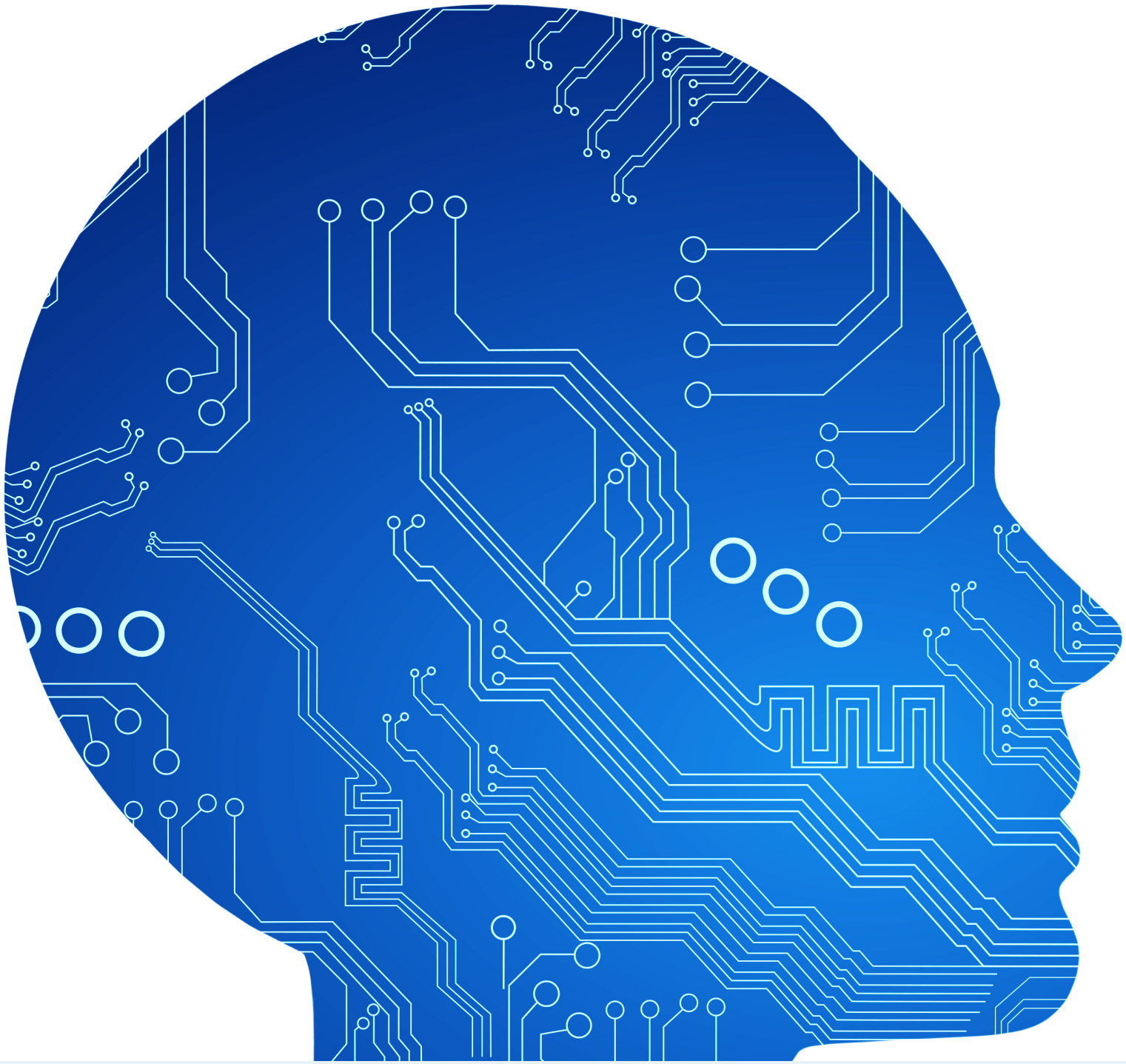
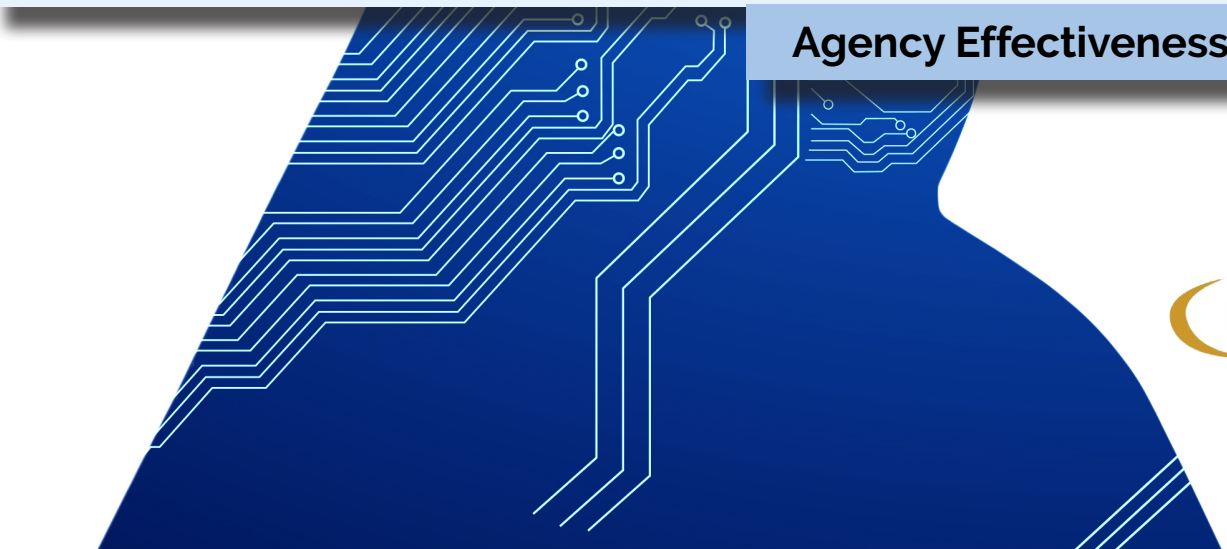


Report on Digitalisation, Innovation and Agency Effectiveness, 2021

Agency Effectiveness Working Group



International Competition Network

Digitalisation, Innovation and Agency Effectiveness
A Report by the ICN Agency Effectiveness Working Group, June 2021

Cover: Mostphotos

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List of abbreviations and acronyms

AEWG	Agency Effectiveness Working Group
AI	Artificial intelligence
API	Application programming interface
AR	Augmented reality
AWG	Advocacy Working Group
BI	Business intelligence
CDEO	Chief digital enforcement officer
COVID-19	Coronavirus disease 2019
CWG	Cartel Working Group
DMS	Document management system
ECM	Enterprise content management
ECN	European Competition Network
ERP	Enterprise resource planning
EU	European Union
ICN	International Competition Network
IT	Information technology
ML	Machine learning
NGA	Non-governmental advisor
NLP	Natural language processing
OCR	Optical character recognition
OECD	Organisation for Economic Co-operation and Development
OSINT	Open-source intelligence
PhD	Doctor of philosophy
RFI	Request for information
RPA	Robotic process automation
SaaS	Software as a service
TAR	Technology-assisted review
VPN	Virtual private network
WBS	Work-breakdown structure

Executive summary

Background

In tandem with the digitalisation of society as a whole, public administrations are taking measures to modernise and digitalise their work processes in order to perform their tasks more efficiently. Competition authorities are no exception to this. In particular, the accelerated digitalisation of the economy leads competition authorities to re-think their processes and innovate to meet new challenges in ensuring effective competition enforcement. Some agencies have come quite far in this regard. Others are just starting their digital transformation journeys, and are perhaps wondering what the first steps should be to promote effectiveness.

This report shows the levels of digitalisation of competition agencies across the International Competition Network (ICN) membership in different areas, and outlines various strategies and approaches employed by agencies when embracing the potential of digitalisation to enhance their efficiency and effectiveness. The report findings are based on data collected through a survey of the ICN Agency Effectiveness Working Group (AEWG) member agencies between November 2020 and February 2021.

In an effort to address agencies' digital transformations from an integrated and holistic perspective, the report looks at three key areas – agencies' digital environments (including digital tools), digital goals and strategies, as well as adoption of new digital skills. To be able to unlock the full potential of digitalisation, it is important that agencies consider all three of these domains, rather than address each of them separately.

It is clear from the survey results that there is no single "one-size-fits-all" digitalisation solution that will work for every agency. Rather, agencies need to find methods and strategies that will serve their needs. However, by looking at the experiences summarised in the report, agencies can get a better picture of different options available to them, which can help them in their own choices.

We hope this report will serve as an inspiration and stimulate discussion within competition agencies about possible ways to increase their effectiveness and efficiency, and help them become better equipped for the digital age.

Summary of findings

How agencies perceive their level of digitalisation

When looking at agencies' investigative functions and tools, survey findings show that agencies perceive themselves as most digitalised in the performance of IT forensic work, as well as in conducting economic analysis. This is followed by application of open-source intelligence (OSINT) and cartel screening tools. The responses also suggest that the use of automation, artificial intelligence (AI) and machine learning (ML) tools is currently still fairly low among agencies, although this area shows a tremendous growth potential for the future.

When it comes to agencies' internal processes, survey responses demonstrate that internal communication and document management and archiving are also two areas where agencies consider themselves digitally mature. Budget management, recruitment processes and knowledge management appear to be slightly less digitalised, while project management is overall the least digitalised area of agencies' internal operations.

Lastly, the survey reveals that general interaction with the public is another area where agencies consider themselves highly digitally mature. Looking at other types of interaction with external stakeholders, the survey shows that communication with respect to ongoing competition enforcement was slightly less digitalised. Open data initiatives and external whistleblowing tools are even less digitalised among competition agencies.

Digital solutions for improving investigative functions can deliver the highest return on investment

The survey found that investing in digital solutions for improving agency's investigative functions is overall perceived as bringing the greatest return on investment, as this kind of improvement can save valuable time, increase an agency's efficiency and productivity, as well as reduce the likelihood of errors. In particular, numerous responses identified IT forensics, OSINT, and cartel screening as being of key relevance to achieving effective and efficient enforcement in the digital age. An important consideration was that in the context of continuous technological change it might not be enough to invest in only one type of digital investigative tool – a better solution could be to digitalise and optimise all investigative areas gradually, bearing in mind the amount of resources available to the agency.

Other areas where digitalisation can bring high return on investment include agencies' document and case management systems and knowledge management. Well-functioning digital solutions for document management allow for better organisation and retrieval of case files, easier monitoring of case progress, the facilitation of litigation processes, as well as better accessibility and circulation of documents within the agency, and increased transparency as a result. At the same time, having a coherent digital repository for knowledge-based information can facilitate and streamline agency's overall daily work, improve investigation time and efficiency, as well as help with the process of integrating new staff.

Lastly, survey results revealed that digital solutions for interaction with external stakeholders (both as part of ongoing competition enforcement matters as well as general communication with the public) are viewed as another essential component of effective agencies. Digital channels for interaction can play a major role in building competition culture, as well as creating a deterrent effect for enforcement work. Many agencies also agreed that having digital communication solutions in place was particularly helpful when adapting to the new ways of working due to the COVID-19 pandemic.

Automation, artificial intelligence and machine learning are on agencies' priority lists

Survey responses demonstrate the growing importance of automation, AI and ML tools. While agencies currently deploying such tools are still in the minority, a significant number of agencies are planning to do so in the near future. Some of the most common uses of such innovative tools include cartel screening (particularly when it comes to detecting bid rigging in public procurement), collecting information about market conditions, document review and processing, as well as evidence gathering (IT forensics).

Agencies are well aware of the benefits automation, AI and ML solutions can bring. Many respondents agreed such technologies allow them to conduct more comprehensive and efficient analysis and, accordingly, increase their investigative capacity. However, survey respondents also voiced and reflected upon certain risks and challenges. These include AI "ethics", issues with algorithm accuracy, data privacy and security concerns, acceptability of evidence derived from AI-powered analysis, challenges in obtaining large and high-quality data sets, difficulties in interpreting the results of complex ML models, the significant amount of resources required to develop and implement such tools, as well as overcoming initial staff distrust of using AI technologies.

Most agencies have specific strategies or goals for digitalisation

The report demonstrates that the majority of agencies consider the process of digitalisation to be of strategic importance. This can take different forms for different agencies. While around half of participating agencies have formulated their own overarching strategies or goals for agency digitalisation – in some cases publicly available – a smaller number of agencies report developing their digital goals in line with broader national e-government strategies. The remaining agencies have either plans to digitise specific tools or processes (albeit not within the framework of a broader strategy per se) or have strategies for tackling competition problems on digital markets, which may in turn have an impact on the digital tools or skills needed. The report offers various agencies' examples of how such strategies are formulated and the focus areas of agencies' planned digital transformations.

COVID-19 has accelerated the digitalisation of competition agencies

A clear trend reflected in this report is the effect the COVID-19 pandemic has had on most agencies' digitalisation. While for a handful of agencies the pandemic has hampered digitalisation plans due to budgetary constraints or physical restrictions, nearly all responding agencies reported that the COVID-19 outbreak accelerated their digitalisation process as they have been required to digitise various functions in light of societal restrictions and work-from-home orders.

In some cases, the digital tools and processes implemented may have an effect on agency effectiveness measures far beyond the immediate pandemic. COVID-19's effects can be seen most clearly in the development of remote working environments, but have also had a bearing on the opening up of decision-makers' hearings to broader audiences, remote investigative methods for dawn raids, the digitalisation of archives and records, and new digital merger filing systems.

Agencies collaborate with a broad range of actors in their digitalisation efforts

The report casts light on the types of collaboration with external expertise that agencies utilise in advancing their digitalisation efforts. While it may come as no surprise that IT consultants are used in the implementation of specific digital tools, agencies also reveal examples of best practices being shared with national agencies or within e-government initiatives, as well as the sharing of IT tools with other agencies or ministries as a way of addressing resource limitations. Another form of cooperation of particular interest for the continued work of the ICN is the examples of bilateral and regional cooperation between competition authorities in order to share best practices and methods. There are even examples of competition authorities being offered access to and usage of specific digital tools developed by other competition authorities.

Resource limitations are the most common obstacle to digital transformation

A recurring theme across agencies of all sizes and ages is resource limitations that hinder their digitalisation efforts. Not only do agencies observe limitations in terms of the budget available to invest in digital tools, but digitalisation also requires an investment in terms of staff time that must be diverted from other core functions. Some agencies lack specific digital skills within the organisation and may not be in a position to recruit new staff. For certain agencies, digitalisation plans depend on receiving specifically allocated funding from government.

Other challenges relate to technical stumbling blocks, for example in terms of how to deal with legacy technology, how to ensure data security, and the fact that national legislation may not provide the conditions for the agency to undergo different types of digital changes. The question of mistrust of digital solutions and how to ensure "buy-in" from staff and stakeholders is also raised as a concern in the report.

The report equally offers examples of how agencies have overcome challenges, which may serve as an inspiration for others who face similar obstacles.

Agencies differ as to how they integrate new digital skills into their organisations

In conjunction with the development of digital tools, agencies generally acknowledge the necessity of having appropriate expertise among staff. However, the way in which this is achieved in practice varies. Around a third of contributing agencies have recruited staff with specific digital skills, and another third plan to do so. For others, digital skills will be acquired through investment in training. However, there appears to be no "one-size-fits-all" approach, with a number of agencies adopting a hybrid approach to recruiting new staff and training current staff. The report explores perceived advantages and disadvantages of different approaches when it comes to incorporating non-traditional roles within competition authorities.

Reflecting similar trends in terms of digital tools, IT forensic capabilities is the most common area of digital expertise that agencies invest in. Furthermore, around a third of responding agencies have either recruited or plan to create and fill specific digital analysis or data science roles. In the case of certain larger agencies, other tailored roles have been created relating to digitalisation efforts. The report shows that innovative approaches have been adopted by some agencies to create specialised digital units or task forces, but this is not yet widespread.

Conclusions and suggestions for future ICN work

Based on the findings, the report concludes with reflections about where the ICN may usefully be able to support agencies' digitalisation efforts to offer the greatest impact. Some of these efforts may be implemented within the ICN AEWG. However, digital investigative tools and methods have a bearing on all working groups, suggesting that cooperation between working groups, or alternatively, special projects or ICN Training on Demand modules may be an appropriate way of disseminating good practices across the ICN membership.

1 Background

1.1 About the report

The "Digitalisation, Innovation and Agency Effectiveness" project was undertaken by the ICN Agency Effectiveness Working Group (AEWG) in 2020–2021. The Swedish Competition Authority was the project leader on behalf of its fellow co-chairs of the working group, the Competition and Consumer Commission of Singapore and the Competition and Consumer Authority of Botswana.

Building on previous ICN AEWG work on organisational design,[1] this project explored various strategies and approaches used by competition agencies when harnessing digitalisation to improve agency effectiveness. While digitalisation and e-government initiatives are not new questions for public authorities, competition agencies are increasingly required to contemplate how to equip themselves to better meet the new demands of the digital economy.

This report illustrates the level of digitalisation among competition agencies across the world and the ways in which it is achieved. It also shares practical experiences that member agencies may learn from in order to improve agency effectiveness. This is done through summarising data collected through a survey of ICN AEWG member agencies about their digital transformation journeys; specifically, actions agencies have taken in order to digitalise and innovate their authorities in line with the growing digitalisation in society.

Beyond questions of organisational changes, the report explores three key areas: agencies' digital environments (including digital tools they use), digital goals and strategies, as well as new digital skills in order to get a holistic picture of how digitalisation and innovation affects competition agency effectiveness. If one pictures digital environment or digital tools as a vehicle to get from point A to point B, digital goals and strategies can be perceived as the navigation system providing guidance on where to go, while digital skills are the driver operating the vehicle. To be able to tap into the full potential of digitalisation, agencies might want to consider all three elements together, rather than looking at each of them in isolation.

[1] In particular, the AEWG Report on agency effectiveness through organisational design (2019): https://www.internationalcompetitionnetwork.org/wp-content/uploads/2019/05/AEWG-Organisational-design-2019-report.pdf.

In considering the findings of the report it is important to bear in mind that digitalisation cannot be perceived as a binary state, i.e., that the agency is either digitally mature or not. Digital transformation is rather a continuous process, where different agencies can find themselves in different places on a spectrum – some agencies are further along the digital transformation journey, while others have yet to take their first steps in this direction. Either way, the report strives to provide ideas and inspiration to competition agencies about the possible ways forward in their digital transformation process.

1.2 Agency digitalisation survey

In order to learn more about competition agencies' digital transformations, the ICN AEWG carried out a survey among the AEWG member agencies between November 2020 and February 2021 (attached as an appendix).

The survey focused on competition agencies' internal digital strategies or tactics, organisational design and staffing changes (for instance, recruiting new staff or establishing new digital teams), as well as digital tools and technologies that agency staff use to increase their work efficiency.

Questions related to agencies' specific enforcement or policy actions in digital markets (for example, antitrust or merger investigations related to digital markets or platforms, market studies or inquiries into digital markets) were left outside the scope of the survey, as these topics are largely covered by the other ICN working groups.[2]

The survey was comprised of four sections, as follows:

1. The "agency details" section was designed to collect basic background information about the responding agencies, such as the name of the agency, contact person information, as well as the size of the agency (number of staff working with competition-related matters).
2. The "digital environment" section was designed to gain agencies' perspectives on their current level of digitalisation when it comes to investigative tools, internal processes, as well as interaction with external stakeholders. This section also aimed to collect agencies' views on areas where digitalisation can bring the greatest impact in terms of agency effectiveness and efficiency. In addition, agencies were asked about their current or planned use of automation, artificial intelligence (AI) or machine learning (ML) tools.

[2] More information about other ICN working groups' projects or initiatives related to competition agencies' actions in digital markets can be found on the ICN website: https://www.internationalcompetitionnetwork.org/working-groups/.

3. The "digital strategies" section aimed to find out whether responding agencies have digital goals, objectives, strategies or any other tactics to advance their digitalisation. Furthermore, agencies were asked whether they use or plan to use any external expertise as part of their digitalisation process, as well as whether they experience any obstacles or challenges in their digitalisation efforts. Lastly, this section specifically sought input as to whether agencies' digital transformation has been affected by the COVID-19 pandemic.
4. The "digital skills" section was designed to collect agencies' experiences of the steps they are taking to acquire new digital skills and competencies in an effort to become more digitalised (in terms of recruiting new digital staff or training the agency's current staff). Respondents were asked to provide information about how the new digital staff are integrated within the agency, what their roles and responsibilities are, as well as how they collaborate with other teams within the agency. In addition, respondents were asked to share their views on advantages and disadvantages of recruiting new digital talent versus training current staff.

Prior to circulating the survey, the ICN AEWG sought feedback on the draft questions from an informal reference group of ICN member agencies and non-governmental advisors (NGAs).[3]

[3] The AEWG co-chairs would like to thank the Competition and Consumer Authority of Botswana, the Finnish Competition and Consumer Authority (FCCA), the Israel Competition Authority (ICA), the Competition Council of Latvia, the Mexican Federal Economic Competition Commission (COFECE), Ms. Dina Kallay (NGA, Sweden) and Ms. Victoria Mertikopoulou (NGA, DG COMP) for their valuable comments and suggestions.

1.3 Webinars on digitalisation and agency effectiveness

The ICN AEWG hosted two webinars on the topic of digitalisation and agency effectiveness. The first webinar on "Organisational Design and Digitalisation" was held on 26 March 2020,[4] while the second webinar on "Digitalisation, Innovation and Agency Effectiveness" was held on 2 March 2021.[5] The two webinars offered structured presentations and discussions on how competition agencies are shaping their organisations to be fit for effective and efficient enforcement in the digital era.

The first webinar helped shed light on some of the central questions covered by this report, such as what considerations agencies are making when planning new digital units, the types of work being done by such units, how digital staff are being recruited or trained, and the benefits, as well as potential pitfalls, in terms of perceived agency effectiveness. In addition to these topics, the second webinar explored agencies' internal digital goals, strategies or tactics, innovative digital tools and technologies agencies use to increase their efficiency, as well as how the COVID-19 pandemic has affected agencies' digital transformation. Key takeaways from both events were considered in the drafting of this report.

[4] The AEWG co-chairs would like to thank the moderator Mr. Graeme Jarvie (International Affairs Director, Swedish Competition Authority) and the speakers Mr. Michael Christian Høg Riis (Head of Digital Platforms Division, Danish Competition and Consumer Authority), Ms. Kate Brand (Director of Data Science, UK Competition and Markets Authority), Mr. Jonathan Chan (Senior Assistant Director, Business & Economics Division, Competition and Consumer Commission of Singapore), and Mr. Ian Conner (Director of the Bureau of Competition, U.S. Federal Trade Commission) for their valuable input and presentations.

[5] The AEWG co-chairs would like to thank the moderator Dr. Barbara Seelos (Senior Case Handler and Deputy Head of Staff, Austrian Federal Competition Authority), Mr. Stig Bendiksen Hauge (Director of Administration, Norwegian Competition Authority), Mr. Pedro Isaac Alcalá Berhouague (Head of Digital Markets General Directorate, Mexican Federal Economic Competition Commission (COFECE)), Ms. Mariana Rosa (Managing Director, Administrative Council for Economic Defence (CADE), Brazil), Ms. Ninette Mwarania (Manager, Planning, Policy and Research, Competition Authority of Kenya), Mr. Julian Daniel Jimenez Krause (IT Project Manager, Information Technology, DG COMP R3) and Mr. Flavio Laina (Head of Unit, Cartels V, DG COMP G5) for their valuable input and presentations.

2 General information about the responding agencies

The survey was sent out via e-mail to 120 competition agencies. In total, 59 agencies completed the survey, which gives a response rate of around 50%. Contributions to the survey were received from the following ICN member agencies.

Table 1. List of responding agencies by region

Middle East and Africa	Asia-Pacific
Competition and Consumer Authority of Botswana	Australian Competition and Consumer Commission (ACCC)
COMESA Competition Commission	Bangladesh Competition Commission
Egyptian Competition Authority	Hong Kong Competition Commission (HKCC)
Israel Competition Authority (ICA)	Japan Fair Trade Commission (JFTC)
Competition Authority of Kenya	Malaysia Competition Commission
Competition Commission of Mauritius	New Zealand Commerce Commission
Saudi Arabia General Authority for Competition	Competition Commission of Pakistan
Seychelles Fair Trading Commission	Philippine Competition Commission
	Competition and Consumer Commission of Singapore (CCCS)
	Taiwan Fair Trade Commission
Europe	
Austrian Federal Competition Authority	Competition Council of the Republic of Lithuania
Bulgarian Commission on Protection of Competition (CPC)	Competition Council of Luxembourg
Croatian Competition Agency	Agency for Protection of Competition, Montenegro
Commission for the Protection of Competition of the Republic of Cyprus	Norwegian Competition Authority
Office for the Protection of Competition of the Czech Republic	Office of Competition and Consumer Protection (UOKiK), Poland
Danish Competition and Consumer Authority (DCCA)	Romanian Competition Council (RCC)
Directorate General for Competition (DG COMP), European Commission	Federal Antimonopoly Service of the Russian Federation (FAS Russia)
Estonian Competition Authority	Commission for Protection of Competition of the Republic of Serbia
Finnish Competition and Consumer Authority (FCCA)	Slovenian Competition Protection Agency
Bundeskartellamt, Germany	Spanish National Authority for Markets and Competition (CNMC)
Hellenic Competition Commission (HCC), Greece	Swedish Competition Authority (SCA)
Hungarian Competition Authority (GVH)	Competition Commission, Switzerland
Icelandic Competition Authority	Turkish Competition Authority
Italian Competition Authority (AGCM)	Competition and Markets Authority (CMA), United Kingdom
Competition Council of the Republic of Latvia	Antimonopoly Committee of Ukraine

North America	South America
Competition Bureau Canada	Administrative Council for Economic Defence (CADE), Brazil
National Commission for the Defense of Competition of the Dominican Republic (PRO-COMPETITION)	Fiscalía Nacional Económica (Chile)
Fair Trading Commission of Jamaica	Superintendence of Industry and Commerce (SIC), Colombia
Mexican Federal Economic Competition Commission (COFECE)	National Institute for the Defense of Competition and Protection of Intellectual Property (INDECOPI), Peru
Authority for Consumer Protection and Competition Defense (ACODECO), Panama	
U.S. Department of Justice, Antitrust Division	
U.S. Federal Trade Commission	

The ICN AEWG co-chairs would like to thank all the agencies that responded to the survey for their valuable contributions.

Based on the survey responses, throughout the report agencies are often referred to according to their size in terms of the number of staff working on competition-related matters, as follows:

- 0 to 49 employees: **small**;
- 50 to 199 employees: **medium**;
- 200 or more employees: **large**.

3 Digital environment

3.1 Agencies' perceived level of digitalisation

The purpose of this section is to give an overview of how competition agencies perceive their level of digitalisation in different areas of their operations, along with sharing some specific examples that may provide guidance or inspiration to other ICN member agencies. The survey looked at 15 different functional areas that fall into three broad categories:

1. investigative tools;
2. internal processes;
3. engagement with stakeholders.

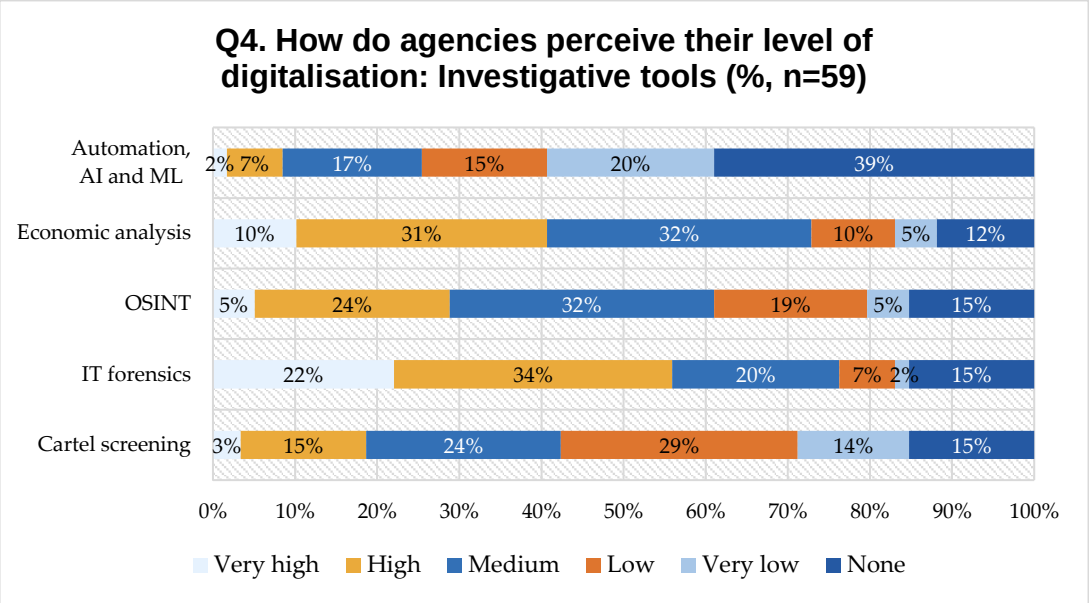
The survey results in each of these categories are presented in more detail below.

3.1.1 Investigative tools

First, the survey looked at the state of digitalisation when it comes to investigative tools that agencies use in their enforcement activities. Specifically, the survey focused on the following five types of investigative tools:

1. cartel screening (e.g., using econometric tools for detecting bid rigging cartels);
2. IT forensics (e.g., gathering and reviewing digital evidence during or after dawn raids);
3. open-source intelligence (OSINT);
4. economic analysis (e.g., using tools or software for data analysis during investigations);
5. automation, AI and ML tools.

Figure 1. Perceived level of digitalisation: investigative tools



As Figure 1 shows, there is a significant degree of variation in digitalisation levels when it comes to different types of investigative tools. IT forensics is the area in which agencies perceive themselves to be the most digitalised. More than half (56%) of the responding agencies indicated that their digitalisation level here was either very high (22%) or high (34%), while slightly less than one third of the respondents (27%) said their level was either medium (20%) or low (7%).

How do agencies conduct IT forensic work?

"A Forensic IT team has been set up within the agency. Staff from both Operations (i.e., investigation unit) and IT Departments have been given training about different IT forensics concepts and tools that would be useful for investigations. The team is also purchasing different tools (e.g., IT forensic software for mobile devices) to strengthen its capabilities. The team has been deployed to work with an external IT consultant to conduct dawn raids."

"The agency uses a number of dedicated IT forensics programs, which are used to search, copy and analyse evidence stored electronically on different devices (e.g., computers, mobile phones, external and internal data collectors) during investigations."

"The agency is part of a government-wide agreement that draws on shared skills and resources. The agency also uses an e-discovery software solution to review evidence collected."

Economic analysis also ranked relatively high in terms of digitalisation level, although here the situation is more diverse compared to IT forensics. 41% of responding agencies indicated that their digitalisation level was either very high (10%) or high (31%), while a very similar proportion, 42% of the respondents, indicated that their level was either medium (32%) or low (10%).

What tools do agencies use for economic analysis?

"The agency uses a variety of quantitative techniques in its investigations, relying on a number of different software (mainly open-source software Python and R, as well as commercial statistical analysis software)."

"The Economic Analysis Group relies heavily on digital tools and software to conduct investigations. This includes developing code to model anticipated merger effects."

"Software for shareholding and directorship connections, as well as geographic mapping is in use."

"Economists have access to a range of software tools and appropriate computing power to conduct analyses based on information obtained from companies and/or public sources. We have equally adapted to allow employees access to their full range of tools from home during the COVID-19 pandemic."

With respect to employing OSINT and cartel screening tools, the survey results seem to reflect a somewhat lower level of digital maturity among the responding agencies. When it comes to OSINT, slightly more than half (51%) of the responding agencies estimated their level being either medium (32%) or low (19%), while nearly one third (29%) of the respondents thought their level was either very high (5%) or high (24%). Around one fifth (20%) of the respondents indicated that their level was very low (5%) or non-existent (15%).

What types of OSINT tools do agencies use?

"The agency is developing semi-automated investigations on several social media platforms. This includes automated network analysis."

"Tools for web-scraping and website change detection are in use."

"The agency's Market Intelligence Unit has developed in-house tools and technical procedures drawing from the field of intelligence practice, which are used to collect, analyse and exploit strategic information from sources such as social networks, websites and media."

In cartel screening contexts, a very similar proportion, 53% of the respondents, indicated that their digitalisation level was either medium (24%) or low (29%), while 18% of respondents indicated that their level was very high (3%) or high (15%). Almost one third of all respondents (29%) said their level in this area was either very low (14%) or non-existent (15%).

How do agencies screen for cartels?

"The agency runs an in-house screening program which has provided positive results for detecting potential collusion in public procurement. This has been implemented drawing from best international practices like the OECD criteria for detecting bid rigging."

"In several cases, the agency has carried out cartel screening to collect and analyse large-scale procurement-related information. Cartel screening is used to gather more initial information on trends in cooperation between public procurement market participants over the longer term. No specifically designed software is used for data collection and analysis. The programs provided by standard office suite software are used for everyday work."

"The agency has had an active screening approach since 2013. Economists in the Cartels and Mergers Unit and Chief Economist's Unit carry out screens on procurement data. The screens are based on statistical and econometric methods and aim to detect bid rigging and collusive tendering, for instance by comparing actual bid prices in public procurements with how they should normally be distributed based on economic theory. A long-term ambition is to use screening tools not only in the field of public procurement, but with regard to cartels in general. An obstacle to apply such screens is the lack of sufficiently detailed data. Therefore, we mainly use the screening tools to confirm or verify the existence of a suspected infringement in situations where we have already received corresponding tip-offs through other channels, and not as the sole source to initiate investigations."

Finally, the results show that the adoption of automation, AI and ML tools is currently relatively low among the survey participants. More than half (59%) of the agencies indicated they employ such tools only to a very low extent (20%) or do not use them at all (39%). Nearly one third (32%) of the respondents stated they use these tools to a medium (17%) or low (15%) extent, while only 9% of the respondents estimated they use these tools to a very high (2%) or high (7%) extent. Despite the somewhat low level of implementation, this area shows a tremendous growth potential, as demonstrated by agency responses in Section 3.3 below.

In which areas do agencies use automation, AI or ML tools?

"AI and ML is possible with the forensic software the agency is using, however it is still in the trial-and-error phase."

"The agency has a big data project with data from some bids and tries to find coordinated bids with the help of AI."

"These tools are used at scale in document review and evidence management; this is based on intelligent search software. The agency also uses natural language processing (NLP) search capabilities; ML search features are planned."

"A text analytics tool has been developed in-house to analyse topics in complaints from stakeholders."

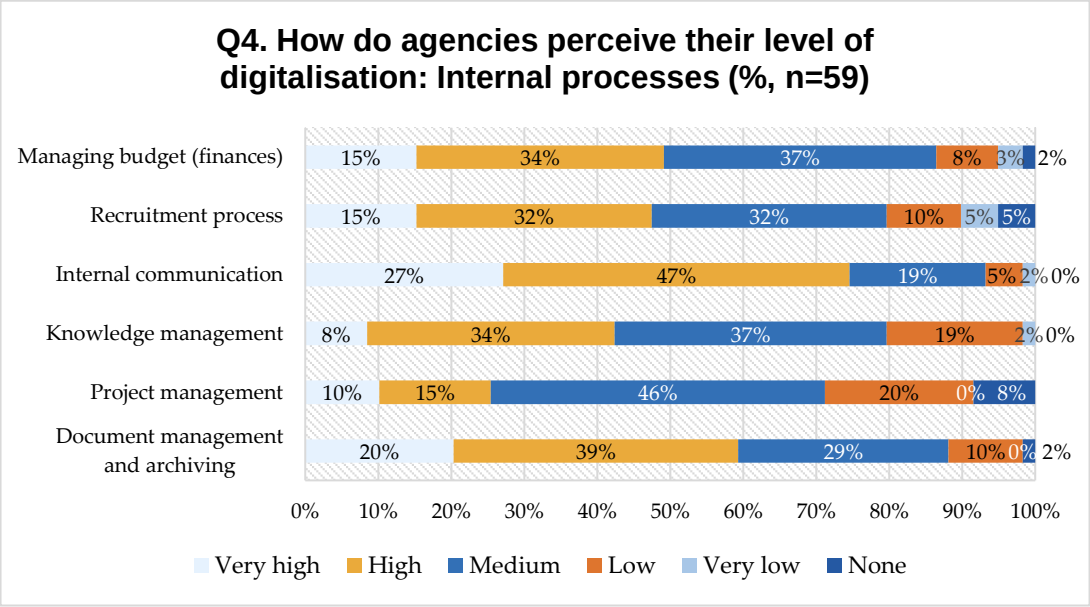
3.1.2 Internal processes

The survey also aimed to measure the following areas of agencies' internal operations:

1. document management and archiving;
2. project management (e.g., project monitoring, tracking or reporting);
3. knowledge management (ensuring institutional memory);
4. internal communication;
5. recruitment process;
6. managing budget (finances).

Overall, survey results suggest agencies are slightly more digitalised with respect to their internal processes than with respect to their investigative tools. However, as Figure 2 shows, there are still some differences in digitalisation levels between the different areas of agencies' internal operations.

Figure 2. Perceived level of digitalisation: internal processes



Agencies' internal communication and document management and archiving are the two areas that appear to be by far the most digitalised. If we take a closer look at internal communication, nearly three quarters (74%) of all respondents indicated that their digitalisation level in this area was either very high (27%) or high (47%), while around one quarter (24%) classified their level as either medium (19%) or low (5%).

How do agencies communicate internally?

"The agency uses intranet, staff emails, live video streaming software, team collaboration software with different channels (e.g., for COVID-19 Recovery Insights, or for agency leadership group), as well as Collaboration Hub for generating and responding to ideas."

"There is an electronic chat system for internal communication. During the COVID-19 pandemic remote communications via virtual private network (VPN) were developed. The staff also makes extensive use of video conferencing and teleconferencing systems and platforms."

The situation looks slightly more diverse when it comes to document management and archiving. While more than half (59%) of the responding agencies indicated that their level here was either very high (20%) or high (39%), 39% of the respondents also said their level was medium (29%) or low (10%).

What tools do agencies use to manage their documents?

"The agency uses a document management system (DMS) where the registration of incoming and outgoing documents takes place. The DMS ensures the internal assignment of the tasks and electronic copy of the documents to employees. Outgoing documents (information requests, decisions, etc.) are electronically signed in the DMS and forwarded to addressees via e-mail. Internal documents (internal reports, drafts of decisions and outgoing correspondence before signing, etc.) are transmitted and endorsed using the DMS. Most of the documents (responses to requests, etc.) the agency receives are in electronic form. Those received in paper form are scanned and added in the DMS. The DMS also provides an archiving option."

"The agency has an Integral Competition Information System, which allows managing documents, following up files and organising information in accordance to the needs of the agency. The system "feeds in" other important tools agency uses, such as the Resolutions and Opinions Browser, which facilitates access to information regarding all resolutions issued by the Board of Commissioners. To further support document management and internal official communications in light of a remote work environment, in 2020 the agency enabled an electronic letters system, which allows sending this type official communications electronically."

In contrast, survey results demonstrate that project management is currently the least digitalised area of agencies' internal operations. Only around one quarter (25%) of those responding to the survey indicated that their digitalisation level here was very high (10%) or high (15%), while roughly two-thirds (66%) characterised their level as medium (46%) or low (20%).

How do agencies track their projects?

"The agency uses a program for quarterly reporting on the portfolio of all ongoing projects. The division for investigations has standards and checklists they use for the investigations."

"The agency uses workload indicators to follow up on the instruments it deals with: new cases, stock of cases and closed cases as well as number of decisions taken. In addition, to capture the level of work cases/projects require, the agency has developed a "project expense time reporting application" which has been used for almost 10 years now."

"The agency uses internal systems (a business intelligence platform and spreadsheet software) to track, monitor and report projects and initiatives. Project management methods such as work-breakdown structure (WBS) and Gantt charts are applied using standard office suite software."

Survey results reveal great similarity in agencies' digitalisation levels in budget management, recruitment process and knowledge management. With respect to controlling budget, nearly half (49%) of the respondents considered their digitalisation level being very high (15%) or high (34%), while a very similar proportion, 45% of the respondents said their level was medium (37%) or low (8%).

How do agencies manage their budget?

"The agency uses all financial and budgetary software products intended specifically for the state administration. The use of these software programs is mandatory. They provide the necessary tools for following the expenditures and for reporting purposes."

"Cash flow movements are digitalised. In addition, the agency allows enterprises the use of payment apps to submit their annual contribution to the agency's budget."

"The agency uses a business intelligence (BI) reporting tool in addition to an enterprise resource planning (ERP) solution."

Similarly, 47% of the respondents stated their digitalisation level was either very high (15%) or high (32%) when it comes to their agencies' recruitment process. An almost identical share (42%) indicated their level was either medium (32%) or low (10%).

How do agencies recruit new talent?

"The agency currently conducts all its recruitment processes through an online platform in which interested candidates can consult the positions available, open a profile and submit their applications. In this platform, candidates can review their applications and receive updates regarding the several stages of the process."

"As the result of the COVID-19 pandemic, we transitioned an already partially digital recruiting process into a fully digital effort. All interviewing, review of applications and materials, and staff evaluation of candidates is performed via digital platforms."

"The recruitment process was transferred into on-line sessions due to the COVID-19 pandemic. The participants still have to come to the agency's premises, but they are instructed to stay in a separate room and communicate through video conferencing apps."

The situation looks only slightly more diverse when it comes to knowledge management. Around 42% of the responding agencies characterised their digitalisation level as very high (8%) or high (34%), while more than half (56%) of the respondents said their level was medium (37%) or low (19%).

How do agencies manage their knowledge-based information?

"Knowledge management was recognised as a priority by the senior management and subsequently a knowledge management team was formed. A wiki-based tool was selected for, among other advantages, its ease of use. All newcomers are trained in knowledge management related topics."

"The agency maintains its knowledge and related materials in shared folders/drives which are within its intranet system. Also, the agency has a Learning Management System for internal training."

"We have an internal web app with a collection of recorded training sessions and other saved training documentation organised by topic."

"Staff are required to draft a summary of any training/webinar attended with key takeaways, which is then shared with co-workers to ensure knowledge transfer. These are also stored on our document management system for easy retrieval."

3.1.3 Interaction with stakeholders

Lastly, the survey looked at how digitally advanced agencies are when engaging with external stakeholders. In particular, the survey measured the following four areas:

1. interaction in connection to ongoing competition enforcement matters (e.g., possibility to submit tip-offs, complaints or merger notifications via interactive parts of agency's website, publishing documents or information on case timelines online);
2. external whistleblowing tools;
3. interaction with the general public (e.g., via agency's website, social media platforms, online chats, organising digital events);
4. making the competition authority's data sets available openly (open data initiatives).

Figure 3. Perceived level of digitalisation: interaction with stakeholders

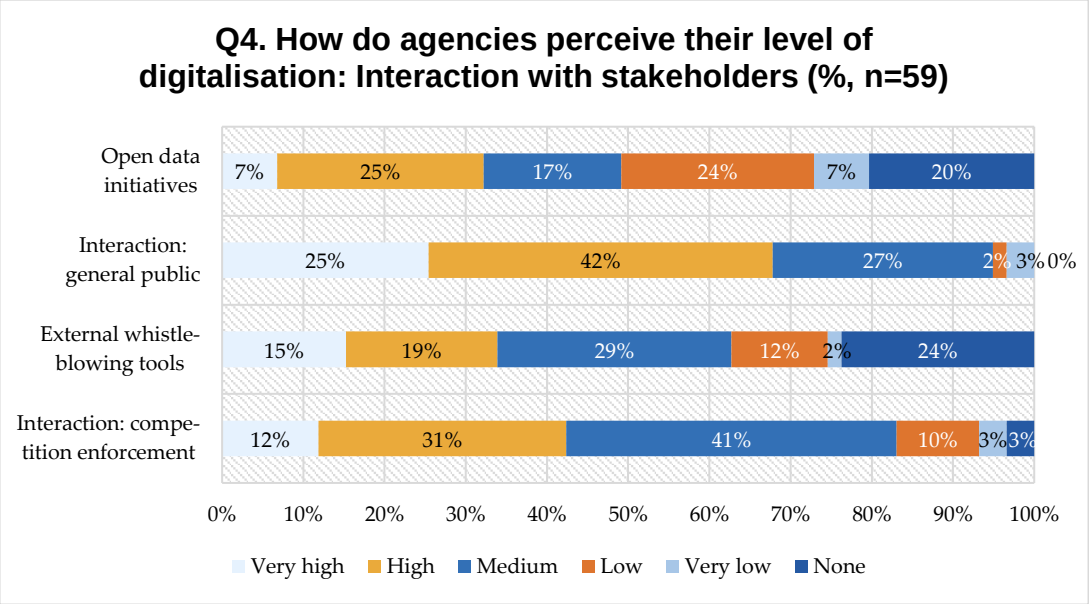


Figure 3 above shows that interaction with the general public is an area where agencies feel they are the most digitalised. Almost two-thirds (67%) of all respondents characterised their level of digitalisation here as being either very high (25%) or high (42%). Nearly one-third (29%) of the respondents thought their level was medium (27%) or low (2%).

How do agencies interact with the public?

"External communication and interaction with the general public takes place via the agency website and social media platforms (Facebook, Twitter and LinkedIn). Digital events (webinars, conferences etc.) are organised via online streaming (Facebook Live, Zoom webinars). Recordings from digital events are available on the agency's YouTube channel. To promote competition culture, the agency also records a monthly podcast series, as well as creates informative videos and infographics."

"Over the years, the agency has invested more resources on establishing and maintaining its presence on social media, in particular Facebook and LinkedIn, which we find to be an effective way to reach out to members of the public, especially youths/students. The agency has organised two social media contests (called "Post To Compete") in which tertiary students were invited to provide ideas to promote competition law by making use of social media."

"The agency maintains a comprehensive public website. The website includes a number of resources on agency policies, guidance and resources to support businesses navigate antitrust laws, archived case filings from agency cases, full texts of speeches by agency officials, and an Action Center through which the public may interact with the agency in many ways. The agency issues press releases on case developments and makes key documents associated with its investigations publicly available. The agency maintains a Twitter account. Anyone may subscribe and receive news feeds from the authority."

However, if we look at interaction with respect to ongoing competition enforcement, the figure above reveals a slightly lower level of digital maturity among the respondents. Around 43% of the responding agencies noted that their level was either very high (12%) or high (31%), whereas slightly over half (51%) of the respondents indicated their level was medium (41%) or low (10%).

How do agencies interact with their stakeholders with respect to ongoing competition enforcement matters?

"We have various online forms published on our website for the public to submit feedback, complaints and merger notifications. In addition to online forms, we provide email channels for leniency applications. However, we are also making further enhancements to these channels to improve current business processes. In addition, on a regular basis, we publish information on cases and other relevant information such as press releases and resources on a timely basis."

"The agency has increased the use of online survey tools to seek input from stakeholders for ex-post studies. In particular, the survey platform that agency uses allows creating questionnaires to be administered on the web. This platform is made available in open-source mode, which allows the user to use, distribute and modify the product free of charge for commercial and non-commercial use."

"Virtual Data Room is implemented to provide online access for (representatives of) undertakings to documents generated in the course of cases concerning the undertakings. A mobile application is currently being developed for client relationship management."

Finally, as regards both open data initiatives and external whistleblowing tools, the survey results reflect a rather diverse situation. In each case, around one third (32% and 34% respectively) of all respondents assessed their level as very high (7% and 15% respectively) or high (25% and 19% respectively). In both areas, 41% of the respondents considered their level being medium (17% and 29% respectively) or low (24% and 12% respectively). At the other end of the spectrum, around one quarter (27% and 26% respectively) of all respondents reported that their digitalisation level was very low (7% and 2% respectively) or non-existent (20% and 24% respectively).

What types of whistleblowing tools do agencies use?

"The agency has an anonymous whistle-blower system available on its homepage for any tip-offs from external parties. This system allows communicating with third parties with no traceability.

"The agency has an anonymous cartel chat."

"In 2015, the agency implemented the Whistleblowing Platform, an instrument through which individuals can report any infringements of the Competition Law that they are aware of. To effectively protect whistle-blowers, the agency provides a secured communications platform using the latest techniques for submitting anonymous information, using certified encryption methods."

What are the agencies' approaches to open data initiatives?

"The agency has an Open Data Plan, in which its open data planning can be found. Some databases are already available. Besides, our "Agency in Figures" tool is available on our website."

"The agency's market transparency unit for fuels provides pricing data of petrol station operators to private consumer information service providers. The agency could engage even more in open data initiatives from a technological point of view. However, due to legal provisions and in order to protect business secrets, the agency may only share its data with outside parties to a very limited extent regulated by law."

"Most sectoral statistics compiled by the agency (those that are non-confidential) are publicly available at the agency's website through an open data initiative called "Agency Data"."

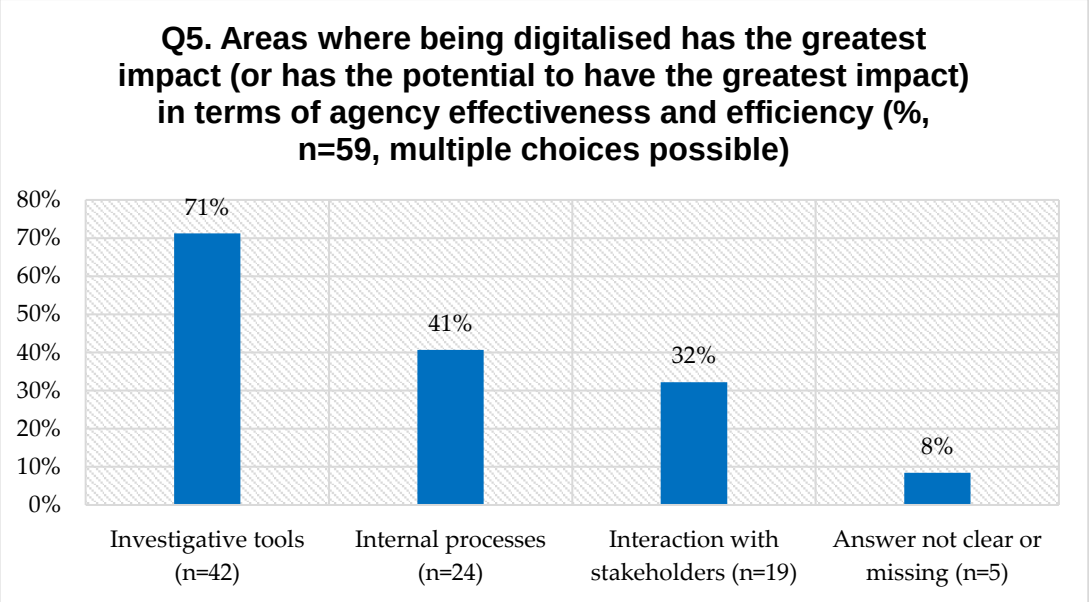
"We have made anonymised data available to various students for research purposes."

3.2 Measuring return on investment of digitalisation

In order to further explore the effects of digitalisation, survey respondents were asked to identify areas where they deem digitalisation has (or has the potential to have) the greatest impact or return on investment in terms of their agency's effectiveness and efficiency.

Agencies were able to provide free-text answers to this question, however, data analysis shows that the majority of responses fall into one of the three categories already discussed in the previous section. As shown by Figure 4 below, the largest share, almost three quarters of the responding agencies (71%) viewed digitalisation of investigative tools as bringing them the greatest positive impact in their work. This was followed by digitalising internal processes (41%), and finally, digitalising interaction with external stakeholders (32%).

Figure 4. Areas where being digitalised has the greatest return on investment



3.2.1 Investigative tools

A significant number of agencies pointed out that investigative tools are the most important area to digitalise, as this kind of improvement can save valuable time, help case handlers to be more efficient and productive in ongoing investigations, and reduce the likelihood of human error. One mid-sized South American agency also added that it is necessary to invest in upgrading investigative tools in order to be able keep up with the new realities of digital markets.

If we look at investigative tools in more detail, the majority of responding agencies identified IT forensics, OSINT and cartel screening as being of the greatest importance to achieving effective and efficient enforcement.

Many responding agencies recognised that the vast amounts of data that agencies now have to deal with necessitate use of IT forensic tools in order to approach evidence gathering strategically and efficiently. One mid-sized European agency highlighted the value of IT forensics, along with OSINT, explaining that the "agency's cartel investigations are ex-officio rather than based on leniency, therefore a sound digital approach to the gathering of evidence is crucial for the successful detection of infringements."

Case study: Competition and Consumer Commission of Singapore (CCCS)

Cartel screening tools have the greatest return on investment as they save the agency a lot of time in terms of sieving through multitudes of documents to spot evidence of bid rigging or market sharing. For example, in a recent case involving government procurement, the case team manually reviewed 597 tenders and spotted 12 problematic ones before applying the bid rigging detection tool, which then screened 1,642 tenders and flagged 117. This means a 2.8x expansion of coverage, with a 3.5x improvement of screening efficiency.

Several agencies also stressed the importance of advanced data analytics or AI-based tools, in combination with IT forensics and OSINT, in order to achieve greater accuracy and efficiency in their investigations, as the data volumes continue to grow at an immense pace.

In addition, one North American agency mentioned that its cloud strategy[6] is expected to have a significant impact on its ability to support its mandate and operate more efficiently, as well as rapidly scale the work already under way in areas like intelligence gathering.

Case study: U.S. Department of Justice, Antitrust Division

For the Antitrust Division, digitalisation that aids the core investigative function is the most important. An effective document review platform is a critical digital tool. With the ever-increasing amounts of information we receive, Division staff require the means to review, sort, filter, and code submitted documents to find information relevant to investigations. The Division invests, as needed, in the digitisation of hard-copy documents it obtains, including scanning that allows for optical character recognition (OCR) that renders these documents searchable. Other case organisation tools that allow effective organisation of case files and the construction of adaptable case fact chronologies are similarly regarded as essential to the work of the Antitrust Division.

[6] A cloud strategy can be defined as a plan aimed at adopting cloud technology within the agency and moving to cloud-based business applications.

At the same time, a couple of responding agencies thought that in order to reap the greatest effectiveness and efficiency rewards in the context of continuous technological change, it is insufficient to invest in only one particular digital investigative tool. For instance, one South American agency was of the opinion that the better solution would be for agencies to have a clear investment plan for digitalising and optimising all the investigative areas gradually, taking into account available resources, rather than investing in a "one-size-fits-all" digital solution. It noted that the ability to utilise various investigative tools such as screening and OSINT must be seen in conjunction with the ability to handle and review these cases. This means that expertise and methods must be in place to optimise staff resources and handle the large amounts of information that are involved in competition investigations.

3.2.2 Internal processes

When it comes to internal processes, digitalisation of document and case management systems and knowledge management are the two areas that were cited the most and were considered the most critical for effective and efficient functioning of the agency.

One North American agency explained that reliance on past case information and the ability to generate statistical data based on information stored over time has proven very useful for enabling research and investigations. Another agency from South America mentioned that "the essence of the authority's credibility is reflected in its due process and in carefully gathering and preserving information in all investigations and proceedings".

Several responding agencies noticed that digitalising their document and case management systems enabled their case handlers to retrieve relevant decisions to be used as a reference more easily, and allowed for better accessibility and circulation of documents within the agency and increased transparency in a more general sense.

Case study: Hong Kong Competition Commission (HKCC)

The HKCC's remote desktop system is one of the digitalised areas that brings the greatest impact to the agency, as it allows staff to work from home smoothly and seamlessly despite the social distancing restrictions and tight security policies. Additionally, a new document management system (DMS) has recently been adopted to assist staff in organising their case files, monitoring case progress, and facilitating litigation, in particular for disclosure purposes. With the new DMS, the metadata of the documents will be kept in a systematic way, the case team can easily identify which organisations or individuals are related to each document, and whether the documents duplicate other documents in the case files. One of the add-on functions of the DMS is that it allows executives to approve and sign documents in the system with their e-signatures, which greatly improves the efficiencies of the approval, signing and filing process.

In addition, a couple of European agencies mentioned their strategic goal of reaching a completely paperless document management and archiving system in the future. One of them noted it has already undertaken the process of digitalising its archives, and the process has yielded excellent results in terms of eliminating large amounts of paper documentation, as well as providing easy access to older documentation.

With respect to knowledge management, two African agencies argued that having a coherent digital repository of knowledge-based information makes it easier for case handlers to refer to past practice, improves the overall quality of their work, and enables them to conduct investigations more swiftly and efficiently. One of the agencies added that having a digital knowledge management system helps with the process of integrating new staff.

One mid-sized European agency cited an ongoing project to review its current multiple information storage systems in order to build up a new single internal database that would contain both externally published material (such as reports, formal opinions, decisions and relevant court judgments), and documents exclusively used for internal purposes (such as internal presentations, meeting notes and internal policy documents). This agency noted that the ultimate goal is to make all documents that can facilitate and streamline its daily work searchable and accessible to all its staff members in a one comprehensive collection.

3.2.3 Interaction with stakeholders

Many responding agencies also thought that digital solutions for interaction with external stakeholders, both when it comes to ongoing competition enforcement matters and general communication with the public, were essential for the effective functioning of the agency. One South American agency made the point that digital communication channels are critically important for building a culture of competition, along with creating a deterrent effect for enforcement work.

One mid-sized European agency noted that digital communication tools were especially relevant when dealing with complex investigations or market studies when several stakeholders are involved. Another agency from the Asia-Pacific region specifically highlighted the benefits of having online complaint forms, as this leads to fewer opportunities for the transposition of errors to occur, and helps staff process a large volume of complaints.

Many agencies also mentioned that having digital communication solutions in place was particularly useful when adapting to the new reality of remote work due to the COVID-19 pandemic.

Case study: National Institute for the Defense of Competition and Protection of Intellectual Property (INDECOPI), Peru

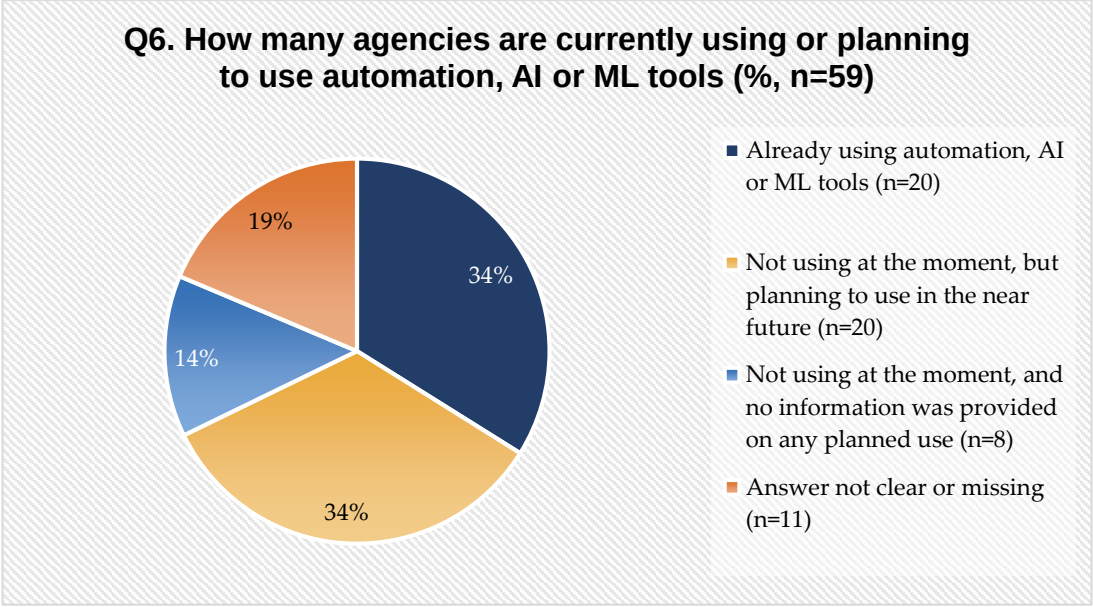
INDECOPI considers that interaction with the public has a great return on investment because through communication and public information access, the public can be informed, collaborate with the agency, and report anticompetitive practices. One example is the webpage developed for applicants to have access to a digital form to provide information and apply to INDECOPI's Rewards Program. The webpage is available at: https://www.indecopi.gob.pe/en/solicitud-de-recompensas.

3.3 Use of automation, artificial intelligence and machine learning tools

In order to get a better sense of trends in the use of very novel tools and methods, the survey also sought agencies' input on any current or planned use of automation, AI and ML solutions. While Section 3.1.1 above demonstrates that this is an area in which agencies overall consider themselves to have the lowest level of digitalisation, free text responses reveal the rising importance of such innovative tools.

Figure 5 below shows that a substantial share of responding agencies (68%) are either already using automation, AI or ML (34%), or are at least planning to deploy them in the near future (34%). The responding agencies provided numerous examples of specific areas where these tools are being used today, or can be used looking ahead, in order to increase their efficiency and augment their staff capabilities in significant ways.

Figure 5. Current or planned use of automation, AI or ML tools



3.3.1 Cartel screening

While not all cartel screening involves automation, AI and ML, it is apparent from agencies' free text responses that it is an area where they see the potential for deploying such tools. This is particularly the case in the field of detecting bid rigging in public procurement. For instance, a number of agencies mentioned that they had already deployed or were planning to deploy AI or ML-powered tools that can flag suspicious tenders, for example by analysing their similarity, coincidence and trends.

Case study: Spanish National Authority for Markets and Competition (CNMC)

One of the main fields of application of AI and ML tools is public procurement. The CNMC periodically downloads public data from the National Public Procurement Platform and other related regional platforms. All procurement data are compiled into a single database to which specific software is subsequently applied. One of the next steps will be application of ML techniques to obtain the bids from the national and regional platforms submitted not just by the winner, but also by the other undertakings, a crucial element to improve the CNMC's public procurement database and its bid rigging detection capacity. We are also testing the application of an algorithm on some of these data in order to obtain potentially collusive patterns.

Case study: Hellenic Competition Commission (HCC), Greece

The HCC Data Analytics and Economics Intelligence platform is in its initial stages of operation. When fully developed, it will use a number of screening algorithms to detect excessive pricing and collusion practices. The platform will be used to indicate red flags in specific markets and subsequently generate new cases the HCC will pursue. The platform will also be used in ongoing cases, were economists and data scientists will draw data from application programming interfaces (APIs) and datasets integrated in the platform. The HCC staff will benefit from the readily available data, which would otherwise have to be requested ad hoc from the market. An anticipated risk is the ability to use the screening tool's results without prior fact checking from the economists.

3.3.2 Collecting information about market conditions

In addition to screening for cartels, one European and one North American agency said they used automated tools in order to gather information about how certain markets function in general, without following up on a particular suspicion of collusive behaviour. According to one of these agencies, this might be particularly useful in the context of sector inquiries, which are not targeted against individual companies, where one needs to gather extensive information about certain markets, and consequently, analyse large data volumes. Another agency mentioned it had created automated tools that are used to analyse significant volumes of information and collect input about relevant markets, market concentration indexes, as well as price and time series.

3.3.3 Document review and processing

Agency responses also suggest that automation, AI or ML tools play a significant role in document review and processing. More specifically, the most common application areas include:

- Making scanned documents searchable by keywords using optical character recognition (OCR) technology.
- Analysing complaints and discovering the abstract "topics" from complaints data (topic modelling).
- Various natural language processing (NLP) tools, used for classifying, searching and filtering through documents and extracting or mining certain text or data.

  For instance, one European agency reported it was in early stages of developing an ML-based tool using an open-source software Python, which would help to organise and summarise a large number of documents based on their content. This would make it possible for a case team to get a quick overview of the case file following a dawn raid, where a lot of digital material has been collected.

  Another European agency mentioned it has built a summarisation tool for document review that extracts the key sentences from a document so that case handlers can quickly skim documents for relevance. This agency also stressed the importance of making sure that the new ML-based document review tools it has developed can be smoothly integrated into its current IT forensic tools.

- Technology-assisted review (TAR) tools used to classify documents automatically based on initial manual input from case handlers. One North American agency noted that this technology is a good tool for identifying documents that are "responsive" (relevant) or "non-responsive" (irrelevant) to the agency's document requests, however, it is not yet especially effective at identifying the most relevant documents within a collection.

In addition, a few European agencies noted they were looking into different solutions for how to visualise certain text data. One example of this is network graphs, which show relationships and connections between the data, and can be used, for instance, to visualise how e-mails have been sent between e-mail addresses.

Furthermore, one South American agency reported it had recently launched an AI-powered search tool, which allows external stakeholders and agency staff to find agency's decisions, guides, legislation, as well as other publications. This agency also disclosed it intended to start using AI in merger analysis, in order to identify cases with a high likelihood of competition concerns. What is more, one European agency mentioned it was looking into the possibility of developing a tool for automated confidentiality assessments.

3.3.4 IT forensics

A few European and Asia-Pacific agencies noted they were either using or were exploring potential use of automated web-scraping tools, where a computer program is used to extract certain data from online sources such as websites. The web-scraping tools can be utilised during investigations to assist the agency in evidence gathering.

Several European agencies also mentioned they had recently deployed or were considering potentially deploying certain AI-based tools during dawn raids. For instance, one agency mentioned it has developed a network analysis tool that, in the future, could be used to analyse e-mail data collected during dawn raids, for instance, to see which people have spoken to each other and what was said in their communication. Furthermore, one South American agency mentioned it was using predictive analytics to facilitate the analysis of seized evidence.

3.3.5 Other use cases

Several responding agencies shared other examples of how different innovative technologies can be incorporated into agencies' activities. For instance, one Asia-Pacific agency mentioned it had launched a state-of-the-art network threat-detection system to analyse its network traffic with ML techniques in order to identify any cyber-attacks or other network intrusions.

Another agency from the same region has plans to incorporate augmented reality (AR) and AI technologies into its website to ensure a user-friendly, engaging and interactive experience for its stakeholders, especially when promoting its e-learning competition compliance programme.

Furthermore, several Middle Eastern and European agencies revealed plans to take advantage of big data technologies in their work. One agency noted it was examining different solutions for pooling large volumes of data collected during its enforcement activities and storing them in one system, a so-called data lake, which would significantly facilitate data processing and analysis.

Case study: Romanian Competition Council (RCC)

The RCC has launched a Big Data project whose primary objective is to implement an IT system on a big data platform (information gathering and analytics). The IT system integrates existing internal processes, archives, interoperability platforms and databases (using them as data sources), and should assist the investigative process of the RCC. It then uses specialised tools to retrieve structured and unstructured data, to visualise, analyse and corroborate this data and to notify and report the results to the RCC's data analysts and investigators. Project implementation started in 2018 and is currently still ongoing.

In addition, a couple of Asia-Pacific and North American agencies disclosed they were looking into the possibility of deploying robotic process automation (RPA) tools in areas of high repetition and "click tasks" to shift resources to more complex tasks, so that agency staff can "consume" information instead of spending time on information gathering and assembly.

3.3.6 Benefits and potential risks

The survey results demonstrate that various automation, AI and ML initiatives are clearly on the priority list for many agencies. One of the main reasons for the growing role of such technologies is that they enable agencies to conduct more comprehensive and efficient analysis of investigative materials (which are increasing in volume and complexity), thus advancing their investigative ability.

As explained by one North American agency, advanced data analytics is a natural choice to approach "disruptive" economic activities. Given the significant volumes of information these activities generate, swift, efficient and effective analysis is essential. A couple of agencies also added that such initiatives allow case handlers to focus on interpreting the results of data analysis processes or making a decision on the merits, rather than spending their time on repetitive tasks such as assembling the data or filling in standard templates.

At the same time, a few agencies expressed their concern about AI "ethics" and correctness, i.e., the fact that the predictions of AI- or ML-powered algorithms can be biased and are not yet precise enough to forgo human expert review. Data privacy and security concerns were also mentioned as one of the risks agencies have to address if they decide to employ the abovementioned tools.

Furthermore, a couple of European agencies raised concerns about the acceptability of evidence derived from AI-fuelled analysis. For instance, one agency noted it currently refrains from using AI-based methods in a narrow sense, e.g., neural networks. One of the main reasons for this was the high requirements on documenting and communicating the reasoning behind a case in a comprehensible and transparent way, especially in view of court proceedings and applicable legal principles. The agency thought that these requirements outweighed the expected benefits from the use of AI in its casework.

One North American agency also pointed out that ML algorithms iteratively learn from data and experience; therefore, they depend on the quality of the input and the criteria of analysis in order to provide valuable results. Besides, successful ML models rely intensely on large data sets, which can be difficult to obtain. What is more, AI and ML models are often so complex that their results may be challenging to interpret by the case team, thus hindering the decision-making process.

When it comes to developing innovative tools in-house, one European agency shared its experience that it takes a significant amount of time and effort to develop a reliable programme, in particular with respect to complex assessments. It can also be challenging to overcome initial staff distrust and convince them that a computer programme can perform their manual tasks efficiently. Therefore, the agency was of the opinion that initially it is probably most feasible to implement such innovations with regard to more formalised and defined tasks, where automation can save significant time.

4 Digital strategies

This section describes the extent to which responding agencies have put in place digital goals, objectives or strategies. It also explores the ways in which agencies use external expertise as part of their digitalisation process, as well as whether they have experienced any obstacles or challenges in their digitalisation journeys. Lastly, this section discusses the ways in which agencies' digital transformations have been affected by the COVID-19 pandemic.

4.1 Agencies' digital goals, objectives and strategies

In the survey, agencies were asked whether they had in place digital goals, objectives, strategies or any other tactics or approaches to advance their digitalisation. Although there was a large degree of variation in terms of the ways in which agencies interpreted and responded to this question, the vast majority of authorities responded positively, providing examples demonstrating that the digitalisation process currently has a strategic importance for most competition authorities.

The types of digital goals, objectives and strategies identified by member agencies can broadly be grouped into the following categories.

4.1.1 Overarching agency strategies

Around half of responding agencies disclosed information about documented, overarching strategies for agency digitalisation, or otherwise listed broader identified goals for the digitalisation of the agency. In some cases, these strategies are publicly available.

A viewpoint expressed by speakers from two member agencies during the AEWG webinar of 2 March 2021 was that an overarching digitalisation strategy is a precondition not just to ensure digital optimisation (i.e., to do existing tasks more effectively), but to contribute to digital transformation (i.e., to carry out new tasks through digitalisation). Similar viewpoints were expressed by two European agencies' survey responses, which pointed out the importance of good strategies and planning processes to implement digitalisation, stressing the fact that clear focus, concepts and priorities are key, as well as feasibility tests at an early stage.

Case study: Finnish Competition and Consumer Authority (FCCA)

The FCCA is currently drafting its new strategy and part of this work concerns digitalisation of the agency. This part is divided into different sub-projects. First, the FCCA wants to ensure it has appropriate and well-functioning IT tools. This includes the utilisation of electronic workspaces and tools optimised for project work, appropriate IT equipment, as well as providing local IT support. Second, the FCCA strives to make use of data analytics and other tools used in enforcement activities (including AI and ML). Third, the FCCA is planning to implement better electronic communication solutions and stakeholder relationship management. Lastly, the FCCA will take steps, and has already done so, towards enhancing discoverability of information and managing organisational memory (knowledge management).

One Asia-Pacific authority reported it had established overarching objectives to both improve service delivery to the public and strengthen internal business processes and operations. It planned to achieve this via business process reengineering, harnessing automation tools where applicable, enhancing the existing IT system to better meet changes in business requirements and digitalising existing manual processes where applicable.

This was echoed by another Asia-Pacific authority, which stated it had established a medium and long-term plan to strategically promote digitalisation, including goals for (i) the promotion of online administrative services, (ii) securing and training security and IT staff, and (iii) the use of digital technologies in the workplace.

In addition, a European agency described that it had created a digital solutions modernisation plan, which defines its strategy to become a more data-driven organisation equipped with state-of-the-art digital tools to support competition policy and enforcement needs. The plan has four pillars: (i) workflow-driven, adaptive case management tools, (ii) digitising interactions with external stakeholders, (iii) data and AI for competition enforcement, and (iv) on-premises secure data access points.

This agency further explained that the third pillar relating to data and AI puts data creation, collection, storage, access, use, processing and exploitation at the heart of its digital modernisation process. In this respect, in 2021, the agency planned to focus on several workstreams: (i) data governance, (ii) the agency's data platform, (iii) modernisation of e-discovery and search functions, (iv) application of ML (including TAR), (v) dashboards for management, (vi) advanced data services and joint projects with case teams, as well as (vii) acceleration of service delivery as part of COVID-19 support actions.

Case study: Romanian Competition Council (RCC)

In the IT field, the RCC has developed a multi-annual strategy for 2016-2020, approved at the governmental level. All developments of information systems in recent years have been made in accordance with this strategy. The strategy has four main directions of action:

- *Supporting business processes by implementing high-performance IT solutions;*
- *Increasing the performance of the decision-making system of the RCC;*
- *Supporting logistical/administrative processes;*
- *Ensuring an efficient management of information resources.*

4.1.2 Digital strategies as part of broader e-government strategies or plans

Another method for establishing digitalisation goals, reported by five responding agencies, is within the framework of broader national e-government strategies or plans.

Case study: Italian Competition Authority (AGCM)

The AGCM follows the strategic objectives and goals of the Agency for Digital Italy (AgID), which is the technical agency of the Presidency of the Council of Ministers. AgID's main purpose is to ensure the achievement of the national digital agenda objectives. AgID has the task of coordinating the implementation of the three-year plan for information technology in public administration. Some of the guiding principles for digital services include security and privacy by design, cloud-first strategy, inclusiveness, user-centric and data driven approach, and open-source software.

One African agency reported it was implementing a digital economy blueprint established by central government. Another mid-sized European agency reported that as part of the federal administration, it follows the national e-government strategy, within which it will increase the use of electronic communication, particularly applied to possibilities to accept electronic filings or forms in enforcement matters.

The reliance on broader national e-government strategies in some cases may relate to economies of scale, where individually implemented strategies are not feasible due to the agency's budgetary limitations. One small European authority reported that digitalisation of authority work was one of its goals, closely related to streamlining and improving its processes. However, due to its size and budgetary restrictions, it was difficult to introduce solutions tailored to the authority. Therefore, certain digitalised tools (such as document management and accounting programmes) had been developed for several different authorities, including the relevant ministry and institutions subordinated to that.

Further information about collaborations with national agencies and utilisation of national e-government resources is found in Section 4.3.2.

Case study: Administrative Council for Economic Defence (CADE), Brazil

In August 2020, CADE signed a document known as the Digital Transformation Plan for 2020-2021, developed along with the Ministry of Economy and the General Secretariat of the Presidency of Brazil. The Plan aims at establishing guidelines to broaden CADE's role in providing digital answers to services rendered to the citizens, and promoting the reduction of bureaucracy and infrastructure costs. CADE's Digital Transformation Plan includes 23 actions that fall into three broad categories: changing services to digital format, interoperability and systems unification.

With respect to changing services to digital format, some initiatives are under development, such as the leniency request tool, the electronic issuance of debt settlement certificates and digital questionnaires for data collection for merger review purposes.

In terms of interoperability, CADE's final proceedings database will be available for other agencies' query. Furthermore, CADE will develop tools to obtain databases necessary for its performance, such as the platform, which concerns a blockchain system for the social security database.

Lastly, concerning systems unification, CADE will develop the integration of the electronic information system SEI with the single login (Login Único) system, which provides single access to different digital public services. The implementation will be shared with more than 360 governmental bodies that use the electronic information system SEI, which will benefit millions of citizens. In addition, CADE's website will be moved to the government domain.

4.1.3 Goals to implement specific digital tools

In response to the question about goals, objectives and strategies, a number of agencies provided details about plans to implement specific digital tools or processes, albeit not within a broader digital strategy per se. This suggests that, even in those cases where digital goals have not been expressed in documented strategies, digitalisation is nevertheless a focus area for agencies. The most common type of digital processes that respondents plan to implement relate to document and case management systems, IT forensics and screening capabilities. Further information about these types of digital tools is provided in Sections 3.1 and 3.2.

Case study: Icelandic Competition Authority

The agency has set its digital goals and we are currently working towards achieving our first goal (with a special funding from the Government), which is launching a communication gateway/portal for all correspondence and documents delivered to and received from stakeholders and parties to a certain case. The gateway/portal would also serve as a data room for access to information in investigations. Our goal is to increase efficiency and digitalise the entire investigative process as much as possible. The gateway/portal is intended to be used for all types of cases, and will, for instance, look different in merger cases, where parties will be able to see the deadlines, phases, and different steps. The gateway/portal will also be used for informal information exchange.

4.1.4 Strategies for tackling competition problems on digital markets

A small subset of agencies reported they had established strategies for tackling competition problems on digital markets. While these strategies are not specifically aimed at efforts to digitalise the competition authority per se, they are pertinent to the topic of this report given that they often involve goals related to the recruitment, training and integration of staff with digital skills, and can also have a bearing on the need for introducing new digitalised investigative tools.

Case study: Mexican Federal Economic Competition Commission (COFECE)

In March 2020, COFECE published its Digital Strategy, a document that establishes a series of actions to be done by the Commission to strengthen its capacity to face digital markets and explore the challenges posed by digital transformation. The document lists 5 actions to be carried out to address digitalisation from the competition perspective. While nearly all the actions mentioned in the strategy are directly related to enforcement matters, one of them foresees the strengthening of COFECE's infrastructure and its staff capacities. The full document is available at: https://www.cofece.mx/wp-content/uploads/2020/03/EstrategiaDigital_ENG_V10.pdf.

Moreover, in line with this strategy, the Commission modified its Organic Statute and created a new General Directorate of Digital Markets. This new unit reports directly to the Board of Commissioners, it advises all other areas of the Commission in relation to digital markets and is responsible for analysing regulatory prospects for these markets in Mexico.

4.2 Impact of the COVID-19 pandemic on digital transformation

Agencies were asked to describe whether and how the COVID-19 pandemic has affected their digital transformation. The overwhelming majority of agencies responded that the COVID-19 pandemic had had a positive effect on digitalisation, which is a picture confirmed by a poll of agency participants during the AEWG webinar on digitalisation and innovation held on 2 March 2021.[7]

Indeed, one small European agency referred to research carried out in its country showing that the pandemic had accelerated digitalisation by five years. A North American agency stated that the pandemic had forced it to pilot, experiment and shift to digital platforms immediately, allowing it to build confidence in the ability to work remotely.

However, two European agencies, one African agency and one Asia-Pacific agency reported that their digital transformation to some extent had been delayed due to COVID-19 and the lockdown measures and budgetary restrictions that this has entailed.

[7] See Section 1.3 above.

Based on the input provided, it appears that some of the digital working methods implemented will not be limited to the temporary demands of the current pandemic, but rather may be incorporated into the future work of agencies. As expressed by a European agency, COVID-19 has not changed its goals, but has given a boost to developing digital culture and opened its eyes for more possibilities and offered reflections on what the agency should take with it into the post-pandemic situation.

The same sentiment was expressed by a North American authority, which stated that the actions taken were part of the response to the pandemic, but would shape the immediate future for the authority's handling of its operations.

For some agencies, the pandemic has reinforced digitalisation efforts that had already been introduced or were in the pipeline. In the case of one European agency, the pandemic enhanced the "buy-in" of agency staff for the introduction of digital tools such as automated workflows.

Case study: U.S. Department of Justice, Antitrust Division

The Antitrust Division responded to the COVID-19 pandemic in several ways. First, the Division modified the policies and procedures surrounding the production of data to Division staff conducting investigations. The Division previously required parties to produce documents to the Division via physical media. In response to the pandemic, we allowed parties to make productions via the Division's secure enterprise file-sharing portal.

Second, although the Division had deployed videoconferencing platforms before the pandemic, post-pandemic, the Division greatly expanded use of these tools to conduct both internal and external communications, and the Division issued new guidance and training on the use of videoconferencing tools and how to conduct effective meetings remotely. It continues to expand its access to various platforms for these purposes.

Third, the Division made available a platform that allowed staff to take depositions remotely. Pre-pandemic this required a physical meeting between our staff, opposing counsel, and the witness.

Finally, as noted above, the Division, along with the U.S. Federal Trade Commission, implemented a temporary platform for filing merger notifications, which will be used until a more permanent online portal is deployed.

It is unclear which of these changes are permanent, but we expect that some of these changes will remain permanent facets of the Antitrust Division's work.

Of those agencies that reported a positive impact on digital transformation, the benefits were primarily noted in the areas described below.

4.2.1 Remote-working environments

Owing to the prevalence of work-from-home measures in many countries, many agencies cite the fact that the use of hardware and software to allow the day-to-day, internal operations of competition authorities has accelerated during the pandemic. The most cited example of this was the use of digital collaboration environments or online meeting platforms. Other remote-working tools mentioned were the expanded use of virtual private network (VPN) facilities and electronic signature systems. One African agency provided the example of procuring a solution to help with monitoring attendance of staff working from home and allow them to report efficiently on tasks completed.

Some agencies also reported that the pandemic had accelerated the dissemination of hardware in the form of smartphones, tablets and laptops, as well as mobile internet connection subscriptions.

Even in the case of one country where few societal restrictions are in place in relation to COVID-19, the competition authority noted that the pandemic had still accelerated the use of digital tools, led to an increase in working from home, and improved communication between regional offices.

4.2.2 Hearings by decision-makers

The expanded use of virtual meetings was cited as allowing decision-makers to carry out hearings in a digital environment. One South American agency described that its Tribunal's hearings had become virtual and broadcast on YouTube. Another agency's board of commissioners had also issued an agreement allowing its sessions to be held through electronic means. Thus, the physical distancing requirements imposed by the pandemic may provide inspiration for how competition agencies could utilise digital tools to allow more access to hearings even after the pandemic.

Case study: Bulgarian Commission on Protection of Competition (CPC)

In order to avoid close contacts of several persons in one hall during the Commission's open hearings on cases, the CPC introduced the use of video conferencing software. Even when all the CPC staff members and the parties are present in the CPC's building, they are in different rooms communicating via video conferencing software and equipment.

4.2.3 Investigative tools and techniques

Measures to digitalise investigative tools and techniques as a result of COVID-19 were only reported by a few agencies, specifically in the area of interviews and dawn raids. One European agency stated it was exploring possibilities to use remote inspections and remote interviews with a view to enabling investigations during the pandemic, and would probably continue using these tools even after restrictions are removed. In a parallel shift, the same agency had started to request information more frequently by sending out requests for information (RFIs), especially in cases on vertical agreements where such measures could sometimes be used as a substitute for inspections. As noted in the case study in Section 4.2 above, one agency introduced a platform for taking depositions remotely, which previously required an in-person meeting between staff, counsel and the witness.

Case study: Swedish Competition Authority (SCA)

COVID-19 has accelerated the digital transition of the SCA's enforcement work, meaning that certain data collection and certain types of meetings can take place in a more efficient way. Interviews have been conducted via a video conferencing app rather than through physical meetings. Recently, the SCA has also conducted a dawn raid where the document review took place remotely. The SCA has been able to accomplish most of its enforcement activities digitally without there being any drop in effectiveness or quality.

4.2.4 Merger filings and other interactions with stakeholders

Some agencies noted that merger procedures had been digitalised as a result of the pandemic. One European agency noted that its merger review process was digitalised within two weeks of the country's first lockdown. Another North American authority responded that it had implemented a temporary system for electronic filing of pre-merger notification forms.

Case study: Hellenic Competition Commission (HCC), Greece

As a result of the pandemic, the HCC now provides integrated digital services to the public and companies. Merger and complaint files can now be submitted digitally. The HCC has also developed a "hotline" for citizens wishing to report market irregularities, and for companies in need of guidance with respect to competition issues. In response to the increased need to monitor the market for excessive pricing practices during the first lockdown, the Greek government has obliged firms in a number of sectors to report prices. The HCC was able to use APIs created for that purpose.

4.2.5 Digitisation of records

The digitisation of files was also identified by a small number of agencies as having accelerated because of the pandemic.

Case study: Superintendence of Industry and Commerce (SIC), Colombia

The COVID-19 pandemic brought about important challenges for the SIC. The agency was aware that within the framework of administrative investigations, the virtual environment generated great challenges in order to guarantee the right to defence and due process for those being investigated. For this reason, it proceeded with the digitalisation of 100% of the files of the administrative investigations carried out by the Delegation for the Protection of Competition. This is the first time in the history of the SIC that the total digitalisation of the information contained in the active files on free competition has been achieved.

4.3 Collaboration with external expertise in digitalisation efforts

Agencies were asked whether they use or plan to use any external expertise as part of their digitalisation process, for example through consultation with other national agencies or external professionals, or by making use of broader e-government resources. Agencies reported a high level of consultation with external expertise sources, most commonly in the context of utilising national e-government resources or other national agencies, but also through external IT consultants and other competition authorities.

4.3.1 External IT consultants

Several agencies reported that they utilise external IT consultants when required, for example, when it comes to specific search tools for IT forensics. An agency in the Asia-Pacific region reported that during the implementation of a new internal document management system, it had worked closely with the vendor to move content from the old document management system to the new one. A large European agency responded that it used external expertise to improve its use of online questionnaires.

Case study: Fair Trading Commission of Jamaica

External expertise is critical to executing our plans. We hired a business process analyst to assist us in identifying and documenting our needs, as well as utilised IT expertise from another government agency that is more experienced than we are in several aspects of digitalisation. In addition, an external contractor will build a customised enterprise content management (ECM) system for us.

4.3.2 E-government resources and other national agencies

Confirming a picture reported in other responses to the survey (see Section 4.1.2), a majority of agencies reported that they chose to or were obliged to follow broader national e-government resources or strategies as part of their digitalisation processes. For example, one small European agency reported that it discusses and consults with the country's national e-Government Agency. This agency's powers include issues such as e-governance, electronic certification services, electronic identification, network and information security and sector-related information in machine-readable open-source code.

In addition, a number of agencies across the Europe, Africa and Asia-Pacific mentioned that in the field of IT forensics they are cooperating with national law enforcement agencies such as police authorities, anti-corruption offices or financial crime investigation offices.

Case study: Estonian Competition Authority

The main IT partner for the agency is the Centre of Registers and Information Systems. This centre provides the IT service (including IT administration, IT development and leading digitalisation processes) and is the centre of competence within the jurisdiction of the Ministry of Justice. The digitalisation of government agencies in general is coordinated by the Ministry of Economic Affairs and Communications. Sharing knowledge and best practices is rather common in Estonia in different forms of cooperation.

Case study: Israel Competition Authority (ICA)

The ICA is in constant communication with peer agencies involved in similar activities. The ICA also takes part in an inter-governmental "innovation forum" (its purpose is to share ideas, initiatives and experiences in implementing digitalisation processes), and works with inter-governmental agencies to share experiences. Moreover, procurement of software is done under the guidance of specialists from the National Digital Ministry.

Case study: Malaysia Competition Commission

The Commission always consults with the government agency for modernising the public sector. This government agency is a central institution for the modernisation and transformation of the public service administration in Malaysia. All the digitalisation processes within the Commission are always in line with the standard set by this agency.

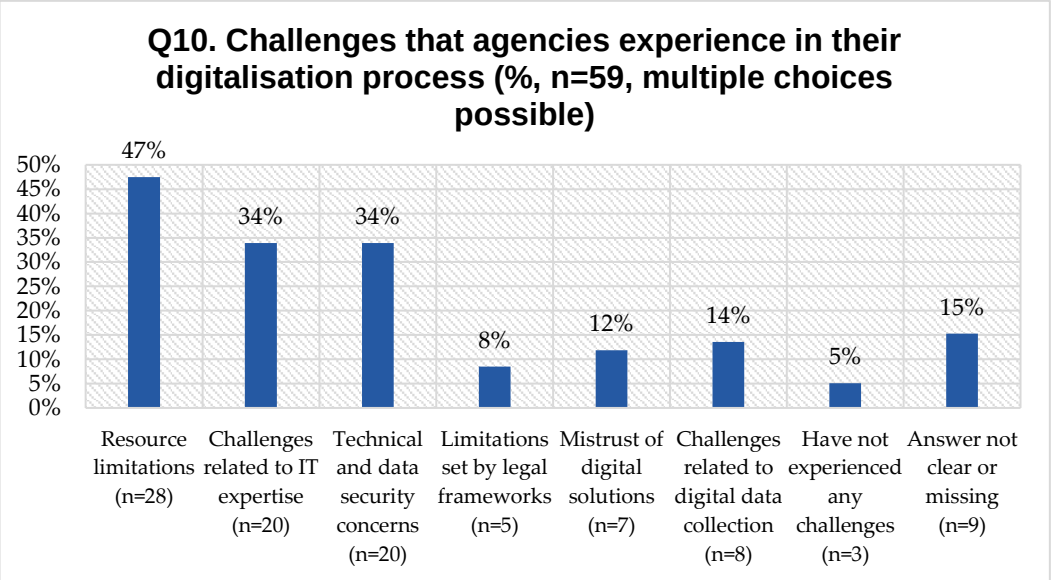
4.3.3 Cooperation between competition authorities

Several agencies reported that they shared best practices, experiences and tools with other competition authorities. For example, one South American agency stated that its digital transformation plan was based on the experience of a large European agency. Within the context of regional cooperation, such as the Nordic cooperation and the European Competition Network (ECN), a few responding agencies highlighted that the possibility for sharing and reusing digital solutions among competition agencies was being explored. This was highlighted, for example, with respect to solutions for oral leniency statements, RFIs, and confidentiality claim management. One small European agency reported that it had exchanged experiences with other European competition authorities regarding software used for detecting cartels in public procurement.

4.4 Biggest digital transformation challenges

Agencies were asked to describe whether they had experienced, or anticipate experiencing, any obstacles or challenges in their digitalisation journeys. Almost all responding agencies report having faced challenges. As described in more detail below, resource limitations are by far the most commonly cited challenge in terms of competition authorities' digital transformations. This appears to be common across different agency sizes, although more prevalent among smaller agencies. As reflected in Figure 6 below, other limitations such as lack of IT expertise or technological and data security issues were also frequently recurring themes. Within each type of digital transformation challenge listed below, some potential solutions are offered based on agencies' experiences.

Figure 6. Digital transformation challenges



4.4.1 Resource limitations

As one North American agency expressed it, "resource shortfalls are our biggest obstacles in our digital journey." This sentiment was echoed by many respondents. One small European agency explained, for example, that it had no dedicated budget for IT development, and investments result in resources being diverted from other operations. The lack of financial resources is not restricted to IT equipment and technology, but also affects the ability to recruit digital staff.

Another North American agency that is in the process of developing an electronic document and case management system explained that staff capacity was seen as an expected challenge during development and implementation of the system. This is because staff will be required to assist in the development phase while handling their existing workload, and will be required to undergo training when the system is implemented.

One small African agency noted that its greatest challenge is funding of digitalisation projects since it is directly dependent on government support. Similarly, a small European agency reported that since the IT-related budget is not decided by the agency, it is dependent on general priorities set by the ministry, and as such, processes may take longer than expected. A North American agency echoed the fact that financing depends on the allocation of a state budget that may or may not be approved.

On the other hand, one small European agency reported that government funding had in fact been the solution to resource shortfalls, reporting that a special grant had been provided to further its digital transformation. Another European agency had managed to make IT investments through attracting EU funds.

Another small European agency agreed that digitalisation is a costly project and burdensome for an authority with a tight budget. This agency offered a potential solution, noting it has managed to create synergies with other public bodies, for instance, the police, in the purchasing of forensics software, so that the administrative burden of abiding by the procurement law requirements for the agency was lowered. A large European agency acknowledged that technologies need a certain level of maturity to avoid high administrative costs.

A specific challenge highlighted by a South American agency is the fact that in some cases, commercial digital forensics solutions are highly specialised or comprehensive products geared towards corporate or large-scale work environments, and not suited to competition agencies that are just beginning their work towards digitalising working methods. The agency had addressed this problem by sourcing smaller scale tools for different stages of an investigation, and by ensuring that the tools are integrated with one another.

4.4.2 Challenges related to IT expertise

While Section 3 explored different potential paths to agency effectiveness through new digital tools, the extent of their use may depend on the availability of IT expertise to be able to implement them. Some agencies reported that the lack of specific IT or digital expertise among staff was a challenge for their digital transformations. One small African agency reported that current training programmes do not take into account modern technological developments. Another small European agency mentioned that there might be resistance by some employees in terms of the requirements posed by digital transformation on their daily work routine. Furthermore, a mid-sized European agency reported that one of its main challenges was the integration of new professional figures within current staff and the need to cross-train them. One agency lacked sufficient autonomy to be able to hire specialised staff.

A lack of IT expertise can in turn entail knock-on effects on the ability of competition agencies to acquire cost-effective digital tools. According to one European agency, having IT specialists would have meant that open-source software or in-house developments of existing software would be possible. Instead, the agency's IT system is based on commercial off-the-shelf solutions, which increases costs for acquisition and future maintenance.

In terms of solutions, one mid-sized European agency described the fact that moving away from long-established paper-based workflows had been assisted by legal orders and backed by international training for managers encouraged by the authority's president. An Asia-Pacific agency reported that a lack of technical expertise in different niche areas such as IT forensics, document management systems, etc. had been solved by recruiting staff in these areas that could provide training to other members of staff.

The question of digital skills and competences is addressed specifically in Section 5 below.

Case study: Administrative Council for Economic Defence (CADE), Brazil

In response to the challenge of developing digital investigation tools where resources were limited and IT staff did not possess the requisite capacity to develop tools in-house, CADE turned to a university "innovation lab" comprised of PhD students to develop customised tools. In CADE's view, the lab was highly motivated to produce innovative tools in a much more cost-effective way than could have been achieved by procuring off-the-shelf solutions.

4.4.3 Technical and data security concerns

Cyber and data security was also mentioned in some responses as a challenge for digitalisation. One mid-sized South American agency reported that its main challenge had related to cyber security practices that needed to be put in place to avoid data breaches. The agency recommended that consistent and correct implementation of security policies and procedures on the part of its IT team was necessary. A North American agency was of the opinion that it can be difficult to ensure that the cloud environment provides the same ability to upload and download data. There may be costs to improving the connectivity to remote data that ultimately reduce the net cost savings from a cloud migration. Furthermore, the move towards more digital working environments entails a balancing of greater access for staff and stakeholders while ensuring the security of data. One potential solution to data security issues proposed by one European agency was the establishment of federal secure data clouds.

In terms of other technical challenges, one large Asia-Pacific agency reported the challenge of upgrading legacy systems to ensure staff had more flexible access to systems. This had become particularly relevant during the COVID-19 pandemic, where the agency reported that staff had been required to rotate working online and offline to manage the bandwidth load. This was overcome by investing in sufficient capacity and bandwidth to enable people to work remotely.

Another technical challenge described by a North American agency is the tension between maintaining legacy technology while also keeping pace with new digital market trends. The linking of software and the interplay between new software and hardware was also viewed as a challenge by one agency from the Africa and Middle East region.

Case study: Competition and Consumer Commission of Singapore (CCCS)

One of the challenges we face as a small organisation is that unlike some larger organisations, we are not able to have a dedicated full-time team to work on digital transformation. Hence, officers have to work on this even as they deal with their regular work responsibilities. Another challenge is that some processes may not generate sufficient volume to justify the development of customised technological solutions. To overcome these challenges, we make use of existing ready solutions such as designing our online forms using the whole-of-government online forms solution, commercial software as a service (SaaS) subscriptions and adopting ready-made solutions suitable for our use from other government agencies that are keen to share their technologies. In addition to this, we are also making practical enhancements where applicable to our existing system rather than introducing major system changes or overhauling our existing system.

4.4.4 Limitations set by legal frameworks

It was reported by some agencies that limitations had arisen due to a sub-optimal national framework for digitalisation. One small European agency reported that national legislation currently does not provide the preconditions for interoperability. Similarly, another mid-sized European agency reported that its digitalisation efforts might require legislative amendments, for example, with regard to investigative tools.

4.4.5 Mistrust of digital solutions

A few agencies described specific cases of mistrust of digital solutions as a limitation to further digitalisation. This was, for example, expressed by a North American agency, which foresaw that this mistrust would lead to procedural restraints in its enforcement. Similarly, a cultural resistance to digital processes such as using online signatures was cited by another North American agency. An Asia-Pacific agency echoed this noting that the implementation of certain tools had met resistance by users of the applications in question.

As a potential solution to such issues, a mid-sized African agency that had introduced a digital e-filing system for mergers explained that the authority had to engage stakeholders in order to encourage them to adopt the system. According to the agency, "communication and sensitization" sessions had been carried out to create awareness.

Case study: Competition Bureau Canada

Lack of funds, corporate culture and resistance to change are our biggest challenges. We have deployed an innovation garage aimed at having the difficult conversations and taking in all perspectives to drive towards solutions for the Competition Bureau. It has been very effective in enabling risks and concerns to be voiced, while bringing everyone together towards a single outcome. There is also the need to balance risk management with the need for speed, agility and the need to scale rapidly in the digital economy.

4.4.6 Challenges related to digital data collection

Some agencies cited specific challenges related to data collection in their investigations, for example relating to the increasing volumes of data that need to be investigated. For one South American agency, this has significantly lengthened the time undertaken to conduct dawn raids and investigations. A North American agency described the significant growth in the number of seized phones, computers, e-mail and social media accounts, which involve the collection and processing of forensic images. According to the agency, this slows the identification of relevant data. While some of the digital tools and systems for automation described under Section 3 are intended to solve these kinds of challenges, this must be seen in the context of the resource limitations faced by various agencies.

Meanwhile, a concern shared by one European agency and two Asia-Pacific agencies was the lack of good data sources in the respective countries for using data collection tools. To overcome this, one agency had invested in new tools for generating better intelligence from public data sources.

Case study: New Zealand Commerce Commission

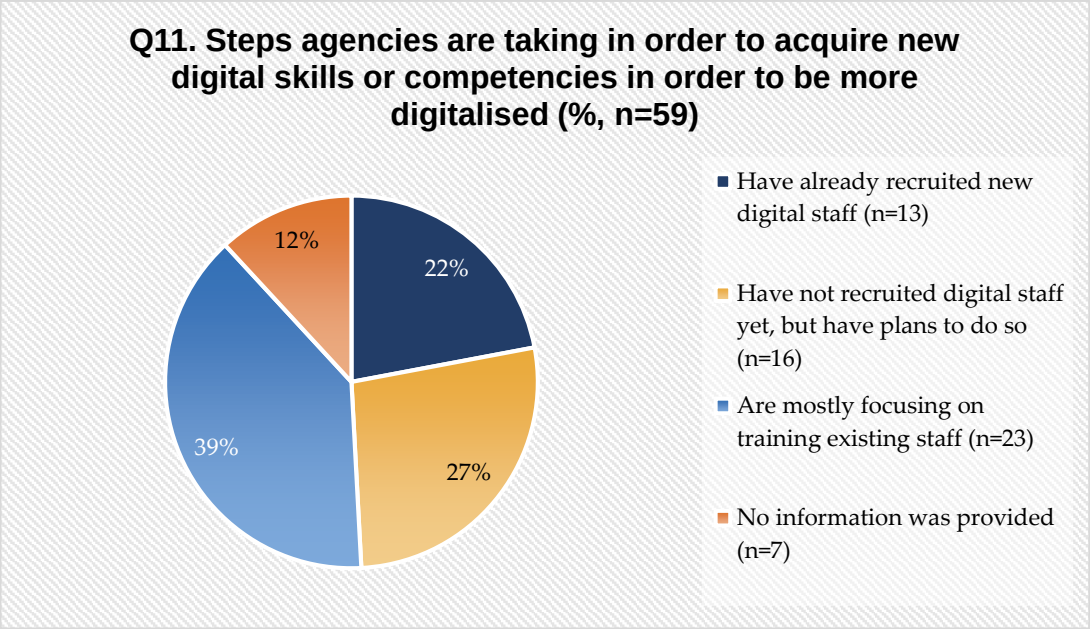
In relation to using data as an investigative tool, obstacles include the lack of data sources available in the New Zealand market, and the relatively high costs of data extraction given the relatively small volume of investigations. Nevertheless, the Commission continues to explore options, aided by observing the experiences of competition agencies in other jurisdictions, and the work of the ICN.

5 Digital skills

5.1 Demand for new digital skills and competencies

As part of the survey, agencies provided details about whether they have taken, or are planning to take, steps to acquire new digital skills, for example in terms of new digital talent. Agencies also provided details about the roles and tasks undertaken by digital staff, as well as how they are integrated into the existing work of competition authorities. As noted in Section 1.3, this was also the topic of a specific discussion within an AEWG webinar on 26 March 2020.

Figure 7. Acquiring new digital skills



The acquiring of specific digital skills and competencies is one area of digitalisation where there is greatest divergence in terms of agencies' experiences. As shown in the diagram above, around one in five (22%) respondents have already recruited staff with specific digital skills, while a slightly larger share of agencies (27%) report that they have plans to do so. The majority of agencies (39%) indicated they have trained, or plan to train their existing staff, while 12% percent of respondents had no relevant information to provide.

Case study: Danish Competition and Consumer Authority (DCCA)

The DCCA has adapted its organisational structure and expanded its staff in order to keep up with the pace of digital economy. A new Digital Platforms Division was established on 1 May 2019. The division is responsible for enforcing competition rules in relation to digital platforms, along with overseeing activities of Danish companies and platforms. In addition, the division conducts assessments of behavioural tools in digital platforms as well as competitive analysis of digital platforms. The division also coordinates studies on big data, AI, ML and the use of algorithms. In order to keep up to date with the digital development, the DCCA works systematically and uses the latest knowledge and research within data science with a consumer welfare angle.

Case study: Australian Competition and Consumer Commission (ACCC)

The ACCC has set up specialised teams within the agency with a digital and data focus. The Strategic Data Analysis Unit provides expert quantitative advice and support across our agency, including in market studies, enforcement investigations, and even internal projects. The team has a variety of professional backgrounds, including data science, economics, statistics, actuarial, law, developers, astronomy, and finance. The ACCC also established a Digital Platforms Branch. The Branch has a range of monitoring functions and works to proactively investigate potential competition and consumer law issues. It is currently conducting inquiries into digital platform services, digital advertising services (adtech), and has recently helped to develop a mandatory news media bargaining code of conduct that it is responsible for administering.

Case study: Mexican Federal Economic Competition Commission (COFECE)

To tackle digitisation, COFECE continuously invests in its IT forensics, data analytics and intelligence teams. In 2014, the Intelligence Unit was created primarily to support investigation process, in addition to engaging in other cross-sectional activities. Another recent effort in this matter is the creation of the General Directorate of Digital Markets in 2020, a specialised unit that will be focused on studying and analysing digital markets and assisting during the examination of possible investigations related to them. COFECE is aware that in order to investigate anticompetitive conduct, a cross-sectional and interdisciplinary approach is needed. Thus, it has sought to increase the diversification of its staff by hiring, among others, data scientists, engineers and intelligence specialists in order to apply their skills and knowledge in investigations. In the short term, COFECE will expand its training and skills to explore AI, blockchain technology and other topics relevant for its institutional priorities. Additionally, case handlers and IT forensic specialists will continue to be trained in order to receive updated and state-of-the-art knowledge.

5.2 Digital roles within competition agencies

IT forensic capabilities are the most commonly cited area of expertise that agencies have recruited or plan to recruit, or otherwise focus on in terms of training existing staff. Furthermore, 17 out of the 59 agencies that participated in the survey indicated that they had or were planning to recruit or train staff in the area of data analytics or data science. One large European agency reported that, in addition to IT forensic experts and data scientists, it was also recruiting profiles such as digital investigator, OSINT specialist and tender data analyst.

There is further variation in terms of how digital roles are integrated into the organisational structure of competition agencies. While a small number of agencies have created dedicated digital or forensic IT units or task forces, it is at present still more common that staff with specific digital skills are integrated into investigative units, chief economists' teams or within existing IT teams. Dedicated digital or forensic IT units typically assist case teams as required. One large European agency has a specialised investigation unit that conducts advanced digital investigation activities, but also supports other units within the authority.

Case study: Competition and Markets Authority (CMA), United Kingdom

The CMA's DaTA Unit includes data scientists, engineers, and data and technology insight specialists. Many were recruited from outside the CMA, but some were trained up from within the agency (from both the digital forensics team and economics team). The DaTA Unit provides eight capabilities that constitute our offering for the CMA. On a particular case we often deploy multiple capabilities depending on the nature of the project, including the following:

Core data science and engineering

1. *Data gathering and manipulation – building the infrastructure and deploying the skills required to ingest, process and store data at a vastly increased scale.*
2. *Analysis and insight using data science – delivering new insights for cases including through applying cutting-edge techniques, such as ML.*
3. *Building software tools – developing new tools to deliver analysis and speed up slow and repetitive tasks, e.g., software to execute local competition analysis much faster and more easily.*

Digital forensics and intelligence service

4. *E-discovery – i.e., working with case teams to process and review document sets. Huge document sets are required principally by Mergers, Cartels and Antitrust.*
5. *Digital forensics and intelligence – rigorously capturing and processing the digital evidence that underpins our cases.*

Insight and enhanced offerings

6. *Analysing algorithms and how they are used – unpicking how the algorithms used by firms work in practice and their impact on consumers and markets.*
7. *Understanding and explaining technology – helping frontline areas understand emerging technologies, and the firms and business models based on them.*
8. *Providing behavioural insight using behavioural science – providing analysis and insights on how consumers and firms interact from existing behavioural science sources and new research and testing, including of remedies.*

The DaTA Unit is separate to case teams, but members can be embedded on particular cases if appropriate.

Case study: Competition Bureau Canada

The Competition Bureau has recently hired a Chief Digital Enforcement Officer (CDEO), and an Innovation Garage facilitator (design thinking practitioner). The CDEO reports directly to the Commissioner and leads the transformation from the top down. The CDEO is positioned Bureau-wide, across all branches. Although the CDEO would like to integrate more into the case teams, this would not be effective due to the current lack of data science resources. The CDEO has provided some subject-matter expertise to the case teams in specific instances while the agency is working towards hiring the required data scientists.

5.3 Recruiting new digital staff vs "unlocking" existing talent

Many of the agencies that have taken steps to acquire new digital skills have adopted a hybrid approach whereby they have both recruited new staff and trained current staff. It is clear from responses that these methods may often complement one another depending on the needs of the agency. Agencies were asked to provide views regarding potential advantages or disadvantages of each method to acquiring new skills. In some cases the advantages of training existing staff mirror the disadvantages of recruiting new staff, and vice versa.

Overall, the key advantage expressed for training current staff to expand their digital skills relates to the fact that it is important for staff to have a good understanding of the specific fields of competition law and economics and the needs and culture of the authority. As such, training existing staff may be a way to bridge gaps and collaborate between newer digital needs and other core competition law and economics tasks. One small European agency suggested that an understanding of what is of interest to the authority from a competition enforcement perspective is difficult to train and develops over time.

A North American agency mentioned that training existing staff in matters such as data analytics methods, programming languages, AI and ML could help to develop innovative in-house solutions. One European agency suggested that training current staff might encourage long-term loyalty to the authority.

Conversely, there were some clear disadvantages expressed in terms of choosing to train up existing staff in digital skills. One relates to workloads of existing staff who are unlikely or unwilling to take on new areas of focus, while one North American agency suggested that extensive reskilling of staff may be demotivating, leading to a need for injecting new talent in the form of recruitment. Some tasks are of such a level of specialisation that retraining existing staff is not an option.

In terms of specific advantages of new recruitment, agencies expressed that recruiting staff to highly specialised roles can be a method to ensure that new skills are quickly integrated and operational. Hiring may bring in competences that simply do not exist within the agency. One European agency with an established data unit stated that outside talent with data science and engineering skills was needed to help train other internal staff.

On the other hand, one large Asia-Pacific agency stated that although bringing in external staff can be an immediate asset, it is unclear whether this will lead to a continuous strengthening of the organisation. This mirrors the advantages expressed above about choosing to retrain existing staff. Furthermore, as implied by Section 4.4.1, resource limitations were again quoted as a potential drawback to recruiting new talent. Specifically, competition authorities may not be able to attract, reward and retain specialised digital talent given dynamics in the labour market for these types of expertise. A North American agency described difficulties with finding and hiring individuals with data science skills, reporting that current government structures struggle to classify the roles and salaries.

6 Findings and suggestions for future ICN work

This report provides an account of the ICN AEWG membership's experiences in the area of agency digitalisation. While it is not intended to be a collection of best practices, it may nevertheless serve to inform member agencies about strategies, tools and methods that have been useful, and the challenges faced, in order to inspire them in their own work.

Furthermore, the findings may also help guide decisions about future ICN work in the areas covered by the report. Although the ICN AEWG would be well placed to continue developing work in this field, it may also be appropriate for work to be carried out by, or in cooperation with, other working groups or within the remit of ICN Training on Demand.

6.1 Developing good practices with respect to digital tools and digital information gathering

Based on the survey participants' input, the ICN AEWG should continue to offer a forum for discussion and organise webinars to allow for the constructive exchange of good examples of agencies' digital transformation initiatives, in particular, how the deployment of various digital tools or solutions can accelerate agencies' internal operations and investigative capacity.

Good practices with respect to specific areas could be developed into written work product where appropriate. Two areas that may be suited for developing written work products are IT forensic work and cartel screening, which have already been explored to some extent within the ICN Cartel Working Group (CWG). Indeed, the ICN Anti-Cartel Enforcement Manual has an existing chapter on digital evidence gathering published in 2014.[8] The ICN CWG also identified the potential for future work on cartel screening in its 2020 Scoping Paper on the Impact of Digitalization in Cartel Enforcement.[9]

ICN Training on Demand may also be an appropriate forum for developing practical guides on the use of digital tools for investigations. At time of writing this report, a module on evidence review is under development. This could be complemented with further practical training modules on IT forensics or screening.

[8] Available at: https://www.internationalcompetitionnetwork.org/wp-content/uploads/2018/05/CWG_ACEMDigitalEvidence.pdf.

[9] ICN CWG SG2 Project on "Big data and Cartels", The Impact of Digitalization in Cartel Enforcement – Scoping Paper, 2020, https://www.internationalcompetitionnetwork.org/wp-content/uploads/2020/06/CWG-Big-Data-scoping-paper.pdf.

Similarly, when it comes to using digital tools in conducting market studies or inquiries, the AEWG might explore the possibility to take part in joint projects or experience-sharing events with the ICN Advocacy Working Group (AWG).

6.2 Increasing focus on automation, artificial intelligence and machine learning

Considering the growing role of various automation, AI and ML tools uncovered by the survey results, the ICN AEWG may continue to provide a platform for discussion about how these technologies can be strategically integrated into the work of competition agencies to augment their staff capabilities and achieve greater efficiency. For instance, this could take the form of a separate written work product or a series of webinars exploring agency practices with regard to the optimal and ethical use of AI or ML solutions. Collaboration with other ICN working groups, such as the CWG or AWG, as mentioned in Section 6.1, might generate significant synergies in the delivery of high-quality and up-to-date content in this regard.

6.3 Continuing discussions on useful components for agencies' digital strategies

In the course of work on this report, the ICN AEWG has hosted a webinar and annual conference plenary session on agency digitalisation, where various agency experiences with establishing digital strategies were presented. Further experience sharing in the context of future conferences and workshops may help keep a spotlight on the high-level considerations that go into developing strategies for agency digitalisation. An essential part of successful strategy implementation is learning how to overcome digitalisation challenges, and shared agency experiences can be helpful in providing inspiration and a more clear-cut path forward.

6.4 Facilitating the sharing or development of open-source digital tools among competition agencies

The report's findings demonstrate examples of well-functioning regional and international cooperation between competition authorities in the sharing and development of digital tools. The ICN could explore the possibility of providing a forum for facilitating the development of open-source tools that could be disseminated more broadly among ICN members, as well as assisting agencies in overcoming any legal or technical barriers in this area. This kind of collaborative work could go some way towards addressing resource limitations that are identified as the key obstacle for many agencies in advancing their digitalisation efforts.

6.5 Offering spaces for cooperation between relevant digital experts

Through the structure and operation of the ICN, there is a great deal of flexibility to allow cooperation on a wide range of areas of expertise that fall within competition agencies' mandates. The ICN AEWG's work stream for chief and senior economists is an example of how the ICN can offer a forum for exchanges among a group of experts that is not specifically accommodated for within the traditional working group structure of the network.

Given the growing prevalence of non-traditional digital roles within competition authorities identified in this report, there may be a corresponding need to create fora for such experts to discuss specific digital issues. This could take the form of targeted webinars within respective working groups, for example webinars for forensic IT specialists within the AEWG or CWG. In due time, if there was sufficient demand, specific work streams for forensic IT specialists, data scientists or other groups of experts could be created without requiring any far-reaching changes to the ICN structure.

Given the diverging levels of IT expertise outlined in this report, such work and discussions could be designed to enhance knowledge and capacity of agencies with differing levels of experience.

Appendix

ICN AEWG project "Digitalisation, Innovation and Agency Effectiveness"

Agency digitalisation questionnaire

Purpose

This questionnaire forms part of the ICN AEWG project "Digitalisation, Innovation and Agency Effectiveness". It aims to collect valuable information on competition agencies' digital transformation journeys – specifically, actions/measures that competition agencies have taken in order to digitalise and innovate their authorities in line with the growing digitalisation in our society. Answers to the questionnaire will form the basis for a report summarising different steps competition agencies have taken in this regard, and, ideally, sharing practical experiences and good practices in this area.

Definitions

For purpose of this questionnaire, the terms **digitalisation and digital transformation of the agency** relate to the integration of digital technology and digital skills into agency's activities in order to strengthen its capacity and increase its operational efficiency.

Scope

The questionnaire focuses solely on competition agencies' internal digital strategies or tactics, organisational design changes as well as digital tools and technologies that agency staff use to increase their work efficiency.

Questions related to agencies' specific enforcement or policy actions in digital markets (e.g., antitrust or merger investigations related to digital markets/ platforms, market studies/inquiries into digital markets) are outside the scope of this questionnaire, as these topics are largely covered by the other ICN working groups[10].

[10] More information about other ICN working groups' projects or initiatives related to competition agencies' actions in digital markets can be found on the ICN website: https://www.internationalcompetitionnetwork.org/working-groups/.

Agency details

1. Please provide the name of your agency: [Please type your answer here]
2. Please provide your agency's contact person information for this project (name, title, email): [Please type your answer here]
3. Please indicate the size of your agency (if your agency has multiple functions, please consider only the number of staff working on competition-related matters):

   ☐ 0–49 employees
   ☐ 50–99 employees
   ☐ 100–149 employees
   ☐ 150–199 employees
   ☐ 200+ employees

Digital environment

4. Please indicate how you would characterise your agency's current level of digitalisation in the following areas. Please feel free to provide any additional comments for each question, such as elaborating on specific examples that may provide guidance or inspiration to other ICN member agencies.

	Very high	**High**	**Medium**	**Low**	**Very low**	**None**	**Additional comments**
Investigative tools							
Cartel screening (e.g., using econometric tools for detecting bid-rigging cartels)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
IT-forensics (e.g., gathering and reviewing digital evidence during/after dawn-raids)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Open-source intelligence (OSINT)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Economic analysis (e.g., using tools/software for analysis during investigations)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Automation/artificial intelligence/machine learning	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Other [Please feel free to share additional innovative examples of your agency's digitalisation related to investigative tools]	[Please feel free to elaborate on any additional examples here]						

Internal processes							
Document management and archiving	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Project management (e.g., project monitoring, tracking, reporting)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Knowledge management/ensuring institutional memory	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Internal communication	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Recruitment process	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Managing budget/finances	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Other [Please feel free to share additional innovative examples of your agency's digitalisation related to internal processes]	[Please feel free to elaborate on any additional examples here]						
Interaction/engagement with stakeholders							
Interaction in connection to ongoing competition enforcement matters (e.g., possibility to submit tip-offs, complaints or merger notifications via "interactive" parts of agency website, publishing documents or information on case timelines online)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
External whistleblowing tools/system	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Interaction/communication with the general public (e.g., via agency's website, social media platforms, online chats, organising digital events)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Making competition authority data sets available openly (open data initiatives)	☐	☐	☐	☐	☐	☐	[Please feel free to provide any additional comments]
Other [Please feel free to share additional innovative examples of your agency's digitalisation related to interaction/engagement with stakeholders]	[Please feel free to elaborate on any additional examples here]						

5. In which of the above-listed areas would you consider being digitalised has the greatest impact/return on investment (or has the potential to have the greatest impact/return on investment) in terms of your agency's effectiveness and efficiency? Please elaborate.

   [Please type your answer here]

6. If your agency uses or plans to use any automation/artificial intelligence/machine learning tools, please describe in more detail their (intended) area of application as well as any benefits or risks you experience or anticipate arising from their use.

   [Please type your answer here]

Digital strategies

7. Please describe whether your agency has digital goals, objectives, strategies or any other tactics/approaches to advance its digitalisation. If so, please provide a short description together with any relevant links to public documents or information.

   [Please type your answer here]

8. Please describe whether and how the COVID-19 pandemic has affected your agency's digital transformation.

   [Please type your answer here]

9. Please describe whether your agency uses (or plans to use) any external expertise as part of its digitalisation process. For example, does your agency consult with other national agencies or external professionals with relevant experience/knowledge, or make use of broader e-government resources?

   [Please type your answer here]

10. Please describe whether your agency has experienced (or anticipates experiencing) any obstacles or challenges in its digitalisation journey. Please share how your agency has overcome them (if applicable).

    [Please type your answer here]

Digital skills

11. Please describe whether your agency has taken or is planning to take any steps in order to acquire new digital skills/competencies in order to become more digitalised (e.g., in terms of recruiting new digital staff, such as data engineers, data scientists, IT forensic experts, etc., or training your current staff[11]).

    [Please type your answer here]

12. Please describe whether your agency has any views on the advantages and/or disadvantages of recruiting new digital talent versus training your current staff ("unlocking" the talent within the agency).

    [Please type your answer here]

13. If your agency has recently hired or trained any digital staff, please provide the following information:

    a Describe how they are integrated into your agency (e.g., whether they are part of a separate new unit/team/task force or if they are embedded in existing case teams).

      [Please type your answer here]

    b Describe what their roles and responsibilities are.

      [Please type your answer here]

    c In case the new digital staff is part of a separate new unit/team/task force, explain how they collaborate/interact with other departments/units within the agency, as well as how you ensure that other departments/units can effectively make use of their specific skills.

      [Please type your answer here]

Further information (optional)

14. Please provide any additional information about the digitalisation of your agency which you believe would be relevant for the purposes of this project.

    [Please type your answer here]

[11] With regard to staff training, please focus specifically on questions of digital training. General information on staff training is covered extensively in the AEWG report "Competition Agency Staff Training Programmes" (2017): https://www.internationalcompetitionnetwork.org/portfolio/competition-agency-practice-manual-training/.

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