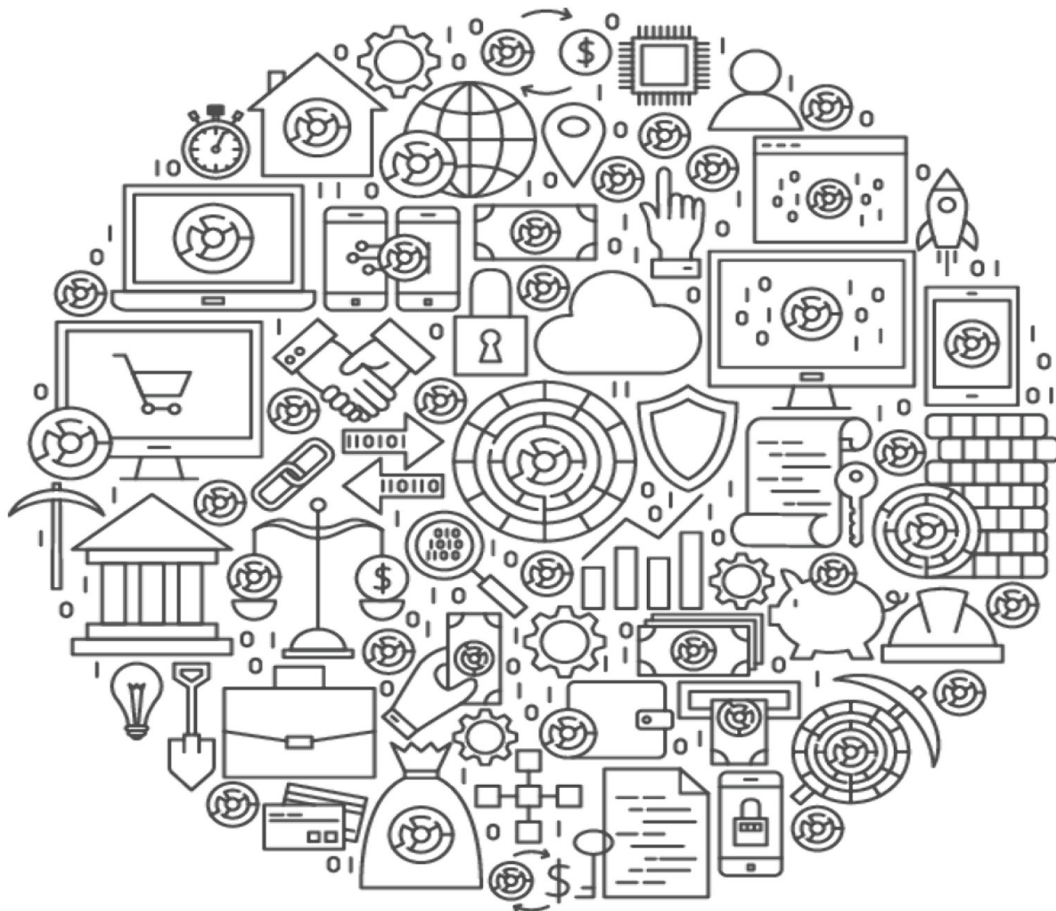


Determine the potential for digitization and harmonisation of administrative process

Deliverable 8: Roadmap

Technical Support Instrument

Supporting reforms in 27 Member States



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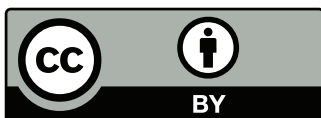
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Directorate-General for Structural Reform Support

REFORM@ec.europa.eu
+32 2 299 11 11 (Commission switchboard)
European Commission
Rue de la Loi 170 / Wetstraat 170
1049 Brussels, Belgium

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List of abbreviations

Abbreviation	
AI	Artificial intelligence
BSW	<i>Behörde für Stadtentwicklung und Wohnen (Authority for Urban Development and Housing)</i>
BUKEA	<i>Behörde für Umwelt, Klima, Energie und Agrarwirtschaft (Office for Environment, Climate, Energy and Agriculture)</i>
GLA	<i>Geologisches Landesamt (Geological State Office)</i>
FTE	Full time equivalent
IDM	Intelligent Dialogue Management
MVP	Minimum Viable Product
PT	Person days

Roadmap

This deliverable is the roadmap for the implementation of the to-be business processes and provides guidance on the specific steps needed in order to achieve this outcome.

Executive summary

This deliverable provides an overview of the indicative project implementation plans for the five to-be models with the result to develop a Minimum Viable Product (MVP) for each of the five processes.

The timeline of the different activities to be carried out is foreseen with a start in January 2023 (after the finalisation of the REFORM 2021/064 Deloitte project). For the implementation of the respective MVPs, it is suggested that the City of Hamburg and an external service provider with knowledge and project references regarding the building, testing, release and deployment of AI models work together in close collaboration.

An implementation of all five to-be processes in parallel could yield synergies regarding budget and resource allocation and efficiency gains through project organisation (e.g. following an agile project, labelling of different processes, development of components that could be used for more than one process).

The project implementation plan for the five to-be models (brief written inquiries, senate printed matter coordination, imputing procedure (BohrIS), info boxes and knowledge management) foresees an expected 546 person days (PT) for the City of Hamburg and 959 PT for an external service provider. The timeline and the person day estimates in order to realise the implementation of the five to-be process models are based on assumptions, which have been derived following the indications that were provided by the different stakeholders and process owners during the workshops. All roles and FTE assumptions are split into external person days delivered by external service providers and person days provided by the City of Hamburg. The efforts are indicative and must be verified depending on more detailed planning regarding the implementation.

Furthermore, a change management plan that lists possible process obstacles that have been identified by the project team was developed. All identified obstacles, clustered according to their relation to the respective to-be process are listed in the table below. For each obstacle, the corresponding risks and its impact as well as a mitigation strategy to address and mitigate these risks is provided.

Introduction

This Deliverable provides a roadmap for the implementation of the five to-be business processes and gives guidance on the specific steps, risks and mitigation measures in order to achieve this outcome.

As an overview, an indicative implementation plan of the different steps per to-be process to be executed is presented. Thereafter, the main activities to be undertaken by the City of Hamburg and its relevant stakeholders that result from this indicative implementation plan are detailed. This also includes the allocation of responsibilities for these activities to different stakeholders.

As a last step, the main obstacles to implement each action per process are presented as well as suggestions in order to tackle them are presented (change management plan).

Please note that all described activities and responsibilities of the to-be models in this deliverable are **considered to be suggestions**. Before the implementation of the five to-be process models, **further alignments and consultations should be made with the process owners**, although they are not authorized to make the final decisions regarding the to-be processes.

Indicative implementation plan for the five MVPs

This chapter provides an overview of the indicative project implementation plan for the five to-be models with the result to develop a Minimum Viable Product (MVP) for each of the five processes.

The timeline of the different activities to be carried out is foreseen with a **start in January 2023** (after the finalisation of the REFORM 2021/064 Deloitte project). For the implementation of the respective MVPs, it is suggested that the **City of Hamburg and an external service provider** with knowledge and project references regarding the building, testing, release and deployment of AI models **work together in close collaboration**.

An **implementation of all five to-be processes in parallel could yield synergies** regarding budget and resource allocation and efficiency gains through project organisation (e.g. following an agile project, labelling of different processes, development of components that could be used for more than one process).

Please note that all project plans and its **timelines and the indications regarding person day estimates** in order to realise the implementation of the five to-be process models are **based on assumptions**, which have been derived following the indications that were provided by the different stakeholders and process owners during the workshops. All roles and FTE are split into external person days delivered by external service providers and person days provided by the City of Hamburg. The efforts are indicative and must be verified depending on more detailed planning regarding the implementation. It is important to note that this indicative action plan needs to be further verified before taken into consideration through internal budgeting and procurement.

Please also note that an **MVP is considered as an initial stand-alone and productive version of the end product**. However, there can still be expansion stages and regular (e.g. once a year) re-trainings of the models within the entire life cycle of the AI product even after the MVP phase has been completed. This re-training and expansion of the models is common for AI products. The implementation of the MVPs depends substantially on the assumption that the person days allocated to the City of Hamburg can be provided by the City of Hamburg and that the designing of the IDM tool is completed before the start of the implementation of the MVPs.

Overarching implementation plan for the five MVPs

The following figure shows the **project implementation plan for the five to-be models** (brief written inquiries, senate printed matter coordination, imputing procedure (BohrIS), info boxes and knowledge management) that foresees an expected 759 person days (PT) for the City of Hamburg and 987 PT for an external service provider.

Figure 1: Overall implementation plan for the five MVPs (brief written inquiries (SKA), senate printed matter coordination, imputing procedure (BohrIS), info boxes and knowledge management)

Activity	01/23				02/23				03/23				04/23				05/23				06/23				07/23				08/23				Lead	PT			
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32		33	34	City of HH	External
1. Warm-up																																			External	0	50
1.1 Harmonisation of the projects with the business requirements																																			External	0	120
1.2 Check integration into existing IDM tool																																			External	0	75
1.3 Short analysis of the IT architectures																																			City of HH	10	5
2. Planning																																			External	42	176
2.1 Acquisition and analysis of data																																			External	0	60
3. Set-up of Labelling Environment																																			External	60	60
3.1 Set-up of Labelling Environment infrastructure																																			External	0	60
3.2 Build Test Release Deploy of Labelling Environment	External	60	60																																		
4. Development of microservices																																			External	0	80
4.1 Conception of models																																			City of HH	138	38,5
4.2 Iteration of labelling																																			External	11	95
4.3 Training and evaluation of models	City of HH	168	28																																		
5. Implementation of toolset extensions																																			City of HH	113	33
5.1 Setup of workflow management basis infrastructure																																			City of HH	14,5	38,5
5.2 Adjustment of dashboard																																			City of HH	157,5	50,5
5.3 Adaption of documentation (e.g. operating manuals)																																			City of HH	157,5	50,5
5.4 Build Test Release Deploy	External	15	15																																		
6. Project management																																			City of HH	30	30
6.1 Quality assurance																																			City of HH	30	30
6.2 Communication and coordination	External	15	15																																		
Sum			759	987																																	

Source: Deloitte (2022)

Activities in blue (such as the set-up of an agile project management and communication and coordination) are expected to unfold **substantial efficiency gains** if all five to-be processes are implemented at the same time. The **numbers in blue** referring to the corresponding person days is therefore expected to be lower than the sum of all person days for the implementation of each individual process.

Please note that it is expected that for the acquisition and analysis of data in the case of the to-be process info boxes more time needs to be planned as currently, no data are stored. This is indicated by the dashed bar in Activity 2 (Planning) for the months April to August.

Overall activities and responsibilities for the five MVPs

The project schedules of the processes are each oriented along the following five phases and the project management. However, there can be a different number of phases depending on the process:

Table 1: Overall activities and responsibilities of the implementation project for the five MVPs

Phase	Indicative timeframe	Overall lead	Description
1. Warm-up	January – February 2023 (5-6 weeks)	External service provider	<p>The warm-up phase covers a period of approximately 5-6 weeks and includes the harmonisation of the projects with the business requirements formulated in this project, the check of the integration into the existing IDM tool and a short analysis of the IT architecture. Key aspects here are to ensure that the software and hardware conditions, as well as interfaces, necessary computing capacity, data protection and similar topics are given.</p> <p>It is particularly important that these points are defined and coordinated at an early stage, if possible, directly after the start of the project. In addition, an agile project management will be set up, led by the City of Hamburg.</p>
2. Planning	End of January – end of March 2023	External service provider	<p>The objective of this phase is to define the structure of the database and to analyse the corresponding data that is needed to train the models. Depending on the data format, a certain amount of effort for data preparation must be planned before labelling can begin. For the info boxes, this phase is expected to take six months given the fact that currently, data are not stored and therefore, a data basis needs to be built up in these six months.</p>
3. Set-up of labelling environment (only for some to-be processes)	Beginning of February – beginning of May 2023	External service provider	<p>After the analysis of data, phase 3 starts with the implementation of a labelling and annotation environment, as well as the infrastructure. This is planned over a course of approximately two months, depending on the quantity and quality of data. Subsequently, this labelling environment will be built, tested, released and deployed another three weeks, completing the entire third phase within several weeks.</p>
4. Development of microservices (only for some to-be processes)	Mid of March – mid of June 2023	External service provider	<p>Phase 4 includes the conception of the models, several iterations of labelling, as well as the training and evaluation of the models. This phase is planned over approximately three months, depending on the respective to-be process, with several iterations of labelling, training and evaluation iterations of the models following the labelling iterations.</p>
5. Implementation of toolset extensions	End of March – mid of August 2023	City of Hamburg	<p>Throughout the development of the microservices, the implementation of toolset extensions will be started. Throughout the duration of this phase, changes to the dashboard are made depending on the development status and the documentation is developed at cyclical intervals and iteratively adapted and completed. In addition, the developed microservices are iteratively built, tested, released and deployed. Within the test phase, performance tests and the interaction of all components are tested in a first step. Furthermore, speed optimisations for the model components and feedback from user tests are obtained. The latter, user feedback, is a crucial point in the agile development of software products and is intended to prevent software from being developed for years only to find that it does not meet user requirements. Thereafter, (final) acceptance tests by the respective process owners after each sprint and before the go</p>

Phase	Indicative timeframe	Overall lead	Description
			live should be conducted and specific training for the process users in the respective business departments should be prepared.
6. Project management	January – August 2023	City of Hamburg	<p>The project management, led by the City of Hamburg, includes the coordination and communication with all involved stakeholders throughout the entire duration of the project as outlined in the change management plan (see chapter Change Management Plan) to ensure a proper collaboration between all parties.</p> <p>Furthermore, a detailed quality assurance should take place, in particular via continuous testing activities conducted by dedicated experts within the City of Hamburg. This quality assurance also entails to flag any upcoming obstacles in a timely manner.</p> <p>At the beginning of the project, a detailed project planning and specification of the core contents of the project based on the results from the Deloitte concept development project (REFORM SC2021/064) is recommended. The budgeting and procurement of services that will be performed by external service providers needs to be conducted prior to the start of this implementation project.</p>

Source: Deloitte (2022)

Phases 1, 2, 5 and 6 are included in each implementation plan of the to-be processes, while phase 3 is not relevant for the senate printed matter coordination and the imputing process and phase 4 is not relevant for the senate printed matter coordination.

Activities and responsibilities for the brief written inquiries

This subchapter presents the project plan to implement the Minimum Viable Product (MVP) of the to-be process for the brief written inquiries (as described in Deliverable 6 and 7).

The implementation of the MVP has a foreseen duration of approximately eight months and should be started immediately following the termination of this REFORM SC2021/064 project of Deloitte regarding the conceptualization of the to-be process. The start of the implementation phase would then be in January 2023. A later start is possible, but it is recommended to not postpone the start too long to benefit from the current stakeholder attention and to take up from the already contacted funding opportunities.

The following figures show the project implementation plan for the brief written inquiries that foresees an expected 213.5 person days (PT) for the City of Hamburg and 233 PT for an external service provider.

Figure 2: Project implementation plan for MVP of the brief written inquiries (SKA)

Activity	01/23	02/23	03/23	04/23	05/23	06/23	07/23	08/23	09/23	Lead	PT		
											City of HH	External	
1. Warm-up													
1.1 Harmonisation of the project with the business requirements											External	0	10
1.2 Check integration into existing IDM tool											External	0	24
1.3 Short analysis of the IT architecture											External	0	15
1.4 Set-up of agile project management											City of HH	10	4
2. Planning													
2.1 Acquisition and analysis of data											External	8	30
3. Set-up of Labelling Environment													
3.1 Set-up of Labelling Environment infrastructure											External	0	25
3.2 Build Test Release Deploy of Labelling Environment											External	20	20
4. Development of microservices													
4.1 Conception of models											External	0	20
4.2 Iteration of labelling											City of HH	48	16
4.3 training and evaluation of models											External	3	30
5. Implementation of toolset extensions													
5.1 Setup IDM basis infrastructure											City of HH	42	7
5.2 Adjustment of dashboard											City of HH	35	7,5
5.3 Adaption of documentation (e.g. operating manuals)											External	4	10
5.4 Build Test Release Deploy											City of HH	43,5	14,5
Sum												213,5	233

Source: Deloitte (2022)

The roadmap is divided into five implementation phases, the achievement of which is key to the implementation of the MVP. This roadmap contains the following steps:

1. Warm-up

Phase 1 is planned to be carried out in this process as previously described. In total, phase 1 is expected to require 10 PT for the City of Hamburg and 53 PT for an external service provider.

2. Planning

The core objective in this phase is to follow up on existing brief written inquiries from the system at authority and department level, as well as to collect new data at all levels during ongoing processes and make it accessible for further processing. It must be further noted here that the time horizon for collecting enough data at the unit level may well be longer than the project horizon. The brief written inquiries are stored in PDF, Word and Excel format whereas the answers are saved in PDF format, which implies a certain amount of data preparation before labelling can be started. This phase begins end of January and ends end of February. In total, phase 2 is expected to require 8 PT for the City of Hamburg and 30 PT for an external service provider.

3. Set-up of Labelling Environment

Phase 3 is planned to be employed in this process as previously described. In total, phase 3 is expected to require 20 PT for the City of Hamburg and 45 PT for an external service provider.

4. Development of microservices

Phase 4 includes the conception of the models, several iterations of labelling, as well as the training and evaluation of the models. This phase is planned over a three-month period, with two

iterations of labelling and two training and evaluation iterations of the models following the labelling iterations. Both functions, the assignment of responsibilities (assisted) and the intelligent search benefit from the same database, which is why labelling and data collection can be done simultaneously for both functions. To train the classifier and the finetuning for the similarity search the extracted texts have to be labeled in various labelling iteration by subject matter experts, which have to be provided by the city of Hamburg. In total, phase 4 is expected to require 51 PT for the City of Hamburg and 66 PT for an external service provider.

5. Implementation of toolset extensions

Phase 5 is planned to be carried out in this process as previously described. Overall, phase 5 is planned to be completed within 4 1/2 months and is expected to require 124.5 PT for the City of Hamburg and 39 PT for an external service provider.

Activities and responsibilities for the senate printed matter coordination

This subchapter presents the project plan to implement the Minimum Viable Product (MVP) of the to-be process for the senate printed matter coordination (as described in Deliverable 6 and 7).

The implementation of the MVP has a foreseen duration of approximately four months and should be started immediately following the termination of this REFORM SC2021/064 project of Deloitte regarding the conceptualization of the to-be process. The start of the implementation phase would then be in January 2023. A later start is possible, but it is recommended to not postpone the start too long to benefit from the current stakeholder attention and to take up from potential funding opportunities and synergies with the implementation of the other to-be processes.

The following figure shows the project implementation plan for the senate printed matter coordination that foresees an expected 109.5 person days (PT) for the City of Hamburg and 90 PT for an external service provider.

Figure 3: Project implementation plan for MVP of the senate printed matter coordination

Activity	01/23				02/23				03/23				04/23				Lead	PT		
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16		17	City of HH	External
1. Warm-up	[Gantt chart for Warm-up: 01/01 to 02/04]																			
1.1 Harmonisation of the project with the business requirements	[Gantt chart for 1.1: 01/01 to 01/28]																	External	0	10
1.2 Check integration into existing IDM tool	[Gantt chart for 1.2: 01/08 to 01/28]																	External	0	24
1.3 Short analysis of the IT architecture	[Gantt chart for 1.3: 01/15 to 01/28]																	External	0	15
1.4 Set-up of agile project management	[Gantt chart for 1.4: 01/01 to 01/28]																	City of HH	10	4
2. Planning	[Gantt chart for Planning: 02/05 to 02/22]																			
2.1 Acquisition and analysis of data	[Gantt chart for 2.1: 02/05 to 02/22]																	External	4	8
3. Implementation of toolset extensions	[Gantt chart for Implementation: 02/29 to 04/19]																			
3.1 Setup IDM basis infrastructure	[Gantt chart for 3.1: 02/29 to 04/19]																	City of HH	42	7
3.2 Adjustment of dashboard	[Gantt chart for 3.2: 03/05 to 04/19]																	City of HH	24	8
3.3 Adaption of documentation (e.g. operating manuals)	[Gantt chart for 3.3: 03/12 to 04/19]																	External	2,5	7
3.4 Build Test Release Deploy	[Gantt chart for 3.4: 03/19 to 04/19]																	City of HH	27	7
Sum																			109,5	90

Source: Deloitte (2022)

The roadmap is divided into three implementation modules, the achievement of which is key to the implementation of the MVP. This roadmap contains the following steps:

1. Warm-up

Phase 1 is planned to be carried out in this process as previously described. In total, phase 1 is expected to require 10 PT for the City of Hamburg and 53 PT for an external service provider.

2. Planning

The aim of this phase is to examine in detail the data base and information of the senate printed matter in order to determine the interfaces and the possibility of archiving as well as processing the data. This will include further discussions with process and system owners, as well as expanded desk research. The core objective is to follow up on existing printed matters from the system at authority and department level, as well as to collect new data at all levels during ongoing processes and make it accessible for further processing. This phase begins end of January and ends end of February. In total, module 2 is expected to require 4 PT for the City of Hamburg and 8 PT for an external service provider.

3. Implementation of toolset extensions

Phase 3 is planned to be carried out in this process as previously described. The IDM tool will be implemented adding further functionalities, an adapted version of the IDM frontend, the manual assignment of responsibilities module, the deadline tracking module, the communication module, and the interface to the eSIS system. Overall, phase 3 is planned to be completed within three months and is expected to require 95.5 PT for the City of Hamburg and 29 PT for an external service provider.

Activities and responsibilities for the imputing procedure (BohrIS)

This subchapter presents the project plan to implement the Minimum Viable Product (MVP) of the to-be process for the BohrIS process (as described in Deliverable 6 and 7).

The implementation of the MVP has a foreseen duration of approximately seven months and should be started immediately following the termination of this REFORM SC2021/064 project of Deloitte regarding the conceptualization of the to-be process. The start of the implementation phase would then be in January 2023. A later start is possible, but it is recommended to not postpone the start too long to benefit from the current stakeholder attention, the need for immediate workload reduction and synergies with the implementation of the other to-be processes.

The following figures show the project implementation plan for the BohrIS process that foresees an expected 128.5 person days (PT) for the City of Hamburg and 205.5 PT for an external service provider.

Figure 4: Project implementation plan for MVP of the imputing procedure (BohrIS process)

Activity	01/23 02/23 03/23 04/23 05/23 06/23 07/23							Lead	PT	
	01/23	02/23	03/23	04/23	05/23	06/23	07/23		City of HH	External
1. Warm-up										
1.1 Harmonisation of the project with the business requirements								External	0	10
1.2 Check integration into existing WF management tool								External	0	24
1.3 Short analysis of the IT architecture								External	0	15
1.4 Set-up of agile project management								City of HH	10	4
2. Planning										
2.1 Acquisition and analysis of data								External	12	48
3. Development of microservices										
3.1 Conception of models								External	0	30
3.2 Iteration of labelling								City of HH	6	30
3.3 training and evaluation of models								External	3	15
4. Implementation of toolset extensions										
4.1 Setup workflow management basis infrastructure								City of HH	42	7
4.2 Adjustment of dashboard								City of HH	24	5,5
4.3 Adaption of documentation (e.g. operating manuals)								External	4	7,5
4.4 Build Test Release Deploy								City of HH	28,5	9,5
Sum									128,5	205,5

Please note that the workflow management tool for the process “BohrIS” could be either “Modul F” or the IDM tool.

Source: Deloitte (2022)

The roadmap is divided into four implementation modules, the achievement of which is key to the implementation of the MVP. This roadmap contains the following steps:

1. Warm-up

Phase 1 is planned to be carried out in this process as previously described. In total, phase 1 is expected to require 10 PT for the City of Hamburg and 53 PT for an external service provider.

2. Planning

This phase defines the structure and analysis of the database used to train the models. The core objective is to follow up on existing drilling information from the system, as well as to collect new data during ongoing processes and make it accessible for further processing. The basic information about new drilling projects is transmitted using PDF, XML and XSD format.

This phase begins end of January and ends end of February. In total, phase 2 is expected to require 12 PT for the City of Hamburg and 48 PT for an external service provider.

3. Development of microservices

Phase 3 includes the conception of the models, several iterations of labelling, as well as the training and evaluation of the models. This module is planned over a three-month period, with two iterations of labelling and two training and evaluation iterations of the models following the labelling iterations. All functions, the completeness check, the plausibility check and the imputing benefit from the same database, which is why labelling and data collection can be done

simultaneously for all functions. In total, module 3 is expected to require 9 PT for the City of Hamburg and 75 PT for an external service provider.

4. Implementation of toolset extensions

Phase 4 is planned to be carried out in this process as previously described. The IDM tool will be implemented, whereby the tool is equipped with further functionalities, including imputing, completeness, and plausibility checks with artificial intelligence support. Overall, module 4 is planned to be completed within 4 1/2 months and is expected to require 98.5 PT for the City of Hamburg and 29.5 PT for an external service provider.

Activities and responsibilities for the info boxes

This subchapter presents the project plan to implement the Minimum Viable Product (MVP) of the to-be process for the info boxes (as described in Deliverable 6 and 7).

The implementation of the MVP has a foreseen duration of approximately six months and should be started immediately following the termination of this REFORM SC2021/064 project of Deloitte regarding the conceptualization of the to-be process. The start of the implementation phase would then be in January 2023. A later start is possible, but it is recommended to not postpone the start too long to benefit from the current stakeholder attention and to take advantage from potential funding opportunities and synergies with the implementation of the other to-be processes.

The following figures show the project implementation plan for the senate printed matter coordination that foresees an expected 169 person days (PT) for the City of Hamburg and 207.5 PT for an external service provider.

Figure 5: Project implementation plan for MVP of the info boxes

Activity	01/23						02/23						03/23						04/23						05/23						06/23						Lead	PT	
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	City of HH	External												
1. Warm-up	[Gantt bars for phase 1]																																						
1.1 Harmonisation of the project with the business requirements	[Gantt bar]																									External	0	10											
1.2 Check integration into existing IDM tool	[Gantt bar]																									External	0	24											
1.3 Short analysis of the IT architecture	[Gantt bar]																									External	0	15											
1.4 Set-up of agile project management	[Gantt bar]																									City of HH	10	4											
2. Planning	[Gantt bars for phase 2]																																						
2.1 Acquisition and analysis of data	[Gantt bar]																									External	8	40											
3. Set-up of Labelling Environment	[Gantt bars for phase 3]																																						
3.1 Set-up of Labelling Environment infrastructure	[Gantt bar]																									External	0	25											
3.2 Build I Test I Release I Deploy of Labelling Environment	[Gantt bar]																									External	20	20											
4. Development of microservices	[Gantt bars for phase 4]																																						
4.1 Conception of models	[Gantt bar]																									External	0	10											
4.2 Iteration of labelling	[Gantt bar]																									City of HH	36	12											
4.3 training and evaluation of models	[Gantt bar]																									External	2	20											
5. Implementation of toolset extensions	[Gantt bars for phase 5]																																						
5.1 Setup of IDM basis infrastructure	[Gantt bar]																									City of HH	42	7											
5.2 Adjustment of dashboard	[Gantt bar]																									City of HH	20	4											
5.3 Adaption of documentation (e.g. operating manuals)	[Gantt bar]																									External	2,5	7											
5.4 Build I Test I Release I Deploy	[Gantt bar]																									City of HH	28,5	9,5											
Sum																											169	207,5											

Source: Deloitte (2022)

The roadmap is divided into five implementation phases, the achievement of which is key to the implementation of the MVP. This roadmap contains the following steps:

- 1. Warm-up**
Phase 1 is planned to be carried out in this process as previously described. In total, phase 1 is expected to require 10 PT for the City of Hamburg and 53 PT for an external service provider.
- 2. Planning**
The core objective in this phase is to collect new data, since currently, data are not stored and therefore, a data basis need to be built up during phase 2. Therefore, this phase is expected to take six months and will run in parallel with the implementation of the IDM tool. It must be further noted here that the time horizon for collecting enough data at the unit level may well be longer than the project horizon. The incoming requests are sent by mail, but can have different attachment formats, which implies a certain amount of data preparation before labelling can be started. This phase begins end of January and ends end of June. In total, phase 2 is expected to require 8 PT for the City of Hamburg and 40 PT for an external service provider.
- 3. Set-up of Labelling Environment**
Phase 3 is planned in this process as previously described. Due to the missing database in this process, the set-up will be rolled out in two phases, first at the beginning of March and the second

iteration in June. In total, phase 3 is expected to require 20 PT for the City of Hamburg and 45 PT for an external service provider.

4. Development of microservices

Phase 4 includes the conception of the model, several iterations of labelling, as well as the training and evaluation of the model. This phase is planned over a two-month period, with two iterations of labelling and two training and evaluation iterations of the model following the labelling iterations, which can start while collecting and setting up the new data basis. To train the classifier for the function of the assignment of responsibilities (assisted), the extracted texts have to be labeled in various labelling iteration by subject matter experts, which have to be provided by the city of Hamburg. In total, phase 4 is planned to require 38 PT for the City of Hamburg and 42 PT for an external service provider.

5. Implementation of toolset extensions

Phase 5 is planned to be carried out in this process as previously described. Overall, phase 5 is planned to be completed within 3 1/2 months and is expected to require 93 PT for the City of Hamburg and 27.5 PT for an external service provider.

Activities and responsibilities for the knowledge management process

This subchapter presents the project plan to implement the Minimum Viable Product (MVP) of the to-be process for knowledge management (as described in Deliverable 6 and 7).

The implementation of the MVP has a foreseen duration of approximately seven months and should be started immediately following the termination of this REFORM SC2021/064 project of Deloitte regarding the conceptualization of the to-be process. The start of the implementation phase would then be in January 2023. A later start is possible, but it is recommended to not postpone the start too long to benefit from the current stakeholder attention and its strategic importance for the City of Hamburg, the need for immediate workload reduction and synergies with the implementation of the other to-be processes.

The following figures show the project implementation plan for the knowledge management process that foresees an expected 195.5 person days (PT) for the City of Hamburg and 243 PT for an external service provider.

Figure 6: Project implementation plan for MVP of the process knowledge management

Activity	01/23 02/23 03/23 04/23 05/23 06/23 07/23							Lead	PT	
	01/23	02/23	03/23	04/23	05/23	06/23	07/23		City of HH	External
1. Warm-up	[Gantt bars for phase 1]									
1.1 Harmonisation of the project with the business requirements								External	0	10
1.2 Check integration into existing IDM tool								External	0	24
1.3 Short analysis of the IT architecture								External	0	15
1.4 Set-up of agile project management								City of HH	10	4
2. Planning	[Gantt bars for phase 2]									
2.1 Acquisition and analysis of data								External	10	50
3. Set-up of Labelling Environment	[Gantt bars for phase 3]									
3.1 Set-up of Labelling Environment infrastructure								External	0	25
3.2 Build Test Release Deploy of Labelling Environment								External	20	20
4. Development of microservices	[Gantt bars for phase 4]									
4.1 Conception of models								External	0	20
4.2 Iteration of labelling								City of HH	48	16
4.3 training and evaluation of models								External	3	30
5. Implementation of toolset extensions	[Gantt bars for phase 5]									
5.1 Setup of IDM basis infrastructure								City of HH	42	7
5.2 Adjustment of dashboard								City of HH	30	5
5.3 Adaption of documentation (e.g. operating manuals)								External	2,5	7
5.4 Build Test Release Deploy								City of HH	30	10
Sum									195,5	243

Source: Deloitte (2022)

The roadmap is divided into five implementation phases, the achievement of which is key to the implementation of the MVP. This roadmap contains the following steps:

1. Warm-up

Phase 1 is planned to be carried out in this process as previously described. In total, phase 1 is expected to require 10 PT for the City of Hamburg and 53 PT for an external service provider.

2. Planning

The core objective in this phase is to examine the already existing database in the folder structure and prioritize the usage of the files for a tiered labelling approach, since there are already many documents in the existing folders, which must first be labeled in order to gradually distribute the workload. The documents are stored in PDF, Word and Excel format, which implies a certain amount of data preparation before labelling can be started. This phase starts end of January and ends end of February. In total, phase 2 is expected to require 10 PT for the City of Hamburg and 50 PT for an external service provider.

3. Set-up of Labelling Environment

Phase 3 is planned to be employed in this process as previously described. In total, phase 3 is expected to require 20 PT for the City of Hamburg and 45 PT for an external service provider.

4. Development of microservices

Phase 4 includes the conception of the models, several iterations of labelling, as well as the training and evaluation of the models. This phase is planned over a three-month period, with two iterations of labelling and two training and evaluation iterations of the models following the labelling iterations. The function for the criteria-based and additional analysis, as well as the intelligent search benefit from the same database, which is why labelling and data collection can be done simultaneously for both functions. For the finetuning for the similarity search the extracted texts have to be labeled in various labelling iteration by subject matter experts, which have to be provided by the city of Hamburg. In addition, the process must be set up in which the documents can be labeled when uploading new documents in order to expand the database. In total, phase 4 is planned to require 51 PT for the City of Hamburg and 66 PT for an external service provider.

5. Implementation of toolset extensions

Phase 5 is planned to be carried out in this process as previously described. Overall, phase 5 is planned to be completed within 3 1/2 months and is expected to require 74.5 PT for the City of Hamburg and 29 PT for an external service provider.

Change management plan

During our workshops and document analysis, several process obstacles have been identified by the project team.

These obstacles, clustered according to their relation to the respective to-be process are listed in the table below. For each obstacle, the corresponding risks and its impact as well as a mitigation strategy to address and mitigate these risks is provided.

Table 2: Change management plan

Related to process	Obstacle	Risk	Mitigation strategy
All processes	System integration Various systems and tools need to be integrated (Outlook, IDM, eSIS)	Information loss or efficiency loss can occur when switching between different systems	<ul style="list-style-type: none"> • Interfaces are programmed between the individual systems
	Content-related process changes In general, the processes remain unchanged, but the introduction of the system can add new process steps or eliminate some of them.	New or missing process steps can lead to confusion among process participants	<ul style="list-style-type: none"> • The process owners were involved in the design of the to-be model from the very beginning. • All process participants should be involved in the implementation of the to-be model • Preparation of documentation and information on the new processes
Info boxes	Training of the AI model Data not (yet) available to train AI model	Since the already sent requests are currently not stored, there is no data basis to train the model.	<ul style="list-style-type: none"> • Gradual implementation of the new system • During the implementation of the workflow management system, the requests including the addresses are stored centrally until enough data is available
	Stakeholder reluctance The process owner appeared highly reluctant regarding any potential automation and/or change of this process	Difficulties in further collaborations and implementation of a new system	<ul style="list-style-type: none"> • Explain the benefits for the daily work for the employees • Transparent communication • Gradual implementation of the new system
	Data storage/- exchange No commonly used data storage for exchange of data. The exchange of data currently takes place through mails.	The risk of inconsistencies arises. Changes in the data can be done after sending the system extract. Increased time expenditure due to the necessity of additional controls.	<ul style="list-style-type: none"> • Usage of a unitary data storage for documents which are currently in use • Exchange of data will take place in a unitary system (IDM tool)
	Data protection For data protection reasons, not all requests can be stored, or only for a limited time.	An incomplete data basis can lead to deficits of the model	<ul style="list-style-type: none"> • Anonymization and redaction of data can allow to process the relevant information
Brief written inquiries	Training of the AI models Insufficient data per authority/department to train the model	A precise suggestion for the responsibilities is not possible	<ul style="list-style-type: none"> • Gradual implementation of the new system • During the implementation of the workflow management

Related to process	Obstacle	Risk	Mitigation strategy
			system, the inquiries including the responsibilities are stored centrally until enough data is available
	Time criticality The process is very time-critical and allows for a very low error tolerance	Especially in the beginning, when the data volume is small, the suggested responsibility can still be inaccurate, which requires increased manual controls	<ul style="list-style-type: none"> Through the workflow management tool, the responsibilities can still be assigned manually, which can lead to the improvement of the model
Senate printed matter coordination	Media discontinuity Since the printed matters are coordinated across several authorities	The introduction of the IDM tool is planned inside BUKEA and BSW as a first instance, which may cause system discontinuities with other authorities.	<ul style="list-style-type: none"> Interfaces to other systems and to email system Evaluation of the introduction of the IDM tool for other authorities
Knowledge management	Initial high effort Especially for labelling the already existing documents, to implement intelligent search	Employees familiar with the content must initially process the documents, which leads to a temporary increased workload	<ul style="list-style-type: none"> Not all stored documents are used on the same regular basis, so prioritization allows for a graduated workload Gradual implementation of the new system
	Inconsistent syntax When storing and labelling new information, care should be taken to use a uniform syntax. Since everyone can store new information, variations can occur	Disparate storage and labelling of information can lead to complexity and inaccuracies.	<ul style="list-style-type: none"> Mandatory fields and instructions for uploading new data Additional training materials and information about the uploading process
Imputing procedure	Correctness of the data Insurance of the correctness of the imputed data can only take place in controls afterwards.	Increased need of coordination. Time loss within the process. Ongoing adjustments of data within the process possible	<ul style="list-style-type: none"> Inclusion of additional manual controls in the workflow management system

Source: Deloitte (2022)



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