Opportunities and Challenges for the Use of Artificial Intelligence in Border Control, Migration and Security

Management Summary

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EUROPEAN COMMISSION

Directorate-General for Migration and Home Affairs
Directorate B – Borders, Interoperability and Innovation
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Executive summary

Artificial Intelligence (AI) has been a key topic across business sectors during recent years and is seen a main factor for disruptive innovation in the years to come. The term, as defined by the European Commission, refers to "systems that display intelligent behaviour by analysing their environment and taking actions - with some degree of autonomy to achieve specific goals". Thus, we can think of AI as any system capable of doing things which we would normally regard as intelligent in humans. For AI applications today, this typically comes in the form of recognising patterns, making inferences, taking case-by-case decisions or engaging in conversation. Indeed, it is important to recognise AI as an umbrella term, covering various technologies each designed to solve a particular kind of problem. AI as a concept and a field of research has existed since the 1950s. However, several key drivers are contributing to the acceleration in industry adoption that it is observed today. The amount of data available for AI models to learn from is greater than ever before, and continues to grow at pace. At the same time, increasing democratisation of algorithms and platforms has created an ecosystem in which AI solutions can be tested and implemented more easily, by a wider range of people and organisations.

This study explored how AI can be leveraged in the context of Border Control, Migration and Security. It is clear that the impact of AI on these areas is not identical around the world. Moreover, the market of AI products and solutions is relatively young, and thus remains fragmented across and within most countries. The first part of the study showed that it is important to be aware that increasingly advanced AI, unless properly designed and governed, can demonstrate the more controversial sides of human-like behaviour as well. These include various forms of bias in decision-making, as well as raising questions around transparency, privacy and accountability. Moreover, this study assessed the areas and identified opportunities where AI can positively impact the domains of borders control, migration and security. To do so, the study looked at global and domain-specific trends, use cases, products and success stories in the AI field. The study then looked at nine internal and external processes related to border, migration and security management in the European Union, to assess the potential application of AI. The approach taken was to document the main sub-processes, challenges, data points and systems in use for these processes, and it was within this context that use cases were derived and then prioritised.

The objective of this report (which forms the second part of the study) is to describe how DG HOME and other relevant stakeholders (such as European Union member states, eu-LISA, Frontex, and other agencies) can transform the opportunities identified in the first stage of the study into a programme of work for implementation (referred to as "the roadmap"). The second objective is to describe how this specific programme can be governed, monitored and updated in the future, linked to the working context of the European Commission.

The methodology used to develop the roadmap consists of different steps. First, the identified use cases (referred to as "opportunities") are grouped into nine initiatives, each related to a process examined in the first phase of the study. The rationale for creating initiatives is threefold. First, initiatives provide a good way to structure project management across different opportunities. Furthermore, the initiatives provide a comprehensive view on the upcoming developments most relevant for a stakeholder group (e.g. visa policy officers). Finally, grouping into initiatives provides a good way to ensure accountability, both during and after development, while also ensuring synergies within the initiative are fully leveraged.

A brief description of the overall objective for each initiative is provided below:

- **Initiative 1 (Visa):** The objective of this initiative is to smoothen the visa application process both for applicants as for visa workers, both from a time consuming perspective as user-friendliness. Secondly, the aim is to strengthen the internal security of the Schengen Area by means of improved background checks performed by visa officers.
- **Initiative 2 (ETIAS):** Similar to initiative 1, but then focused for the ETIAS process. Thus, focused on smoothening the process while ensuring security of the Schengen Area.
- **Initiative 3 (Long-term stay or migration):** This initiative covers the process for applying for long-term stay or migration within the EU. The objective of this initiative is to, similarly as the previous, smoothen the application process while ensuring the security of the Schengen Area by means of appropriate background tests.
- **Initiative 4 (Granting international protection):** Here the process for requesting (or granting) international protection is tackled. The objective is to ensure a more transparent, data driven approach to ensure appropriate decisions are made to help those in need. Additionally, follow-up on individuals that are under review and prevent related absconsion.
- **Initiative 5 (SIS and SIRENE Bureaux):** The objective of this initiative is to make better use of data stored in the SIS system resulting in increase in the number alerts solved. Secondly, the objective is to facilitate new entries into the system while ensuring data quality.
- **Initiative 6 (Schengen border checks):** The initiative is focusing on the border checks process at the external Schengen borders. The ultimate objective is to improve and ensure seamless and secure border crossings into the European Schengen Area.
- **Initiative 7 (Operational management of IT systems):** This seventh initiative is focused on the Operational Management of Large-Scale IT systems in the Area of Freedom, Security and Justice (eu-LISA). Practically this leads the Agency to build and to ensure the uninterrupted operation of large-scale IT systems.
- **Initiative 8 (Policymaking):** The objective of this initiative is to ensure that policy making is effective in the sense that it meets the intended goals and needs. Moreover, the objective is also to facilitate the enforcement process (e.g. checking the national enactment or application of legislation).
- **Initiative 9 (Transversal (or "cross-process") opportunities):** This initiative covers opportunities, which do not fit exclusively in one specific process group (and thus initiative). It has various elements that can work across, or augment, other AI opportunities.

Each of the initiatives are further detailed in this report along different aspects such as objective and scope, expected benefits, risks, challenges, involved stakeholders, and relevant key performance indicators (KPIs).

In the second step of developing the roadmap, each of the opportunities within an initiative are assessed in terms of complexity.

This complexity score will have an impact on the duration of implementation projects. To perform this assessment, the feasibility scores[1] obtained in the first phase of the study are used together with new insights provided by process experts (e.g. comments on required regulation changes, technology maturity, etc.) to allocate opportunities into low, medium and high complexity categories. These are mapped respectively to six, twelve and eighteen month end-to-end implementation durations.

In the third step of developing the roadmap, the opportunities are sequenced in accordance with a number of factors. In brief, six main factors were considered with different levels of importance: dependencies (e.g.

[1] Feasibility score is a weighted average of eight different criteria used to assess requisite effort and overall possibility for developing and using the solution. For more information see **Error! Reference source not found.**.

existing timelines such as ETIAS), value/feasibility ratios (a metric to identify "quick wins", as developed in the first part of this study), strategic drivers (specific goals of DG HOME and wider European Commission), logical sequences (to start small and grow incrementally), technological factors (to leverage synergies and create expertise within the organisation) and finally balanced workload (to avoid having too many initiatives in progress simultaneously).

The resultant roadmap is presented below as a graphic, displaying the expected start and end time for implementation of each of the prioritised opportunities. The full roadmap covers a little more than five years (beginning Q3 2020)[2] to, on the one hand, give a sufficiently long horizon for developing the opportunities, while on the other to ensure commitment and capacity for the upcoming activities. The first year is relatively light on AI opportunity development as broader preparations (for funding, procurement, stakeholder engagement) need to happen first. Therefore, only select Proof-of-Concepts (see section **Error! Reference source not found.**) will happen in the first year along with over-arching enabling activities (known as "enablers", see chapter **Error! Reference source not found.**).

Another element on the roadmap is the way that opportunities are clustered into five different groups, identified mostly from a technical perspective (while the groups are not strictly defined by technology, the particulars of an AI application in each of these groups is sufficiently different to classify in this way):

- **Chatbots and intelligent agents**[3]
- **Risk assessment tools**
- **Knowledge management tools**
- **Policy insight and analytics tools**
- **Computer vision tools**

The graphical figures further down provide an overview of the roadmap[4], with the key highlights of sequencing rationale:

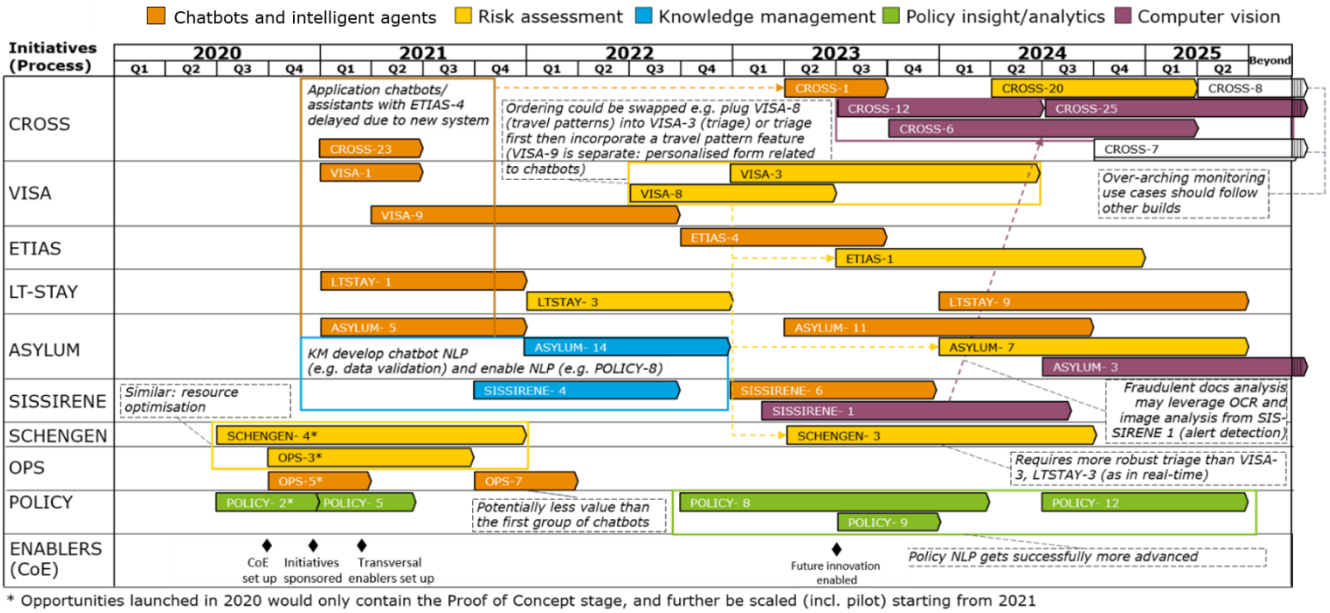

Figure 1: Overview of the roadmap with sequence rational

[2] Although the roadmap targets the first initiatives to begin in Q3 2020, the overall start date could be adjusted as required (subsequent phasing should remain in its relative ordering but at different/later dates).
[3] "Chatbots" is a more colloquial term generally referring to conversational interfaces while "intelligent agents" implies a broader category tools with additional functionality (such as the ability to personalise). The specific label is not significant in the context of this report, so the term "chatbot" is mainly used throughout as one overarching category.
[4] Regarding the projects in mid-2020, the availability and resources are yet to be confirmed.

More feasible opportunities are generally placed to come earlier in the overall sequencing. Most initiatives begin with chatbots, forming a first phase of AI implementation over the coming two years. Some more complex opportunities, such as risk assessment tools, are also scheduled relatively early due to perceived strategic importance for the European Commission. However, in general, opportunities are sequenced to create incremental increases in complexity.

For example, less intrusive risk assessment opportunities (e.g. irregular travel pattern analytics) are placed before more involved or cross-cutting risk assessment use cases.

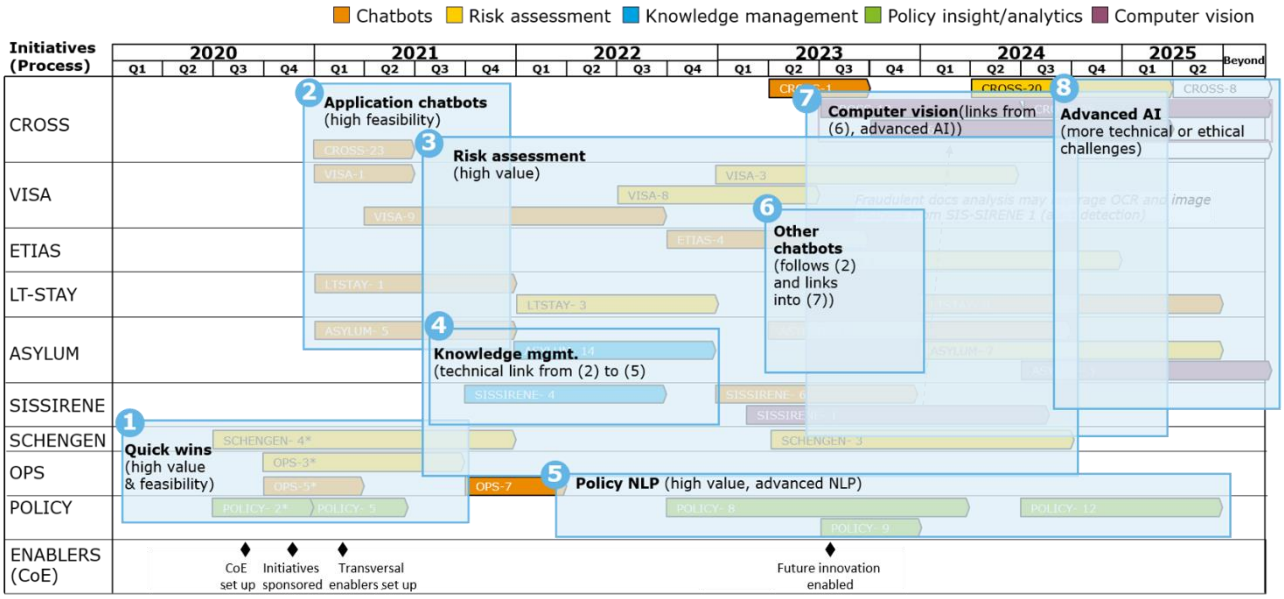

Figure 2: Overview of the roadmap with the different types of opportunities, see Annex A for a larger image

As mentioned, there is an additional stream in the roadmap containing the so-called "enablers". These are activities required for the development of other use cases (e.g. ensuring availability of infrastructure) and to ensure coordination and alignment across initiatives and stakeholders. Six different considerations for this stream are described, namely: Strategy, People, Process, Ethics, Data and Technology. Strategy defines a vision for each of the stakeholders involved and an overall direction for the roadmap. Moreover, DG HOME should articulate a common vision for the use of AI in the borders area. Secondly, the resourcing of people and talent should be centrally coordinated where possible, with local expertise as required, and guided by leadership. The Process dimension highlights the need for a consistent approach to managing different processes and monitoring KPIs. Data enablers advocate for data sharing across opportunities (where relevant) while providing oversight on data privacy and protection. Finally, a common view of technological best practice for development environments, vendor solutions, infrastructure, across different initiatives would help to drive the roadmap forward.

In general, all efforts to implement AI sit underneath the over-arching European AI strategy and coordinated action plan, set out by the European Commission. Therefore, implementation should be viewed as a collaborative endeavour. Stakeholders should avoid siloed implementation where possible, for example by creating shared core AI models for subsequent tailoring to different specifications and contexts. Enabling activities are transversal in nature, so the goal of addressing these is to drive broader collaboration around AI (in addition to enabling this roadmap), for example if subsequent AI studies are undertaken by DG HOME.

In this report, one approach to addressing these enablers is explored, namely to establish a Centre of Excellence (CoE) or "hub". Centres of Excellence are flexible communities of specialists built to address common goals around a topic or technology. By bringing together business and technology stakeholders,

CoE's can develop best practices, build use-case solutions, and provide training, and share resources and knowledge to, in this case, increase the chance of a successful implementation programme. It is recommended for DG HOME (and various stakeholders) to perform some further thinking on specific roles and responsibilities to match their needs.

To maximise benefits from the CoE approach, this study recommends it has five distinct responsibilities. Firstly, it would need to facilitate the integration with the border control, security and migration processes and systems: the CoE would act as a "test bed" for member states and EU agencies to trial new processes and technologies driven by AI solutions. Secondly, the CoE would be responsible for designing and setting-up an AI platform with tools to support member state authorities and other agencies to rapidly create AI prototypes and test them within the CoE, ahead of looking to create an MVP or scale the solution in production. Third, the CoE would provide a set of services around AI research, innovation, and guidance/monitoring on some of the enabling dimensions such as regulatory impacts and ethical implications. The CoE could evolve to certify the use of certain technologies for the implementation of AI across the EU, leading to standardisation. Finally, suitable governance of the CoE should be in place: the stakeholders responsible of governing the CoE would be a combination of EU agencies, member states representatives and any relevant industry partners.

This study also provides guidance around how to operationalise these AI opportunities, by means of detailing the different steps required in a typical AI implementation. This typically begins with a Proof-of-Concept to validate the core idea, followed by a more developed Minimum Viable Product (to build and test the other requirements) before a full-scale implementation project to deliver and deploy the solution (comparison against Commission Technology Readiness Levels is provided in the document). The requisite skillsets consist of data science, data engineering, business analysis and project management expertise. Specific considerations are provided for the given technical clusters, and specific AI opportunities where relevant.

In the context of the European Commission, a typical approach to an AI implementation would see central funding and coordination from the Commission or DG HOME. Significant member state (and/or Agency) specifics that are present across a single AI opportunity (for example different member states working with incompatible local systems of some kind) may necessitate local staffing of the more technical resources, especially as the AI implementation progresses in scale. However, as is noted throughout this report, a holistic approach with cross-initiative collaboration would help to drive the roadmap forwards. More details on project resourcing and division of responsibilities across stakeholders in the ecosystem is provided for each AI initiative in section **Error! Reference source not found.**.

Whilst identifying use cases at the outset of this study (through numerous interviews, workshops, and follow-up discussions), an approach that balanced current needs with future aspirations was followed. The resulting longlist consisted of ideas that spanned: AI for automation and streamlining of processes; AI for better citizen and employee engagement; and AI for deeper insights from the increasing quantities of available data. During the subsequent prioritisation exercise there were two particular factors of note that stand out as important areas for future considerations: the ethical nature of a use case, and the availability of data for use cases. As progress is made against this roadmap, it is worth putting increasing focus on the mechanism by which new use-cases and solutions are monitored for their alignment to these ethical principles – particularly for those concepts where there are a number of entities involved in the development. As demonstrated by the ideas short-listed in this study, there is much value to be captured through more effective use of the data that already exists within systems. A recommendation for the future would be to

understand how current data capture across Border Control, Migration, and Security could adapt in order to enable some of the use cases that are currently deemed infeasible.

The roadmap will see significant internal efficiencies and external experience improvements brought in to the processes at the start, followed by augmentations to human decision-making (with knowledge, risk and policy analytics solutions). The roadmap concludes with a set of more advanced and ambitious AI use cases which would show DG HOME and related agencies as highly mature with regards to these new technologies. The overall sequencing of the initiatives aims to help achieve short term value, and in parallel, aims to build capabilities and learnings that better facilitate future endeavours. It will be important to prepare the programme across different 'enabling' aspects such as Strategy, Data, Technology, People and Process to ensure success. The governance mechanisms discussed in this report, such as the CoE, are seen as key to addressing these surrounding points, to maximise the benefits of each initiative.

The reader should understand that this roadmap should be used as guide to assist with implementing the AI initiatives as defined in this document. In other words, the roadmap is a strategic plan that defines a goal and includes the major steps or milestones needed to reach it. It also serves as a communication tool and a high-level document which articulates strategic logic (the 'why') behind both the goal and the plan. Different external factors might change in the coming months. Therefore, the roadmap must be seen as a toolkit with different elements that can help the organisation in their implementation journey, with the acknowledgement that depicted elements (synergies, dependencies, constraints, etc.) may shift. Considerations for adapting the roadmap in the future might include new technological advances (with AI platforms and academic research becoming ever more mature), new migration trends and projects within the EU, specific member states considerations and needs, and so forth.

The analysis of AI opportunities and development of the implementation roadmap were conducted between September 2019 and February 2020, reflecting the working context (legislation, technology, resources, etc.) as understood during this time. An outbreak of 2019 novel coronavirus (SARS-CoV-2/COVID-19) spread from Wuhan, Hubei Province, China to Europe and other countries around the world during this period. On 11 March 2020, the World Health Organisation recognised the spreading coronavirus disease as a pandemic. At the time of writing this report, the pandemic is ongoing and unprecedented social measures are in effect to contain the spread (including closed borders, social distancing and individual movement lockdown). The consequences of this global crisis on border control and migration, and on priority setting and resource allocation within the EU in future, are currently unknown. The study does not attempt to reflect the impact of the coronavirus pandemic beyond presenting the option of postponing the entire timeline.

This study benefited from many enthusiastic stakeholders in the European Commission ecosystem, willing to explore using AI to improve their day-to-day work. The stakeholders understand that AI has a high potential but should be tackled in a considerate manner, as reflected by the general suggested approach to development. Furthermore, there will be regulatory, political and technological challenges necessary to be overcome. Despite these, DG HOME is excited to harness AI for the benefit of borders, migration and security in Europe.

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