Digital transformation roadmap

A guide for African science granting councils to support the development and maintenance of data management systems, with a particular focus on digitalisation

SCIENCE GRANTING COUNCILS INITIATIVE SGCI IOSRS INITIATIVE DES ORGANISMES SUBVENTIONNAIRES DE LA RECHERCHE SCIENTIFIQUE

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Evi-Pol

Enabling more effective use of evidence in policy and decision making by science granting councils

African Centre for Technology Studies
Knowledge for Better Livelihoods

HSRC Human Sciences Research Council

CeSTII Centre for Science, Technology & Innovation Indicators

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Preface

In sub-Saharan Africa, national systems of innovation take distinctive forms. Science granting councils play a central role, and balance multiple mandates to set national research agendas, manage funds for research and innovation activities, gather evidence on science, technology and innovation (STI) and advise on STI policy. They typically do so with limited funding, human resources, and organisational capacity.

To strengthen their capacities to better perform these intermediary functions, the Science Granting Councils Initiative (SGCI) was launched by a consortium of international funding agencies, led by the International Development Research Centre (IDRC).

Currently, 16 sub-Saharan African countries participate in the SGCI from East, West and Southern Africa. The Evi-Pol project, which ran from November 2020 to February 2023, responded to one theme under the SGCI Phase Two, through a consortium led by the African Centre for Technology Studies (ACTS) in Kenya. It focused on strengthening the role that science granting councils play in identifying, managing and using evidence in policy and decision making.

Rather than follow a traditional model in which experts *parachute* in to *transfer* skills and knowledge, the Evi-Pol project took a different approach to providing technical assistance. The project design was based on a participatory approach, that emphasised consultation from the start, the co-creation of solutions, bringing in local consultants and building local networks. Flexibility in the design and process was encouraged. Using this model, much of the first year of the project was spent developing work plans, frameworks, and instruments through (virtual) consultative meetings and workshops. The technical assistance provided was thus demand driven and customised to the needs and capabilities of each science granting council, and included interactive workshops, peer-to-peer learning opportunities and one-on-one coaching.

In collaboration with partners in the Université Cheikh Anta Diop de Dakar (UCAD) in Senegal, CeSTII led activities to support science granting councils to strengthen their data management systems. The work was led by Nazeem Mustapha, with a team of CeSTII researchers and statisticians, and a consultant IT Architecture Specialist. Glenda Kruss and Il-haam Petersen were responsible for overall project conceptualisation, oversight and co-ordination at CeSTII. During the first year, Gerard Ralphs, Amy Kahn and Moses Sithole drafted a project process document that set out the framework for the work on data management systems. This was informed by a needs assessment survey designed by Yasser Buchana and completed by nine science granting councils. Darryn Whisgary, as project manager, played a key role in team co-ordination, liaising with the science granting councils and keeping the project activities on track.

Working with data managers and staff at the participating science granting councils, the team produced a set of toolkits to help build sound data management systems that align with the mandates and capabilities of science granting councils:

- Digital Transformation Roadmap: a guide for African science granting councils to support the development and maintenance of data management systems, with a particular focus on digitalisation
- Data Governance Toolkit: a guide to assessing and implementing data governance in science granting councils
- Guide to Data Curation

The toolkits were designed for use as interrelated guides for *enabling more effective use of evidence in policy and decision making by African science granting councils*.

This Digital Transformation Roadmap was designed to guide science granting councils through a process to create their own roadmaps to develop digital data management systems. Data governance is a key part of data management and is therefore integral to a science granting council's roadmap to digital transformation. Science granting councils can use the Data Governance Toolkit to assess their current data governance framework and processes and develop a strategy to strengthen data governance. The Guide to Data Curation was created in response to a specific need by science granting councils for a guide on best practice to curate grants and research-related data for decision making and public use.

A big thank you to the data managers, SGCI co-ordinators and leadership at the science granting councils who contributed to the creation of these toolkits as resources accessible beyond the Evi-Pol project.

WHY THIS GUIDE TO **DIGITAL TRANSFORMATION?**

"There are likely to be many roads on the journey to effective data management, and there could be many changes in direction along the way. While CeSTII can help chart the journey's course, it's up to the SGCs to decide the speed of travel, the vehicle to travel in, the roads to take, and who to bring along." (CeSTII, 2021)

African science granting councils play a key role in providing evidence to inform policy. Science granting councils need to ensure that the evidence they gather and manage is relevant, timely, rigorous, and affordable. Sound and efficient data management systems that enable the retrieval and use of data gathered is thus essential.

A common need expressed by African science granting councils is to develop their own consolidated, digital data management systems. Digital transformation can help science granting councils achieve their goals by enabling faster and more efficient data collection, storage, and analysis. Digital transformation can also enhance collaboration among researchers, facilitate the sharing of research findings, and increase the impact of research.

The development of digital data management systems is not linear, or the same for every organisation. Each science granting council is located within a unique country and institutional context, with particular resources and constraints.

While there is no one-size-fits-all approach, some common elements can be defined and reflected in a roadmap to strengthen organisational planning and performance. This sets out the major steps or milestones on the journey to achieve the desired goals or outcomes.

DATA MANAGEMENT SYSTEM

A working combination of organisational dimensions; human capabilities; technological capabilities, including hardware and software; elements of information systems; policies that describe what is possible; and the vital ingredient that 'fuels' the system, data.

This guide describes key elements of a digital transformation roadmap. It was customised through consultations with nine science granting councils, and a self-assessment questionnaire, covering the six key elements of data management systems: collection, storage, querying and retrieval, sharing, and the cross-cutting elements of management and governance. It is informed by the current challenges, needs and practices of science granting councils.

While some science granting councils have aspects of fully functional data management systems in place within their organisations, a roadmap can help to identify areas of future growth in relation to changing external factors, such as data privacy law or the fourth industrial revolution.

Other science granting councils may find a roadmap useful to win support within their organisations for data management systems development. Each science granting council needs to identify the mandates they focus on and decide how the concepts, steps and tools in this guide apply to their contexts and inform their roadmapping process.

What the guide is about

This guide outlines a process that science granting councils can follow to build a roadmap to develop and maintain their data management systems, with a particular focus on digitalisation.

ROADMAP

A strategic management tool to guide organisations toward achieving a set of goals or outcomes. It includes the major steps or milestones on the journey to the desired goals or outcomes.

This guide aims to help science granting councils to map out their own unique path. It recognises that science granting councils have different capabilities and are at different stages in the development of digital data management systems. Furthermore, as science granting councils have different mandates, they will require different data management system functionalities and designs.

DIGITAL TRANSFORMATION

The integration of digital technologies to transform business processes, operations, and partner experiences resulting in a fundamental change to the way the organisation operates and delivers value to all stakeholders. For a fully digital system, data is collected, processed, analysed, and stored using digital tools and processes.

The guide identifies three levels of capabilities, as illustrated in Figure 1.

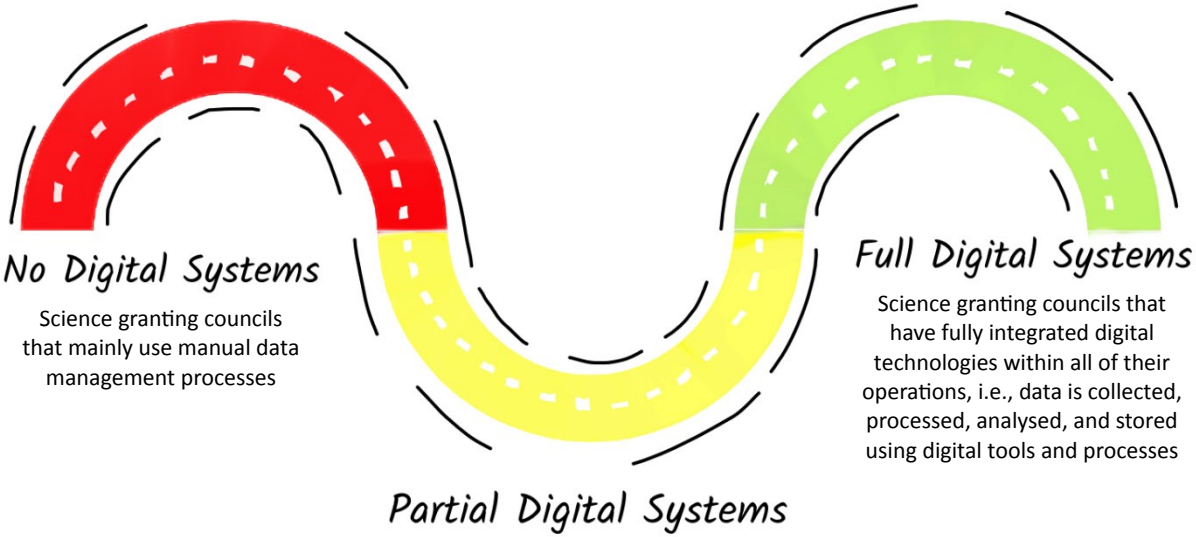


Figure 1
Three levels of capabilities

Who the guide is for

This guide is designed for African science granting councils participating in the Science Granting Council Initiative (SGCI), many experiencing human and financial resource constraints. It was co-designed by science granting councils working with the Evi-Pol project team at CeSTII, to support them to move towards digitalisation by implementing interconnecting projects in a modular, accumulative way, over time as resources allow.

While the roadmap was designed by and with science granting councils, it may be used by a wider range of organisations performing similar functions.

How to use the guide

This guide may be used to develop a digital transformation roadmap customised for a specific science granting council. It identifies these milestones:

A. Assessment of organisational readiness
B. Development of a digital transformation strategy
C. Investment in digital infrastructure
D. Training and development of employees
E. Implementation of digital systems
F. Monitoring and evaluation of digital systems

Best practice guidelines and a curated set of templates and tools are provided to guide the achievement of each milestone. Table 1 details the steps to achieving each milestone.

Table 1 Guide to developing a customised Digital Transformation Roadmap

Milestone		Step	Action	Tool/Template
A	**Assessment of organisational readiness**	Step A1	Assess organisational readiness for digital transformation	**Template 1** Digital Maturity Assessment Tool
B	**Development of a digital transformation strategy**	Step B2	Develop a digital transformation strategy	See Steps B2.1 to B2.8
		Step B2.1	Define the goals and objectives of the digital transformation	**Template 2** Digital Transformation Goals Template
		Step B2.2	Assess the science granting council's current technology systems	
		Step B2.3	Identify areas for improvement	**Template 3** Digital Transformation Process Mapping Tool
		Step B2.4	Develop a roadmap for implementation	**Template 4** Digital Strategy Implementation Plan **Template 5** Agile Project Plan
		Step B2.5	Monitor and adjust the roadmap	**Template 6** Project Critical Success Factors: Project report **Template 7** Project Critical Success Factors: Dashboard data including examples
		Step B2.6	Define metrics for success	See Step B2.5
		Step B2.7	Develop a change management plan	**Template 8** Change Management Process **Template 9** Change Impact Assessment **Template 10** Change Proposal **Template 11** Change Management Policy Document
		Step B2.8	Develop a data management framework	Refer to the **Evi-Pol Data Governance Toolkit**
C	**Investment in digital infrastructure**	Step C3	Identify, evaluate and select suitable technologies	**Template 12** Software Evaluation Matrix
D	**Training and development of employees**	Step D1	Develop a detailed employee training plan	**Template 13** Staff Training Plan
E	**Implementation of digital systems**	Step E1	Develop a plan for implementation	See Steps B2.1 to B2.8
F	**Monitoring and evaluation of digital systems**	Step F1	Develop a plan for monitoring and evaluation	**Template 6** Project Critical Success Factors: Project Report **Template 7** Project Critical Success Factors: Dashboard Data including examples **Template 14** Digital Transformation (Project) Prioritisation Tool

DIGITAL TRANSFORMATION IN **SCIENCE GRANTING COUNCILS**

Digital transformation and its significance for science granting councils

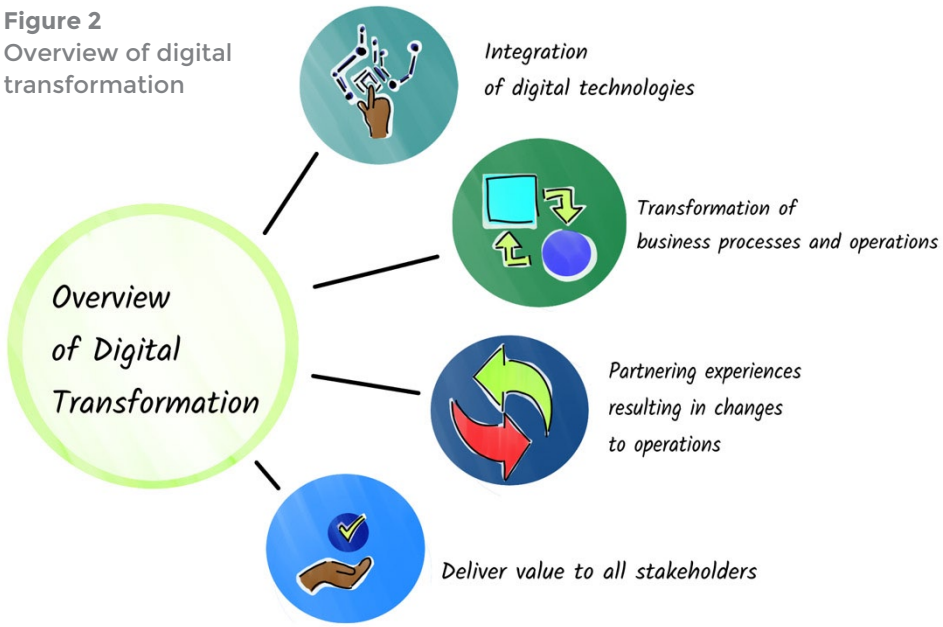
Definition: **DIGITAL TRANSFORMATION**

Digital transformation refers to the integration of digital technologies to transform business processes, operations, and partner experiences resulting in a fundamental change to the way an organisation operates and delivers value to its stakeholders.

The digital revolution has transformed the way we live, work, and communicate, and has brought a range of opportunities and challenges to organisations. Digital transformation is comprehensive and holistic. It involves reimagining an entire organisation's processes, strategies, and culture. The process of digital transformation typically involves the integration of technologies such as artificial intelligence, machine learning, big data analytics, cloud computing, and the internet of things.

Whilst digital transformation in private sector organisations is primarily driven by the need for tangible outcomes (such as efficiency improvements, increase in market share, or profits), digital transformation in the public sector must be informed by public good purposes, as well as factors of ownership, the protection of public data, data security and privacy and digital literacy.

Figure 2
Overview of digital transformation



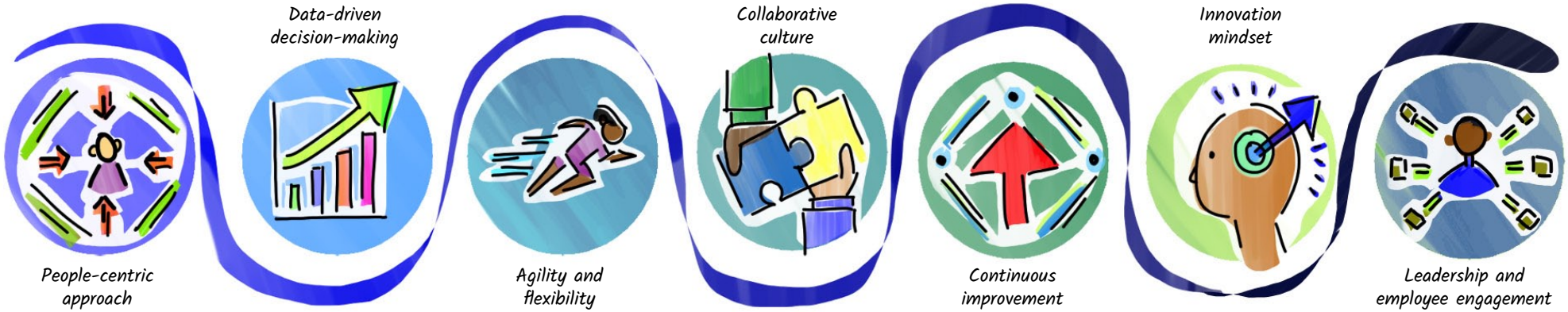
Why digital transformation is important for science granting councils: Digital transformation may have positive implications for organisations, including improved efficiency and productivity, increased innovation, and greater stakeholder value. The implementation of digital technologies can result in science granting councils streamlining their operations, reducing costs and improving decision-making processes.

Challenges of digital transformation: Despite the benefits of digital transformation, there are significant challenges that science granting councils can face. These include resistance to change, lack of skills and expertise, and cybersecurity risks. Resistance to change can arise from a fear of job losses, disruption to business processes, and the complexity of implementing new technologies. Science granting councils also need to invest in developing the necessary skills and expertise to manage digital transformation effectively.

A specific challenge facing the public sector is its ability to attract and retain the skills needed for digital transformation and the ability to integrate digital tools, methods, strategy, and culture. This is exacerbated by the fact that there is a scarcity of these skills in the broader workforce, and often these skilled people are recruited by private companies with attractive renumeration packages. In addition to these constraints digital transformation introduces new skill profiles that surpass digital-related jobs and are about new ways of designing and delivering services: from user experience and user interface designers to ideation and strategic vision designers and facilitators. Many of these have not been part of public organisations before and we need to change some structures within science granting councils to accommodate new skills profiles.

This should be seen as an opportunity for science granting councils to partially or wholly re-evaluate and redefine their goals and their unique public value, to remove sunset and redundant roles and functions, and adapt to the changing needs of its stakeholder community.

Principles of digital transformation: The principles of digital transformation are the key concepts that underpin the successful adoption of digital technologies in science granting councils. By following these core principles, science granting councils can create a solid foundation for their digital transformation initiatives and achieve meaningful outcomes:



1	2	3	4	5	6	7
People-centric approach: Digital transformation should prioritise the needs and experiences of users and people, as they are the ultimate beneficiaries of the new technology.	Data-driven decision-making: Data is a critical asset in the digital age, and science granting councils can leverage data insights to make informed decisions.	Agility and flexibility: Digital transformation should facilitate organisational agility and adaptability in the face of rapid technological change.	Collaborative culture: Collaboration across teams and departments is essential for successful digital transformation, as it breaks down silos and encourages cross-functional problem-solving.	Continuous improvement: Digital transformation is an ongoing process, and science granting councils that continuously improve their systems, processes, and technologies will stay ahead of the curve.	Innovation mindset: A culture of innovation is critical, and digital transformation should foster an environment that encourages experimentation, risk-taking, and learning from failure.	Leadership and employee engagement: Strong leadership and engaged employees are essential for successful digital transformation, as they help to drive cultural change and ensure the adoption of new technologies.

Figure 3
Principles of digital transformation

Navigating digital capabilities: From no digital systems to full digital systems

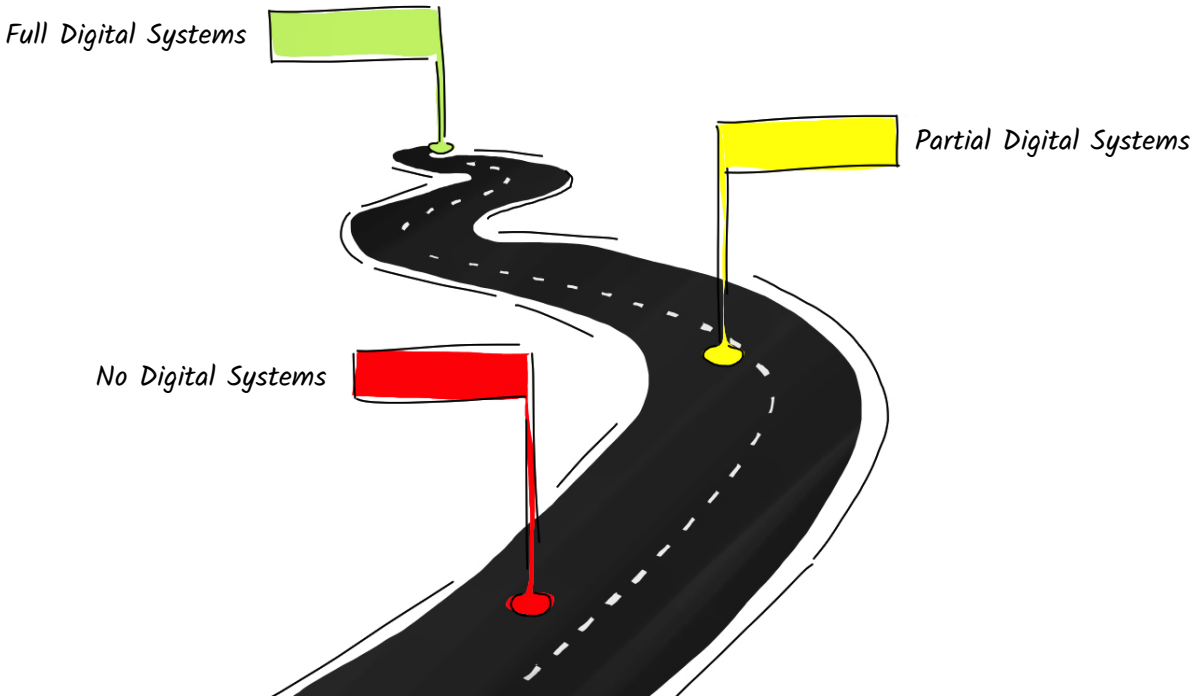


Figure 4
Digital Transformation Roadmap: three levels of capability

Science granting councils may be categorised by level of capability:

No digital systems

Definition: NO DIGITAL SYSTEMS

"No digital systems" refers to a situation in which a science granting council does not use any digital technology to support its operations. All work is done manually, without the use of computers, software, or other digital tools and all communication and data management are carried out using traditional methods such as paper-based documents, telephone calls, or face-to-face meetings.

In a science granting council with no digital systems, routine tasks such as record-keeping, and communication can be time-consuming and error prone. There is a greater likelihood of misplacing or losing important documents, and it can be difficult to share information between different departments or locations. The lack of digital systems can also make it challenging to scale operations, as the need for additional staff and resources can become a major obstacle.

While there may be some instances where a lack of digital systems is intentional, such as remote or rural communities where access to technology is limited, in most cases it is the result of a lack of resources or a lack of funding to invest in technology. As such, the decision to implement digital systems is often driven by a desire to improve efficiency, benefit from reduced costs further down the line, and enhance productivity.

Partial digital systems

Definition: **PARTIAL DIGITAL SYSTEMS**

A partial digital system is one in which the science granting council has adopted some digital technologies, but not fully integrated them into its operations, and uses a combination of manual and digital processes to support its work. This can take many forms; for example, a council may have digital tools to manage its financial transactions, but still use paper-based systems for data collection. Or, it may use digital communication tools to support some aspects of its operations, but rely on in-person meetings for certain important discussions.

While partial digital systems can provide some benefits, they can also create challenges for science granting councils. One of the key challenges is the potential for data silos. When a council has a mix of manual and digital systems, it can be difficult to share information across different departments and functions. This can lead to redundant work, data inconsistencies, and delays in decision-making.

Another challenge is the potential for inefficiencies. Manual processes can be time-consuming and prone to errors, which can slow down operations and increase costs. In addition, digital systems that are not integrated may require duplicate data entry, which can also increase the risk of errors.

While partial digital systems can create challenges for councils, they may provide an opportunity to identify areas where digital systems can be fully implemented to improve operations. The challenges of partial digital systems reflect the limitations of relying on a mix of manual and digital processes. Science granting councils that are looking to fully realise the benefits of digital transformation may need to consider integrating their systems more fully and overcoming these challenges.

Full digital systems

Definition: **FULL DIGITAL SYSTEMS**

A fully digital system refers to a science granting council or process that has fully embraced digital technologies and operates entirely without manual processes. In a fully digital system, data is collected, processed, analysed, and stored using digital tools and processes. This can involve the use of software, automation, and online communication tools to manage all aspects of operations.

Fully digital systems can be found in a wide range of industries and applications, from e-commerce and finance to healthcare and transportation. Fully digital systems are used by both the private and public sector, including science granting councils.

A defining characteristic of a fully digital system is the use of data-driven processes. These rely on data to make decisions, predict outcomes, and optimise operations. In a fully digital system, data is collected from a variety of sources, including software, and user interactions, and then analysed and used to inform decision-making.

Another key feature of a fully digital system is automation. By automating tasks, science granting councils can reduce the need for manual labour and increase efficiency. Automation can help ensure that tasks are completed consistently and accurately, leading to fewer errors, and delivering a better stakeholder experience.

Overall, a fully digital system is characterised by the complete adoption of digital technologies and the elimination of manual processes. This can result in greater efficiency, better decision-making, and improved stakeholder experience. However, implementing a fully digital system can also create challenges, such as data security risks and the need for significant investment in technology and infrastructure as well as a commitment to ongoing innovation and adaptation.

While there are numerous benefits to implementing a fully digital system, there are also several challenges that science granting councils should be aware of and take steps to address them. By investing in the right technology, training, and change management, science granting councils can successfully implement a fully digital system and reap the benefits of improved efficiency, productivity, and innovation.

Table 2 describes and compares the key features of each level.

Table 2 Comparing the three levels of SGC digital capabilities

Key Features	No Digital Systems	Partial Digital Systems	Full Digital Systems
Type of processes	Manual processes mainly: manual data entry, paper-based record-keeping, or manual communication methods, such as telephone calls or in-person meetings.	Mix of manual and digital processes.	• Operates entirely without manual processes. • Data is collected, processed, analysed, and stored using digital tools and processes. Data-driven decision-making. • Heavy reliance on automation.
Information access and sharing across departments and functions	• Limited. • Information is often stored in physical files or documents, making it difficult to access or share quickly and easily.	• Limited integration. • Leading to data silos, where information is stored in different systems and cannot be easily shared.	• Integrated systems, cloud-based storage - data can be seamlessly shared and used across different systems and processes. • Real-time access to data and documents.
Efficiency of workflows	• Inefficient. • Tasks take longer to complete and require more resources.	• Uneven adoption. • Partial digital systems may require duplicate data entry and redundant work.	• Relies heavily on automation to reduce the need for manual labour and increase efficiency. • Requires contingency plans for system downtime, ongoing maintenance and upgrades to ensure that the system remains up-to-date and effective.
Productivity	Reduced productivity due to time-consuming processes.	• Potential for redundancies. • May require duplicate data entry and redundant work creating inefficiencies.	Automation for faster turnaround times, reduced errors, and increased output.
Agility and scalability	Difficult to adapt and scale-up in response to changes in the policy, research and funding environment.	Potential to change and adapt to challenges and opportunities.	Can quickly and easily adapt to a changing environment.
Stakeholder and user experience	• Limited. • Difficult to personalise user experience.	Potential for enhanced data analytics and digital data sharing interface.	Improved user experience through the use of data analytics and automation: personalised recommendations, chatbots, and online self-service portals.
Cost	• Low investment cost. • Data collection and capturing more time-consuming than digital systems.	Flexible.	• Reduced costs by reducing the need for manual labour and eliminating paper-based processes. • Significant investment in technology and infrastructure, and integration into existing systems.
Risk of errors	Higher risk of errors such as data entry mistakes or misplaced documents.	Potential for reduced risk of errors.	• Digital data collection and automated capturing and data quality control.

Continues overleaf...

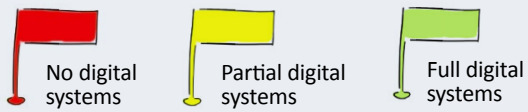
Key Features	No Digital Systems	Partial Digital Systems	Full Digital Systems
Security risks	Risk of storing physical files and documents.	• Better control of access to data and application. • Digital security risks such as data breaches and cyber-attacks. • Partial digital systems may be more vulnerable to security risks because they may not have the same level of security as fully digital systems.	• Better control over access to data and applications. • Digital security risks such as data breaches and cyber-attacks. • Need to take steps to ensure that data is properly secured and protected.
Other challenges	Difficult to integrate across data types and sources.	• Internal resistance to change may limit the adoption of new digital processes or technologies. • Change management and employee training is crucial.	• Internal resistance to change. • Change management and employee training are crucial. • Requires a high degree of technical expertise, particularly in areas such as data analytics, cloud computing, and cybersecurity.
Benefits	Low investment cost.	Flexibility.	• Data-driven processes - rely on data to make decisions, predict outcomes, and optimise operations. • Improved customer experience. • Enhanced data analytics to gain insight into stakeholder needs for better decision-making and stakeholder interface.

ROADMAP TO
FULL DIGITAL TRANSFORMATION

Developing a roadmap to full digital transformation in a science granting council, from the position of no or partial digital systems

Several key **milestones** need to be achieved as part of a roadmap to full digital transformation. The steps and principles that are important for achieving each milestone are explained, and templates are included as resources for developing the roadmap. The milestones are illustrated in Figure 5.

TIP:
Not all steps are relevant for every science granting council. Whether or not a step is relevant depends on current digital capabilities. The level indicator is used throughout to signal when a step is relevant. For example, assessing technology systems is only relevant for science granting councils with partial or fully digital systems.



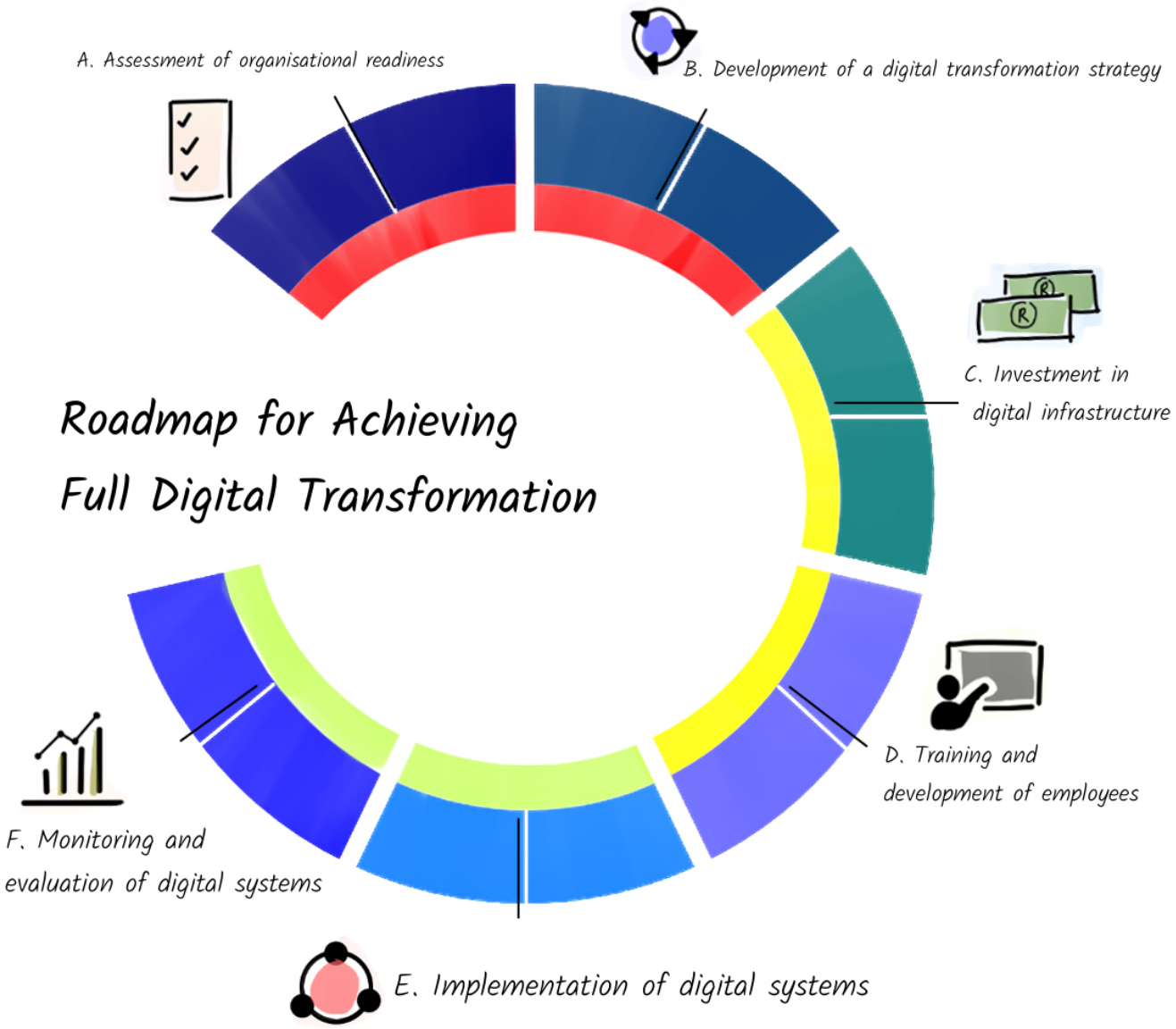
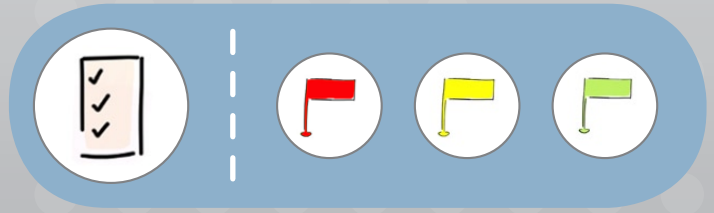


Figure 5
Milestones on the road to full digital transformation

A. Assessment of organisational readiness



The first milestone is the assessment of the readiness of your organisation to implement a fully digital system. This is a critical milestone in the process.

Here are the key factors to consider when assessing organisational readiness:

- Leadership support: The support and commitment of senior leadership are critical to the success of any major change initiative. Leaders need to communicate the importance of the digital transformation and provide resources and support to make it happen.
- Employee readiness: Employees are the frontline users of new technology and play a critical role in its success. Assessing employee readiness involves evaluating their knowledge, skills, and attitudes towards the technology, as well as their willingness to adopt new ways of working.
- Organisational culture: A science granting council's culture can play a significant role in its ability to adopt new technologies. A culture that values innovation and continuous improvement is more likely to support a digital transformation initiative than one that is resistant to change.
- Infrastructure: Assessing a science granting council's infrastructure involves evaluating its technology systems and infrastructure to determine whether they are capable of supporting a new digital system. This includes assessing the hardware, software, networks, and security systems.
- Data management: A fully digital system requires effective data management practices to ensure that data is accurate, secure, and accessible. Assessing a science granting council's data management practices involves evaluating its current data storage, security, and retrieval practices.
- Financial resources: A fully digital system can be expensive, and it is important to assess whether a science granting council has the financial resources to support the initiative. This includes not only the costs of purchasing and implementing the technology, but also ongoing maintenance and upgrades.
- Risk management: This involves identifying potential risks associated with the digital transformation and developing strategies to mitigate them. Risks include data breaches, system downtime, and employee resistance.

Definition: **ORGANISATIONAL READINESS**

Organisational readiness refers to an organisation's ability and willingness to adopt and implement a new technology.

A1. Assess organisational readiness using a Digital Maturity Assessment Tool

This tool will allow you to self-assess your organisation's level of digital maturity and readiness to embark on digital transformation. The tool has five pillars that measure digital maturity:

1. **Governance and leadership**: The executive support, authorisation, reporting processes, and detailing of roles and responsibilities.
2. **People and culture**: The organisation's culture, including stakeholder focus, innovation, risk appetite and attention to managing change, especially staff roles.
3. **Capacity and capability**: The ability to be digitally mature. Resources, staff numbers and skill sets, access to the right technology, training plan, supporting policies and procedures.
4. **Innovation**: The willingness and ability to imagine new services and products and new ways of service delivery. Level of proactivity and desire to assess and implement new technologies, business processes and modes of working.
5. **Technology**: The suitability of the underlying technology platforms, programmes and systems that support the other four pillars.

WHY A COMPREHENSIVE AND SYSTEMATIC APPROACH TO ASSESS READINESS

- To identify potential barriers to success and develop strategies to overcome them.
- To ensure that the digital transformation initiative is successful and that the SGC can reap the benefits of a fully digital system.

For each pillar, there are five levels of maturity rated on a scale from *minimal* (level 1) to *transformed* (level 5) (see Figure 6). The overall rating indicates the organisation's level of capability:

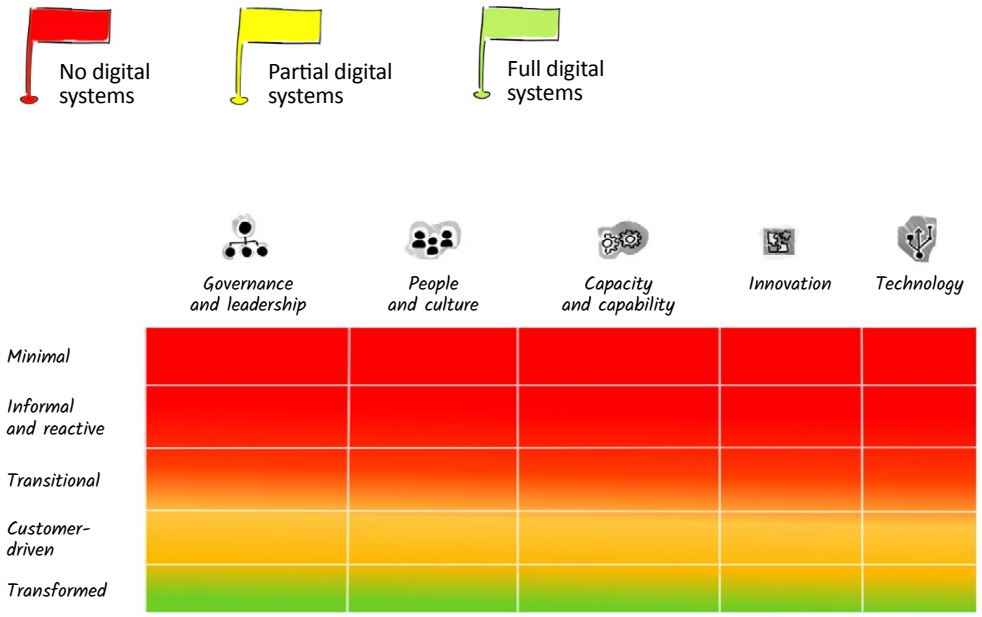
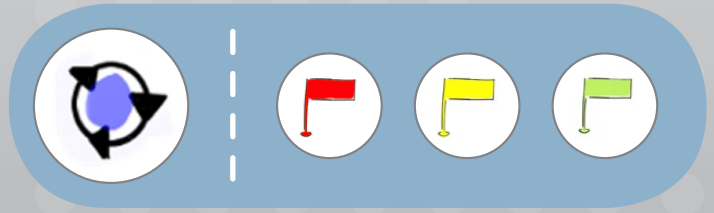


Figure 6
Digital Maturity Assessment Tool

TIP:

Use **Template 1 Digital Maturity Assessment Tool** to determine the readiness of a science granting council for digital transformation. The tool requires responses to questions that are assigned scores or weights. After responding to the questions, calculate the overall score for your organisation, indicating your organisation's level of Digital Maturity.

B. Development of a digital transformation strategy



Once you have assessed your organisation's ability and willingness to adopt and implement new technology, through the Digital Maturity Assessment Tool (Step A1), the next milestone is the development of a digital transformation strategy. This outlines how a science granting council will leverage technology to improve business processes, increase efficiency, and better serve its stakeholders.

Using a comprehensive and systematic approach, here are some key steps to develop a digital transformation strategy:

1. Define the goals and objectives of the initiative
2. Assess the science granting council's current technology systems
3. Identify areas for improvement
4. Develop a roadmap for implementation
5. Allocate resources
6. Define metrics for success
7. Develop a change management plan

Step B2.1: Define the goals and objectives of the digital transformation

The first step to achieving the milestone involving developing a digital transformation strategy is to define the goals and objectives of the initiative. This involves identifying what the science granting council hopes to achieve through the digital transformation, such as improving service, increasing efficiency, or reducing costs.

WHY DEFINE DIGITAL TRANSFORMATION GOALS

- Define goals and objectives for the SGC's digital transformation that are aligned with the overall organisational strategy, stakeholder needs, efficiency and productivity, innovation and agility, and financial performance.
- This helps to ensure that the digital transformation is focused and that the council can achieve the outcomes it hopes to realise.

Key considerations for completing the Digital Transformation Goals template include:

- Business strategy: The goals and objectives of a digital transformation should align with the science granting council's overall business strategy. This involves considering the council's vision, mission, and values, as well as its long-term goals and objectives.
- Stakeholder or user needs: The goals and objectives of digital transformation should also be informed by the needs and expectations of the science granting council's stakeholders and users. This involves understanding the process journey, identifying pain points, and considering how technology can be used to improve the user experience.
- Efficiency and productivity: Digital transformation can help to improve the efficiency and productivity of a science granting council's operations. The goals and objectives of the initiative should consider how technology can be used to automate processes, reduce manual tasks, and streamline workflows.
- Innovation and agility: Technology is constantly evolving, and science granting councils need to adapt quickly to stay ahead of the curve. The goals and objectives of the initiative should consider how technology can be used to enable innovation and increase agility.
- Financial performance: Finally, the goals and objectives of a digital transformation should consider the financial performance of the science granting council. This involves identifying how technology can be used to reduce costs, increase revenue, and improve profitability.

TIP:

Use **Template 2 Digital Transformation Goals** to define organisational goals and objectives for digital transformation. An editable version is provided in **PowerPoint**.

Science granting councils with partial and fully developed digital systems should also assess their current technology systems (Step B2.2) and identify areas for improvement (Step B2.3).

Step B2.2: Assess the science granting council's current technology systems

Before developing a digital transformation strategy, it is important for science granting councils with partial or fully digital systems to assess their current technology systems to determine what is working well and what needs to be improved. This involves evaluating the organisation's hardware, software, and network infrastructure (including existing technology infrastructure, applications, and data) to identify areas of strength and weakness and determine how they can be leveraged or improved to support the digital transformation.

Key considerations when assessing a science granting council's current technology systems include:

- Identify the technology systems currently in use: Identify the applications, systems, and infrastructure that are currently in use. This includes internal systems and those used by external stakeholders.
- Evaluate the functionality and performance of the technology systems: This involves determining how well they support the science granting council's current business processes and identifying areas where they may be lacking.
- Analyse data management and security practices: This involves analysing how data is stored, accessed, and secured, and identifying any vulnerabilities or areas for improvement.
- Consider the level of integration between technology systems: This involves determining how well the systems work together to support the science granting council's business processes and identifying any areas where integration can be improved.
- Identify gaps or areas for improvement: Based on the evaluation of the technology systems, it is important to identify gaps or areas for improvement. This may involve identifying new technologies or systems that need to be implemented or identifying opportunities to enhance or upgrade existing systems.

WHY ASSESS THE SGC'S CURRENT TECHNOLOGY

- To identify areas of strength and weakness.
- To develop a clear understanding of how the SGC's existing technology infrastructure, applications, and data can be leveraged or improved to support the digital transformation.
- To ensure that the digital transformation is aligned with the SGC's current technology systems and maximises the value of technology investments.

Step B2.3: Identify areas for improvement

Based on the goals and objectives of the digital transformation (Step B2.1) and the assessment of the science granting council's current technology systems (Step B2.2), identify areas where technology can be used to improve business processes, increase efficiency, or better serve stakeholders. A useful way to identify areas for improvement is through process mapping.

It is important to consider the following, which may be used to guide the digital transformation process mapping:

- Analyse user feedback: This can provide valuable insight into areas where technology systems are not meeting the needs of the science granting council. This may include feedback from employees, or other stakeholders who interact with the science granting council's technology systems.
- Conduct a gap analysis: This involves comparing the science granting council's current technology systems with its desired future state. This can help to identify areas where current technology systems are not meeting the needs of the science granting council and where improvements can be made.
- Evaluate the efficiency and effectiveness of current processes: Technology systems are often designed to support specific business processes. Evaluating these can help to identify areas where technology systems can be improved to better support the science granting council's business objectives.
- Consider emerging technologies: These may offer opportunities to improve existing technology systems or provide new capabilities to support the science granting council's business objectives. It is important to keep up to date with emerging technologies and consider how they can be leveraged to improve existing technology systems.
- Consult with technology experts: Consult with technology experts, both within the science granting council and externally, to gain a broader understanding of how technology can be leveraged to support the council's business objectives. This can help to identify new technologies or systems to address areas of improvement.

WHY IDENTIFY AREAS FOR IMPROVEMENT IN THE SGC'S TECHNOLOGY SYSTEMS

- Helps to ensure that digital transformation is aligned with the SGC's current technology systems.
- Maximises the value of the SGC's technology investments.

TIP:

Create a detailed digital transformation process map using **Template 3 Digital Transformation Process Mapping Tool**.

Step B2.4: Develop a roadmap for implementation

Once the areas for improvement have been identified (Step B2.3), develop a roadmap for implementation. This involves outlining the steps to be taken to implement the digital transformation, and a timeline for each step.

To develop a roadmap for implementing a digital transformation strategy, a science granting council should:

- Prioritise the goals and objectives identified in the digital transformation strategy based on their impact on the science granting council's business objectives. This helps to ensure that the most important initiatives are addressed first.
- Define the scope of each initiative, including the resources required, timeline, and expected outcomes. This helps to ensure that each initiative is well defined and focused on specific objectives.
- Determine dependencies between initiatives, including potential roadblocks or issues that may arise. This helps to ensure that the roadmap is well coordinated and issues are addressed early on.
- Develop a timeline for each initiative, taking into account any dependencies, resource constraints, and other factors that may impact the implementation. This can help to ensure that the implementation is well-planned and executed in a timely manner.
- Assign responsibilities for each initiative to specific individuals or teams. This helps to ensure that everyone is clear on their role and that the implementation is well coordinated.
- Define metrics to measure the success of each initiative, including both short-term and long-term goals. This helps to track progress against results. A detailed guide to define metrics can be found in Step B2.6.

TIP:

The information gathered at each step may be captured in a set of templates designed to track progress, as part of the process of drafting the roadmap for implementation:

- **Template 4 Digital Strategy Implementation Plan** may be used to map the steps, timeline and progress along the five pillars of digital transformation in the Digital Maturity Assessment Tool at Step 1.
- **Template 5 Agile Project Plan** can be used to identify and track progress for key tasks.

Step B2.5: Monitor and adjust the roadmap

Regularly monitor the implementation of the roadmap and make adjustments as needed based on feedback and changing organisational needs. This helps to ensure that the digital transformation strategy remains aligned with the council's organisational objectives and delivers the expected value. **Template 4 Digital Strategy Implementation Plan** and **Template 5 Agile Project Plan** (Step B2.4) are designed for monitoring implementation to track progress and adjust when needed.

The step focuses on monitoring resources. Developing a digital transformation strategy requires resources, including financial, technology, and human resources. It is important to identify the resources required to implement the strategy and to allocate those resources effectively. The following are key considerations for allocating resources effectively:

- Identify the necessary resources: The first step is to identify the resources required for each initiative. This may include people, technology, equipment, and budget.
- Assess the availability of resources: Once resources have been identified, assess the availability of those resources within the science granting council. This may involve looking at the current capacity of teams, availability of budget, and availability of technology and equipment.
- Prioritise resource allocation: This is based on the criticality of each initiative and the availability of resources. Assign the most critical initiatives to teams with the highest capacity, and allocate additional resources as needed to ensure success.
- Develop a budget: Develop a budget for each initiative, based on the necessary resources and priorities. This should include both capital and operational expenses, such as technology investments, training costs and ongoing maintenance.
- Develop a resource plan: This outlines the resources required for each initiative, the timeline for resource allocation, and the expected outcomes. This should be communicated to all stakeholders, including team members, executives and external partners.
- Monitor and adjust resource allocation: Regularly monitor the allocation of resources and adjust as needed based on feedback and changing organisational needs. This may involve shifting resources between initiatives or reallocating budget for high-priority initiatives.

TIP:

Use **Template 6** and **Template 7** to create a plan to monitor resource allocation. Figures 7 to 10 illustrate how critical success factors or metrics for success can be presented and monitored.

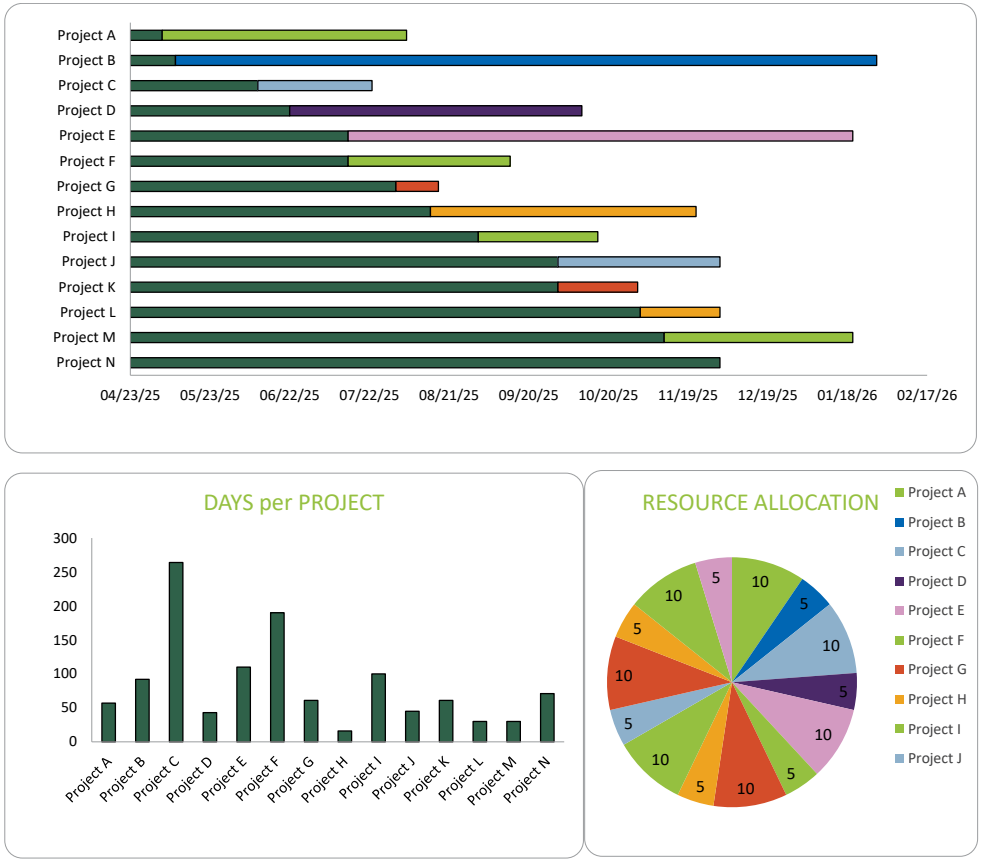


Figure 7
Project Critical Success Factor: Delivery timeline and resources

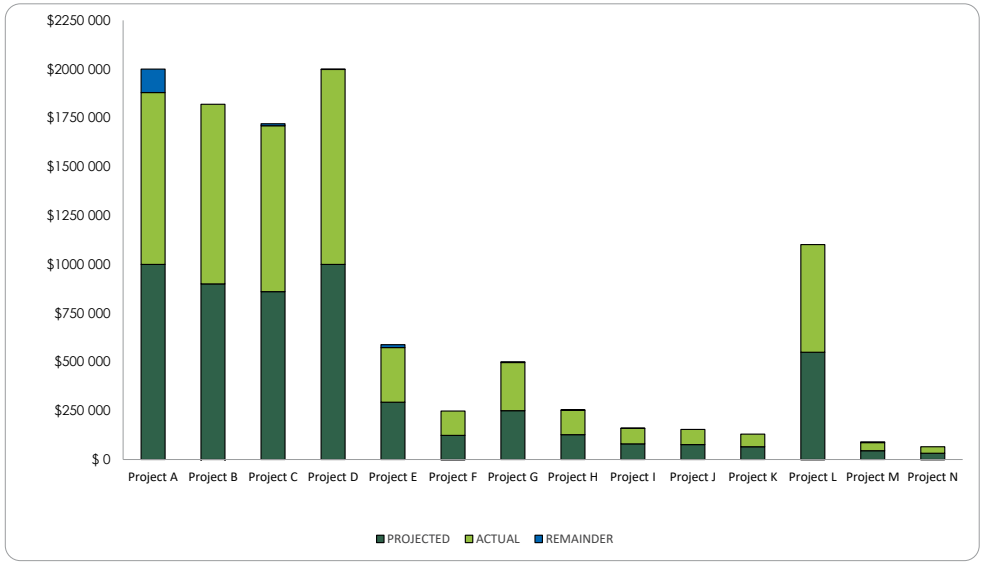
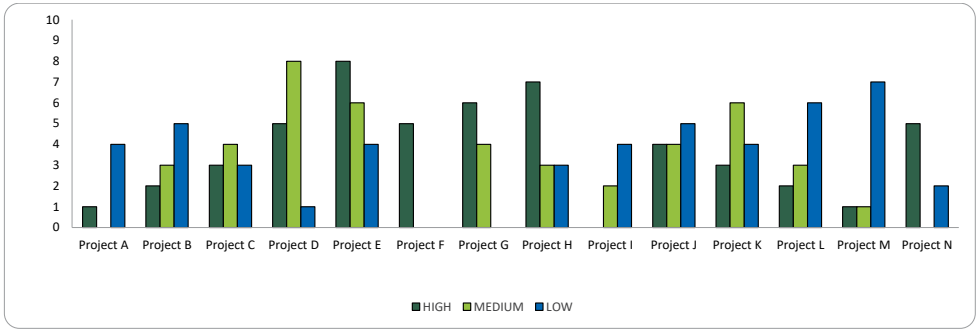


Figure 8
Project Critical Success Factor: Project financials



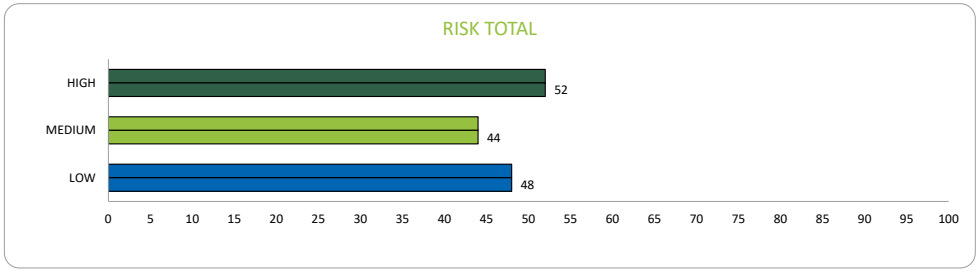
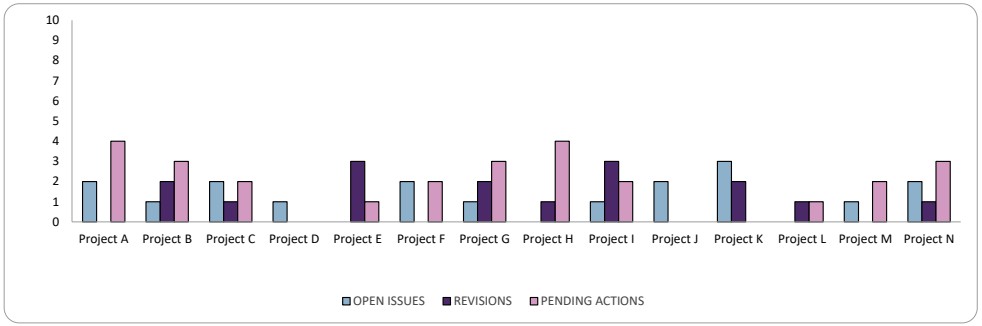


Figure 9
Project Critical Success Factor: Risk analysis



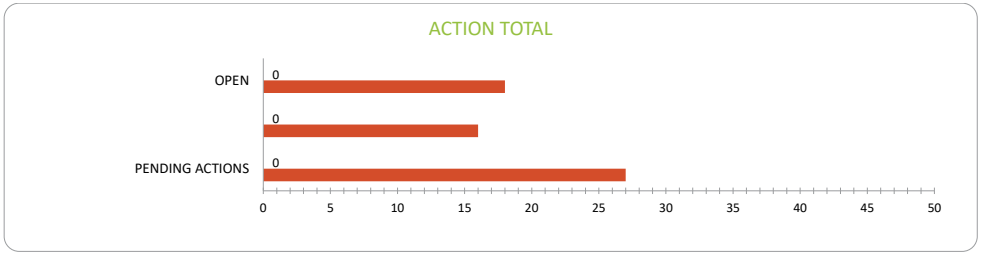


Figure 10
Project Critical Success Factor: Open and pending actions

Step B2.6: Define metrics for success

For successful digital transformation it is important to define metrics for success. This involves identifying the key performance indicators (KPIs) that will be used to measure the success of the initiative, such as improved stakeholder engagement or increased efficiency.

Metrics help a science granting council to measure the impact of the initiative, identify areas for improvement, and track progress towards achieving its goals. Here are some steps to define metrics for success:

- Define the goals of the initiative: Clearly define the goals of the digital transformation initiative (see Step B2.1). What specific outcomes are you trying to achieve? What are the key performance indicators (KPIs) that will help you measure progress towards these goals?
- Identify the metrics: Once the goals have been defined, identify the specific metrics that will be used to measure success. These may include cost savings, increased stakeholder engagement, or improved employee productivity.
- Ensure the metrics are specific and measurable: Each metric should include a clear definition of what is being measured and how it will be measured. This helps ensure that everyone involved in the initiative shares a common understanding and that progress can be tracked consistently.
- Assign responsibility: Responsibility for each metric should be assigned to a specific team or individual. This helps to ensure accountability and provide a clear line of sight between the initiative and the outcomes being measured.
- Set benchmarks and targets for each metric, based on historical performance or industry standards: This helps ensure that progress can be measured over time and that the initiative makes meaningful progress towards its goals.
- Regularly monitor progress using the metrics and adjust as needed. This helps the initiative stay on track and address any issues that arise in a timely manner.

WHY DEFINE METRICS FOR SUCCESS

Helps ensure that the SGC's digital transformation initiative is on track and making progress towards its goals.

TIP:

Template 6 and **Template 7** help to define and monitor Project Critical Success Factors or metrics for success such as time and cost savings.

Step B2.7: Develop a change management plan

Implementing digital transformation can be a major change for a science granting council. It is important to develop a change management plan that includes strategies for communicating the changes to employees, training employees on the new technology, and addressing any concerns or resistance to the change.

Developing a change management plan is a critical step in any digital transformation initiative, specifically in councils with partial or fully digital systems, as this helps ensure that the people within a science granting council are ready and willing to embrace the changes that come with new technology. Here are some steps to develop a change management plan:

- Identify the stakeholders who will be impacted by the digital transformation: These may include employees, stakeholders and partners.
- Communicate the vision: Once the stakeholders have been identified, it is essential to communicate the vision for the digital transformation initiative. This includes explaining why the change is necessary, what the benefits will be and what specific changes will be made.
- Create a roadmap that outlines the steps and the timeline for each step: This should be communicated to all stakeholders so that they understand what is involved and when the changes will be made.
- Identify potential resistance within the science granting council and develop strategies to address this: This may include providing training and support to employees or developing incentives to encourage buy-in.
- Develop a training plan: This should address the specific skills and knowledge needed to implement the new technology, tailored to the needs of different groups within the science granting council, and ongoing to ensure that everyone is capacitated.
- Establish a governance framework that outlines the roles and responsibilities of everyone involved in the digital transformation initiative: This should include clear lines of authority, decision-making processes, and escalation procedures.
- Monitor and evaluate the effectiveness of the change management plan throughout the digital transformation initiative: This helps to identify areas that require attention and ensure the plan is executed as intended.

SGC CHANGE MANAGEMENT PLAN

The SGC's change management plan should be flexible enough to adapt to changes as they arise and should be regularly reviewed and updated to remain relevant and effective.

TIP:

Develop an effective, convincing, and flexible Change Management Plan using Templates 8 to 11. Use:

- **Template 8 Change Management Process** to define the change management process, including steps and guidelines for team members at each step.
- **Template 9 Change Impact Assessment** outlines a way to record and analyse impact including recording changes observed, risks, impact type, timeline and level, and change requirements such as training and leadership changes.
- **Template 10 Change Proposal** may be used to develop a change proposal that includes key information to motivate for the changes necessary to enable digital transformation.
- **Template 11** provides an outline for drafting a Change Management Policy document.

Step B2.8: Develop a data management framework

A successful digital transformation initiative is founded on the principle that the different systems and departments will have an integrated ecosystem of data and software to make the sharing and accessing of data easier and seamless.

This necessitates the implementation of a data governance and management strategy. Follow these steps to implement a data management strategy to ensure the security and privacy of sensitive information:

- Assess data security and privacy needs: This takes into account factors such as the type and volume of sensitive information being stored and processed, and the legal and regulatory requirements that apply.
- Develop data management policies: This defines how sensitive information will be stored, processed, and protected, considering access control, data encryption, and disaster recovery.
- Establish data ownership: This ensures that the individuals and teams responsible for managing sensitive information are identified and accountable.
- Implement data encryption: This protects sensitive information while in transit and at rest, using industry-standard encryption algorithms.
- Implement access controls: This restricts access to sensitive information to authorised individuals only, and ensures that access is granted based on the principle of least privilege.
- Train employees: Employees should be trained on the importance of data security and privacy, and on the policies and procedures that are in place to protect sensitive information.
- Implement data backup and recovery: This ensures that sensitive information can be recovered in the event of a disaster or data loss.
- Conduct regular audits: Audits monitor the effectiveness of the data management strategy, and identify potential security and privacy risks.

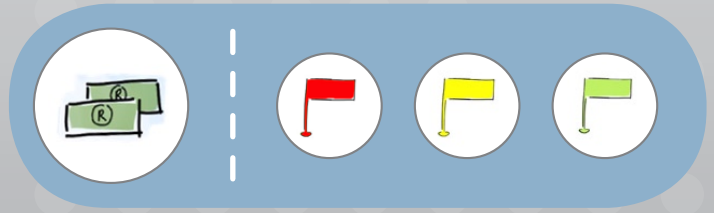
WHY DEVELOP A DATA MANAGEMENT FRAMEWORK

- A way to ensure the security and privacy of sensitive information, while meeting the SGC's legal and regulatory obligations.
- Helps to build trust with users of the SGC's systems, employees and other stakeholders.
- Helps to protect the reputation and brand of the SGC.

TIP:

The **Data Governance Toolkit** compiled by the Evi-Pol team at CeSTII provides a useful set of guidelines and templates to develop a data governance framework.

C. Investment in digital infrastructure



Investing in digital infrastructure can be a significant financial commitment for a science granting council, but it is critical for successful digital transformation. Without the right digital infrastructure, a science granting council may struggle to realise the full benefits of its digital transformation initiative. This milestone focuses on identifying, evaluating and selecting suitable technologies.

Here are some key considerations when investing in digital infrastructure:

- Scalability: The digital infrastructure should be able to scale up or down to accommodate changing business needs. This means investing in technologies that are flexible and can adapt to the evolving needs of the science granting council.
- Reliability: The digital infrastructure must be reliable and able to handle high volumes of data traffic. This means investing in technologies that are robust and have the capacity to handle large amounts of data.
- Security: The digital infrastructure must be secure to protect the science granting council's data and systems from cyber threats. This means investing in technologies that have robust security features, such as firewalls, intrusion detection systems, and encryption.
- Interoperability: The digital infrastructure should be able to integrate with other systems and technologies within the science granting council. This means investing in technologies that have open interfaces and can communicate with other systems.
- Agility: The digital infrastructure should be agile and able to adapt to changing organisational needs quickly. This means investing in technologies that are easy to configure and manage.
- Cloud-based infrastructure: This can be an excellent option for many science granting councils as it offers scalability, reliability, security and agility. Cloud-based infrastructure can also be more cost-effective than traditional on-premises infrastructure.
- Future proofing: The digital infrastructure should be designed with future needs in mind. This means investing in technologies that are likely to remain relevant and useful in the years to come.

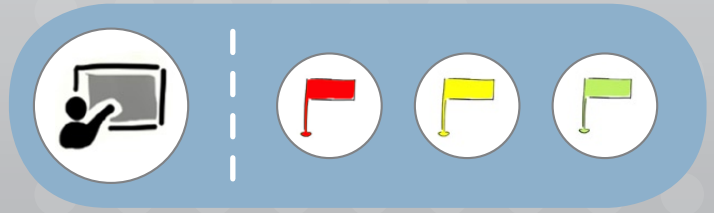
WHY INVEST IN DIGITAL INFRASTRUCTURE

By carefully considering the factors listed here and selecting the right technologies, an SGC can build a robust and effective digital infrastructure that will support its digital transformation goals.

TIP:

Use the checklist in **Template 12 Software Evaluation Matrix** to assess the suitability of software vendors to meet the needs and budget of the science granting council. The slides from the online *Masterclass on the Interoperability of Data Management Systems* held by the Evi-Pol team in August 2021 is another useful resource (Additional resources section).

D. Training and development of employees



Without proper training, employees may struggle to adapt to new digital technologies and workflows, which can lead to resistance and reduced productivity. It is therefore necessary to develop an employee training plan.

Key considerations when planning for employee training and development include:

- Assess current skill levels: Before developing a training programme, it is important to assess the current skill levels of employees. This helps identify where training is needed, and the types of training that will be most effective.
- Develop a comprehensive training programme: This should cover all aspects of the digital transformation initiative. This includes not just technical training on new digital systems and tools, but also training on new business processes, workflows, and communication protocols.
- Use a variety of training methods: Different employees may learn best through different methods, so it is important to use a variety of training methods to accommodate different learning styles. This can include classroom training, online courses, hands-on workshops, and one-on-one coaching.
- Provide ongoing training and support: Digital transformation is an ongoing process, and new technologies and workflows may be introduced over time. To ensure that employees are up-to-date and effective, ongoing training and support should be provided.
- Encourage feedback and collaboration: Employees should be encouraged to provide feedback on the training programme and share their experiences and insights with colleagues. This helps identify areas for improvement and builds a collaborative culture that supports continuous learning and development.
- Recognise and reward progress: Employees who successfully adapt to new digital technologies and workflows should be recognised and rewarded for their progress. This can help motivate employees to continue learning and developing their skills.

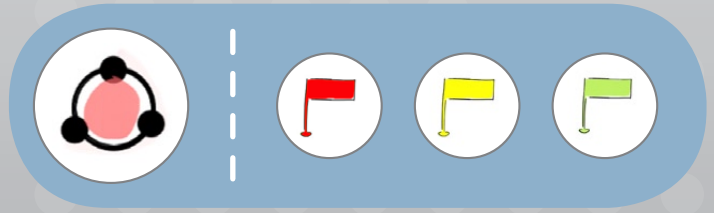
WHY INVEST IN EMPLOYEE TRAINING AND DEVELOPMENT

By providing comprehensive training and ongoing support, SGCs can ensure that employees are equipped with the skills and knowledge needed to successfully navigate digital transformation and drive business results.

TIP:

Create a detailed training plan using **Template 13 Staff Training Plan**.

E. Implementation of digital systems



To ensure successful implementation, the following considerations should be taken into account:

- Select the right technology: This is crucial for successful implementation. The technology should align with the science granting council's goals and objectives and be capable of addressing the identified areas for improvement. It is important to assess the technology's compatibility with existing systems and ensure that it can be integrated seamlessly.
- Develop a project plan: A comprehensive project plan should be developed that outlines the implementation process, timelines and responsibilities of all stakeholders. The plan should include a detailed budget, risk management plan and a timeline for testing and training.
- Test and refine: Testing the technology before implementation helps identify any potential issues and ensures that the technology is functioning as expected. Once implemented, it is important to continue monitoring and refining the technology to ensure it meets the council's needs.
- Provide adequate training and support: This is crucial to the success of the implementation. This includes not only technical training on the new digital system but also training on new business processes and workflows. Ongoing support and troubleshooting should be provided to ensure employees can effectively use the new system.
- Address security concerns: With the implementation of new digital systems, there may be security concerns to address. Science granting councils should ensure that data security measures are in place and that employees are trained to maintain data security.
- Monitor progress and adjust: After implementation, it is important to monitor progress and make adjustments as needed. This includes tracking key metrics and comparing them to the defined metrics for success. Adjustments should be made to the system or business processes as needed to optimise performance.

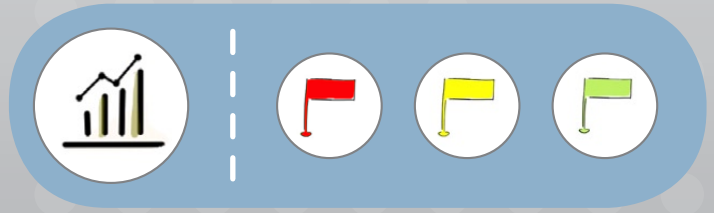
WHY TAKE A COMPREHENSIVE AND SYSTEMATIC APPROACH TO IMPLEMENTING A DIGITAL SYSTEM

Helps to ensure successful implementation that drives organisational results and supports the digital transformation process.

TIP:

Implementation of digital systems requires careful planning, testing, and ongoing support. A comprehensive Digital Transformation Strategy is important. See the guidelines and templates provided as part of *B. Development of a digital transformation strategy*.

F. Monitoring and evaluation of digital systems



Monitoring and evaluation of digital systems helps to ensure that the system is functioning as expected and contributing to the science granting council's goals and objectives. This requires a plan for monitoring and evaluation that includes the establishment of KPIs, regular review and analysis of KPIs, identification of areas for improvement, addressing any issues that arise, continuous refinement of the digital system, and communication of progress to stakeholders.

Key considerations for monitoring and evaluation of digital systems include:

- Define KPIs: These are measurable values that demonstrate how effectively a digital system is meeting the science granting council's goals and objectives. KPIs should be established early in the digital transformation process and reviewed regularly to ensure they are aligned with the council's changing needs.
- Regularly review KPIs: KPIs should be regularly reviewed and analysed to track progress towards the science granting council's goals and objectives. This can help identify areas of success and areas for improvement. KPIs should be analysed against the defined benchmarks, targets, and industry standards to assess the digital system's performance.
- Identify areas for improvement: Monitoring and evaluation can help identify areas for improvement in the digital system or related business processes. By identifying areas for improvement, science granting councils can adjust their strategies and optimise the use of the digital system.
- Address issues: If issues arise during the monitoring and evaluation process, it is important to address them quickly to avoid a negative impact on the science granting council's operations. This may involve making changes to the digital system, adjusting business processes, or providing additional training and support to employees.
- Continuously refine the digital system: The digital system should be continuously refined based on the monitoring and evaluation results. This can involve making changes to the system, adjusting business processes, or providing additional training and support to employees. Continuous refinement ensures that the digital system remains relevant and effective in meeting the science granting council's evolving needs.
- Encourage a culture of continuous improvement: Foster a mindset of continuous learning and innovation among employees.
- Communicate progress: Communication of the digital system's performance is important to build trust and maintain support from stakeholders. Regular communication of progress and performance against the KPIs should be provided to key stakeholders, including employees, external stakeholders and funding agencies.

WHY MONITOR AND EVALUATE THE SGC'S DIGITAL SYSTEMS

Helps ensure that the SGC's digital systems remain relevant and effective in supporting the digital transformation process.

TIP:

Use **Template 6** and **Template 7** to create a plan for allocating and monitoring resources. Implementing digital transformation projects are challenging when resources are limited. Use **Template 14** to assess and compare the cost, benefits, ease of execution and risks of projects to help decide what to prioritise.

TEMPLATES
AND TOOLS

Templates and tools to guide the achievement of each milestone towards a customised Digital Transformation Roadmap

Milestone		Step	Action	Tool/Template
A	**Assessment of organisational readiness**	Step A1	Assess organisational readiness for digital transformation	**Template 1** Digital Maturity Assessment Tool
B	**Development of a digital transformation strategy**	Step B2	Develop a digital transformation strategy	See Steps B2.1 to B2.8
		Step B2.1	Define the goals and objectives of the digital transformation	**Template 2** Digital Transformation Goals Template
		Step B2.2	Assess the science granting council's current technology systems	
		Step B2.3	Identify areas for improvement	**Template 3** Digital Transformation Process Mapping Tool
		Step B2.4	Develop a roadmap for implementation	**Template 4** Digital Strategy Implementation Plan **Template 5** Agile Project Plan
		Step B2.5	Monitor and adjust the roadmap	**Template 6** Project Critical Success Factors: Project report **Template 7** Project Critical Success Factors: Dashboard data including examples
		Step B2.6	Define metrics for success	See Step B2.5
		Step B2.7	Develop a change management plan	**Template 8** Change Management Process **Template 9** Change Impact Assessment **Template 10** Change Proposal **Template 11** Change Management Policy Document
		Step B2.8	Develop a data management framework	Refer to the **Evi-Pol Data Governance Toolkit**
C	**Investment in digital infrastructure**	Step C3	Identify, evaluate and select suitable technologies	**Template 12** Software Evaluation Matrix
D	**Training and development of employees**	Step D1	Develop a detailed employee training plan	**Template 13** Staff Training Plan
E	**Implementation of digital systems**	Step E1	Develop a plan for implementation	See Steps B2.1 to B2.8
F	**Monitoring and evaluation of digital systems**	Step F1	Develop a plan for monitoring and evaluation	**Template 6** Project Critical Success Factors: Project Report **Template 7** Project Critical Success Factors: Dashboard Data including examples **Template 14** Digital Transformation (Project) Prioritisation Tool

1. Read the characteristics of the five levels of digital maturity (Minimal to Transformed) and tick the characteristics in each level you feel apply to your organisation.

2. Look at the pattern of ticks across Minimal to Transformed, assess the digital maturity for each pillar and estimate a rating between 1 and 5. For example, if most ticks appear in the levels *informal and reactive* and *transitional*, with hardly any in *stakeholder-driven*, your rating would be 3. It is important to use your discretion, as some characteristics may have greater weighting than others for your organisation.

Pillars	Level 1 Minimal	Level 2 Informal and reactive	Level 3 Transitional	Level 4 Stakeholder-driven	Level 5 Transformed
1. Governance and leadership	☐ little buy-in from the executive for digital solutions or strategy ☐ a website exists but there is no departmental digital strategy ☐ digital value proposition not understood or developed ☐ digital opportunities are not understood or defined ☐ ad hoc digital projects initiated by internal groups and individuals	☐ value proposition of digital solutions is starting to be acknowledged by executive ☐ exploring the impact of innovation and emerging technologies on the business ☐ some one-off collaboration with other departments regarding digital service delivery ☐ social media channels are monitored but social media is seen more as a risk than an opportunity	☐ digital strategy in place ☐ roles and responsibilities for delivering the digital strategy are clear and understood ☐ benefits are well-defined, understood ☐ strategic digital partnerships with other departments ☐ focussed on audiences and their needs and emerging technologies ☐ pro-active engagement with stakeholders across all digital channels ☐ the benefits of social media are understood and drive social media activity	☐ digital strategy integrated into departmental planning process and influences overall organisational strategy and direction ☐ benefits are well-defined, understood and drive all digital activity ☐ KPIs and benefits to the business and stakeholders understood, monitored and reported on ☐ seamless stakeholder experience across all channels – digital and non-digital ☐ strategic collaboration with other departments, utilising multiple channels	☐ digital strategy is embedded in, and indistinguishable from, the organisational vision and strategy ☐ executive understands and fully embraces digital channels and leads by example ☐ new services and products are born digital ☐ non-digital services and products are reengineered, joined up and re-born as digital ☐ digital services and channels drive the organisational structure and reporting
2. People and culture	☐ bottom-up drive by staff embracing digital culture ☐ little or no appetite in the organisation for digital service delivery ☐ risk-averse and resistant to change ☐ limited or no attempt to understand stakeholders ☐ fear of risk of engagement with social media and of	☐ small number of staff engaged in digital projects ☐ some cross-organisation awareness of digital opportunities ☐ risk aversion inhibiting change ☐ social media engagement restricted to listening	☐ digital strategy developed and embraced by staff ☐ digital team embedded in organisational structure ☐ staff understand the benefits and opportunities to them and stakeholders of the digital strategy	☐ all staff fully embrace the digital strategy and are driving cultural change ☐ strong stakeholder-focussed culture adopted and continually improved ☐ staff organised in teams around stakeholders rather than the organisation's services and products ☐ staff seek to redefine their roles and personal KPIs in line with the digital strategy and organisational KPIs	☐ all staff are digitally savvy and aware; having a defined 'digital team' becomes obsolete ☐ digital culture is embedded in overall corporate culture and constantly monitored, improved and refined ☐ feedback from stakeholders and staff is encouraged, made public, and lessons learned are applied ☐ staff proactively generate and explore ways to improve digital

Continues overleaf...

	staff use of social media	☐ change management strategy developing ☐ starting to break down internal silos and collaborative practices emerging	☐ focus is on stakeholders and how digital can meet their needs ☐ digital transformation change management plan implemented		service delivery and internal productivity via digital solutions
3. Capacity and capability	☐ no or little attempt to develop and document digital policies and procedures ☐ little or no budget allocation to digital services and technology ☐ staff have limited or no access to the web and social media platforms at work ☐ no training for staff in use of digital tools and channels ☐ no attempt to re-engineer service delivery and associated business practices to leverage digital service delivery	☐ some digital processes developed and documented ☐ move towards defining digital capabilities ☐ limited awareness of digital channel benefits to staff and stakeholders ☐ risks and challenges of digital engagement not identified ☐ some staff training provided in using the organisation's digital channels and social media	☐ key digital policies and procedures have been identified and developed ☐ digital policies and procedures regularly audited and improved ☐ digital budget appropriate to current needs ☐ staff productivity gains and benefits from embracing digital solutions are identified and sought ☐ staff training regime helping to improve online presence and service delivery	☐ all digital policies and procedures have been identified and developed ☐ staff have the resources and training to fulfil their assigned roles and responsibilities to deliver the digital strategy ☐ digital is fully integrated into organisational plans and the business review cycle ☐ all digital resources and staff training are focussed on meeting and managing the needs of stakeholders	☐ all digital policies, procedures and digital activities are in place and are core to everyday business activity ☐ policies and procedures are constantly reviewed and optimised ☐ staff training supports the current digital strategy and anticipates future skills and knowledge requirements ☐ resources and budgets are appropriate to support the digital channels, activities and service delivery ☐ staff have the resources to anticipate and respond to new technologies and digital innovation
4. Innovation	☐ no attempt to consider how digital solutions might benefit the organisation and stakeholders ☐ no experimentation or querying the current methods of service delivery and better ways of	☐ business processes that are easy and cost effective to deliver online are being digitised ☐ digital projects remain organisation-centric ☐ consideration is given to leveraging digital channels to	☐ all business practices and processes are being reviewed and prioritised for conversion to digital channels ☐ the potential for digital channels to create new ways of engaging with stakeholders and	☐ Stakeholders' needs and expectations drive innovation in service delivery – new services, new products, new relationships ☐ Experimentation is encouraged across all channels ☐ new methods of developing digital services are	☐ the whole organisation seeks ways to use digital channels and technologies to redefine stakeholder engagement and to generate new benefits ☐ new management practices and organisational structures emerge to align with the digital organisation ☐ imagining future needs and technologies and exploring and

Continues overleaf...

	engaging with stakeholders	change service delivery methods	delivering services is explored and digital projects formed ☐ digital channels are used to create new relationships with stakeholders	employed that are appropriate to the dynamic nature of the web – e.g., agile and lean	experimenting with methods and solutions is common practice
5. Technology	☐ no or very low dedicated IT commitment to the digital channel and solutions ☐ no or ill-defined IT strategy ☐ no integration of the digital channels with business processes or systems ☐ no integration with communications strategy	☐ basic IT support for the digital strategy ☐ focus is on IT solutions for the department not the digital channels and the stakeholders' needs ☐ some integration of the digital channels with business processes, systems and communications strategy	☐ IT strategy and systems are aligned to the digital strategy ☐ IT is focussed on digital channel delivery and delivering the benefits articulated in the digital strategy ☐ greater integration of multiple IT systems that assists development of joined-up services and a single-stakeholder view ☐ IT systems and solutions comply with best practice in security and business continuity	☐ IT enhances the delivery of digital services and speed and ease of developing new digital services ☐ IT team input ensures digital services are responsive to the stakeholders' chosen devices and comply with accessibility standards ☐ IT team provides proactive input into digitisation projects and business re-engineering ☐ IT team is skilful in training and supporting other staff in their use of digital solutions and tools	☐ IT strategy and performance are entirely aligned to the organisational vision and strategy ☐ IT constantly optimises the benefits of digital service delivery ☐ business processes and IT systems are driven by the digital channels and stakeholder needs ☐ on-going feedback and optimisation of IT processes and digital tools encouraged and applied

Overall digital maturity rating
[Average score: add pillars and divide by 5]

WHY

Council mission and vision

Insert here your mission statement, strategic intent, service charter etc

WHAT

What is the Strategy

Insert here the

- *purpose of the digital strategy*
- *guiding principles*
- *defining characteristics*

How

Digital transformation

How and what will be transformed

Stakeholder
Stakeholder vision/engagement

Innovation
What are your aspirations for innovation?

All channels need to be digitally aligned

Capability and change management

What policies, procedures, staff training and change management are required.

Governance
What management structure and resourcing is required.

Enabling technologies
What hardware and software do you need e.g. new Customer Relationship Management.

Benefits

Better... *eg*

- ⇧ *stakeholder experience*
- ⇧ *education and advice that is easy to find, understand and act on*
- ⇧ *understanding of stakeholders and the changing policy environment*

More... *eg*

- ⇧ *Self-service channels*
- ⇧ *time for SGC staff to provide quality service due to less time doing admin*
- ⇧ *services tailored to stakeholder needs*
- ⇧ *collaboration across SGC in devising and delivering services to stakeholders*

Shorter... *eg*

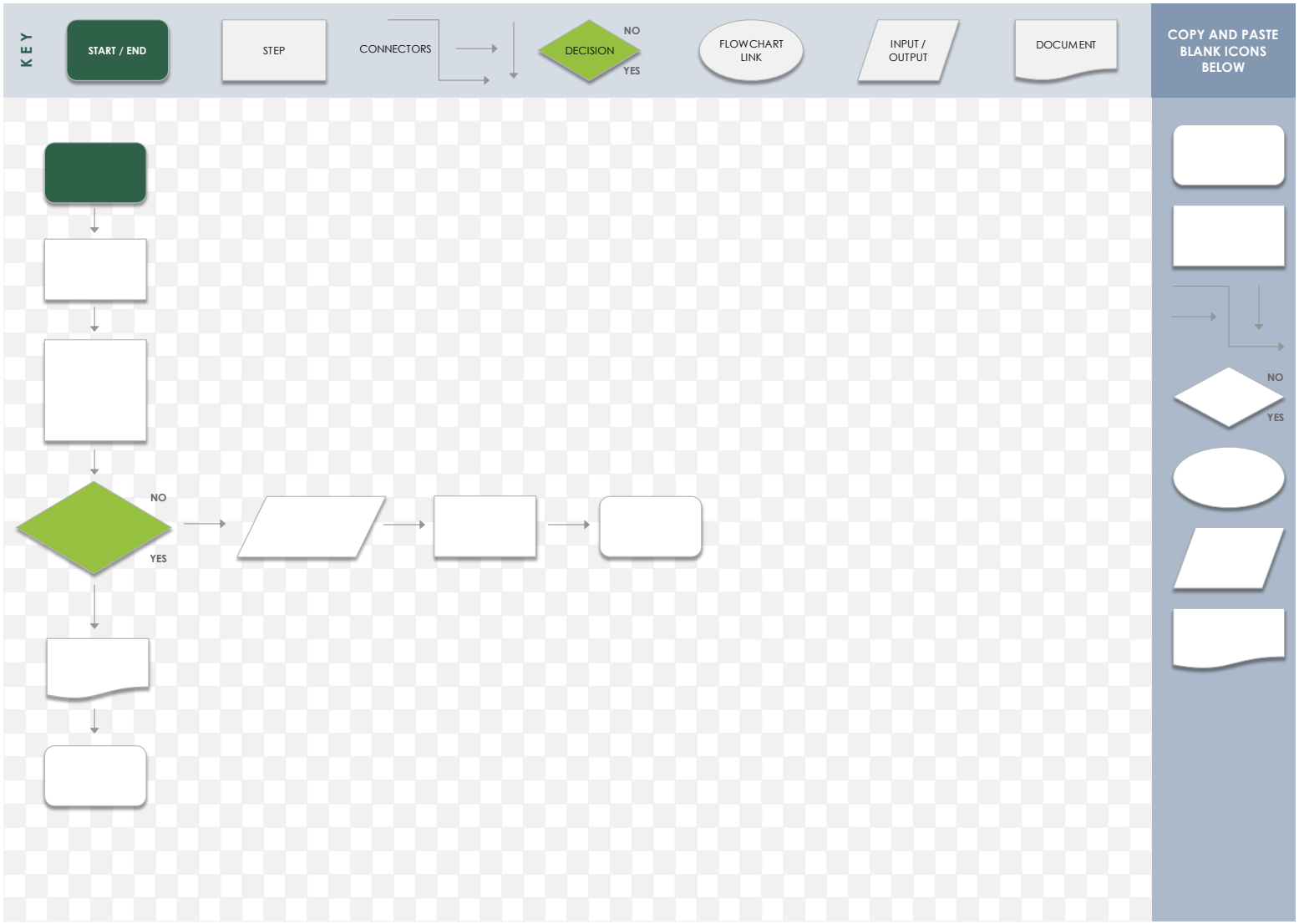
- ⇩ *time finding the right answers and responding to queries*
- ⇩ *time to determine an issue*

Reduced... *eg*

- ⇩ *red-tape and barriers to doing core operations*
- ⇩ *cost to perform operations*
- ⇩ *time spent by our staff on administrative tasks*

DETAILED PROCESS MAPPING TEMPLATE

PROCESS	ANALYSIS COMPLETED BY	DEPARTMENT(S)	DATE COMPLETED



	Year 1					Year 2		
	0-3months	3-6months	Review/report	6-9months	9-12 months	12-18 months	18-24 months	Review/report
DIGITAL STRATEGY	*E.g. Drafted*	*E.g. Signed off*						
GOVERNANCE AND LEADERSHIP				*E.g. Attain level 3 on Maturity Matrix*				
PEOPLE AND CULTURE		*E.g. Attain level 2 on Maturity Matrix*						
CAPACITY AND CAPABILITY								
INNOVATION								
TECHNOLOGY								
Other…								
Other…								
Other…								

PROJECT NAME	PROJECT MANAGER	OVERALL PROGRESS	START DATE	END DATE	TOTAL DAYS	PROJECT DELIVERABLE
Name	Name	0%			0	Deliverable

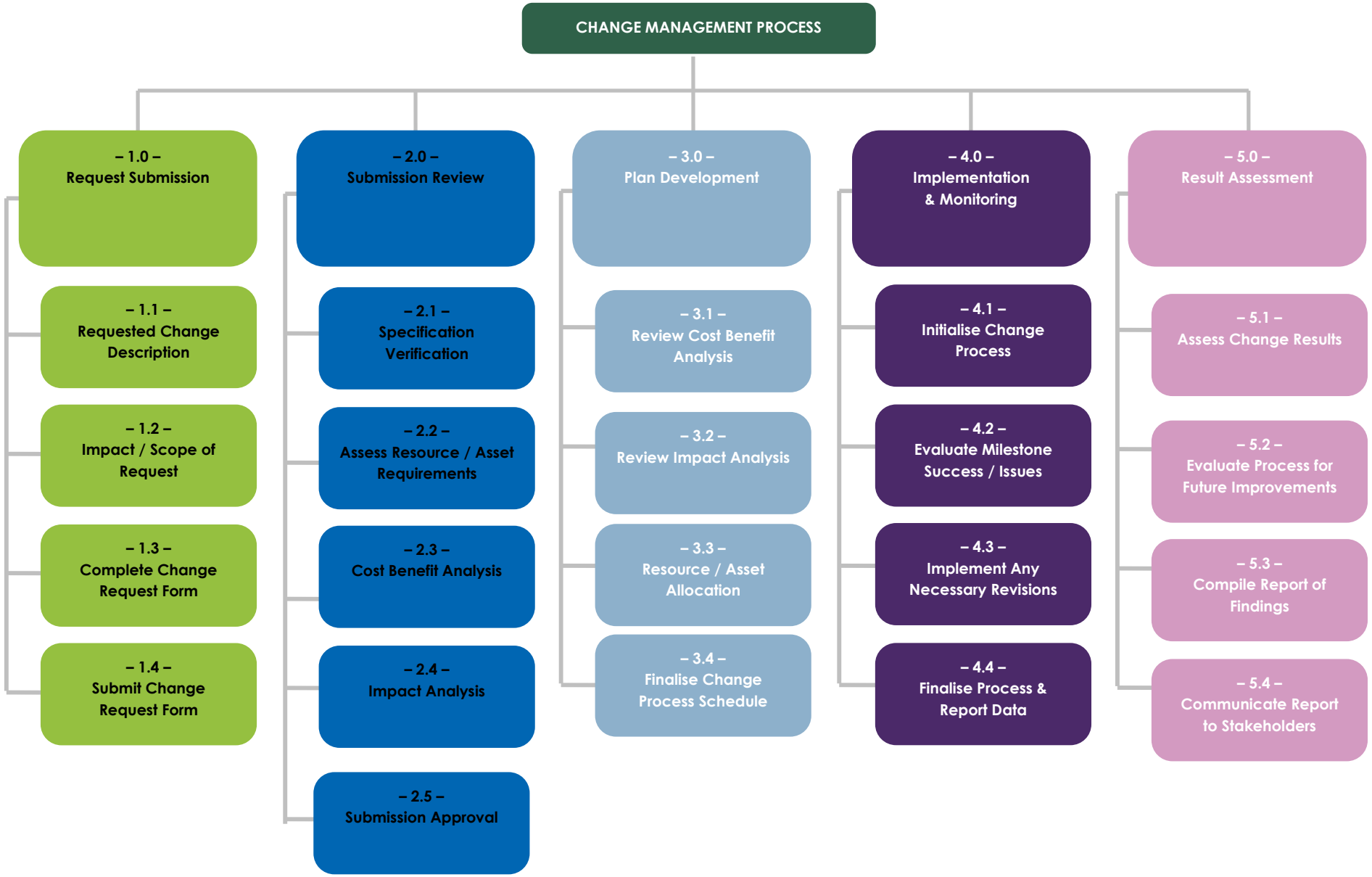
SCOPE STATEMENT

Scope statement

AT RISK	TASK NAME	FEATURE TYPE	RESPONSIBLE	STORY POINTS	START	FINISH	DAYS	STATUS	COMMENTS
	Sprint 1						0	COMPLETE	
	Feature 1						0	IN PROGRESS	
	Feature 2						0	ON HOLD	
	Feature 3						0	COMPLETE	
	Sprint 2						0	OVERDUE	
	Feature 4						0	NOT STARTED	
	Feature 5						0	NOT STARTED	
	Feature 6						0	COMPLETE	
	Sprint 3						0	COMPLETE	
	Feature 7						0	COMPLETE	
	Feature 8						0	COMPLETE	
	Feature 9						0	COMPLETE	

PROJECT NAME	SCHEDULE	BUDGET	RESOURCES	RISKS	ISSUES	COMMENTS
Project A						
Project B						
Project C						
Project D						
Project E						
Project F						
Project G						
Project H						
Project I						
Project J						
Project K						
Project L						
Project M						
Project N						

PROJECT NAME	TIMELINE				NUMBER OF TEAM MEMBERS	BUDGET			RISKS			OPEN		PENDING ACTIONS
	CALENDAR	BEGIN	FINISH	# of DAYS		PROJECTED	ACTUAL	REMAINDER	HIGH	MEDIUM	LOW	ISSUES	REVISIONS	
Project A	05/01/25	05/05/25	07/01/25	57	10	$1 000 000	$880 000	$120 000	1	0	4	2	0	4
Project B	06/01/25	05/10/25	08/10/25	92	5	$900 000	$920 000	-$20 000	2	3	5	1	2	3
Project C	07/01/25	06/10/25	03/01/26	264	10	$860 000	$850 000	$10 000	3	4	3	2	1	2
Project D	08/01/25	06/22/25	08/04/25	43	5	$1 000 000	$998 050	$1 950	5	8	1	1	0	0
Project E	09/01/25	07/14/25	11/01/25	110	10	$294 000	$280 000	$14 000	8	6	4	0	3	1
Project F	10/01/25	07/14/25	01/20/26	190	5	$123 400	$125 000	-$1 600	5	0	0	2	0	2
Project G	11/01/25	08/01/25	10/01/25	61	10	$250 500	$246 000	$4 500	6	4	0	1	2	3
Project H	12/01/25	08/14/25	08/30/25	16	5	$127 200	$126 000	$1 200	7	3	3	0	1	4
Project I	01/01/26	09/01/25	12/10/25	100	10	$80 000	$79 900	$100	0	2	4	1	3	2
Project J	02/01/26	10/01/25	11/15/25	45	5	$77 000	$77 000	$0	4	4	5	2	0	0
Project K	03/01/26	10/01/25	12/01/25	61	10	$65 000	$65 000	$0	3	6	4	3	2	0
Project L	04/01/26	11/01/25	12/01/25	30	5	$550 000	$551 000	-$1 000	2	3	6	0	1	1
Project M	05/01/26	11/10/25	12/10/25	30	10	$45 000	$42 000	$3 000	1	1	7	1	0	2
Project N	06/01/26	12/01/25	02/10/26	71	5	$32 500	$33 000	-$500	5	0	2	2	1	3
						$5 404 600	$5 272 950	$131 650	52	44	48	18	16	27


CHANGE MANAGEMENT PROCESS
– 1.0 – Request Submission
– 1.1 – Requested Change Description
– 1.2 – Impact / Scope of Request
– 1.3 – Complete Change Request Form
– 1.4 – Submit Change Request Form
– 2.0 – Submission Review
– 2.1 – Specification Verification
– 2.2 – Assess Resource / Asset Requirements
– 2.3 – Cost Benefit Analysis
– 2.4 – Impact Analysis
– 2.5 – Submission Approval
– 3.0 – Plan Development
– 3.1 – Review Cost Benefit Analysis
– 3.2 – Review Impact Analysis
– 3.3 – Resource / Asset Allocation
– 3.4 – Finalise Change Process Schedule
– 4.0 – Implementation & Monitoring
– 4.1 – Initialise Change Process
– 4.2 – Evaluate Milestone Success / Issues
– 4.3 – Implement Any Necessary Revisions
– 4.4 – Finalise Process & Report Data
– 5.0 – Result Assessment
– 5.1 – Assess Change Results
– 5.2 – Evaluate Process for Future Improvements
– 5.3 – Compile Report of Findings
– 5.4 – Communicate Report to Stakeholders

Template 9 Change Impact Assessment

PROJECT NAME		DATE CREATED	
PROJECT MGR.		VERSION DATE	
ORGANISATION		VERSION NO.	

STATE OF EVENT / ACTION / STRATEGY	
CURRENT STATE	
RESULTING STATE POST-CHANGE	
GAP BETWEEN CURRENT STATE AND CHANGE COMPLETION	
KEY RISKS	

IMPACT OVERVIEW		
SUMMARY OF IMPACT		
IMPACT TYPE	IMPACT TIMELINE	IMPACT LEVEL

POSITIONS AFFECTED	NUMBER AFFECTED

CHANGE REQUIREMENTS	
COMMUNICATION	
TRAINING	
LEADERSHIP	
STAKEHOLDER COLLABORATION / COMMUNICATION	

Template 10 Change Proposal

PROJECT NAME		DATE CREATED	
PROJECT MGR.		VERSION DATE	
ORGANISATION		VERSION NO.	0.0.0

CASE FOR CHANGE		
PROPOSED CHANGE	Detailed overview of proposed change	
WHY CHANGE IS REQUIRED	Detailed overview of reasons necessitating the change and how the change corresponds with the organization's mission	
INTENDED OUTCOME	Detailed overview of resulting achievements and benefits	
ESTIMATED TIME FRAMES	Anticipated time frame for preparaton, planning, consultation, implementation, and evaluation	
ADDITIONAL FACTORS	Consider any other factors crucial to the successful implementation of proposed change, such as the need for change awareness, work environment climate, previous changes, etc.	
ESTIMATED COSTS	Complete table below	
STAKEHOLDERS IMPACT	Identify stakeholders and the potential benefits and adverse effects for each	
	POTENTIAL BENEFITS	POTENTIAL ADVERSE EFFECTS
STAKEHOLDER 1		
STAKEHOLDER 2		
STAKEHOLDER 3		
STAFF & OPERATIONS IMPACT	Identify areas likely to be impacted by the change, and the potential benefits and adverse effects for each	
	POTENTIAL BENEFITS	POTENTIAL ADVERSE EFFECTS
PROCESS		
TECHNOLOGY		
STRUCTURE		
OTHER		

APPROVAL			
PARTY PROPOSING CHANGE		SIGNATURE	
CONSULTING PARTY		SIGNATURE	
ENDORSED BY		SIGNATURE	

Continues overleaf...

ADDITIONAL COMMENTS
Include any additional comments

COST / BENEFIT ESTIMATE			
ESTIMATED PROJECT COSTS			
RESOURCE	DESCRIPTION	PROJECTED EFFECTIVE DATE	ESTIMATED COST
Staffing			
Consultation			
Assets			
Technology			
		TOTAL	$ -

STRUCTURAL CHANGES				
ELEMENT	DESCRIPTION	PROJECTED EFFECTIVE DATE	ESTIMATED COST (+)	ESTIMATED SAVING (-)
New Hires				
Redundant Positions				
Promotions				
Demotions				
		TOTAL	$ -	$ -

POTENTIAL NEW HIRES			
POSITION	DESCRIPTION	PROJECTED EFFECTIVE DATE	RECRUITMENT COST

			TOTAL	$ -

POTENTIAL REDUNDANT POSITIONS				
POSITION	DESCRIPTION	PROJECTED EFFECTIVE DATE	ESTIMATED COST OF REDUNDANCY (+)	ESTIMATED SAVING (-)
		TOTAL	$ -	$ -

ADDITIONAL ESTIMATED SAVINGS		
DESCRIPTION	PROJECTED EFFECTIVE DATE	ESTIMATED SAVING (-)
	TOTAL	$ -

PROJECT NAME

REQUESTED CHANGE

AUTHOR

DATE

Version 0.0.0

REVISION HISTORY			
DATE	VERSION	DESCRIPTION	AUTHOR

Continues overleaf...

1. Introduction

Proposed change overview.

1.1 Purpose

Identify the desired outcome, as well as what the change seeks to improve.

1.2 Background

Discuss previous issues that lead to the change request.

1.3 Scope

Provide an outline of the scope and detail any omissions.

2. Stakeholders

Overview of stakeholders.

2.1 Stakeholder Review

Identify stakeholders involved or impacted by the proposed change.

STAKEHOLDER REVIEW		
STAKEHOLDER	NATURE OF IMPACT	EXTENT OF IMPACT

2.2 Stakeholder Impact

Discuss how stakeholders will be impacted by the change.

2.3 Communication

Detail how milestones or results will be communicated to stakeholders, including method and frequency.

3. Team

Describe team structure and management.

3.1 Existing Positions

Identify existing positions involved in the change process.

3.2 New Positions

Identify any positions created for the purpose of the change process, or as a result of the implemented change.

3.3 Team Profile

Identify roles and responsibilities of the change management team.

TEAM PROFILE		
TEAM MEMBER	ROLE	RESPONSIBILITIES

Continues overleaf...

4. Cost Analysis

Provide a breakdown of costs for the proposed system and alternatives. This should include design and development, installation, operational costs, maintenance, disposal, and consumables. Conduct analysis of costs for each year so they may be weighed against resulting benefits.

4.1 Development Costs

Breakdown the costs associated with the proposed change per phase. Personnel, equipment, training, software licensing, and tools should be included in the development phase. Provide information in an outline by completing the chart below or provide a link or attachment to a spreadsheet.

CHANGE REQUEST COST ANALYSIS			
ID NO.	PHASE	DESCRIPTION	AMOUNT
1.1	PLANNING		
1.2	REQUIREMENTS		
1.3	DEVELOPMENT		
1.4	TESTING		
1.5	IMPLEMENTATION		
		TOTAL	

4.2 Operational Costs

Breakdown the operational costs. Provide information in an outline by completing the chart below or provide a link or attachment to a spreadsheet.

OPERATIONAL COSTS				
CATEGORY	DESCRIPTION	BEGIN DATE	END DATE	COST
	PERSONNEL			
	CONTRACTORS			
	COMMERCIAL SOFTWARE			
	INFRASTRUCTURE			
	FACILITIES			
	SUPPLIES			
			TOTAL	

5. Implementation Procedure

Detail the assets and steps necessary to complete the change.

5.1 Asset / Resource Review

Describe any resources or assets required.

5.2 Change Process

List steps in sequence required to complete change.

CHANGE PROCESS		
NO.	STEP	PARTY RESPONSIBLE

5.3 Process Management

Method of management employed throughout the change process.

Continues overleaf...

6. Status Monitoring and Evaluation Process

Discuss milestones and quality benchmarks.

6.1 Monitoring Process

Who will be responsible and what methods will be used to monitor the process?

6.2 Criteria for Evaluation

Define how success will be measured throughout the process.

7. Key Risks

Describe any associated risks. Detail and rank key sources.

7.1 Risk Breakdown and Analysis

Identify potentially limiting external factors. Provide detailed analysis of overall impact of each.

RISK ANALYSIS			
KEY RISK	EXTENT OF IMPACT	NATURE OF IMPACT	IMPLICATIONS

7.2 Preventative Measures

Identify any measures to be taken to avoid risks detailed above.

7.3 Recommended Solutions

Summarise all recommended solutions.

8. Process Schedule

Provide a timeline for all activities and milestones with expected start and completion dates.

PROCESS SCHEDULE				
ACTIVITY ID	ACTIVITY DESCRIPTION	PARTY RESPONSIBLE	EXPECTED START DATE	EXPECTED END DATE

Use the checklist below to evaluate software identified as important for the science granting council based on a set of criteria. Once vendors have been identified, score the vendors according to the criteria provided in the checklist to identify the most suitable vendor.

		Weight	Unweighted Score			Weighted Score		
			Vendor 1	Vendor 2	Vendor 3	Vendor 1	Vendor 2	Vendor 3
	Criteria							
1	Adherence to RFQ Instructions	15	2,5	3		12,5	15,0	0,0
2	Company Information	10	2	3		6,7	10,0	0,0
3	Project Understanding & Solution Vision	10	0	2		0,0	6,7	0,0
4	Functional & Non-Functional Requirements	25	2	3		16,7	25,0	0,0
5	Product Viability & History	15	2	3		10,0	15,0	0,0
6	License/Maintenance Agreement Terms & Conditions	5	2,5	3		4,2	5,0	0,0
7	Vendor Involvement in Project	10	2	2,5		6,7	8,3	0,0
8	Vendor Demonstrations	5	3	3		5,0	5,0	0,0
9	Fee Summary	5	0	3		0,0	5,0	0,0
	TOTAL (out of 100)	100				61,67	90,00	0,00

Scoring Criteria	Score	Level	Description
	3	Excellent	SI has fully addressed and conforms to best practices
	2	Strong	SI has adequately addressed this factor. Minor deviations from best practices.
	1	Cause for Concern	A critical issue raises doubt as to SI qualification with this factor. Factor is inadequately address. Large deviations from best practices

	Vendor 1	Vendor 2	Vendor 3	Basis For Score
1. Adherence to RFQ Instructions				
Timeliness				
Completeness				
Overall quality and professionalism				
Overall responsiveness				
Average Score	0	0	0	

2. Company Information				
Financial viability				
Organisation structure				
Overall exposure to government sector				
Services department/division				
Pending litigation				
Partnerships				
Average Score	0	0	0	

Continues overleaf...

3. Project Understanding				
Overall understanding of project objectives				
Understanding of the business requirements				
Understanding of the end state vision				
Average Score	0	0	0	

4. Functional & Non-Functional Requirements				
Functional Requirements:	--	--	--	
Completeness of vendor response				
Extent of proposed enhancements/extensions				
Extent of BPR required				
Non-Functional Requirements:	--	--	--	
Vendor ability to meet requirements				
Average Score	0	0	0	

5. Product Viability & History				
Sustainable technology				
Investment in on-going research & development				
Product development life cycle				
Process for beta-testing and new releases				
Ability to influence vendor development focus				
Average Score	0	0	0	

6. License / Maintenance Agreement, Terms & Conditions				
Buyer duties				
Agreement terms and conditions favourable				
GSA Schedule				
Blanket agency purchase agreement				
Average Score	0	0	0	

7. Vendor Involvement in Project				
Willingness to be involved				
Experience working with systems integrators				
Average Score	0	0	0	

Continues overleaf...

8. Vendor Demonstrations				
Integrated solution				
Degree of alignment with objectives				
Third party products shown & demonstrated				
Ease of use - # screens & keystrokes				
System performance				
Flow & simplicity				
Ability of system to handle requirements				
Ability to meet future needs				
Flexibility, tailorability, and extensibility of system				
Ability to answer questions				
Adherence to script				
Aesthetics				
Robustness of the application(s)				
Average Score	0	0	0	

9. Fee Summary				
License fees				
Maintenance fees				
Purchase timeline				
License period				
Maintenance period & fee adjustment				
Maintenance start date				
Other fees				
Average Score	0	0	0	

Template 13 Staff Training Plan

KNOWLEDGE AREAS

EMPLOYEE	UNIT	TARGET COMPLETION DATE	DATE COMPLETED	DATE(S) RETAKEN if required	SCORE

COMPETENCY SCORES

EMPLOYEE	TARGET DATE	DATE OBSERVED	SCORE	AREAS EXCELLED	AREAS REQUIRING IMPROVEMENT

TRAININGS AND MEETINGS

TITLE	TARGET DATE(S)	DATE(S) ATTENDED	NUMBER OF HOURS	TOPIC(S) COVERED

Digital Transformation (Project) Prioritisation Tool

Project Titles
(Enter names on 'Project Description' workbook sheet)

Selection criteria	*Criteria Weight*	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9	Project 10
		0	0	0	0	0	0	0	0	0	0
Mandatory											
The project delivers a new or transformed service		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
The project has high alignment with our business strategy		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
The project has high alignment with our digital strategy		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
The project has high alignment with [policy/legislation]		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cost											
The level of capital expenditure required to develop the project	*1*	Medium	High	Medium	Medium	medium	High	High	medium	Medium	Medium
The level of recurrent expenditure required to maintain the project	*1*	Low	Medium	Low	Low	medium	Medium	High	Medium	Low	Low
Benefits											
Degree to which it meets customers' expectations and needs	*3*	High	High	High	Medium	High	High	Medium	medium	High	High
Degree to which it improves organisational productivity	*3*	High	High	High	High	Medium	High	High	low	Medium	Medium
Degree to which it reduces the cost to serve	*2*	High	High	Low	High	Medium	High	High	medium	High	Medium
Level of benefit to our agency and staff - wellbeing/satisfaction/retention	*1*	High	High	High	Medium	Medium	High	High	low	Medium	Medium

Continues overleaf...

Ease of execution											
Complexity of the business process re-engineering or creation required	*3*	Medium	Medium	Easy	Easy	Easy	Hard	Hard	easy	Medium	Hard
Ease of securing budget and resources to enable the transformation	*2*	Medium	Easy	Easy	Easy	Medium	Medium	Hard	medium	Easy	Medium
Ease of securing appropriate staff levels and skills	*2*	Easy	Easy	Easy	Easy	Easy	Medium	Medium	easy	Medium	Easy
Change management required to ensure staff buy-in	*2*	Easy	Medium	Easy	Easy	Medium	Easy	Hard	easy	Medium	Medium
Supporting ICT systems and infrastructure readiness	*3*	Easy	Medium	Medium	Medium	Medium	Medium	Medium	easy	Easy	Medium
Ease of dealing with interdependent projects, service offerings and collaboration	*2*	Medium	Hard	Medium	Easy	Easy	Hard	Hard	easy	Easy	Medium
Risk											
Operational - negative impact on day-to-day operations	*2*	High	Low	High	Low	Low	High	High	low	Low	Medium
Project outcomes - uncertain consequences, difficult to measure success	*1*	Medium	Low	Medium	Low	High	Low	High	low	Low	Medium
Reputational - likelihood project is unpopular, fails or doesn't meet its KPIs	*3*	Medium	medium	High	medium	High	High	Medium	medium	Low	Low
Financial - capital cost or operational expense blow-out	*3*	Low	Low	Low	Low	Low	Low	Medium	low	Low	Low
Organisational - risk to good governance and management	*2*	Low	Low	Low	Low	Low	Medium	Medium	low	Medium	Medium
Mandatory test		**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**
Costs		**1,5**	**-1,5**	**1,5**	**1,5**	**0**	**-1,5**	**-3**	**0**	**1,5**	**1,5**
Benefits		**13,5**	**13,5**	**7,5**	**7,5**	**4,5**	**13,5**	**9**	**-6**	**7,5**	**4,5**
Ease of execution		**10,5**	**3**	**13,5**	**16,5**	**10,5**	**-4,5**	**-13,5**	**18**	**10,5**	**-1,5**
Level of risk		**9,5**	**7**	**11**	**7**	**9,5**	**11,5**	**12,5**	**7**	**6,5**	**8**
Total Project Score = (cost+benefit+ease) - risk		**16**	**8**	**11,5**	**18,5**	**5,5**	**-4**	**-20**	**5**	**13**	**-3,5**

ADDITIONAL **RESOURCES**

Glossary of key terms

Cloud computing	The delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale.
Cloud infrastructure	The components needed for cloud computing, which include hardware, abstracted resources, storage, and network resources.
Cybersecurity	The practice of protecting systems, networks, and programmes from digital attacks.
Data	Factual information (such as measurements or statistics) used as the basis for reasoning, discussion, or calculation. (Webster's 11th Collegiate Dictionary)
Data analytics	The science of analysing raw data to make conclusions about that information.
Data centre	A physical facility that organisations use to house their critical applications and data.
Data classification	Data classification tags data according to its type, sensitivity, and value to the organisation if altered, stolen, or destroyed.
Data interoperability	The ability of systems and services that create, exchange and consume data to have clear, shared expectations for the contents, context and meaning of that data.
Data portability	The ability to move, copy or transfer data easily from one database, storage or IT environment to another.
Data subject	Any individual person who can be identified, directly or indirectly, via an identifier such as a name, an ID number, location data, or factors specific to their physical, physiological, genetic, mental, economic, cultural or social identity.
Digitalisation	The incorporation of digital technologies into business and social processes, with the goal of improving them.
Digital transformation	Digital transformation refers to the integration of digital technologies to transform business processes, operations, and partner experiences resulting in a fundamental change to the way an organisation operates and delivers value to its stakeholders.
Digitisation	To convert analogue data into digital form.
Metadata	Metadata describes other data. It provides information about a certain item's content.
Non-personal data	Any set of data that does not contain personally identifiable information.
Organisational readiness	An organisation's ability and willingness to adopt and implement a new technology.
Open data	Data that can be freely used, re-used and redistributed by anyone – subject only, at most, to the requirement to attribute and share alike.

Introduction to data interoperability

Marco Davids
26 October 2021

OBJECTIVES

1. Have a common understanding of key aspects of interoperability
2. Discuss how data interoperability is fundamental to data quality and a prerequisite for open data

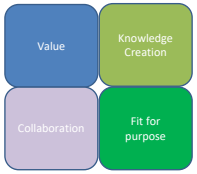
Data Interoperability

- Interoperability - ability of a system to work independently with some or all of another system
- Data interoperability - ability to use the data from a source without help from that source
- Data interoperability must include metadata interoperability

Data Challenge

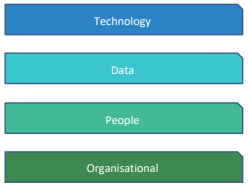
- Different stakeholders have different data needs and requirements
- Diverse technology stacks, standards and protocols
- Data production and dissemination systems are fragmented across the organisation and not standardised

Data Challenge



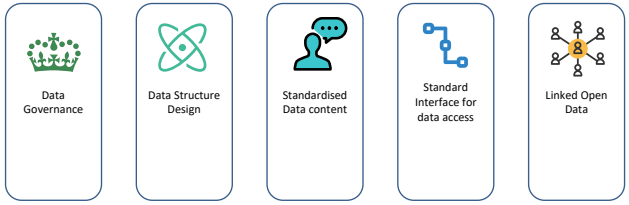
Data Interoperability is a measure of data quality

Data Challenge



Data interoperability affects all facets of the organisation

The road to data interoperability



Data Governance

Data Governance

Data management:

*"The development, execution, and supervision of plans, policies, programs, and practices that deliver, control, protect, and enhance the value of data and information assets throughout their lifecycles" - **DAMA 2017***

Data governance:

*"How decisions are made about data, and how people and processes are expected to behave in relation to data" - **DAMA 2017***

Data Governance

• The biggest challenge to interoperability is often the issue of data governance and management

• Good data governance of data across the data lifecycle is important for data management

Data Governance

Data governance model best suited is determined by

- Size and complexity of the organisation
- The availability and skills of resources
- Organisational management structure
- The broader data ecosystem and the role of the organisation in the ecosystem

Data Models

Data Models

- There is no single right way to represent data
- Data interoperability is highly dependent on our data modelling decisions
- Have interoperability mindset when designing and modelling data
- Data modelling is the process of identifying entities and selecting their attributes, their relationship to each other, and how to codify their content

Data Models

- Should follow specific standardised patterns
- Should be reusable and conducive to data sharing
- Can be used to represent multiple sources of data using standardised patterns for easier data integration

Data Models

Generic data modelling process flow:

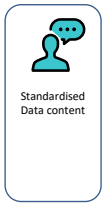
• Starting from a set of source tables, identify elementary datasets to be modelled (indicators).

• Identify key entities that are described in the information contained in the dataset

• Identify dimensions and attributes needed to describe each entity at the target level of granularity

• To the extent possible, re-use standard dimensions and naming conventions from existing data models

Data Standards



Data Standards

- Classification systems defines how we collect, process and analyse data
- Standardised classifications and vocabulary impacts the ability to easily find, access and integrate different data set across data platform

Data Standards

- Sometimes customised classification are unavoidable such as in the case of legacy systems, or localised terminology
- Data ecosystem is continuously evolving and so too classifications must adapt over time
- They need to be publicly available and accessible in machine readable format e.g. JSON, CSV, RDF

Open Data Formats

Open Data Formats

- Data availability and accessibility should be the primary driver for ease of use
- Data logistics should also be addressed as part of the interoperability challenge
- Getting data to users in a fast, effective and efficient manner through the use of common access paths

Open Data Formats

- Use common, open data formats such as CSV,JSON, XML when making data available for sharing
- Non-Proprietary, open data file formats improves the interoperability of shared data sets

Open Data Formats

- Application Programming Interfaces (APIs) - reusable pieces of software that enable applications to interact with a system
- Facilitates Machine to machine access to data services
- Automation of data flows that requires repetitive and frequent data sharing operations
- API documentation - technical contract between the data provider and users of the API
- Open API specification is a standard format to document functionality in a human and machine readable format

Open Data Formats

- It is good practice to manage all APIs as a single product
- All organisational APIs should be standardised using a common implementation pattern
- APIs implementation should prioritise interoperability and flexibility over specificity and optimisation
- A balance between specific user group needs and broader usability must be maintained

Thank you

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Link to editable templates and tools that may be customised to purpose

Access the digital transformation roadmap

To access the digital version of this digital transformation roadmap and other Evi-Pol outputs and resources, scan the QR code below.

Alternatively, you may access these tools by visiting the CeSTII webpages at **https://hsrc.ac.za/divisions/centre-for-science-technology-and-innovation-indicators/** or the HSRC's Research Output Repository at **https://repository.hsrc.ac.za**.

This toolkit includes a set of existing templates and tools freely downloaded and curated for use by science granting councils to inform the development of a digital transformation roadmap. The main sources include:

1. KPMG Australia and the *South Australian Government. South Australian Government Digital Transformation Toolkit Guide, Version 4.2*. Retrieved from https://www.dpc.sa.gov.au/__data/assets/pdf_file/0008/46565/Digital_Transformation_Toolkit_Guide.pdf (accessed 9 June 2023). See the Digital Maturity Assessment Tool, Digital Transformation Goals Template, Digital Strategy Implementation Plan and the Digital Transformation (Project) Prioritisation Tool.
2. The rest of the templates and tools are from Smartsheet, which creates 'innovative work management solutions' for organisations. Retrieved from https://www.smartsheet.com/ (accessed 9 June 2023).

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