terms of their criticality or intensity respectively, with the ultimate goal of prioritising application domains and bringing forward those of greater interest, importance, urgency and capability for innovation.

The framework builds upon the concept of the policy cycle and the individual stages that the former incorporates, as well as upon an assortment of specific and representative policy domains in the sense that it places application domains, and thereby potential areas for intervention, at the intersection of policy cycle stages with policy domains.

Along the above lines, the framework's rationale, and thereby the rationale for the prioritisation of application domains, lies in comparing for each application domain *Demand* and *Supply*;

- with *Demand* on the one hand being reflected in the *number* of needs in each application domain and their *criticality*, as well as in the *number* of trends and their *intensity*;
- and *Supply* being accordingly reflected in the *number* of assets available in the same application domain and their *score*, a metric calculated based on specific criteria, those of *Technology Readiness Level (TRL)*, *Implementation or Customisation Cost*, *Ease of Use* and *Availability of an Open License*.

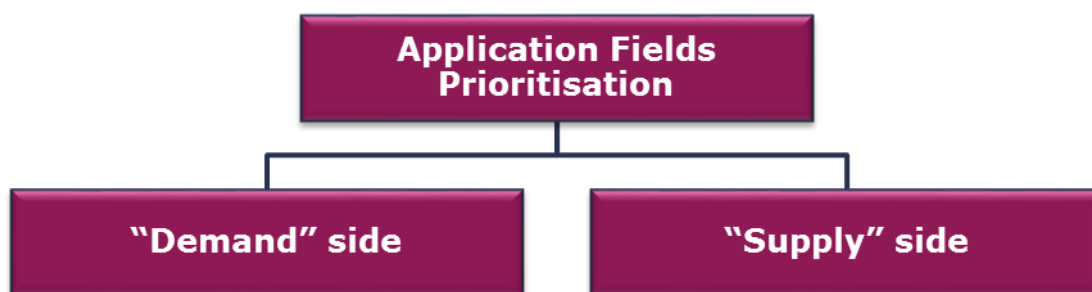


Figure 2: Big Policy Canvas Assessment Framework Rationale

The approach of juxtaposing Demand against Supply originates from the field of microeconomics [1]. It can be met however in several other areas, including but not limited to agriculture, education, engineering, environment and natural resources, information and knowledge, health, public services, welfare, etc. as the relationship between demand and supply underlies the forces behind the allocation of resources, which is a common issue in all aforementioned fields. In the context of the Big Policy Canvas Needs and Trends Assessment Framework, the Demand-Supply comparison serves, as already clarified, the evaluation of application domains and thereby the identification and prioritisation of areas for intervention.

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Addressed primarily to public administration representatives, policy makers and researchers, the Needs and Trends Assessment Framework is a methodological tool that can be customised as per the needs of the former stakeholders.

The Big Policy Canvas Assessment Framework has already been presented to and validated by the BPC Experts' Committee, whereas the BPC consortium is going to seek further validation of both its methodological content and application results through their presentation to a wider range of stakeholders in the context of the dedicated events to be organised by the project, but also through their publication on the project website and their assessment by the BPC online community. A validation workshop has already been scheduled and will be held in the context of the EGOV-CeDEM-ePart 2018 Conference that will take place in Danube University Krems, Austria, 3-5 September 2018. This workshop is expected to attract a good number of public sector-related stakeholders that will provide feedback for the Assessment Framework. Apparently, the BPC Assessment Framework is meant to be applied on the contents of the Knowledge Base, thereby it also has strong links with WP4 and Task 4.2 in specific.

2.2 Previous Work

The Big Policy Canvas Needs and Trends Assessment Framework lays, as already mentioned in Section 2.1, particular emphasis on the notion of the policy cycle, as well as on the identification and selection of a number of representative domains of public policy.

The policy cycle stands for the set activities, carried out in the context of policy making [2]. Numerous versions of the policy cycle are proposed in literature.

One of the most popular approaches regarding the policy cycle recognises five key steps that form a closed loop [3], followed also by the WHO [4] in a specific policy making toolkit [5]:

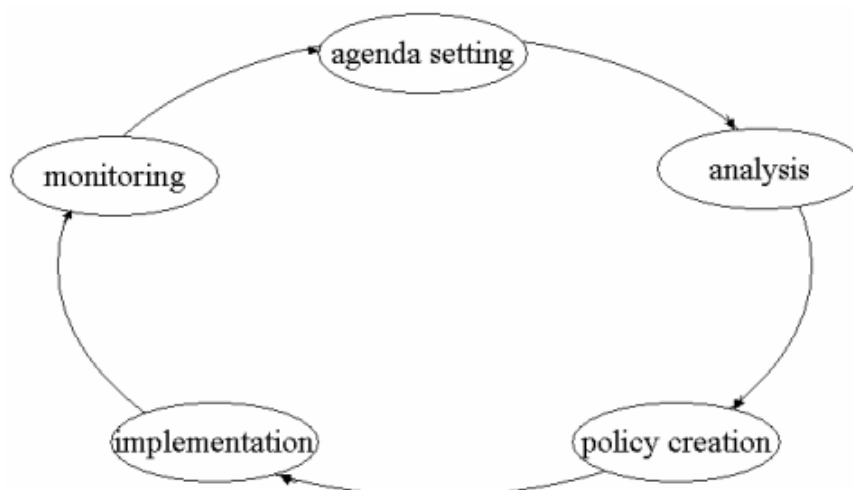


Figure 3: Policy Cycle Steps

David Paletz, Diana Owen and Timothy Cook are also in favor of this approach, slightly differentiated in terms of the name of the intermediate stages, in their book "21st Century American Government and Politics" [6]; the same goes for the National Collaborating Center for Healthy Public Policy [7].

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The policy cycles presented by Jack Meyer, Tanya Alteras and Karen Bentz Adams [8] and Jack Barkenbus [9] can be considered as predecessors of the modern approaches, as the exploitation of modern technologies in these paradigms was absent.

A more complex illustration of the policy cycle was given by Catherine Althaus, Peter Bridgman and Glyn Davis, who proposed a circular model consisting of 8 steps, namely: identify issues; policy analysis; policy instruments; consultation; coordination, decision; implementation; evaluation [10].

The UK Children and Family Court Advisory and Support Service also published a framework describing the policy cycle in 2007. What is worth noting, apart from the fact that the four phases in which it spans the policy cycle are very similar to the above-mentioned approaches, is that it is trying to strictly model the process:

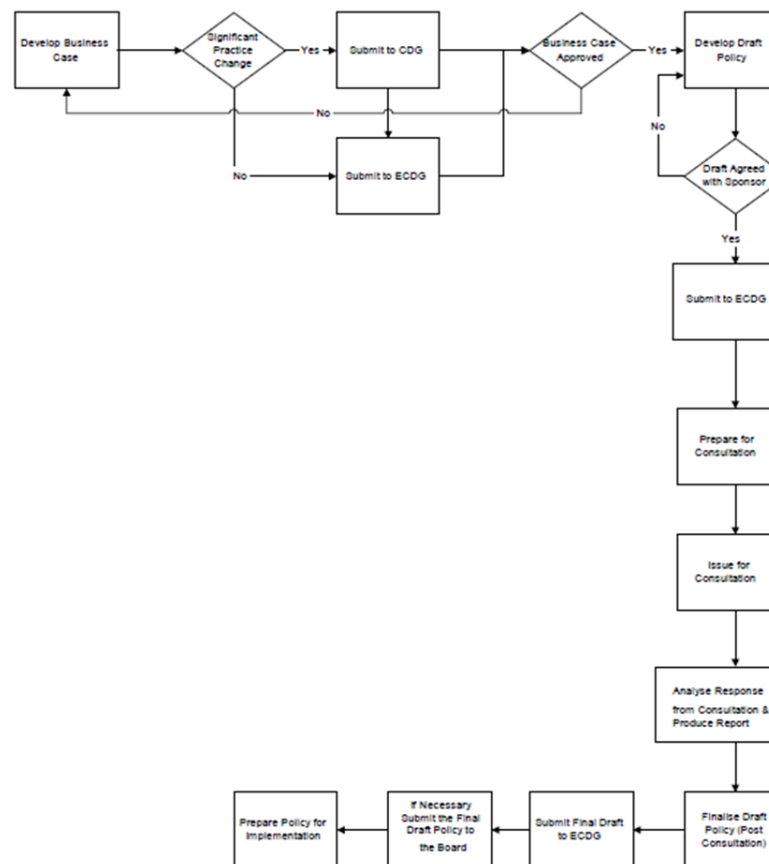


Figure 4: The Policy Making Process (Source: [11])

In the context of the Big Policy Canvas, preference is given to the description of the policy cycle [12], developed by the *CROSSOVER* project [13], which is one of the predecessors of the current project. This is a simple, yet quite comprehensive description of the policy cycle which encompasses the following five phases:

- *Agenda Setting*. This phase lies in the basic analysis on the nature and size of problems at stake, including the identification of any causal relations between different factors.
- *Policy Design and Analysis*. The policy design phase comprises the development of possible solutions, the analysis of the formers' potential impact, and the development accordingly and revision – if needed – of a policy proposal. At the end of the Design and Analysis phase, a

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stage called “Adoption” corresponds to the cut-off decision on the policy. It is the most delicate and sensitive area, where accountability and representatives are needed. Additionally, it is the area most covered by existing research on e-democracy.

- *Policy Implementation.* This is frequently considered as the most challenging phase, as it needs to translate the policy objectives in concrete activities that deal with the complexity of the real world. It includes ensuring a broader understanding, the change of behaviour and the active collaboration of all stakeholders.
- *Policy Monitoring and Evaluation.* This phase makes use of implementation data to assess whether the policy is being implemented as planned and is achieving the expected objectives.

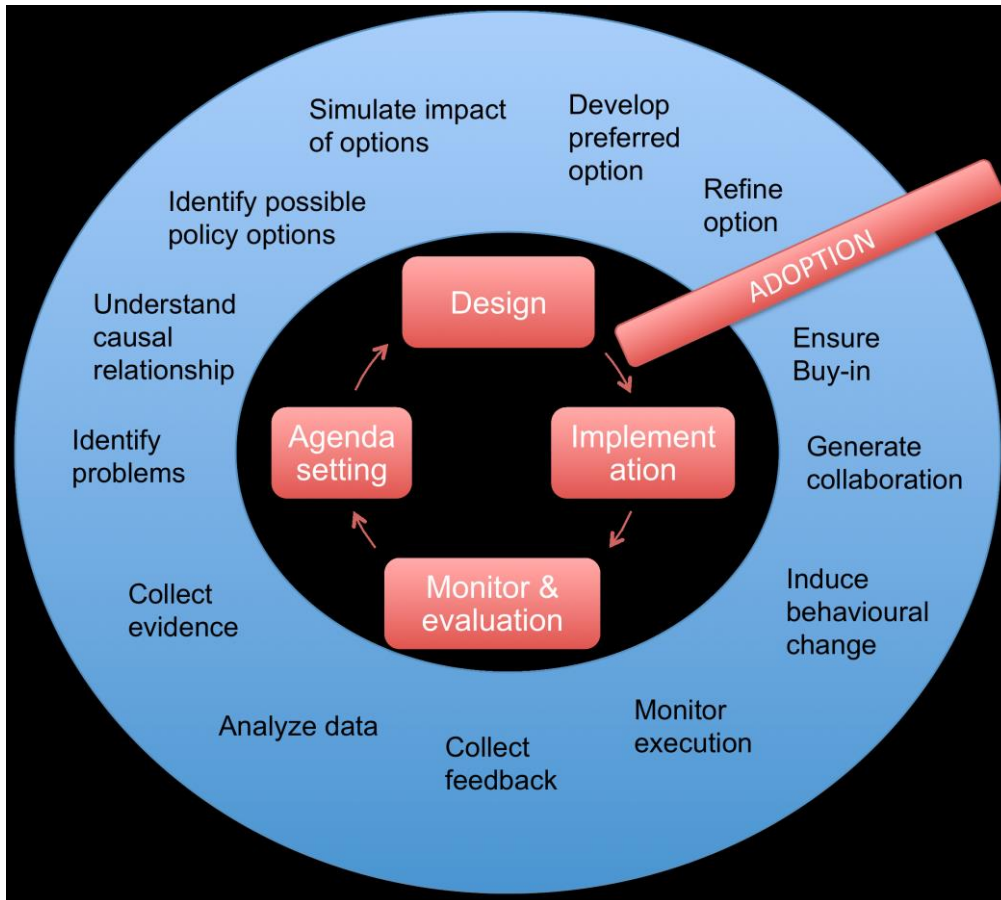


Figure 5: CROSSOVER policy cycle and related activities (Source: [12])

For the selection of the Big Policy Canvas policy domains, the consortium has basically drawn inspiration from the data categories of the European Data Portal [14] (see Figure 6). The latter is a platform that harvests the metadata of Public Sector Information, available on public data portals across European countries with the goal of facilitating their re-use. The idea for grounding the assortment of BPC policy domains on the data categories offered by the European Data Portal is that if the majority of open public data on a European level can be classified under these categories, then the latter can also be sufficient for mapping the needs, trends and assets that the Big Policy Canvas project is to identify and address or leverage in the context of supporting the public sector’s transition into an effective and transparent structure with evidence-based policy making processes.

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Figure 6: European Data Portal data categories

The selection of policy domains adopted by Big Policy Canvas for the needs of the Assessment Framework has further been refined with the help of the interviews and focus groups run by the project partners in view of identifying public administrations' needs, related trends and assets that can be used to advance policy making and encompasses the following twelve fields:

1. Agriculture, Fisheries, Forestry & Foods
2. Economy & Finance
3. Education, Youth, Culture & Sport
4. Employment & Social Security
5. Environment & Energy
6. Health
7. Institutional Questions / Internal Affairs
8. Foreign Affairs and Defense
9. Justice, Legal System & Public Safety
10. Public Affairs
11. Innovation, Science & Technology
12. Urban Planning & Transport

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3 Needs and Trends Assessment Framework

3.1 Framework Overview

The Big Policy Canvas Assessment Framework is structured across three axes. These encompass as shown in Figure 7:

- i. the assessment and prioritisation of existing and emerging needs of public administrations,
- ii. the assessment and prioritisation accordingly of existing and emerging trends that may impact the policy making process and
- iii. the prioritisation of specific application fields based on selected criteria.



Figure 7: BPC Assessment Framework Axes of Application

Axes I and II deal with the assessment of the “Demand” side, whereas Axis III presupposes the assessment of the “Supply” side and targets the identification of areas for intervention. The rationale for the assessment of both “Demand” and “Supply” lies in mapping needs, trends and assets against application domains, i.e. combinations of policy cycle stages and policy domains. The determination of Demand counts more specifically with the determination of the number of needs and trends in each application domain, and the assessment of their criticality or intensity respectively. The determination of Supply on the other hand presupposes the identification of the number of assets in each application and the calculation of their score, as the aggregate of the factors “technology readiness level”, “implementation/customisation cost”, “ease of use”, “open license availability”, generated through the Analytic Hierarchy Process (AHP) multi-criteria decision making method. The comparison among Demand and Supply for each application field serves the prioritisation of application domains, and thereby the identification of those of greater interest, importance, urgency or capability for innovation. The Framework axes are presented at greater detail in the following paragraphs.

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3.2 Axes I and II: Assessment and Prioritisation of Needs and Trends

Taking into account the definitions presented within deliverable D3.1, public administrations' needs are considered "as conditions or capabilities needed by an organisation to solve a problem or achieve an objective", whereas trends reflect "a long-term movement in an ordered series, which may be regarded, together with the oscillation and random component, as generating the observed values" [15]. Both needs and trends can be considered to provide some stimulus for change or improvement: A need expresses the necessity to do something, and parallel to that a trend accordingly indicates the tendency to do something. Thereby, they are treated in the context of the Big Policy Canvas Assessment Framework in a similar way.

The assessment of both needs and trends is carried out using the structure of **Error! Reference source not found.**, i.e. an assessment matrix, and involves the mapping of the aforementioned elements against policy domains and policy cycle stages, as well as the calculation of a score that reflects either the needs' criticality or the trends' intensity.

Table 1: Assessment Matrix

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods					
Economy & Finance					
Education, Youth, Culture & Sport					
Employment & Social Security					
Environment & Energy					
Health					
Foreign Affairs and Defence					
Justice, Legal System & Public Safety					
Public Affairs					
Innovation, Science &					

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Technology					
Urban Planning & Transport					
Institutional Questions / Internal Affairs					
Total Score					

The assessment matrix can be more specifically filled in for each need or trend, which is mapped to the application domains, found at the intersection of policy domains and policy cycle stages on the basis of i. the results of interviews with policy makers, ii. the outcomes of a set of online surveys, designed by the project consortium for this purpose, as well as iii. the findings of the literature review, conducted in the context of the needs' and trends' identification and reported within deliverable D3.1. Attention is drawn to the fact that, based primarily on interview results and thereby the design of the corresponding questionnaire [15], such mapping is intended to involve as well a qualitative indication of the relevance of each need or trend to policy domains on a five-level scale. Provided that different weights are further attributed to policy cycle stages, the score of each need/trend can be eventually calculated by multiplying its relevance to a specific policy domain by the weight of each policy phase, summing up the products for each row of the assessment matrix and then calculating the sum for all rows. The prioritisation of either needs or trends can then be realised by defining the appropriate score intervals and grouping accordingly needs and trends in a set of priority groups, based on their overall score (aka criticality or intensity respectively).

It is worth noting that application of Framework Axes I and II can be customised as per the needs of the stakeholders involved by weighting appropriately the different stages of the policy making cycle, as well as by attributing greater importance to specific policy domains. The assumptions made for the application of Framework Axes I and II in the context of the Big Policy Canvas project are presented in Section 4.

3.3 Axis III: Prioritisation of Application Fields

Axis III of the Big Policy Canvas Assessment Framework targets the prioritisation of application fields. The latter is based on two dimensions of evaluation for each application field, one that has to do with the Demand side, namely the needs and trends identified and the other dealing with the Supply side, thus the assets recorded, and their combination in a ratio, as shown in Eq. 1.

In this ratio, the numerator equals the average score of all assets identified for a specific application field and the denominator is respectively given by considering the criticality of all needs and the

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intensity of all trends, identified for the same field and taking the sum of their average values. Apparently, the higher the ratio for a specific application field, the more value there is for the public sector to deal with it and thus the higher the priority to be attributed to it.

$$App. Field Prioritisation Ratio = \frac{Supply}{Demand} = \frac{\frac{\sum_{i=1}^L S_{A_i}}{L}}{\frac{\sum_{j=1}^M C_{N_j} + \frac{\sum_{k=1}^N I_{T_k}}{N}}{M + \frac{N}{N}}} \quad (Eq. 1)$$

where

- S_{A_i} : the score of the identified asset i
- L : the number of identified assets in the specific app. field
- C_{N_j} : the criticality of the identified need j
- M : the number of identified needs in the specific app. field
- I_{T_k} : the intensity of the identified trend k
- N : the number of identified trends in the specific app. field

Figure 8: App. Field Prioritisation Ratio (Eq. 1)

The score of each identified asset, which is required for calculating this ratio may accrue by combining the criteria of readiness level, implementation or customisation cost, ease of use and open license availability with the help of the Analytic Hierarchy Process (AHP) multi-criteria decision making method (MCDM). The latter is the most frequently used MCDM approach. Developed by Thomas Saaty in the 1970s, AHP is a technique based on pairwise comparisons, representing the relative importance of one criterion versus another [16]. The main benefits of the method are that it is easy and simple to use, whereas it can handle both tangible (quantitative) and intangible (qualitative) criteria. A description of the AHP method can be found in Annex III. It should be noted that the assessment of each of the aforementioned criteria may be supported by appropriate instruments, such as interviews and online surveys, and thus the design of appropriate questionnaires. In the context of the Big Policy Canvas project, care has been taken for the assessment of the aforementioned attributes within the frame of an assets’ identification questionnaire, which is to be reported in deliverable D4.1.

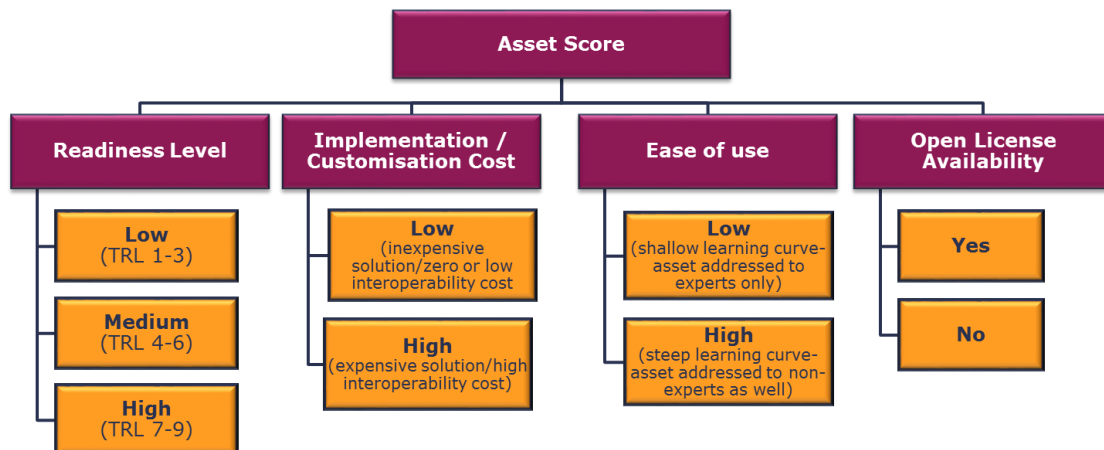


Figure 9: Decision hierarchy for assets’ score

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Apparently, application of the AHP approach presupposes the definition of an appropriate evaluation scale for each criterion, an issue which is handled in a qualitative way, as shown in Figure 9, still providing clear definitions of what each level of the evaluation scale represents. Along the above lines, in the case of the readiness level criterion, a three-level scale is defined, where level one (“Low”) corresponds to TRL values 1 to 3, level 2 (“Medium”) maps to TRL values 4 to 6 and level 3 (“High”) corresponds to TRL values 7-9. The criterion of implementation or customisation cost is accordingly assessed against a two-level scale, where a low cost indicates that the identified asset does not require significant investment nor does it induce significant costs in terms of ensuring interoperability and compatibility with existing infrastructures, whereas a high cost reflects respectively an expensive solution and/or one that requires significant efforts for customisation and interoperability. Then, the ease of use is characterised either as low, indicating an asset with a shallow learning curve or one that can be effectively utilised by people with specific background knowledge only, or as high, corresponding accordingly to an asset with a steep learning curve or one that can be easily used by non-experts as well. Last but not least, the availability of an open license makes up an on-off criterion, receiving yes or no as value.

Application of Framework axis III can be as well customised as per the needs of the stakeholders involved in the directions of both the assessment criteria themselves as well as their relative importance in the calculation of the assets’ overall score.

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4 Framework Application

In the context of the Big Policy Canvas project, application of Needs' and Trends' Assessment Framework is narrowed down to the assessment of needs and trends and their prioritisation (Axes I and II). The latter involves the qualitative mapping of needs and trends to application domains as well as the assessment of their criticality or intensity respectively and their rough classification according to the latter in different priority groups on the basis of the assumptions that

- i. all policy cycle stages are weighted equally (assuming a weight of 0.25 for each) and
- ii. all policy domains are considered to be of equal importance.

It has to be noted that an end-to-end application of the framework requires a particularly broad spectrum of inputs and is meaningful when realised only under the appropriate conditions. Thus, a fully-fledged application of the Big Policy Canvas Framework, incorporating a more elaborate assessment of needs and trends, as well as comparison among the forces of Demand and Supply, and therefore prioritisation of application domains (Axis III), is only to be realised in the context of specific policy domains, those addressed through the interviews conducted with policy makers, and will be reported within deliverable D3.3.

The main reason for this is basically that the importance that each policy cycle stage may hold and/or the gravity (relevance) of each identified need or trend to the considered policy domains may be dependent upon the decision maker's perception and actual experience, i.e. upon factors such as their background, country of origin, policy domain, policy cycle stage and administrative level of their professional activity. Hence, the balance between forces of Demand and Supply can only be assessed on a context-specific basis that is determined by the decision maker's needs and experiences.

Along the above lines, an overview of the Framework application results for axes I and II is presented in the following paragraphs. The assessment tables for each individual need and trend are included in Annexes I and II respectively. Application of Framework axis III, and thereby the mapping of assets to application domains along with the prioritisation of the latter, is, as stated above, left for deliverable D3.3, as it presupposes the comprehensive recording of assets (currently in process and planned to be reported in deliverable D4.1).

4.1 Axis I: Assessment and Prioritisation of Needs

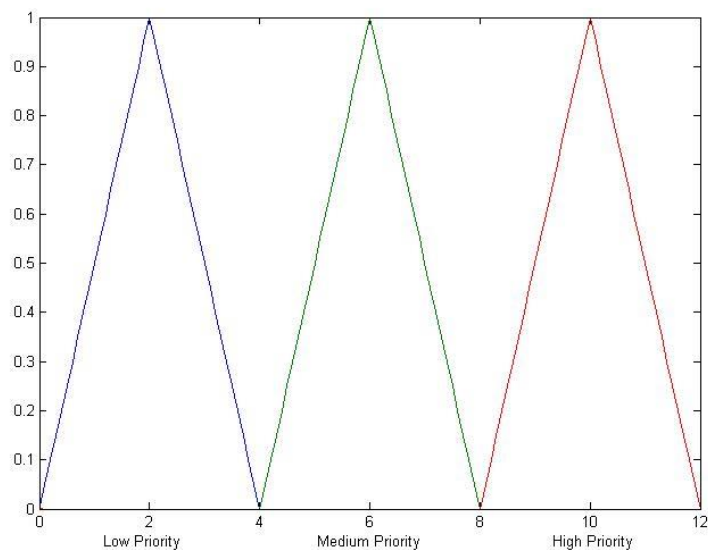
Using the findings of deliverable D3.1, the Big Policy Canvas Assessment Framework was applied on a total of 28 needs (9 strategical, 7 organisational, 6 technical, 4 informational and 2 legal needs). The latter were mapped against policy domains and policy cycle stages (i.e. application domains) on the basis of outcomes of the literature review, the results of an ongoing online survey and a number of 11 interviews with policy makers, public administration representatives and the members of the BPC Experts' Committee, carried out by project partners. The mapping took place on a qualitative basis, thus reflecting the existence or not of a need's relevance to each policy domain and policy cycle stage, but not the actual magnitude of this relevance, as this was deemed to be subjective and dependent

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upon each respondent's experiences. The goal was to record as thoroughly as possible the breadth of each need with regard to the policy cycle and the identified policy domains.

The criticality of each need was also calculated based on the resulting mapping and needs were eventually grouped in three classes, mathematically represented by triangular fuzzy numbers as shown in Figure 10, and indicating low, medium and high priority. The criticality of each need is graphically illustrated in Figure 11, whereas the results of the grouping are presented in Table 2.

Figure 10: priority groups



It is remarkable that beside citizens' trust in public administration, which is a prerequisite of the policy making process that spans all policy cycle stages and policy domains, the majority of the needs that are classified as high priority ones address issues of knowledge and information availability, exchange and management, performance measurement and indicator systems and data security, i.e. briefly issues that are tightly related to data and their management. Other needs of this group relate to quality standards, process standardisation, citizens' involvement and the available IT infrastructure.

Needs classified under the second priority group concern basically process-related aspects, such as those of recruitment and personnel development, process optimisation, policy evaluation, contextual parameters, such as the legal framework, local or regional specificities or Europeanisation, as well as other requirements touching upon the use of data and technologies, the understanding of the IT potential, the consideration of scientific expertise, etc. Finally, a lower rating is attributed to aspects, such as the cooperative working within the public sector, the coherent use of digital technology, incentives for employment in the public sector, and the organisational framework.

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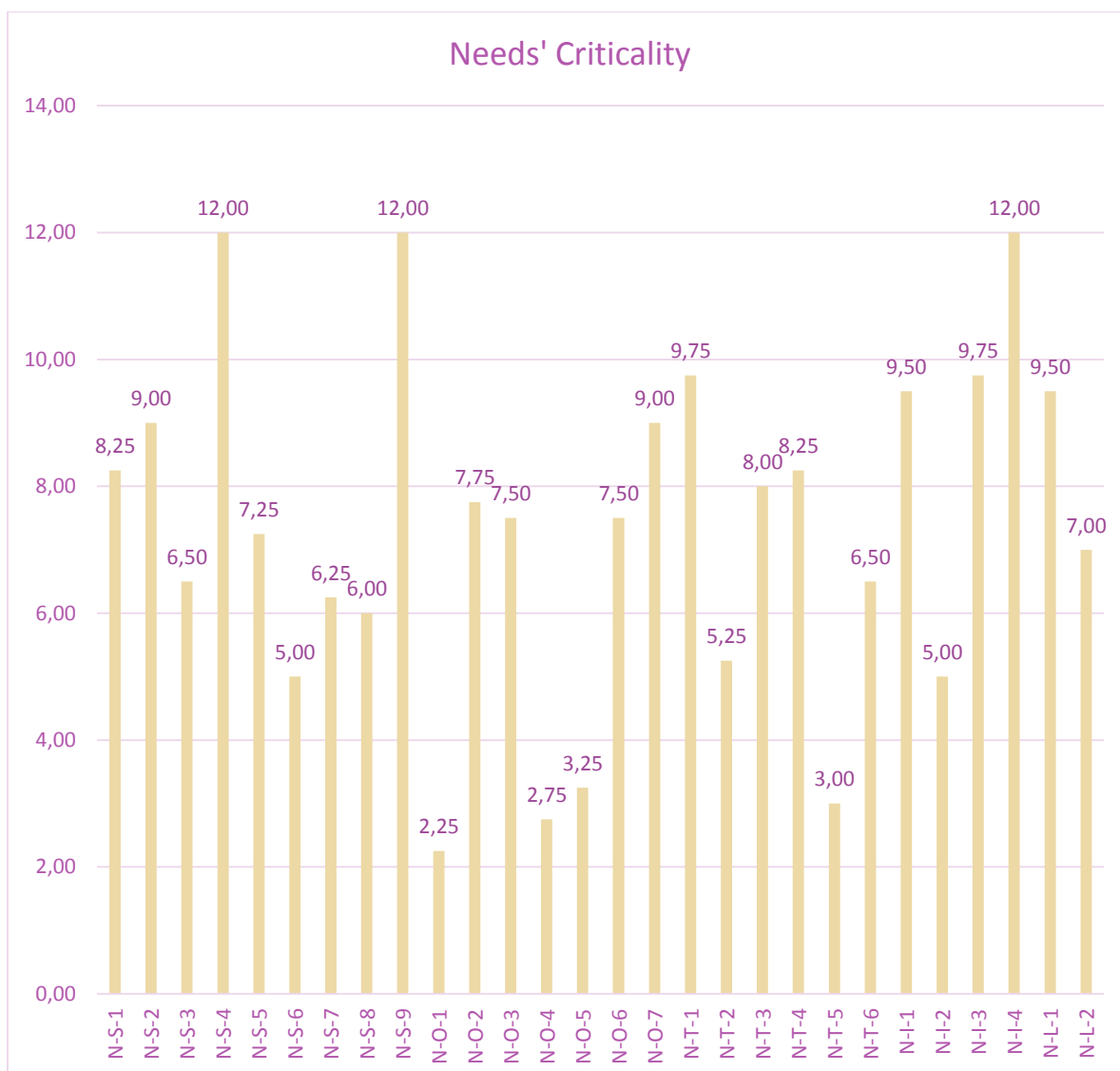


Figure 11: Needs' Criticality

Table 2: Needs' Classification

Need Id.	Need Name	Score
<i>High Priority Needs (8-12)</i>		
N-S-4	Strengthen citizens' trust in public administration	12.00
N-S-9	Cross-linked information exchange	12.00
N-I-4	Comprehensive knowledge and information management	12.00
N-T-1	Cope with the production of huge volumes of data	9.75

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Need Id.	Need Name	Score
N-I-3	Ensure availability of (real-time) information and knowledge	9.75
N-I-1	Link between impact, quality, performance measurements and financial information	9.50
N-L-1	Better quality standards in the formulation and evaluation of norms	9.50
N-S-2	Involvement of the public and citizens, as well as the development of citizen-centred policy making	9.00
N-O-7	Standardisation of processes	9.00
N-S-1	Development of domain specific target and indicator systems	8.25
N-T-4	Establishment of a comprehensive technical infrastructure and IT architecture	8.25
N-T-3	Ensuring data security taking into account the protection of citizens' privacy	8.00
<i>Medium Priority Needs (4-8)</i>		
N-O-2	Improve the process of recruiting in order to acquire suitable staff in a timely manner	7.75
N-O-3	Establish target-oriented personnel development	7.50
N-O-6	Process and resource optimisation	7.50
N-S-5	Continuous Evaluation of Policies	7.25
N-L-2	Secure legal framework	7.00
N-S-3	Forward-looking strategic planning for the use of data and technologies as well as for practical implementation	6.50
N-T-6	Standardisation of data management	6.50
N-S-7	Take into account local and regional specificities	6.25
N-S-8	Environmental Awareness and Protection	6.00
N-T-2	Deeper understanding of IT potential and IT processes	5.25
N-S-6	Improve and strengthen Europeanisation	5.00
N-I-2	Include scientific knowledge and expertise	5.00

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Need Id.	Need Name	Score
	<i>Low Priority Needs (0-4)</i>	
N-O-5	Cooperative working between decision makers, departments, hierarchy levels	3.25
N-T-5	Coherent use of digital technology across policy areas	3.00
N-O-4	Improved incentive structures for working in the public sector	2.75
N-O-1	Secure organisational framework	2.25

4.2 Axis II: Assessment and Prioritisation of Trends

The Big Policy Canvas Assessment Framework was also applied on the identified set of trends (8 technological, 12 conceptual and 8 societal). The latter were accordingly mapped against application fields on a qualitative basis, reflecting the breadth of each trend against policy domains and policy cycle stages. The intensity of each trend was calculated and trends were similarly classified using the priority groups of Figure 10. The intensity of each need is graphically illustrated in Figure 12, whereas the results of the grouping are presented in Table 3: Trends' Classification Table 3.

In the case of trends, the grouping resulted in a set of technological trends, such as social media, artificial intelligence machine learning, business intelligence and Internet of Things being classified as high intensity ones, thus showcasing the penetration potential of the respective technologies in the policy making process. Trends like algorithmic regulation, smart government, data literacy and open government were also found to be of high influence for the public sector and the policy making process. On the other hand, Big Data, in spite of being a prerequisite for the application of several of the aforementioned high intensity trends, was grouped along with the conceptual trends of e-Governance, privacy and security by design, lean approach and the societal trends of technological unemployment, smart surveillance and the technology of predictive analytics, as a medium intensity trend. Last but not least, a lower intensity was attributed to the technology of cloud computing, the concepts of performance measurement, data governance, evidence-based policy, and the societal trends of smart work, hate speech, glocalisation, nudging, socio-technical systems and ambient assisted living.

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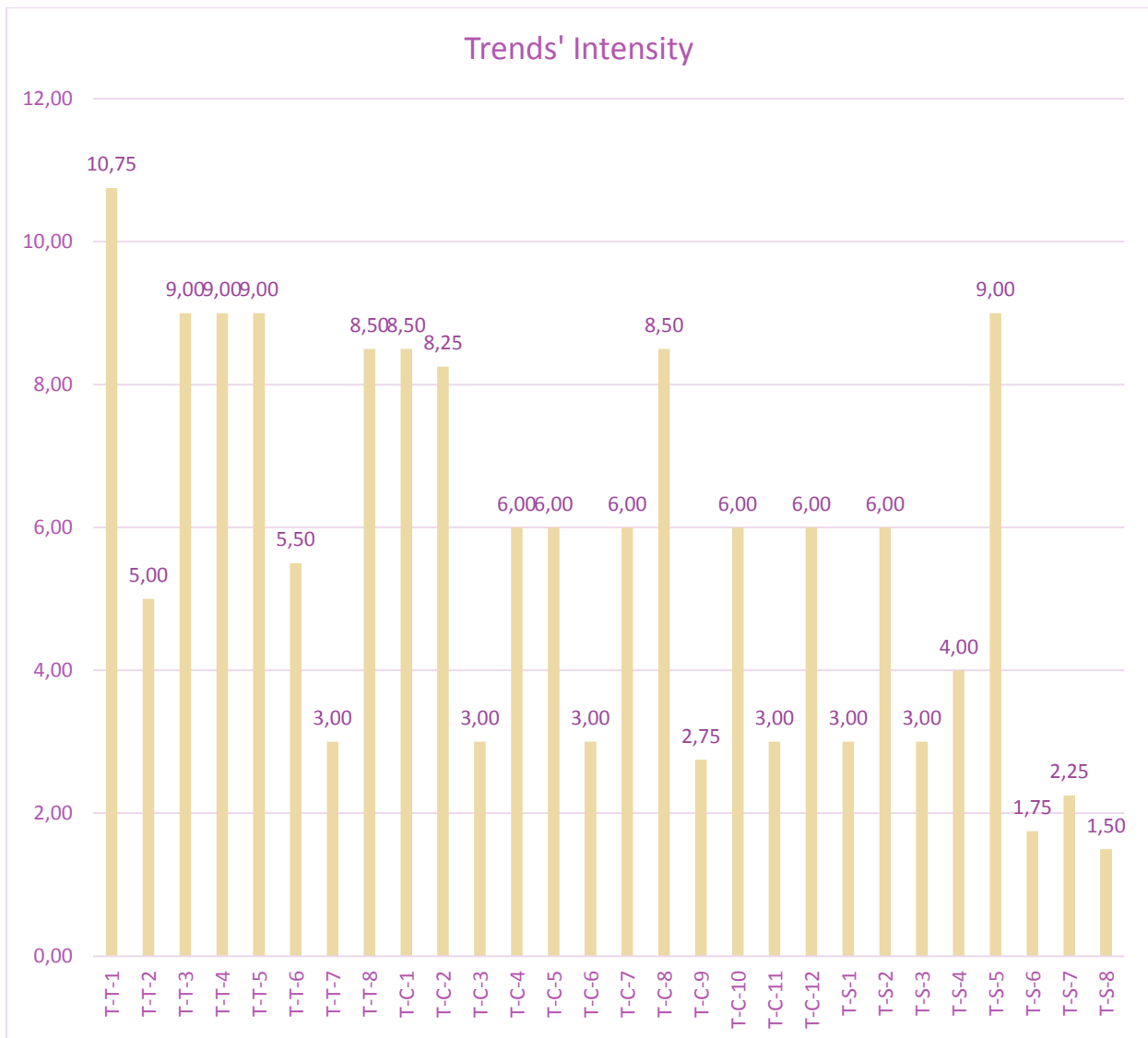


Figure 12: Trends' Intensity

Table 3: Trends' Classification

Need Id.	Need Name	Score
<i>High Priority Trends (8-12)</i>		
T-T-1	Social Media	10.75
T-T-3	Artificial Intelligence	9.00
T-T-4	Machine Learning	9.00
T-T-5	Next Generation of BI and Data Analytics platforms	9.00

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Need Id.	Need Name	Score
T-S-5	Algorithmic Regulation	9.00
T-T-8	Internet of Things (IoT)	8.50
T-C-1	Smart City / Smart Government	8.50
T-C-8	Data Literacy/ Data Literacy Education	8.50
T-C-2	Open Data	8.25
	<i>Medium Priority Trends (4-8)</i>	
T-C-7	E-Governance	6.00
T-C-4	Privacy by Design	6.00
T-C-5	Security by Design	6.00
T-C-10	Data Philanthropy	6.00
T-C-12	Lean Approach	6.00
T-S-2	Technological Unemployment	6.00
T-T-6	Predictive Analytics	5.50
T-T-2	Big Data	5.00
T-S-4	Smart Surveillance Systems	4.00
	<i>Low Priority Trends (0-4)</i>	
T-T-7	Cloud Computing	3.00
T-C-3	Performance Measurement	3.00
T-C-6	Data Governance	3.00
T-C-11	Evidence-based Policy	3.00
T-S-1	Smart Work	3.00
T-S-3	Hate Speech	3.00
T-C-9	Glocalisation	2.75
T-S-7	Nudging	2.25
T-S-6	Socio-Technical Systems	1.75
T-S-8	Ambient Assisted Living	1.50

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5 Conclusions

Towards mapping the recognised and reported needs and trends to the corresponding application domains, as well as towards assessing the criticality and intensity of the former, Big Policy Canvas had to come up with an appropriate scientific Needs and Trends Assessment Framework. Besides the aforementioned activities, that constitute intermediate ones, the framework's goal lays in prioritising application domains and bringing forward those of greater interest, importance, urgency and capability for innovation. The derived framework is based on the analysis and comparison of each application domain's Demand and Supply.

Furthermore, it has to be noted that the aforementioned framework materialises a by-design dynamic approach that offers a customisable approach able to serve the needs of the end-user. An initial validation of the framework's rationale and structure has been provided by the Big Policy Canvas experts.

Diving in more detail, the framework is structured across three axes:

- i. the assessment and prioritisation of existing and emerging needs of public administrations,
- ii. the assessment and prioritisation accordingly of existing and emerging trends that may impact the policy making process and
- iii. the prioritisation of specific application fields based on selected criteria, which encapsulates the Analytic Hierarchy Process (AHP) multi-criteria decision making method.

The Big Policy Canvas Assessment Framework was applied on a total of 28 needs (9 strategical, 7 organisational, 6 technical, 4 informational and 2 legal needs) and 28 trends (8 technological, 12 conceptual and 8 societal). The latter, following certain assumptions, were mapped against policy domains and policy cycle stages (i.e. application domains) on the basis of outcomes of the literature review carried out by project partners, the results of an ongoing online survey and a number of 11 interviews with policy makers, public administration representatives and the members of the Big Policy Canvas Experts' Committee. The process resulted in three main groups of needs and trends (namely High/Medium/Low priority).

As far as the next steps are concerned, application of Framework axis III is foreseen in the follow-up deliverable of the document at hand, namely deliverable D3.3.

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Annex I: Axis I - Assessment and Prioritisation of Needs

I.1 Strategical Needs

N-S-1: Development of domain specific target and indicator systems

Table 4: Assessment Matrix for Need N-S-1

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	√	√	√	√	1.00
Urban Planning & Transport	-	√	√	√	0.75
Institutional	-	√	√	√	0.75

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Questions/Internal Services					
Total Score					8.25

N-S-2: Involvement of the public and citizens, as well as the development of citizen-centred policy making

Table 5: Assessment Matrix for Need N-S-2

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	-	-	-	0.00
Economy & Finance	√	√	√	√	1.00
Education, Youth, Culture & Sport	√	√	√	√	1.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	√	√	√	√	1.00
Health	√	√	√	√	1.00
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	√	-	-	-	0.25
Public Affairs	√	√	√	√	1.00

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Innovation, Science & Technology	√	√	√	√	1.00
Urban Planning & Transport	√	√	√	√	1.00
Institutional Questions/Internal Services	√	√	-	√	0.75
Total Score					9.00

N-S-3: Forward-looking strategic planning for the use of data and technologies as well as for practical implementation

Table 6: Assessment Matrix for Need N-S-3

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	√	√	-	-	0.50
Economy & Finance	√	√	-	-	0.50
Education, Youth, Culture & Sport	√	√	-	-	0.50
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	√	√	-	-	0.50
Health	√	√	-	-	0.50

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Foreign Affairs and Defence	√	√	-	-	0.50
Justice, Legal System & Public Safety	√	√	-	-	0.50
Public Affairs	√	√	-	-	0.50
Innovation, Science & Technology	√	√	-	-	0.50
Urban Planning & Transport	√	√	-	-	0.50
Institutional Questions/Internal Services	√	√	-	-	0.50
Total Score					6.50

N-S-4: Strengthen citizens' trust in public administration

Table 7: Assessment Matrix for Need N-S-4

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	√	√	√	√	1.00
Economy & Finance	√	√	√	√	1.00
Education, Youth, Culture & Sport	√	√	√	√	1.00
Employment & Social Security	√	√	√	√	1.00

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Environment & Energy	√	√	√	√	1.00
Health	√	√	√	√	1.00
Foreign Affairs and Defence	√	√	√	√	1.00
Justice, Legal System & Public Safety	√	√	√	√	1.00
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	√	√	√	1.00
Urban Planning & Transport	√	√	√	√	1.00
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					12.00

N-S-5: Continuous Evaluation of Policies

Table 8: Assessment Matrix for Need N-S-5

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	-	√	√	0.50

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Economy & Finance	-	-	√	√	0.50
Education, Youth, Culture & Sport	-	-	√	√	0.50
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	-	√	√	0.50
Health	-	-	√	√	0.50
Foreign Affairs and Defence	-	-	√	√	0.50
Justice, Legal System & Public Safety	√	√	√	√	1.00
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	-	√	√	0.50
Urban Planning & Transport	-	-	√	√	0.50
Institutional Questions/Internal Services	-	-	√	√	0.50
Total Score					7.25

N-S-6: Improve and strengthen Europeanisation

Table 9: Assessment Matrix for Need N-S-6

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture,	√	√	-	-	0.50

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Fisheries, Forestry & Foods					
Economy & Finance	√	√	-	-	0.50
Education, Youth, Culture & Sport	-	-	-	-	0.00
Employment & Social Security	√	√	-	-	0.50
Environment & Energy	√	√	-	-	0.50
Health	√	√	-	-	0.50
Foreign Affairs and Defence	√	√	-	-	0.50
Justice, Legal System & Public Safety	√	√	-	-	0.50
Public Affairs	√	√	-	-	0.50
Innovation, Science & Technology	√	√	√	-	0.75
Urban Planning & Transport	-	-	-	-	0.00
Institutional Questions/Internal Services	√	√	-	-	0.25
Total Score					5.00

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N-S-7: Take into account local and regional specificities

Table 10: Assessment Matrix for Need N-S-7

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	√	√	-	-	0.50
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	√	-	√	-	0.50
Urban Planning & Transport	-	√	√	-	0.50
Institutional Questions/Internal Services	√	√	-	-	0.50
Total Score					6.25

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N-S-8: Environmental Awareness and Protection

Table 11: Assessment Matrix for Need N-S-8

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	√	√	1.00
Economy & Finance	√	√	√	√	1.00
Education, Youth, Culture & Sport	√	√	√	√	1.00
Employment & Social Security	-	-	-	-	0.00
Environment & Energy	√	√	√	√	1.00
Health	-	-	-	-	0.00
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	-	-	-	-	0.00
Public Affairs	-	-	-	-	0.00
Innovation, Science & Technology	√	√	√	√	1.00
Urban Planning & Transport	√	√	√	√	1.00
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					6.00

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N-S-9: Cross-linked information exchange

Table 12: Assessment Matrix for Need N-S-9

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	√	√	1.00
Economy & Finance	√	√	√	√	1.00
Education, Youth, Culture & Sport	√	√	√	√	1.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	√	√	√	√	1.00
Health	√	√	√	√	1.00
Foreign Affairs and Defence	√	√	√	√	1.00
Justice, Legal System & Public Safety	√	√	√	√	1.00
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	√	√	√	1.00
Urban Planning & Transport	√	√	√	√	1.00
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					12.00

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I.2 Organisational Needs

N-O-1: Secure organisational framework

Table 13: Assessment Matrix for Need N-O-1

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	-	-	0.00
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.20
Employment & Social Security	-	-	√	-	0.25
Environment & Energy	-	-	-	-	0.00
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	√	-	0.25
Justice, Legal System & Public Safety	-	-	√	-	0.25
Public Affairs	-	-	√	-	0.25
Innovation, Science & Technology	-	-	√	-	0.25
Urban Planning & Transport	-	-	-	-	1.00
Institutional Questions/Internal Services	-	-	√	-	0.25
Total Score					2.25

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N-O-2: Improve the process of recruiting in order to acquire suitable staff in a timely manner

Table 14: Assessment Matrix for Need N-O-2

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	-	-	0.50
Economy & Finance	√	√	-	-	0.50
Education, Youth, Culture & Sport	√	√	-	-	0.50
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	√	√	-	-	0.50
Health	√	√	-	-	0.50
Foreign Affairs and Defence	√	√	-	-	0.50
Justice, Legal System & Public Safety	√	√	√	√	1.00
Public Affairs	√	√	-	-	0.50
Innovation, Science & Technology	√	√	√		0.75
Urban Planning & Transport	√	√	-	-	0.50
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					7.75

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N-O-3: Establish target-oriented personnel development

Table 15: Assessment Matrix for Need N-O-3

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	-	-	0.50
Economy & Finance	√	√	-	-	0.50
Education, Youth, Culture & Sport	√	√	-	-	0.50
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	√	√	-	-	0.50
Health	√	√	-	-	0.50
Foreign Affairs and Defence	√	√	-	-	0.50
Justice, Legal System & Public Safety	√	√	√		0.75
Public Affairs	√	√	-	-	0.50
Innovation, Science & Technology	√	√	√		0.75
Urban Planning & Transport	√	√	-	-	0.50
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					7.50

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N-O-4: Improved incentive structures for working in the public sector

Table 16: Assessment Matrix for Need N-O-4

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	-	-	0.00
Economy & Finance	√	√	-	-	0.50
Education, Youth, Culture & Sport	-	-	-	-	0.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	-	-	-	0.00
Health	-	-	-	-	0.00
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	√	-	-	-	0.25
Public Affairs	√	√	-	-	0.50
Innovation, Science & Technology	√	-	√	-	0.50
Urban Planning & Transport	-	-	-	-	0.00
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					2.75

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N-O-5: Cooperative working between decision makers, departments, hierarchy levels

Table 17: Assessment Matrix for Need N-O-5

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	-	-	0.00
Economy & Finance	-	-	-	-	0.00
Education, Youth, Culture & Sport	-	-	-	-	0.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	-	-	-	0.00
Health	-	-	-	-	0.00
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	√	-	-	-	0.25
Public Affairs	√	√	√	-	0.75
Innovation, Science & Technology	-	√	√	-	0.50
Urban Planning & Transport	-	-	-	-	0.00
Institutional Questions/Internal Services	√	√	√	-	0.75
Total Score					3.25

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N-O-6: Process and resource optimisation

Table 18: Assessment Matrix for Need N-O-6

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs and Defence	-	√	√	-	0.50
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	√	√	√	-	0.75
Urban Planning & Transport	-	√	√	-	0.50
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					7.50

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N-O-7: Standardisation of processes

Table 19: Assessment Matrix for Need N-O-7

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					9.00

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I.3 Technical Needs

N-T-1: Cope with the production of huge volumes of data

Table 20: Assessment Matrix for Need N-T-1

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	√	√	1.00
Economy & Finance	√	√	√	√	1.00
Education, Youth, Culture & Sport	√	√	√	√	1.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	√	√	√	√	1.00
Health	√	√	√	√	1.00
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	√	√	√	√	1.00
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	√	√	-	0.75
Urban Planning & Transport	√	√	√	√	1.00
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					9.75

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N-T-2: Deeper understanding of IT potential and IT processes

Table 21: Assessment Matrix for Need N-T-2

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	-	0.25
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	-	√	-	0.25
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	√	-	0.25
Justice, Legal System & Public Safety	-	√	√	-	0.50
Public Affairs	√	√	√	-	0.75
Innovation, Science & Technology	√	-	√	-	0.50
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					5.25

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N-T-3: Ensuring data security taking into account the protection of citizens' privacy

Table 22: Assessment Matrix for Need N-T-3

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	-	-	0.00
Economy & Finance	√	√	√	√	1.00
Education, Youth, Culture & Sport	√	√	√	√	1.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	-	-	-	0.00
Health	√	√	√	√	1.00
Foreign Affairs and Defence	√	√	√	√	1.00
Justice, Legal System & Public Safety	√	√	√	√	1.00
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	-	√	-	0.50
Urban Planning & Transport	-	-	-	-	0.00
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					8.25

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N-T-4: Establishment of a comprehensive technical infrastructure and IT architecture

Table 23: Assessment Matrix for Need N-T-4

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	-	√	√	0.50
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	√	√	√	-	0.75
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	√	√	√	1.05
Urban Planning & Transport	-	-	√	√	0.50
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					8.00

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N-T-5: Coherent use of digital technology across policy areas

Table 24: Assessment Matrix for Need N-T-5

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	-	-	0.00
Economy & Finance	√	√	√	√	1.00
Education, Youth, Culture & Sport	-	-	-	-	0.00
Employment & Social Security	-	-	-	-	0.00
Environment & Energy	-	-	-	-	0.00
Health	-	-	-	-	0.00
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	-	-	-	-	0.00
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	-	-	-	-	0.00
Urban Planning & Transport	-	-	-	-	0.00
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					3.00

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N-T-6: Standardisation of data management

Table 25: Assessment Matrix for Need N-T-6

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	√	0.50
Economy & Finance	-	-	√	√	0.50
Education, Youth, Culture & Sport	-	-	√	√	0.50
Employment & Social Security	-	-	√	√	0.50
Environment & Energy	-	-	√	√	0.50
Health	-	-	√	√	0.50
Foreign Affairs and Defence	-	-	√	-	0.25
Justice, Legal System & Public Safety	-	√	√	-	0.50
Public Affairs	√	-	√	√	0.75
Innovation, Science & Technology	√	√	√	√	1.00
Urban Planning & Transport	-	-	√	√	0.50
Institutional Questions/Internal Services	-	-	√	√	0.50
Total Score					6.50

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I.4 Informational Needs

N-I-1: Link between impact, quality, performance measurements and financial information

Table 26: Assessment Matrix for Need N-I-1

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	-	√	0.75
Economy & Finance	√	√	-	√	0.75
Education, Youth, Culture & Sport	√	√	-	√	0.75
Employment & Social Security	√	√	-	√	0.75
Environment & Energy	√	√	-	√	0.75
Health	√	√	-	√	0.75
Foreign Affairs and Defence	√	√	-	√	0.75
Justice, Legal System & Public Safety	√	√	√	√	1.00
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	√	-	√	0.75
Urban Planning & Transport	√	√	-	√	0.75
Institutional Questions/Internal Services	√	√	-	√	0.75
Total Score					9.50

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N-I-2: Include scientific knowledge and expertise

Table 27: Assessment Matrix for Need N-I-2

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	-	-	0.25
Economy & Finance	-	√	-	-	0.25
Education, Youth, Culture & Sport	-	√	-	-	0.25
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	√	-	-	0.25
Health	-	√	-	-	0.25
Foreign Affairs and Defence	-	√	-	-	0.25
Justice, Legal System & Public Safety	-	√	-	-	0.25
Public Affairs	√	√	-	-	0.50
Innovation, Science & Technology	√	√	-	-	0.50
Urban Planning & Transport	-	√	-	-	0.25
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					5.00

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N-I-3: Ensure availability of (real-time) information and knowledge

Table 28: Assessment Matrix for Need N-I-3

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	√	-	0.75
Economy & Finance	√	√	√	-	0.75
Education, Youth, Culture & Sport	√	√	√	-	0.75
Employment & Social Security	√	√	√	-	0.75
Environment & Energy	√	√	√	√	1.00
Health	√	√	√	-	0.75
Foreign Affairs and Defence	√	√	√	-	0.75
Justice, Legal System & Public Safety	√	√	√	-	0.75
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	√	√	-	0.75
Urban Planning & Transport	√	√	√	-	0.75
Institutional Questions/Internal Services	√	√	√	√	1.00
Total Score					9.75

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N-I-4: Comprehensive knowledge and information management

Table 29: Assessment Matrix for Need N-I-4

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	1.00
Economy & Finance	-	√	√	√	1.00
Education, Youth, Culture & Sport	-	√	√	√	1.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	-	√	√	√	1.00
Health	-	√	√	√	1.00
Foreign Affairs and Defence	-	√	√	√	1.00
Justice, Legal System & Public Safety	-	√	√	√	1.00
Public Affairs	-	√	√	√	1.00
Innovation, Science & Technology	√	√	√	√	1.00
Urban Planning & Transport	-	√	√	√	1.00
Institutional Questions/Internal Services	-	√	√	√	1.00
Total Score					12.00

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I.5 Legal Needs

N-L-1: Better quality standards in the formulation and evaluation of norms

Table 30: Assessment Matrix for Need N-L-1

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					9.50

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N-L-2: Secure legal framework

Table 31: Assessment Matrix for Need N-L-2

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	-	√	√	-	0.50
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs and Defence	-	√	√	-	0.50
Justice, Legal System & Public Safety	√	√	√	-	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√		0.50
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					7.00

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Annex II: Axis II - Assessment and Prioritisation of Trends

II.1 Technological Trends

T-T-1: Social Media

Table 32: Assessment Matrix for Trend T-T-1

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	√	√	√	√	1.00
Economy & Finance	√	-	√	√	0.75
Education, Youth, Culture & Sport	√	√	√	√	1.00
Employment & Social Security	√	√	√	√	1.00
Environment & Energy	√	√	√	√	1.00
Health	√	√	√	√	1.00
Foreign Affairs and Defence	√	-	√	√	0.75
Justice, Legal System & Public Safety	√	-	√	√	0.75
Public Affairs	√	√	√	√	1.00
Innovation, Science & Technology	√	-	√	√	0.75
Urban Planning & Transport	√	√	√	√	1.00

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Institutional Questions/Internal Services	√	-	√	√	0.75
Total Score					10.75

T-T-2: Big Data

Table 33: Assessment Matrix for Trend T-T-2

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	-	√	-	-	0.25
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs and Defence	-	√	√	-	0.50
Justice, Legal System & Public Safety	-	√	√	-	0.50
Public Affairs	-	√	-	-	0.25
Innovation, Science & Technology	-	√	√	-	0.50

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Urban Planning & Transport	-	√	√	-	0.50
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					5.00

T-T-3: Artificial Intelligence

Table 34: Assessment Matrix for Trend T-T-3

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					9.00

T-T-4: Machine Learning

Table 35: Assessment Matrix for Trend T-T-4

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					9.00

T-T-5: Next Generation of BI and Data Analytics platforms

Table 36: Assessment Matrix for Trend T-T-5

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal	-	√	√	√	0.75

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
System & Public Safety					
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					9.00

T-T-6: Predictive Analytics

Table 37: Assessment Matrix for Trend T-T-6

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	-	√	√	-	0.50
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs	-	√	√	-	0.50

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
and Defence					
Justice, Legal System & Public Safety	-	√	√	-	0.50
Public Affairs	-	√	√	-	0.50
Innovation, Science & Technology	-	√	√	-	0.50
Urban Planning & Transport	-	√	√	-	0.50
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					5.50

T-T-7: Cloud Computing

Table 38: Assessment Matrix for Trend T-T-7

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	-	√	-	0.25
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	-	-	√	-	0.25
Environment & Energy	-	-	√	-	0.25

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	√	-	0.25
Justice, Legal System & Public Safety	-	-	√	-	0.25
Public Affairs	-	-	√	-	0.25
Innovation, Science & Technology	-	-	√	-	0.25
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	-	√	-	0.25
Total Score					3.00

T-T-8: Internet of Things (IoT)

Table 39: Assessment Matrix for Trend T-T-8

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	-	√	-	0.25
Total Score					8.50

II.2 Conceptual Trends

T-C-1: Smart City / Smart Government

Table 40: Assessment Matrix for Trend T-C-1

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	-	√	-	0.25
Total Score					8.50

T-C-2: Open Data

Table 41: Assessment Matrix for Trend T-C-2

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	-	√	√	0.50
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	-	√	√	0.50
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	-	√	√	0.50
Total Score					8.25

T-C-3: Performance Measurement

Table 42: Assessment Matrix for Trend T-C-3

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture,	-	-	-	√	0.25

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	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Fisheries, Forestry & Foods					
Economy & Finance	-	-	-	√	0.25
Education, Youth, Culture & Sport	-	-	-	√	0.25
Employment & Social Security	-	-	-	√	0.25
Environment & Energy	-	-	-	√	0.25
Health	-	-	-	√	0.25
Foreign Affairs and Defence	-	-	-	√	0.25
Justice, Legal System & Public Safety	-	-	-	√	0.25
Public Affairs	-	-	-	√	0.25
Innovation, Science & Technology	-	-	-	√	0.25
Urban Planning & Transport	-	-	-	√	0.25
Institutional Questions/Internal Services	-	-	-	√	0.25
Total Score					3.00

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T-C-4: Privacy by Design

Table 43: Assessment Matrix for Trend T-C-4

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	-	√	√	-	0.50
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs and Defence	-	√	√	-	0.50
Justice, Legal System & Public Safety	-	√	√	-	0.50
Public Affairs	-	√	√	-	0.50
Innovation, Science & Technology	-	√	√	-	0.50
Urban Planning & Transport	-	√	√	-	0.50
Institutional Questions/Internal Services	-	√	√	-	0.50
Total Score					6.00

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T-C-5: Security by Design

Table 44: Assessment Matrix for Trend T-C-5

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	-	√	√	-	0.50
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs and Defence	-	√	√	-	0.50
Justice, Legal System & Public Safety	-	√	√	-	0.50
Public Affairs	-	√	√	-	0.50
Innovation, Science & Technology	-	√	√	-	0.50
Urban Planning & Transport	-	√	√	-	0.50
Institutional Questions/Internal Services	-	√	√	-	0.50
Total Score					6.00

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T-C-6: Data Governance

Table 45: Assessment Matrix for Trend T-C-6

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	-	0.25
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	-	-	√	-	0.25
Environment & Energy	-	-	√	-	0.25
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	√	-	0.25
Justice, Legal System & Public Safety	-	-	√	-	0.25
Public Affairs	-	-	√	-	0.25
Innovation, Science & Technology	-	-	√	-	0.25
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	-	√	-	0.25
Total Score					3.00

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T-C-7: E-Governance

Table 46: Assessment Matrix for Trend T-C-7

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	√	0.50
Economy & Finance	-	-	√	√	0.50
Education, Youth, Culture & Sport	-	-	√	√	0.50
Employment & Social Security	-	-	√	√	0.50
Environment & Energy	-	-	√	√	0.50
Health	-	-	√	√	0.50
Foreign Affairs and Defence	-	-	√	√	0.50
Justice, Legal System & Public Safety	-	-	√	√	0.50
Public Affairs	-	-	√	√	0.50
Innovation, Science & Technology	-	-	√	√	0.50
Urban Planning & Transport	-	-	√	√	0.50
Institutional Questions/Internal Services	-	-	√	√	0.50
Total Score					6.00

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T-C-8: Data Literacy/ Data Literacy Education

Table 47: Assessment Matrix for Trend T-C-8

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	-	-	√	0.25
Total Score					8.50

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T-C-9: Glocalisation

Table 48: Assessment Matrix for Trend T-C-9

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	-	0.25
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	-	-	√	-	0.25
Environment & Energy	-	-	√	-	0.25
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	√	-	0.25
Justice, Legal System & Public Safety	-	-	√	-	0.25
Public Affairs	-	-	√	-	0.25
Innovation, Science & Technology	-	-	√	-	0.25
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					2.75

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T-C-10: Data Philanthropy

Table 49: Assessment Matrix for Trend T-C-10

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	-	-	-	0.00
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	-	-	-	0.00
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					6.00

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T-C-11: Evidence-based Policy

Table 50: Assessment Matrix for Trend T-C-11

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	-	-	0.25
Economy & Finance	-	√	-	-	0.25
Education, Youth, Culture & Sport	-	√	-	-	0.25
Employment & Social Security	-	√	-	-	0.25
Environment & Energy	-	√	-	-	0.25
Health	-	√	-	-	0.25
Foreign Affairs and Defence	-	√	-	-	0.25
Justice, Legal System & Public Safety	-	√	-	-	0.25
Public Affairs	-	√	-	-	0.25
Innovation, Science & Technology	-	√	-	-	0.25
Urban Planning & Transport	-	√	-	-	0.25
Institutional Questions/Internal Services	-	√	-	-	0.25
Total Score					3.00

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T-C-12: Lean Approach

Table 51: Assessment Matrix for Trend T-C-12

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	-	0.50
Economy & Finance	-	√	√	-	0.50
Education, Youth, Culture & Sport	-	√	√	-	0.50
Employment & Social Security	-	√	√	-	0.50
Environment & Energy	-	√	√	-	0.50
Health	-	√	√	-	0.50
Foreign Affairs and Defence	-	√	√	-	0.50
Justice, Legal System & Public Safety	-	√	√	-	0.50
Public Affairs	-	√	√	-	0.50
Innovation, Science & Technology	-	√	√	-	0.50
Urban Planning & Transport	-	√	√	-	0.50
Institutional Questions/Internal Services	-	√	√	-	0.50
Total Score					6.00

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II.3 Societal Trends

T-S-1: Smart Work

Table 52: Assessment Matrix for Trend T-S-1

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	-	0.25
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	-	-	√	-	0.25
Environment & Energy	-	-	√	-	0.25
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	√	-	0.25
Justice, Legal System & Public Safety	-	-	√	-	0.25
Public Affairs	-	-	√	-	0.25
Innovation, Science & Technology	-	-	√	-	0.25
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	-	√	-	0.25
Total Score					3.00

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T-S-2: Technological Unemployment

Table 53: Assessment Matrix for Trend T-S-2

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	√	0.50
Economy & Finance	-	-	√	√	0.50
Education, Youth, Culture & Sport	-	-	√	√	0.50
Employment & Social Security	-	-	√	√	0.50
Environment & Energy	-	-	√	√	0.50
Health	-	-	√	√	0.50
Foreign Affairs and Defence	-	-	√	√	0.50
Justice, Legal System & Public Safety	-	-	√	√	0.50
Public Affairs	-	-	√	√	0.50
Innovation, Science & Technology	-	-	√	√	0.50
Urban Planning & Transport	-	-	√	√	0.50
Institutional Questions/Internal Services	-	-	√	√	0.50
Total Score					6.00

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T-S-3: Hate Speech

Table 54: Assessment Matrix for Trend T-S-3

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	-	√	0.25
Economy & Finance	-	-	-	√	0.25
Education, Youth, Culture & Sport	-	-	-	√	0.25
Employment & Social Security	-	-	-	√	0.25
Environment & Energy	-	-	-	√	0.25
Health	-	-	-	√	0.25
Foreign Affairs and Defence	-	-	-	√	0.25
Justice, Legal System & Public Safety	-	-	-	√	0.25
Public Affairs	-	-	-	√	0.25
Innovation, Science & Technology	-	-	-	√	0.25
Urban Planning & Transport	-	-	-	√	0.25
Institutional Questions/Internal Services	-	-	-	√	0.25
Total Score					3.00

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T-S-4: Smart Surveillance Systems

Table 55: Assessment Matrix for Trend T-S-4

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	√	√	0.50
Economy & Finance	-	-	-	-	0.00
Education, Youth, Culture & Sport	-	-	√	√	0.50
Employment & Social Security	-	-	-	-	0.00
Environment & Energy	-	-	√	√	0.50
Health	-	-	√	√	0.50
Foreign Affairs and Defence	-	-	√	√	0.50
Justice, Legal System & Public Safety	-	-	√	√	0.50
Public Affairs	-	-	-	-	0.00
Innovation, Science & Technology	-	-	√	√	0.50
Urban Planning & Transport	-	-	√	√	0.50
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					4.00

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T-S-5: Algorithmic Regulation

Table 56: Assessment Matrix for Trend T-S-5

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	√	√	√	0.75
Economy & Finance	-	√	√	√	0.75
Education, Youth, Culture & Sport	-	√	√	√	0.75
Employment & Social Security	-	√	√	√	0.75
Environment & Energy	-	√	√	√	0.75
Health	-	√	√	√	0.75
Foreign Affairs and Defence	-	√	√	√	0.75
Justice, Legal System & Public Safety	-	√	√	√	0.75
Public Affairs	-	√	√	√	0.75
Innovation, Science & Technology	-	√	√	√	0.75
Urban Planning & Transport	-	√	√	√	0.75
Institutional Questions/Internal Services	-	√	√	√	0.75
Total Score					9.00

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T-S-6: Socio-Technical Systems

Table 57: Assessment Matrix for Trend T-S-6

Policy Domain	Policy Making Lifecycle Phase				Score
	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	
Agriculture, Fisheries, Forestry & Foods	-	-	-	-	0.00
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	-	-	-	-	0.00
Environment & Energy	-	-	√	-	0.25
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	-	-	-	-	0.00
Public Affairs	-	-	√	-	0.25
Innovation, Science & Technology	-	-	√	-	0.25
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					1.75

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T-S-7: Nudging

Table 58: Assessment Matrix for Trend T-S-7

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	-	√	-	0.25
Economy & Finance	-	-	√	-	0.25
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	-	-	√	-	0.25
Environment & Energy	-	-	√	-	0.25
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	-	-	√	-	0.25
Public Affairs	-	-	-	-	0.00
Innovation, Science & Technology	-	-	√	-	0.25
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					2.25

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T-S-8: Ambient Assisted Living

Table 59: Assessment Matrix for Trend T-S-8

	Policy Making Lifecycle Phase				
Policy Domain	Agenda Setting	Policy Design & Analysis	Policy Implementation	Policy Monitoring and Evaluation	Score
Agriculture, Fisheries, Forestry & Foods	-	-	√	-	0.25
Economy & Finance	-	-	-	-	0.00
Education, Youth, Culture & Sport	-	-	√	-	0.25
Employment & Social Security	-	-	-	-	0.00
Environment & Energy	-	-	√	-	0.25
Health	-	-	√	-	0.25
Foreign Affairs and Defence	-	-	-	-	0.00
Justice, Legal System & Public Safety	-	-	√	-	0.25
Public Affairs	-	-	-	-	0.00
Innovation, Science & Technology	-	-	-	-	0.00
Urban Planning & Transport	-	-	√	-	0.25
Institutional Questions/Internal Services	-	-	-	-	0.00
Total Score					1.50

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Annex III: AHP algorithmic approach

The Analytical Hierarchy Process (AHP) method is used as a means of finding the optimal solution to a complex decision problem. The application of the method involves four steps¹, as follows:

- i. the construction of the structural hierarchy
- ii. the construction of pair-wise comparison matrices
- iii. the determination of weights through a normalisation procedure
- iv. the synthesis of weights and the application of a consistency test.

In the first step of the method, the final objective of the decision problem is decomposed into a number of decision elements, which are in turn further analysed in lesser elements, until the problem acquires a hierarchical structure. The problem objective is represented at the topmost level of this structure, the criteria and sub-criteria are illustrated as the lower levels of the latter, while the potential alternatives are mapped to the lowest level of the hierarchy, as illustrated in Figure 13 below.

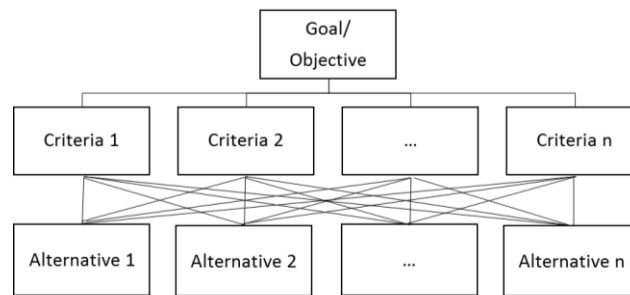


Figure 13: Construction of Structural Hierarchy

Once the problem structural hierarchy is constructed, the elements of each level of the hierarchy are compared in a pairwise fashion as far as the degree of importance / preference of one against the other is concerned. This comparison is realised with the help of comparison matrices, where the decision maker's preferences and judgements are declared by using a numerical scale (usually Saaty's numerical gradations from 1 to 9, where 1 implies equal importance and 9 extreme importance of one element over another). A comparison matrix is mathematically represented as

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix}$$

where

- n represents the number of variables compared
- $a_{ij} > 0$ and $a_{ij} = \frac{1}{a_{ji}}$, where $i, j = 1, 2, \dots, n$

¹ Ansah, R. H., Sorooshian, S., & Bin Mustafa, S. (2015, October 29). Analytic Hierarchy Process Decision Making Algorithm. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2683706

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More specifically, the following apply:

- $a_{ij} > 1$, when element i is considered to be more important than element j
- $a_{ij} < 1$, when element j is considered to be more important than element i
- $a_{ij} = 1$, when an element is compared with itself ($i = j$).

Based on the above, the diagonal of the comparison matrix is equal to one, whereas the preferences granted to the rest of the matrix elements are considered to be reciprocal.

At the third step of the method, the weights of the decision elements are calculated. To this end, each value in column j is divided by the total of the values in column j . The sum of all elements' values in column j must be equal to 1, hence the values are normalised. This is represented in the equation below:

$$W = \begin{bmatrix} \frac{a_{11}}{\sum a_{i1}} & \frac{a_{12}}{\sum a_{i2}} & \dots & \frac{a_{1n}}{\sum a_{in}} \\ \dots & \dots & \dots & \dots \\ \vdots & \vdots & \vdots & \vdots \\ \frac{a_{n1}}{\sum a_{i1}} & \frac{a_{n2}}{\sum a_{i2}} & \dots & \frac{a_{nn}}{\sum a_{in}} \end{bmatrix}$$

At the last step of the method, the global weights of the alternatives are calculated through synthesis of the local weights: The normalised principal eigenvector of matrix A , also called priority vector, is obtained by averaging across the rows:

$$C = \frac{1}{n} \cdot \begin{bmatrix} \frac{a_{11}}{\sum a_{i1}} + \frac{a_{12}}{\sum a_{i2}} + \dots + \frac{a_{1n}}{\sum a_{in}} \\ \dots \\ \vdots \\ \frac{a_{n1}}{\sum a_{i1}} + \frac{a_{n2}}{\sum a_{i2}} + \dots + \frac{a_{nn}}{\sum a_{in}} \end{bmatrix}$$

The sum of all elements in the priority vector is equal to 1. To further check the consistency of the weight values, firstly the principal eigenvalue is obtained from the summation of products between each element of the principal eigenvector and the sum of columns of the reciprocal matrix:

$$\lambda_{max} = \begin{bmatrix} C_1 \\ C_2 \\ \vdots \\ C_n \end{bmatrix} \cdot \left[\sum a_{i1} \quad \sum a_{i2} \quad \dots \quad \sum a_{in} \right]$$

Then, the Consistency Index is calculated as follows:

$$CI = \frac{\lambda_{max} - n}{n - 1}$$

Finally, the consistency of the comparison matrix is checked by calculating the Consistency Ratio, a comparison between the Consistency Index and a Random Consistency Index.

$$CR = \frac{CI}{RI}$$

The values of the Random Consistency Index are given below.

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

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If the value of Consistency Ratio is smaller or equal to 10%, the inconsistency is acceptable. If the Consistency Ratio is greater than 10%, the decision maker needs to revise their judgment.

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