Organizations across the world are in the midst of a digital revolution that’s sweeping away old processes and business models—especially those that are under-prepared for its impacts. In the face of this rapid and pervasive change, the only option is to adapt at pace, or be left trailing by the pace of progress.

Nobody is immune—and border agencies are no exception. In fact, for them the pressure is arguably more intense than for virtually any other type of organization.

UNPRECEDENTED CHALLENGES...

Why? Because as well as being in the front line—quite literally—of digital disruption, today’s border agencies are confronted by a host of other challenges.

The headlong change in business models is being outpaced only by citizens’ rising expectations of government services. And as if this weren’t enough, they’re also faced with record volumes of trade and travel, new and evolving security threats, tightening budgetary constraints, and a complex and shifting mix of opportunities and risks.

The implications for border agencies are profound. Ultimately, citizens want better services, watertight security and seamless travel and trade experiences. For a border agency leader, you might think delivering simultaneously against all three of these apparently conflicting goals is impossible.
...DEMANDING A RADICAL NEW APPROACH

Think again. The good news is, it can be done. The key is for border agencies to commit themselves to innovation—meaning making smarter use of human capital and technology.

The window of opportunity is now open. So the time for discussion and analysis is over: what’s needed now is action.

If you’re bold enough to embrace emerging technologies, then you can deliver what your customers want—along with better outcomes for your staff, your organization and your society.
**RESPONDING TO CHANGES IN THE ORGANIZATION’S MISSION/GOALS**

Against this background, our research probes how emerging technologies can help border agencies not only tackle their near-term challenges, but also lay the foundations for a sustainable future of continuous innovation and improvement.

We examine how agencies are already applying emerging technologies with human-like capabilities, through advances like biometrics-enabled e-gates for passengers and predictive analytics to spot suspicious cargo. So progress is being made. But the pace and extent of adoption—and agencies’ understanding of the potential benefits—are partial and patchy.

It’s vital that they fill the gaps. While public services in areas like revenue and public safety are breaking new ground with emerging technologies, our survey suggests border agencies are still stuck in familiar territory. Now’s the time to break through the technology frontier—and harness the full power of innovation.

> “We’re working in an environment where volumes and complexity are increasing, but budgets are decreasing. This requires us to think very differently about the way we deliver technology services.”

Randall Brugeaud, CIO, Department of Immigration and Border Protection, Australia

Top three challenges that border agencies say they’re facing today:
INNOVATION IN BORDER SERVICES

While many border agencies are piloting emerging technologies, far fewer have fully implemented them. The most common focus areas are:

ADVANCED ANALYTICS

75% OF OUR RESPONDENT BORDER AGENCIES WHO ARE AWARE OF THESE TECHNOLOGIES ARE PILOTING OR IMPLEMENTING THEM

PREDICTIVE MODELING

1/5 OF THESE ARE DOING SO WITH THE AIM OF REDUCING RISK AND IMPROVING SECURITY, FOR EXAMPLE BY USING PASSENGER RISK ASSESSMENTS TO CRACK DOWN ON ILLEGAL IMMIGRATION

In contrast, far fewer agencies are piloting or implementing video or biometric analytics.
NEW APPROACHES TO PASSENGER RISK

Looking specifically at passenger risk assessment, agencies have traditionally carried these out by checking passengers’ names against “watchlists” of known or suspected criminals. Today, this data is being used to drive much more advanced analytics, such as link, pattern and “nearest neighbor” analysis.

New sources of data are also driving fresh insights. For example, with the recent Passenger Name Record directive in the EU, many member states are looking to improve the accuracy of passenger risk assessments by incorporating analyses of their social media profiles. This readiness to use new tools and skills is increasingly important, as criminals make growing use of advanced technologies ranging from the “dark web” to 3D printing.

Analytics can also help tackle immigration fraud by highlighting groups of people that are at a higher risk of over-staying, failing to pay taxes or committing crimes once inside the country, suggesting their eligibility to enter should be considered more carefully.

At the same time, analytics and biometrics are helping in refugee management—particularly in Europe, where some of the world’s most advanced border-protection technology is being tested to protect the Schengen free-movement area.²
A further benefit of predictive analytics is to help to free up staff to be more productive through better workforce planning. Nearly half—48 percent—of respondents say improving the work of staff is their primary objective in using advanced analytics.

Unlike the spreadsheets used in the past, predictive tools enable agencies to allocate officers based not only on expected passenger arrivals and likely footfall, but also on the risk profiles of those passengers. Such an approach is already helping the Toronto Police Service conduct scenario planning and validate the impacts of its policy decisions on resource planning in advance.³

This type of intelligence can also help ports to deal with the inexorable rise in goods and cargo traffic. In the U.S., for example, automation and robotic cargo handling are helping border services to better anticipate container volumes and improve productivity at terminals.⁴
SCREENING AND TRACKING WITH BIOMETRICS

Biometrics—identifying individuals based on their distinct biological traits—is another technology playing an important role in simplifying and accelerating the immigration process.

Biometrics isn’t new: passports with embedded chips that hold individuals’ facial characteristics have been in use for several years. But advances such as biometric fusion—combining multiple biometric inputs to identify individuals more accurately—promise a step change in passenger screening.

As a result a number of immigration agencies, notably in the U.S. and Europe, are now exploring biometrics fusion. In particular, it’s become a central feature of the E.U.’s Smart Borders program, in which fingerprints will be combined with facial imaging analysis to create identities for individual passengers.

And as part of their wider effort to combat digital threats, agencies are using advanced analytics to monitor sentiment proactively on social media. The Australian government, for example, has invested AU$19 million in a stronger social media monitoring and analysis capability to help combat terrorism.⁵

“Advanced analytics and predictive modeling is probably the technology that is going to revolutionize our business more than any other, given that we are just dealing with enormous numbers where we cannot actually cover everything. This type of analytics enables us to far more accurately target our scarce resources to the people we are most interested in.”

Michael Milford, First Assistant Secretary, Major Capability Division, Department of Immigration and Border Protection, Australia
CONNECTING THE DOTS WITH THE INTERNET OF THINGS

To some, it might seem that the Internet of Things (IoT) is over-hyped. But customs agencies should not underestimate its power to help transform their operations.

Smart seals have been around for several years, but the IoT opens the way to better ways to monitor cargo and track journeys. Germany’s Hamburg Port Authority, for example, collects and analyzes data from sensors embedded in commercial vehicles, containers, bridges and roadways. The analysis is delivered to officers’ mobile devices and fed into schedules, while also helping road authorities to channel incoming and outgoing vehicle traffic more efficiently.6

Customs agencies can make greater use of this kind of information to detect fraud and other crimes. For instance, IoT data can be used to check whether cargo actually does move along the declared routes, or to detect potential tampering by tracking unexpected temperature changes in containers.

Applications like these are already in use. In one example, the shipping line Maersk has added “remote container management systems” to its entire fleet of 270,000 refrigerated containers.7 These systems provide real-time data on factors like temperature, humidity and location —information that can be used to drive targeted interventions.

While a number of agencies, like the Hamburg Port Authority, are starting to improve the screening and tracking of goods using the IoT, the potential—as with other emerging technologies—remains largely untapped. And in a world where digitally-enabled supply chains are rapidly becoming the norm, agencies that don’t exploit emerging technologies risk failing to provide traders with the quality of online services now being offered by the industry.8 This would result in loss of trade to other players who can provide services that are state-of-the-art—and therefore faster and more efficient.
SEAMLESS MOVEMENT

More efficient processing of passengers and goods doesn’t just hinge on the technologies used at border crossings. Agencies also have much to gain by streamlining the travel authorization and data collection processes that take place ahead of arrival.

For example, the use of inbuilt rules and intelligence engines to enabling decision-making within automated processes—also known as robotic process automation—is playing an increasingly important role in speeding up the processing of asylum claims, most recently in France. And faster online processes for visa applications have helped Germany during the recent migrant crisis, according to Lothar Lenzen, Head of Division, IT Administration in Germany’s Federal Foreign Office.

“We developed a portal for refugees from Syria to help families reunite,” he explains. “Refugees could apply for visa services online quickly and efficiently. Their data was checked against E.U. records and we were able to speed up the traditional process of applying at embassies.”

Interest in intelligent process automation like this is booming with 93 percent of border agencies surveyed citing awareness of the technology. However, implementation is still patchy with only 23 percent saying that they are beginning to adopt or implement the technology.9

However, as in many other cases, the real power comes when different emerging technologies are combined. By bringing together mobile applications, biometrics and artificial intelligence, agencies can minimize interventions while maximizing effectiveness at border crossings.10

U.S. Customs and Border Protection, for example, has teamed up with trade group Airports Council International to create a Mobile Passport Control app that quickly and efficiently processes U.S. and Canadian travelers returning to selected U.S. airports. The Australian Government, meanwhile, is currently weighing up legislation that would allow travelers to move across the nation’s borders without presenting their passport, relying instead on facial recognition biometrics."
BREAKING DOWN LEGACY BARRIERS

Ask the CIO or CTO of any public sector organization to pinpoint the main factor holding their agency back from innovating with a new technology, and it’s odds-on that their answer will be “legacy systems”. Customs and borders agencies are no different.

However, as an obstacle to innovation, legacy systems are far from insurmountable. Applications such as the Mobile Passport Control described previously, which enable arriving passengers to find a faster queue or be pre-cleared for immigration, do not need to run on large back-end systems. Instead, they can be based on a separate platform that links in to legacy systems to draw on existing data or functionalities.

For example, the e-gates successfully implemented at Amsterdam’s Schiphol and London’s Heathrow airports require minimal integration with legacy systems, needing only to link in to the Government public key database and passenger watch list systems to check for “wanted” people. Agencies are now going further, implementing newer platforms that support analytics and biometrics yet cost less to implement and run than aging legacy systems and applications.

The fact is that the value in legacy systems resides not in the systems themselves, but in the data they hold. So the key to removing the shackles of legacy is to migrate the data to a new platform. Having done this, agencies can then focus on managing, moving and capitalizing on this data at speed.
THE POWER OF PEOPLE

When implementing emerging technologies, the biggest challenge isn’t technology but people. Respondents to the survey underline this, citing a lack of skills within their organizations as one of their toughest technology implementation barriers.

“Our main challenge is the lack of internal skills in these areas. For example, to launch big data in customs, we need to search for people outside the customs area because we are not the best provider to do this.”

Jean-Michel Thillier, Deputy Director General, French Customs and Excise

While there is no lack of high-quality technology talent at border agencies, many of their specialists are invested in—and closely tied to—legacy systems. There’s also the residual fear that emerging technologies will replace rather than enhance jobs. However, our survey provides grounds for optimism about the impact emerging technologies will have on the workforce.

Top two highest-ranked barriers to implementation of emerging technologies

- Legacy Systems Integration
- Lack of Internal Skills/Ability to Hire

87% of those respondents who are considering, piloting, or implementing at least one emerging technology, some believe that emerging technologies will lead to improved job satisfaction.
True, agencies urgently need to hire talented people who are familiar with analytics, social media and other newer technologies, and are eager to experiment and help change how agencies serve their customers. But this is only one part of a much bigger strategic story. Digital talent is crucial, but so is hands-on experience of overseeing seismic changes to organizational design and operations.

"It’s hard to train people but, for example, when you want to build a big data organization, you need some very skilled people like statisticians, mathematicians, informaticians and so on. You still need customs officers, who provide their knowledge of logistics and the way the consignments go from one country to another. You need to mix very skilled people with traditional employees."

Jean-Michel Thillier, Deputy Director General, French Customs and Excise

Many respondents say they look to hire new talent mainly from the private sector. But few are succeeding in doing this: Singapore customs is one of very few border agencies in the world that compete effectively with commercial firms for technology talent. So, how can agencies make themselves more attractive to the stars of digital? Clearly, offering more competitive salaries would be a start. But what’s also needed is a broader rethink of the overall employment philosophy—including, for example, providing greater working time flexibility.
LEADERSHIP: IT’S WILLING TO DRIVE CHANGE—BUT IS IT ABLE?

People challenges extend to the very top of customs and immigration agencies, where too few senior leaders grasp the potential of emerging technologies.

Nine out of ten border agencies in our study say their senior leaders are willing to adopt and support emerging technologies, but less than a third say the same leaders are well-informed about those technologies.

If senior decision-makers are unsure of the key parameters around investing in emerging technologies—what the returns on should be, where they can best be achieved, how to smooth their path—then the progress of rapid prototyping and deployment will be slow, if it manages to get going at all. Deployment efforts that have little direction or are rushed also risk reinforcing perceptions that implementing advanced technologies is inherently complex and costly.

A large part of it is becoming aware of what it can actually do. That’s been a significant mindset change here where we have done a few trials and we have looked at it, and people go effectively, ‘Eureka, we see how we could actually use this!’ Rather than the technology being difficult, it is more the implementation of it (that is a challenge)—you either need to change your mindset or change the way you do business. The technology is actually pretty good and not necessarily difficult to use.

Michael Milford, First Assistant Secretary, Major Capability Division, Department of Immigration and Border Protection, Australia

The knowledge gap

92% OF LEADERSHIP IS ABLE AND WILLING TO ADOPT AND SUPPORT EMERGING TECHNOLOGIES

32% OF LEADERSHIP IS INFORMED ABOUT EMERGING TECHNOLOGIES AND THEIR POTENTIAL
FROM VISION TO REALITY

Most border agencies are still in the very early stages of embracing the new technologies we’ve discussed. And given the fundamental challenges we’ve highlighted, including around people, it’s essential that they take a step-by-step approach to mapping out their journey.

The first step is to be honest and pragmatic. Senior leaders don’t have time to keep up with every new technology. But by gaining a better understanding of each technology’s potential, they will be able to exert the necessary influence over management and set an example for the rest of the organization. Having taken that initial step, leaders should then apply a three-pronged strategy consisting of the following components.
EDUCATE AND EVANGELIZE

Senior management must become better informed about emerging technologies, and change the organizational mindset about what types of innovation are possible (and realistic) with their help. In particular, attitudes must be transformed among those middle-level IT managers who are wedded to established systems and processes. CIOs and other technology leaders must be the evangelists in driving this change.

START SMALL, SCALE AT PACE

Getting senior leaders excited about new technologies risks making them put the cart before the horse—meaning they’re seeking a solution for the technology rather than vice versa. Instead, first identify a specific challenge; then identify a specific emerging technology that can help to address it. For example, immigration officers may not have a sufficiently clear view of higher-risk passengers. Social media and other analytics tools can be used to alert officers to individuals meriting extra scrutiny.

Once a given problem has been identified, it’s time to demonstrate how it can be solved with the technology, and specify the concrete steps that need to be taken to pilot it. The pilot should be planned on a small scale and developed and deployed quickly, with clearly defined success and exit criteria.

Once appropriate resources have been put in place, the pilot program should be rolled out across the chosen parts of the organization. As positive results come in, the agency’s technology leaders should publicize them widely as part of their evangelizing mission.
Given the ever shorter lifecycles of many emerging technologies, it’s important to accept that even a successful program may run its course in two or three years. So agility is imperative, since another new, high-potential technology or innovation idea will become available before too long—and it’s vital to be ready to seize it.

3

RECRUIT CREATIVITY AND AGILITY

To run the pilot successfully and meet the agency’s broader innovation objectives, new talent needs to be hired that brings fresh approaches to solving problems. Recruit more strategically, including from the private sector and universities. Focus more on youth and creativity, and less on long experience and track records. Get recruitment right, and it becomes a virtuous circle: greater energy leads to fast scaling, which leads to sustained innovation.

Complications will inevitably arise during implementation. Original thinking will provide the best opportunities to overcome these issues and ensure positive returns. For example, implementation lessons can be learned from the private sector, and partners should be sought out who can help adapt and apply them.

OF BORDER AGENCY SURVEY RESPONDENTS ARE WILLING TO EMBRACE PUBLIC-PRIVATE PARTNERSHIPS AND NEW COMMERCIAL MODELS
With technologies such as predictive analytics and biometrics now starting to deliver on their promise, border agencies’ customers—travelers and importers—are wasting no time in mastering them. It’s time for border agencies to do the same.

Combined with the other headwinds threatening agencies’ existing models—rising volumes of travelers and trade, shifting security threats, restricted budgets, demands for seamless but secure movement—this means nothing less than total transformation will be sufficient.

These are not challenges that can be tackled by tweaking around the margins of the organization or implementing disconnected point solutions. True, emerging technologies have the potential to address each of the issues that border agencies face. But introducing these technologies in isolation—without simultaneously overhauling the organization’s culture, skillsets and legacy systems—will mean missing out on their full potential.

Indeed, our survey shows that border services agencies have not yet acknowledged that such a transformation is imperative: stuck in familiar territory, their experiments with emerging technologies are inconsistent and often fail to translate into full implementation.

A leadership team that is enthusiastic and knowledgeable about emerging technologies will carry the organization with it. Crucially, it will overcome the workforce’s suspicion and inertia—thereby enabling the swift introduction and rapid scaling-up needed to realize the full opportunities of each new technology.

Those border agencies that achieve this will reap the benefits—in the shape of increased efficiency; better security; enhanced customer experiences; and more meaningful, impactful roles for their workforce. Put simply, it’s time to cross the frontiers of technology.
**Video analytics**

Video analytics applies big data to CCTV footage and deciphers trends in order to automatically raise the alarm. This helps to solve the shortcomings of CCTV cameras, which rely on human monitoring and are limited to forensic analysis after the fact. Video analytics is currently used at ports, where there is 24/7 activity. British Association Ports Southampton, Abu Dhabi Ports Corporation and many more are using video analytics to detect early signs of criminal activity, security threats and suspicious behaviour, allowing rapid and effective interventions.

**Advanced analytics and predictive modelling**

Fast becoming the most rapid area of technological advancement in public services, advanced analytics and predictive modelling use big data to predict future trends. Taking the recent refugee crisis in Europe as an example, this form of analytics could be used to predict migrant patterns across borders, which would allow governments and organizations to better prepare their responses.

**Biometrics**

Biometric data, such as facial recognition, is used at “smart borders” around the world to identify people and run security checks. Use of this technology is expanding rapidly in the E.U. as countries look to improve their monitoring of border crossings. Biometrics is also being used to create identities for refugees as they seek asylum. Accenture has collaborated with the UNHCR to create an identity management system based on individuals’ biological features, which enables them to access social security and open a bank account.12

**Machine learning**

This is a form of artificial intelligence that makes machines more and more efficient and effective over time through repetition and acquisition of new data. Machine learning can be used in conjunction with biometrics, for example, to enable facial recognition technology at borders get better at recognizing individuals the more it is used. California-based Qylyr, meanwhile, is applying machine learning to advanced analytics to develop autonomous security checking machines at airports. These machines sniff for chemicals, scan content, analyze behavior and become more “smart” as they improve their decision-making ability over time.13

**Intelligent process automation**

This is the application of automated intelligence whereby entire processes can be automated by smart processing vast amounts of data. Intelligent process automation is used at many stages of borders and customs services. E-gates, for example, are widely used at airports; this technology combines intelligent process automation with biometric analytics to reduce waiting times.

**Natural language processing/generation**

This technology allows machines to understand natural language and generate a response or action. One application could be in visa application interviews where there is a language barrier between the interviewer and applicant. The technology is already offered by Skype Translator for social purposes, but it could be applied at borders to automatically translate speech in visa applications to increase accuracy and aid mutual understanding.

**Internet of Things (IoT)**

Broadly, the IoT is the concept of multiple devices being connected through the internet – allowing them to communicate and share information. Tracking solutions provided by T-Systems use the IoT to undertake smart tracking of cargo for customs. The technology uses an online portal to track not only the location of the cargo, but also the status of the goods and other information such as temperature and any complications encountered.14
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ABOUT THE RESEARCH
The Accenture Public Service Emerging Technologies research surveyed 774 IT leaders from public service organizations in nine countries (Australia, Finland, France, Germany, Japan, Norway, Singapore, the U.K., and the U.S.). The telephone survey (CATI) was conducted by Longitude Research between April and May 2016. The survey was supplemented by in-depth qualitative interviews with experts across these countries. https://www.accenture.com/us-en/insight-ps-emerging-technologies

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