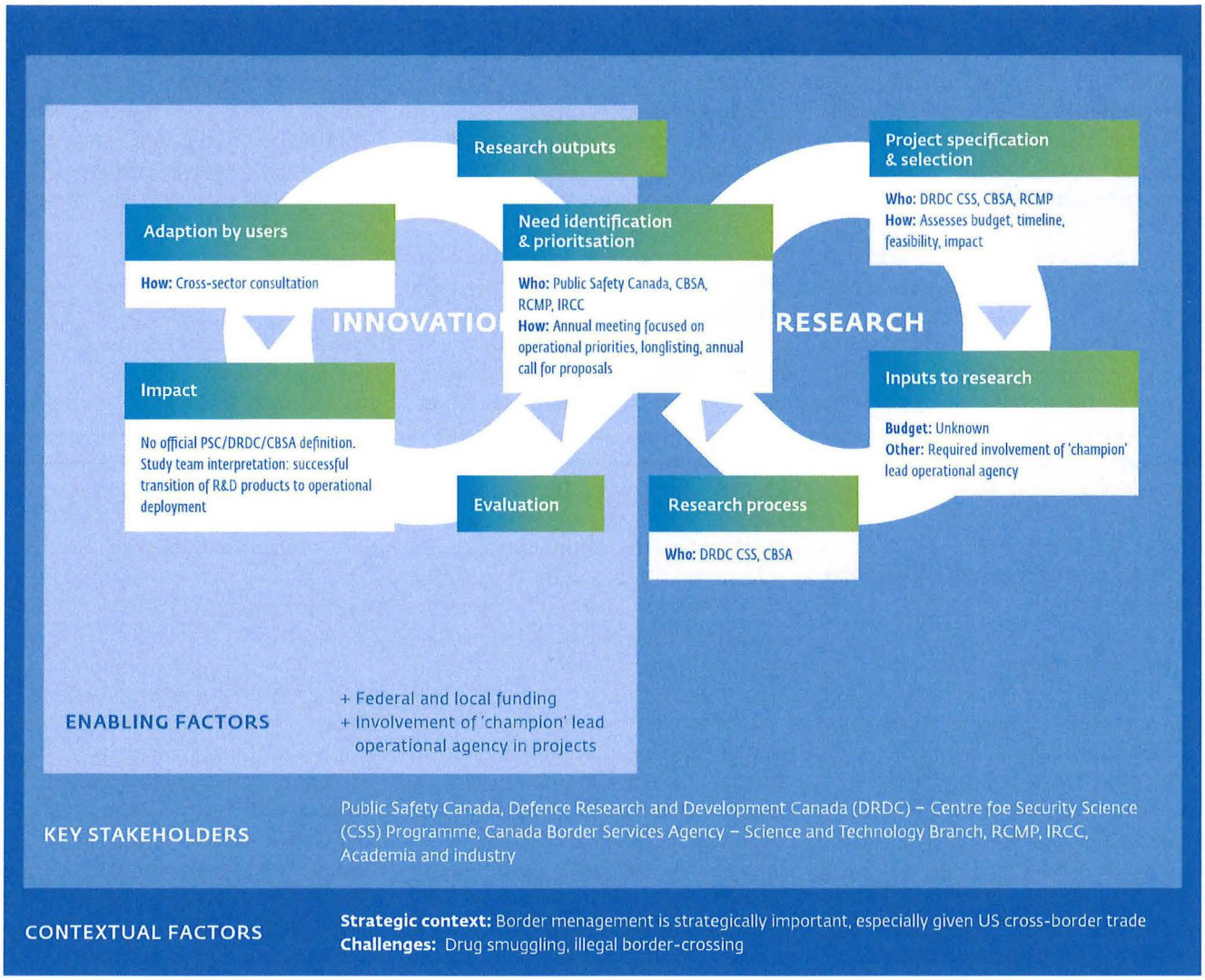
Figure 3.4 **Canadian research and innovation pathway**



covers a broad spectrum of security, resilience and critical infrastructure research of a technical nature. This relates to 'first responders' and Chemical, Biological, Radiological and Nuclear (CBRN) threats, and brings together organisations in the private, academic and public sectors to conduct border security research. While this is said by interviewees to be achieved through collaborating as project partners and generating evidence for decision makers, the specific methods of collaborating and supporting decision makers are not clear from the evidence available to the RAND study team.[393]

The **required involvement of a 'champion' lead operational agency** in conducting federal CSS research facilitates links between academia and end users, helping ensure that research is informed by an understanding of operational needs, priorities and wider context. This focus on the end users of research ensures that any research proposals or technological solutions are designed to be practical and useful to the operators implementing them.[394]

Challenges

The **need for greater federal funding for border research**, particularly in the academic field, was highlighted as being a key challenge in Canada.[395] Consequently, one study interviewee said that the Canadian government should carry out more consultation with the academic community to ensure that finite resources for research are invested efficiently, but also suggested that this deficiency is a common characteristic of government-academic relations in most countries.[396] An associated challenge relates to resource allocation: while substantial resources are now being allocated to improving cross-border infrastructure, such as the CAN$4.8bn[397] construction of the Gordie Howe International Bridge between Windsor and Detroit, far less has been allocated to longer-term border security research and its implementation.[398]

393 RAND Europe interview with DRDC CSS representatives, 19 April 2017.

394 RAND Europe interview with Phil Lightfoot, 19 April 2017.

395 RAND Europe interview with Canadian representative, 21 April 2017.

396 RAND Europe interview with Joel Sokolsky, 25 April 2017.

397 Can$ – Canadian dollar.

398 RAND Europe interview with Canadian representative, 21 April 2017.

End users' resistance to the introduction of new technology was perceived by one study interviewee as being part of the problem of translating border research into operational practice.[399] The interviewee said this is a challenge because end users are operationally focused 'generalists' with a variety of tasks to undertake.[400] This operational focus means that while Canadian border agencies have proved adept at crisis management, their day-to-day focus has made it more difficult to integrate longer-term technology into their activities.[401] One study interviewee viewed this as part of a wider issue, noting that technology developments occur much more quickly than the public administration and protocol changes required to regulate them.[402]

3.3. Australian border security research

3.3.1. Strategic context

There are numerous border security challenges facing Australia, with the level of priority assigned to each shifting from year to year. The issue of irregular migration, encompassing matters such as people smuggling, human trafficking and organised visa fraud, is an ongoing concern – one which is intrinsically linked to regional and international geopolitical events such as instability and conflict, and global health and social crises. Balancing the security of Australia's borders with the legitimate movement of people is therefore a key strategic priority.[403] The Australian Border Force (ABF) has noted the growing scale and complexity of trade and travel patterns, as the range of goods being traded internationally increases along with the potential for biosecurity hazards and economic risks.[404] Illicit trade in drugs, firearms and tobacco has also continued to grow and is linked to organised crime gangs in Australia and the funding of terrorist organisations abroad.[405] In particular, international tobacco smuggling has recently been identified as an area of high financial yield for criminals and is the focus of substantial organisational effort by law enforcement agencies in Australia.[406]

Actors working to breach the country's borders are reportedly becoming more resilient, adaptable and sophisticated in response to efforts by law enforcement. The forces of globalisation and the increasing cross-border movement of people, goods and cash, as well as developing and converging technologies and emerging international markets, have all created opportunities for organised crime. Online international trade in both licit and illicit goods has also grown exponentially in recent years, with the ABF again identifying firearms, tobacco and drugs as key illicit markets.[407]

In the Australian context, public dialogue and research on border security is evolving rapidly. In 2015, the ABF was established as the operational arm of the Department of Immigration and Border Protection (DIBP), which itself was reorganised and renamed in 2013. DIBP is responsible for immigration, citizenship, trade and customs, offshore maritime security and revenue collection. The ABF is responsible for offshore and onshore border control enforcement, investigations, compliance and detention operations in Australia, with relevant policy, regulatory and corporate support delivered by DIBP. According to the ABF, its creation as 'the new front-line operational agency within the Department' reflects 'a greater focus on the border as a strategic national asset'.[408] In mid-2017, the Department fundamentally changed its approach to the commissioning and management of research. Whereas previously a formal department-wide research programme was set at the start of each financial year, research functions are now more deeply embedded in each of the policy teams within the Department. Furthermore, the focus and scale of research projects have shifted. Several interviewees noted that much of the research traditionally produced in this sphere tended to be long-term, based on quantitative analyses and focusing on topics such as migration trends.[409] With the recent change in approach, research projects are designed to be increasingly operationally focused and responsive to emerging issues, with individually commissioned pieces of research with shorter turnarounds becoming more common than long-term research relationships producing multiple deliverables.[410]

3.3.2. Research pathway

Overview of the Australian research landscape

DIBP is the main actor in border security research in Australia. The Department is divided into six Groups: Policy, Corporate, Intelligence and Capability, Visa and Citizenship Services, Support, and Operations. Research may be conducted internally or commissioned from external research organisations such as universities and think tanks. Most research comes through the Policy Group, although some of the more technical research is commissioned or conducted by the Intelligence and Capability Division.

Table 3.4 presents this organisational structure.

Much of the research produced or commissioned by the Department is not publicly available, although a suite of research outputs on topics related to migration is available online and is also utilised for a significant amount of cross-governmental research, for example with the Department of Social Services.[411] There is scant reference to

399 RAND Europe interview with Phil Lightfoot, 19 April 2017.
400 RAND Europe interview with Phil Lightfoot, 19 April 2017.
401 RAND Europe interview with Phil Lightfoot, 19 April 2017.
402 RAND Europe interview with Canadian representative, 21 April 2017.
403 Coyne (2015).
404 Australian Government – Department of Immigration and Border Protection (n.d.-a).
405 McKenzie (2016).
406 RAND Europe interview with two Australian representatives, 24 July 2017.
407 Australian Government – Department of Immigration and Border Protection (n.d.-a).
408 Australian Government – Department of Immigration and Border Protection (n.d.-b).
409 RAND Europe interview with Dr John Coyne, 20 March 2017; RAND Europe interview with two Australian representatives, 24 July 2017.
410 RAND Europe interview with Australian representative, 30 March 2017; RAND Europe interview with two Australian representatives, 24 July 2017.
411 RAND Europe interview with two Australian representatives, 24 July 2017.

Table 3.4 **DIBP organisational structure**

Department of Immigration and Border Protection						
	Secretary of the Department of Immigration and Border Protection				ABF Commissioner	
Group	**Policy**	**Corporate**	**Intelligence and Capability**	**Visa and Citizenship Services**	**Support**	**Operations**
Division	Strategic Policy and Planning	Executive	Intelligence	Visa and Citizenship Management	Border Management	Maritime Border Command
	Immigration and Citizenship Policy	Corporate Services	ICT	Refugee and Humanitarian Visa Management	Border Force Capability	Strategic Border Command
	Traveller, Customs and Industry Policy	People	Major Capability	Community Protection	Children, Community and Settlement Services	Detention, Compliance and Removals
	International	Finance	Identity and Biometrics	Digital Transformation and Channels	Detention Services	Investigations
		Legal		Visa Reform Taskforce		OSB JATF
		Integrity, Security and Assurance				
		Health Services and Policy				
		Enterprise Strategy, Reform and Performance				

Source: DIBP (2017).

research in ABF's annual and corporate reports, although these do mention the Department's migration research programme.

There are a number of other government departments and research organisations conducting or commissioning research related to border security. The **Australian Research Council (ARC)** is a Commonwealth entity which advises the Federal Government on research matters, and allocates research funding to researchers at Australian universities through the National Competitive Grants Program (NCGP). The NCGP comprises two funding programs: 'Discovery', which supports fundamental research in innovation, and 'Linkage', which facilitates national and international collaboration and research partnerships between key stakeholders such as government, business, industry and end users. Where potential research projects relate to topics around immigration or border protection, the ARC may approach DIBP for guidance or co-sponsorship of the project, or contributions such as making Department staff available for workshops.[412]

The **Australian Nuclear Science and Technology Organisation (ANTSO)** offers a number of research partnerships, including: joint research appointments; joint supervision of research students; staff exchange; use of equipment; and negotiated arrangements specific to each partner, including joint grant applications, establishment of centres of excellence and participation in research networks. In addition, the **Commonwealth Scientific and Industrial Research Organisation (CSIRO)** carries out a wide range of scientific research activities to assist Australian industry and encourage or facilitate the application or utilisation of the results of such research. DIBP's Intelligence and Capability Division recently established a partnership with CSIRO's new technical research unit Data61, and one project undertaken within this partnership is seeking to put together a mathematically sound programme for cargo sampling.

Research institutes such as the **Australian Strategic Policy Institute (ASPI)** and the **Lowy Institute** also produce border security research through funding from the Australian government. These may be for specifically commissioned projects or for broad-ranging research activities such as discussion papers and other forms of outreach aimed at informing public discourse on border security.[413] The Lowy Institute is also engaged in a strategic partnership with DIBP for the commissioning of research and the secondment of a DIBP employee for 6–12 months every year. One interviewee stated that research produced by think tanks brings particular value because the institutions enjoy greater freedom to operate and are more aware of the public discussion on these issues than DIBP.[414] In addition, a number of Australian universities produce research in this space and engage in strategic partnerships undertaking specific research projects with DIBP.

As DIBP is the most significant player in border security research in Australia, it will be the focus of this section's analysis of the setup and management of research.

Identification and prioritisation of research topics

As noted above, DIBP has fundamentally changed its approach to research in recent months. Under this newly established process, the Thought Leadership section of the Statistics and Information Governance branch, which sits within the Policy Group, takes the lead in facilitating the identification and prioritisation of research topics. At the same time, the Department is seeking to make research functions more deeply embedded in each policy areas. In practice, this means that identification of research needs happens within these areas on an

412 RAND Europe interview with two Australian representatives, 24 July 2017.

413 RAND Europe interview with Australian representative, 30 March 2017.

414 RAND Europe interview with Australian representative, 30 March 2017.

ongoing basis, allowing a degree of flexibility in picking up projects as and when the need for them arises. Following the identification of a research topic, a process of engagement and consultation takes place with leadership across DIBP, managed by the Thought Leadership section, and consensus is reached on taking forward a research proposal to the Secretary of the DIBP.

Two study interviewees noted that alongside the changes to the process of identifying and prioritising research topics, the type of research prioritised by DIBP has changed. Previously, the Department's research agenda was set at the start of each financial year and related to topics of relevance at that point in time, and commissioned projects were long-term, often running to 12 or 18 months. As a result, by the time project outputs were delivered, interviewees reported that they had often ceased to be relevant to the needs of the Department. The interviewees reported that the current focus for identifying and prioritising research topics is on producing policy research which is current and operational. Research topics are more tightly scoped and can be delivered through individual, concise pieces of research rather than through long-term relationships producing occasional papers over the course of a number of years. Where research partnerships are still in place, DIBP can request specific research projects during the life of the partnership, rather than committing to long-term projects.[415]

Selection of border security research projects

Once the consultation process has concluded and topics for research have been identified, the Secretary of the DIBP makes the final decisions about which research proposals will be selected for commissioning. The Secretary also makes the final decision on the budget allocated to specific projects, following initial discussions and recommendations from leadership within the Policy Group. Overall, DIBP's research funding is carved out of the Department's operational budget rather than from a specific research allocation from the Government, and the amount of funding spent on research varies year by year according to decisions made within the Department about research and operational needs. As a result, information about the size of the Department's research budget is not publicly available. However, two interviewees estimated that annual research funding would typically be in the high six figures or low seven figures.[416] Another interviewee stated that budgets for individual projects range from around Aus$50 000[417] for smaller activities into the millions of dollars for more substantial, multi-year research studies.[418] Where the Department commissions an external organisation to conduct the project, a budget is set out in the invitation to tender.

However, a decision may be made to conduct the research internally if Department staff have access to the required resources and networks to conduct the study. For example, DIBP has collated some of the largest and most complex datasets in the Australian government, and utilises these where possible.[419] Internal research capacity is also a factor: some policy areas such as migration and citizenship tend to have more capacity than border protection. Two interviewees noted that an increasingly part of a policy officer's role is to conduct research, particularly as research resources are relatively constrained and commissioning studies externally may be too costly.[420] Typical project timelines are now between three and six months, with a small number of multi-year studies.[421]

DIBP does not have a centralised research contracts-management team.[422] Typically, the Thought Leadership section manages commissioned research and relationships with external researchers, although occasionally, for specific technical pieces of work, contracts management is handled within the relevant business area.[423]

Monitoring and evaluation

DIBP does not have a formal evaluation programme for its research. However, quality assurance provisions are usually built into contracts with commissioned research organisations. Interviewees noted that these provisions vary depending on the type of project being conducted and the business area which commissioned it.[424] For example, for the Future Capability Assessment and Engagement Section within the Intelligence and Capability Group, it was reported that M&E is performed by a board of Deputy Commissioners and Commanders. As part of this process, monthly reports are submitted on budget expenditure, progress relative to schedule, and risks and benefits related to the project, along with weekly project updates.[425] In general, when quality assurance provisions are being developed, the Thought Leadership section coordinates across Department stakeholders and gathers inputs on measuring the quality of the project and the relevance and utility of its findings.[426]

One study interviewee reported that for M&E of ASPI research activities for the Department, a biannual meeting at programme level is held with the entire DIBP executive, during which project progress is discussed in depth. Representatives from ASPI also meet with senior members from the executive on a monthly basis for management and project updates.[427]

3.3.3. Pathways to impact

Interviewees stated that the impact potential of a research proposal is the first consideration in deciding whether to

415 RAND Europe interview with two Australian representatives, 24 July 2017.

416 RAND Europe interview with two Australian representatives, 24 July 2017.

417 A$ – Australian dollar.

418 RAND Europe interview with DIBP representative, 29 March 2017.

419 RAND Europe interview with two Australian representatives, 24 July 2017.

420 RAND Europe interview with two Australian representatives, 24 July 2017.

421 RAND Europe interview with DIBP representative, 29 March 2017.

422 RAND Europe interview with Australian representative, 30 March 2017.

423 RAND Europe interview with two Australian representatives, 24 July 2017.

424 RAND Europe interview with Australian representative, 30 March 2017

425 RAND Europe interview with Australian representative, 29 March 2017.

426 RAND Europe interview with two Australian representatives, 24 July 2017.

427 RAND Europe interview with Dr John Coyne, 20 March 2017.

take it forward,[428] and that there is increasing emphasis on shaping policy research on topics with implications for the way the Department operates and the achievement of specific policy outcomes.[429] When identifying and prioritising research topics, the DIBP Policy group focuses on topics' impact. While 'impact' does not appear to have been assigned a formal definition by the Policy group, one study interviewee offered a definition that is presented in Box 3.3.

However, a number of study interviewees commented that 'impact potential' is not measured in terms of specific outcomes.[430] It was reported that the Future Capability Assessment and Engagement section has no formal processes to facilitate the impact of border security research, but rather considered impact to be a matter of ongoing engagement and keeping relevant stakeholders informed about research activity.[431]

As the vast majority of border security research is focused on policy outcomes, the Policy group is the predominant body within DIBP in terms of implementing the outputs of research projects funded by the Department. Within the Policy group, research projects tend to inform the development of a policy, which can then be taken to Cabinet.[432] Within the Future Capability Assessment and Engagement section, a report is produced at the conclusion of a research activity for the senior sponsor, who can then determine whether they wish to take the research further.[433]

As regards externally funded research, ASPI's Border Security Program engages with DIBP on multiple levels to maximise the impact of its research activities. This includes, for example, executive sessions at the governmental level, and presentations on reports and policy recommendations at the policy level, where staff may informally review the results of the study.[434]

Beyond the connection between research and policy, few links are made between research and impact, as it is the impact of policy more broadly which is assessed by governments. For example, no direct connection is made between a piece of research and its financial impact: it is the impact of the policy that is assessed, rather than that of the individual pieces of research that informed it. However, in translating research into operational practice, one interviewee emphasised the need to have senior personnel within DIBP who can review research, assess its implications, consider how it can be operationalised, and then take forward recommendations to government.[435]

3.3.4. Summary

Figure 3.5 overleaf provides a visual summary of the Australian R&I pathway, including the various associated factors, stakeholders and inputs.

3.3.5. Lessons identified

There are mixed views on the effectiveness of Australian approaches to the management of border security research, which may reflect the period of transition that DIBP is undergoing. The following paragraphs extract a number of useful lessons from this case study.

Box 3.1 **DIBP Policy group definition of 'impact'**

According to one study interviewee, the DIBP Policy group measures the impact of research topics according to: (i) the extent to which the piece of research becomes a basis for policy; and (ii) the extent to which it is influential and elicits a response from relevant policy stakeholders and the Australian public.[436]

Box 3.2 **Case study: Operationalisation of border security research**

Smartgate is an automated border control system which uses the information in passports and facial biometrics technology to perform checks, usually conducted manually by ABF officers, on arriving and departing international passengers. In developing this technology, the now dissolved Customs and Border Protection Services conducted a feasibility study on automated departures processing, with a technology panel of 16 vendors offering different biometric options. Tests were conducted in a Canberra laboratory, followed by live trials of the technology in Brisbane airport.[437]

In 2014, DIBP received Aus$50.1m of funding to expand the use of departure SmartGates. Between July 2015 and June 2016, 77 departure SmartGates were rolled out and they are now operational at all eight of Australia's international airports. As of 30 June 2016, approximately 6.9m departing travellers had been successfully processed through the gates, with around 85 per cent of all eligible travellers using the SmartGates. Arrival SmartGates are also available at these airports for use by travellers with ePassports from eight countries.

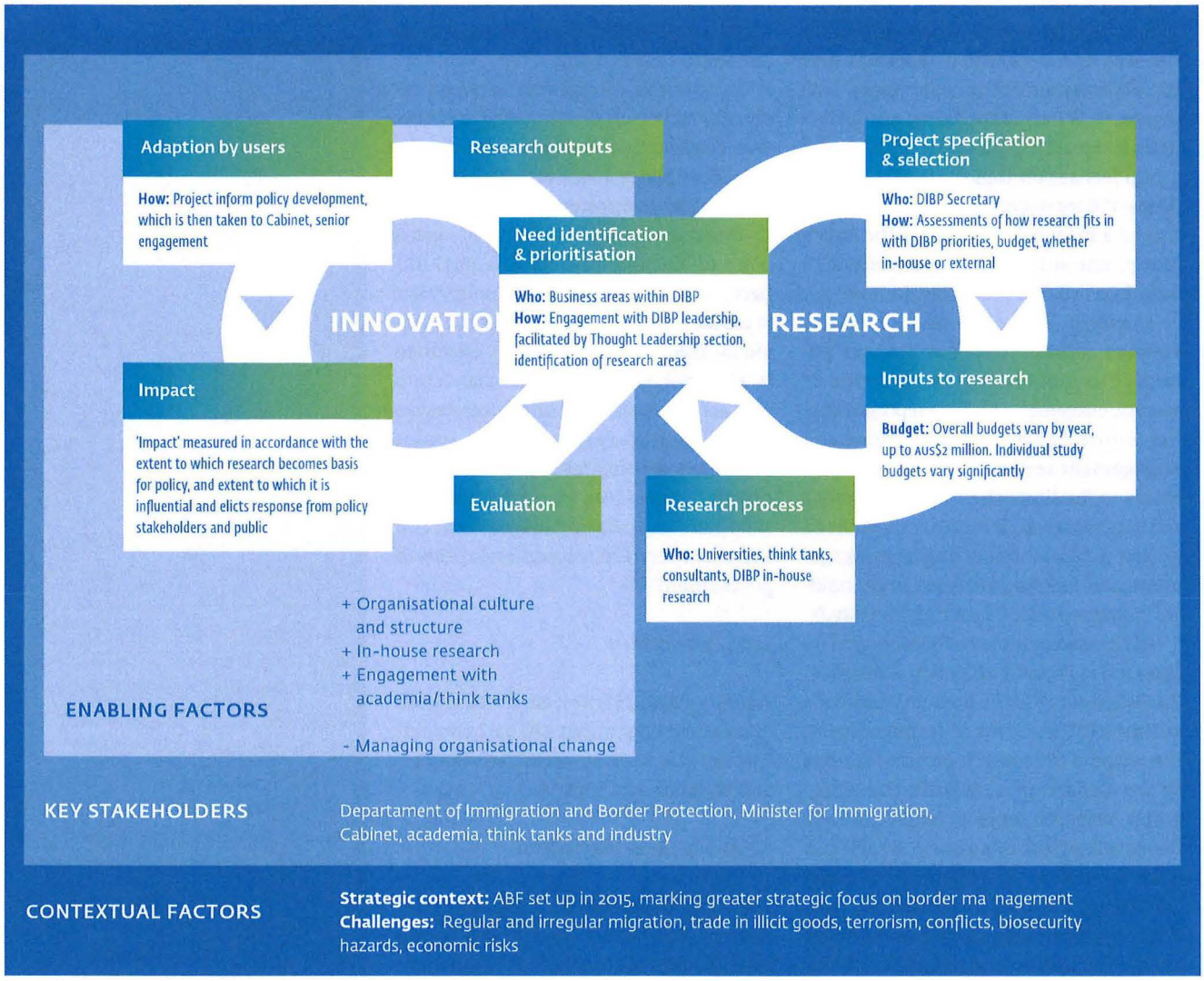
Automated border processing may support border agencies in managing high traveller volumes and facilitating a faster and less intrusive border process for travellers deemed to be of low risk.[438]

Good practices

Interviewees noted the positive effects of **embracing organisational and cultural change** within DIBP. In particular, greater openness to innovation in research, the development of responsive research plans, and flexible engagement with academia and think tanks for fresh, objective analysis were all highlighted by interviewees as positive developments.[439]

428 RAND Europe interview with Australian representative, 30 March 2017; RAND Europe interview with two Australian representatives, 24 July 2017.
429 RAND Europe interview with two Australian representatives, 24 July 2017.
430 RAND Europe interview with Australian representative, 30 March 2017; RAND Europe interview with two Australian representatives, 24 July 2017.
431 RAND Europe interview with DIBP representative, 29 March 2017.
432 RAND Europe interview with Australian representative, 30 March 2017
433 RAND Europe interview with DIBP representative, 29 March 2017.
434 RAND Europe interview with Dr John Coyne, 20 March 2017.
435 RAND Europe interview with Australian representative, 30 March 2017.
436 RAND Europe interview with Australian representative, 30 March 2017.
437 Griffith (2014).
438 Department of Immigration and Border Protection (DIBP) (2016).
439 RAND Europe interview with Dr John Coyne, 20 March 2017; RAND Europe interview with two Australian representatives, 24 July 2017.

Figure 3.5 **Australian research and innovation pathway**



Beyond the recent change in the Department's approach to research, interviewees saw these developments as functions of strong engagement at the senior leadership level in encouraging innovation, research partnerships and secondments with think tanks to drive up interest in research,[440] as well as increased emphasis on strong research backgrounds in the Department's recruitment activities.[441] Two interviewees also reported that the faster pace of research topic identification and commissioning has proved effective in preparing for challenges as they emerge, reportedly resulting in an increase in the impact of their research. Furthermore, the interviewees stated that even in the short space of time since the new approach to research was initiated, they have seen more innovation and variety in the research ideas put forward within DIBP.[442]

Interviewees also reported that DIBP is **engaging more closely with academic institutions and thought leaders** in Australia.[443] Across the country, there are now a number of well-regarded public policy schools within universities that cover a range of issues relevant to border security, and that can offer research services tailored to the Department's evolving requirements. Engagement with academia can take a number of forms. For example, the National Security College, based at the Australian National University, runs an executive development programme where junior and senior leaders undertake courses in executive development in national security. According to one study interviewee, the interaction may teach managers how they can make use of the academic environment and the agencies which are engaging with academics, and develop relationships with these institutions.[444] As noted above, the Department is moving towards funding think tanks and policy institutes not

440 RAND Europe interview with Dr John Coyne, 20 March 2017; RAND Europe interview with Australian representative, 30 March 2017; RAND Europe interview with DIBP representative, 29 March 2017.

441 RAND Europe interview with Dr John Coyne, 20 March 2017.

442 RAND Europe interview with Dr John Coyne, 20 March 2017.

443 RAND Europe interview with Dr John Coyne, 20 March 2017; RAND Europe interview with two Australian representatives, 24 July 2017.

444 RAND Europe interview with Dr John Coyne, 20 March 2017.

Table 3.5 **Summary of findings for non-EU case studies**

	Border security context	Key stakeholders	Needs identification and prioritisation	Project specification and selection	Inputs to research	Research process	Pathways to impact
US (Section 3.1)	**Strategic context:** Border security is part of 'homeland security' umbrella concept and is 1 of 5 of its missions. **Challenges:** Terrorism, migration, cybersecurity, illegal border-crossing, transnational crime, nuclear threats, climate change.	Department of Homeland Security (DHS): ■ S&T ■ USCG Academia and industry.	**Who:** DHS: S&T, USCG. **How:** QHSR (study groups, steering committee, senior leadership meetings, strategy coordination group, sub-interagency policy committees); STRAS; IPTs (research monitoring, technology review platform); portfolio review; ISR.	**Who:** DHS: S&T, USCG, COEs. **How:** No single S&T approach in place for awarding projects – IPTs, STRAS, ISR, Assessment of Prospective Portfolio, HSIP, SVIP, SBIR. **What:** While S&T classifies technologies according to 9 TRLs, research priorities are clustered by thematic area.	**Budget:** S&T – $55m; USCG – $18m for FY2017.	**Who:** RDC (within USCG RDT&D), external implementers.	**How:** End user project involvement (QHSR, IPTs, STRAS, USCG RTD&E); System Analysis; ISR; CG-STIC Innovation and Working Groups. **Challenges:** Work remains to be done to strengthen links between research and end users; time gap between need identification and research programme launch.
Canada (Section 3.2)	**Strategic context:** Border management is strategically important, especially given cross-border trade with the US. **Challenges:** Drug smuggling, illegal border crossings.	■ Public Safety Canada ■ DRDC – CSS ■ CBSA – S&T Academia and industry.	**Who:** Public Safety Canada, CBSA, RCMP, IRCC. **How:** Annual meetings focused on operational priorities, longlisting of priorities, annual call for proposals.	**Who:** DRDC – CSS, CBSA, RCMP. **How:** Proposal selection assesses budget, timeline, feasibility, impact. **What:** CSS and CBSA reportedly prioritise operationally focused research with high TRL potential.	**Budget:** Unknown. **Other:** Required involvement in project of 'champion' operational agency.	**Who:** DRDC – CSS, CBSA, academia, 'champion' operational project partners.	**How:** Cross-sector consultation. **Challenges:** Only so much research providers can do as the decision to operationalise research rests with operational agencies.
Australia (Section 3.3)	**Strategic context:** ABF set up in 2015, marking greater strategic focus on border management. **Challenges:** Terrorism, migration, conflict, biosecurity hazards, economic risks.	■ DIBP ■ Minister for Immigration ■ Cabinet ■ Academia and industry	**Who:** Business areas within DIBP. **How:** Engagement with senior DIBP leadership, preliminary research conducted internally, capability plan, ad hoc identification of research areas.	**Who:** DIBP Executive Committee, Secretary of the DIBP. **How:** DIBP releases request for tender; proof of concept; 'impact' as a key assessment criterion. **What:** An increasing focus on shorter-turnaround studies with greater responsiveness to emerging issues.	**Budget:** Unknown.	**Who:** Universities, think tanks, consultants, DIBP research-management apparatus.	**How:** Projects inform policy development, which is then taken to Cabinet; senior engagement. **Challenges:** Beyond connection between research and policy, few links between research and impact.

only through commissioned research, but also through seed money and grants which the organisations can use to fund projects aimed at informing public discourse on border security through discussion papers and other forms of outreach.

Challenges

One interviewee suggested that **the DIBP is still not well integrated** internally in terms of managing and achieving impact from its research programme,[445] although another interviewee emphasised that organisational restructuring is ongoing.[446] Furthermore, it was reported that **research findings are often used only to inform existing processes**,[447] or are focused mainly on longstanding academic debates in border security rather than on driving forward innovation – although interviewees again noted ongoing efforts to change these practices and use research more effectively.[448] On a related point, **ensuring policy relevance and impact** was also highlighted as an area for improvement,[449] with interviewees reporting increased focus on why research is commissioned, what it is intended to deliver, and how to make the best use of it.[450] Interviewees also noted the **resource constraints** under which the DIBP operates, and the challenge of making the most of a relatively small research allocation. In particular, the interviewees stated that particular business areas see a real need to be able to commission expert external advice as the need arises, but funding for this must be found from within operational budgets.[451]

Table 3.5 provides a summary of the findings presented above.

3.4. Border security research in North Africa and Turkey

A high-level overview of border security research activities and structures in North Africa and Turkey is presented in Boxes 3.5 and 3.6, respectively. While the RAND study team had hoped to gain greater insight into the conduct and implementation of research in these countries, the limitations of the available evidence meant that very little analysis was possible in this regard.

445 RAND Europe interview with Dr John Coyne, 20 March 2017.

446 RAND Europe interview with DIBP representative, 29 March 2017.

447 RAND Europe interview with Dr John Coyne, 20 March 2017; RAND Europe interview with DIBP representative, 29 March 2017.

448 RAND Europe interview with Dr John Coyne, 20 March 2017.

449 RAND Europe interview with Dr John Coyne, 20 March 2017. RAND Europe interview with DIBP representative, 29 March 2017; RAND Europe interview with Australian representative, 30 March 2017.

450 RAND Europe interview with Australian representative, 30 March 2017.

451 RAND Europe interview with two Australian representatives, 24 July 2017.

Box 3.3 **Border security research in North Africa**

The implementation of border security measures in Egypt, Morocco and Tunisia is of critical relevance to Europe.[452] This significance is clear in three main areas of concern for those countries: refugee migration, terrorism and organised crime. Much of the regional instability contributing to these three issues emanates from Libya and its porous borders with neighbouring countries. In addition to the problems posed by terrorism and the migration of refugees, North African countries lie on major smuggling and trafficking routes from Sub-Saharan Africa, the Sahel and North Africa, and across the Mediterranean into southern Europe.[453]

These threats have had an impact not only with North Africa, but also on southern Europe. In response to these threats, most North African countries' borders have been highly militarised, with the main actors involved in border protection being the army and various other border guards, *gendarmes* and police.[454] For example, efforts to secure the Libyan border[455] include a 70km ditch between Tunisia and Libya and the installation of CCTV along the border.[456]

The army and security forces in Egypt and Tunisia have primary responsibility for identifying and prioritising border security research topics.[457] However, given the frequency and severity of the on-the-ground border management issues they face, one study interviewee reported that these actors do not have the time, resources or political inclination to set up and manage a large portfolio of border security research.[458] According to one study interviewee, the little research that is commissioned in North Africa tends to focus on 'hardware' or 'technology', rather than on 'softer' social science approaches.[459]

As a result, there are said to be few specialists in the domain of border security research in most North African countries, aside from historians, psychologists and sociologists working to create think tanks. An example of one such think tank is the Arab Reform Initiative (ARI), which produces research and policy analysis, as well as supporting Arab scholars in the region financially.[460]

However, these endeavours are reportedly impeded by national funding shortages and a lack of individuals specialising in this field of research, resulting in much of the border research being completed in collaboration with European partners and funders, such as the EU's FP7 and H2020 projects (see Section 2.1).[461] An example of EU-funded joint European and North African research is the European University Institute (EUI) Robert Schuman Centre's support for the BORDERLANDS project.[462] This FP7 project examines relations between the EU and North African countries, exploring the processes by which the EU extends its legal and functional borders, rules and practices to North Africa. There appears to be no information available concerning the impact of BORDERLANDS given that it is a relatively recent project running from 2011 to 2016. Additional challenges affecting the conduct and management of border security research include interruptions to funding streams, limited access to research findings and issues regarding research management.[463]

In terms of improving border security research management in North African countries, one interviewee suggested that border security research should be assigned more funding, more think tanks should be established to increase the expertise available, and research should not be led only by national Ministries of Defence or Ministries of Interior.[464] Another lesson concerns the importance of increasing collaborative research on border security involving researchers from across North Africa and Europe.[465]

452 See for example Limam and Del Sarto (2015).
453 See Hanlon and Herbert (2015).
454 For a detailed examination of North African countries' border security forces, see Hanlon & Herbert (2015, 29–41).
455 RAND Europe interview with Egyptian representative, 29 April 2017.
456 RAND Europe interview with Faycal Cherif, 25 April 2017.
457 RAND Europe interview with Egyptian representative, 29 April 2017; RAND Europe interview with Faycal Cherif, 25 April 2017.
458 RAND Europe interview with Faycal Cherif, 25 April 2017.
459 RAND Europe interview with Faycal Cherif, 25 April 2017.
460 See for example Jrad (2015).
461 RAND Europe interview with Faycal Cherif, 25 April 2017.
462 See for example Limam and Del Sarto (2015).
463 RAND Europe interview with Egyptian representative, 29 April 2017; RAND Europe interview with Faycal Cherif, 25 April 2017.
464 RAND Europe interview with Faycal Cherif, 25 April 2017.
465 RAND Europe interview with Egyptian representative, 29 April 2017; RAND Europe interview with Faycal Cherif, 25 April 2017.

Box 3.4 **Border security research in Turkey**

Following the attempted coup in Turkey in July 2016,[466] many police and military officials, civil servants and academics have been dismissed from their jobs, leading to reluctance to discuss border security and related research. This political climate has also been fostered by an earlier communiqué released by the government's Higher Education Council (YOK) in April 2015 stating that academics require permission from 'relevant ministries' in order to conduct any survey or fieldwork concerning Syrian refugees.[467] It appears that such developments will have profound implications for the commissioning and conduct of border research in Turkey for the foreseeable future.[468]

According to a study interviewee, an IBM organisation was established in 2013 but it has reportedly not been very visible in the field.[469] The Turkish Army currently has primary responsibility for securing the Turkish border, which is highly militarised. The Army is supported at POE and other locations by the Jandarma (Gendarmerie) and Turkish National Police (TNP). Many other government agencies are also involved in border management, including the Ministry of Economy for Trade, the Ministry of Health, and Customs.[470]

These organisations face various issues along long and very porous borders, particularly those with Iraq and Syria. As well as the security threats posed by Islamic State (IS), al-Qaeda (AQ) affiliate groups and the Partiya Karkeren Kurdistan (PKK – Kurdish Workers Party), these agencies face significant cross-border challenges relating to drug smuggling, other forms of organised crime, and the arrival of over 3 million refugees from Iraq and Syria.[471]

Due to the sensitivity of the political situation, there is currently very little research being conducted on border security issues. Researchers do not have access to government data, which creates challenges for maintaining an up-to-date understanding of the security situation. Even when contact is established with officials or policymakers, the post-coup dismissals have led to a high turnover of personnel, meaning that it is difficult for continuous relationships to be established. Additionally, many academics, researchers and officials are now said to be applying a measure of self-censo'ship.[472]

466 Al Jazeera (2016).
467 Kayaoglu (2015).
468 RAND Europe interview with Turkish representative, 3 May 2017.
469 See Sert (2013).
470 Republic of Turkey, Ministry of Customs and Trade (n.d.).
471 European Commission (2017e).
472 RAND Europe interview with Turkish representative, 3 May 2017.

4. Case studies: Operational models (WP3)

This chapter provides an overview of how different organisations, including those outside of the border security domain, seek to operationalise research findings. The six case studies include two European examples (European Space Agency and European Institute of Innovation and Technology) and four from the US (Defense Innovation Unit Experimental, Small Business Innovation Research, Homeland Security Innovation Programs and DHS S&T Centres of Excellence). The following sections provide summaries of the case study organisations and of their vision and governance, before exploring the types of activities they undertake to support innovation. These activities relate to the functional roles mapped onto the R&I pathway provided in Chapter 2 of the main report.[473]

4.1. European Space Agency

4.1.1. Summary

The European Space Agency is the co-ordinating entity for European civilian space activities. First established in 1975, ESA has its headquarters in France but also maintains a number of sites across Belgium, Germany, Italy, the Netherlands, Spain and the United Kingdom. ESA is responsible for the design and delivery of the European space programme with the goal of defining and implementing a long-term space policy that allows Europe to remain competitive in the field of space technology.[474] While ESA conducts a range of activities, the following sections discuss programmes and initiatives that upon review were found to be most relevant for the scope and objectives of this study.

473 A full description of these functional roles is presented in Appendix D.

474 Turner (2009).

4.1.2. Vision

Mission

ESA's mission is to provide and promote, for exclusively peaceful purposes, cooperation among European states in space research, technology and applications, with a view to their being used for scientific purposes and for operational space application systems.[475]

Objectives

To fulfil its mission, ESA is tasked with designing a unified space policy and a related industrial policy, recommending space objectives to participating Member States (pMS) and integrating national programmes into the activities of the European programme.

4.1.3. Governance

Organisational governance

ESA is governed by a Council, which provides basic policy guidelines within which ESA develops the European space programme.[476] Each pMS is represented on the Council and has one vote, irrespective of its size or financial contribution.[477] The Council is responsible for approving activities and programmes by a majority of all pMS, and determining – by a unanimous decision of all pMS – the level of resources to be made available to ESA for the coming five-year period. Another function of the Council is to adopt annual ESA work plans and to determine the order of priority of programmes in the course of their implementation.[478]

Leadership and membership

ESA is an intergovernmental organisation with 22 pMS from across Europe.[479] In addition to its headquarters, ESA maintains several sites in a number of European countries:

- The European Astronauts Centre (EAC) in Cologne, Germany;
- The European Space Astronomy Centre (ESAC) in Villanueva de la Canada, Spain;
- The European Space Operations Centre (ESOC) in Darmstadt, Germany;
- The ESA centre for Earth Observation (ESRIN) in Frascati, Italy;
- The European Space Research and Technology Centre (ESTEC) in Noordwijk, the Netherlands;
- The European Centre for Space Applications and Telecommunications (ECSAT) in Harwell, United Kingdom; and
- The ESA Redu Centre in Redu, Belgium.

ESA is headed by a Director General who is elected by the Council every four years. Individual research sectors are headed by Directorates that report directly to the Director General.[480]

475 ESA (2007).

476 Bonnet et al. (1994).

477 However, a pMS does not have the right to vote on matters concerning programmes in which it does not take part. Source: ESA (2010).

478 ESA (2010).

479 ESA comprises Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom. Slovenia is an Associate Member, and Canada takes part in some projects under a cooperation agreement. Bulgaria, Cyprus, Malta, Latvia, Lithuania and Slovakia have cooperation agreements with ESA, and discussions are under way with Croatia. See European Space Agency (2017a).

480 European Space Agency (2017a).