



The Registry Capability Maturity Model (RCMM)

A Holistic Approach Towards Enhanced Register Performance

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Introduction

In today's data-driven world, the effective management of registries has transcended the realms of data storage, record management, archival, and retrieval, to become the bedrock of efficient and effective strategic decision-making. Registries are the primary repository of Government; they persist the information with respect to the entire gamut of society. They hold the key to valuable information across various domains, including business, finance, asset ownership, government, healthcare, and education. It has become a dynamic and ever-evolving landscape where digital data is king and the seamless flow of information is paramount, where organizations must continuously strive to enhance their operational and technical capabilities, ensure transparency and security, and constantly be on a path towards service delivery improvements.

The challenge, however, lies in not just in the digital capturing/management/delivering of registry data, but directly towards optimizing registry operations to ensure data currency and accuracy, keeping pace with best practices and technological innovations, all while harnessing its full potential around a transformation to support their strategic and operational objectives. Indeed, a continually changing regulatory environment in which those registers exist, demands new processes, interoperability, evolving philosophies, and techniques.

The authors contend that to navigate the complexities of this landscape, governments responsible for registries need industry insights and expertise to collaborate on the design of a well-defined framework. A framework that will be able to assess their current operational models, their desired future state, and ultimately what a registry transformation roadmap entail. This paper delves into the design and application of a capability maturity model, a comprehensive framework that has emerged as an indispensable guide for organizations seeking to elevate their registry management practices.

Maturity assessments can work effectively as both a research tool at the beginning of organisational design work and as part of a process to identify business, service areas and opportunities, prioritised along with a clear future vision, roadmap, and plan for delivering change.¹

As technology, economic behaviour and user needs evolves, the maturity model will have to adapt to new realities. It is envisaged therefore that the maturity model is a live framework that is periodically reviewed and adjusted.²

The Registry Capability Maturity Model (RCMM) is more than a theoretical construct; it's a practical roadmap for organizations seeking to assess, enhance, and optimize their registry operations. The RCMM offers a structured framework for organizations to evaluate their registry operations, set improvement objectives, and chart a path towards optimal performance.

The Registry Capability Maturity Model (RCMM) leverages the clarity and outline of a Target Operating Model (TOM), guiding architectural principles, and the adaptation and integration of best practices to create a roadmap for optimizing registry capabilities and to foster excellence in registry management.³ These elements intertwine to form a holistic approach, playing a dominant and critical role in enhancing registry operations across diverse sectors.



¹ <https://medium.com/we-are-futuregov/an-update-on-our-digital-maturity-assessment-cade2c1ce2a8>

² <https://unstats.un.org/unsd/statcom/53rd-session/documents/BG-3p-SBR-Maturity-Model-E.pdf>

³ <https://www.fostermoore.com/hubfs/PDF/Registers-The-New-Frontier-05-2023.pdf>

The Importance of the TOM in a RCCM

The Target Operating Model (TOM) serves as a strategic blueprint for organizations, guiding them from their current state to a desired future state. In the realm of registry management, where data is the lifeblood, a well-defined TOM becomes the linchpin for optimal performance.

Creating a detailed roadmap serves as a navigational chart guiding your enterprise toward the TOM. In a report by McKinsey & Company, 70% of organizational transformations fail, and one key differentiator for the successful 30% is a comprehensive roadmap. The roadmap spells out each step, milestone, and criteria for success, fostering alignment and accountability.⁴

When the TOM is combined with guiding architectural principles, best practices, and best practice statements, it forms a powerful quartet that profoundly influences the development of the Registry Capability Maturity Model for the registry domain.

This synergy ensures that the RCMM is not only well-informed but also strategically aligned with industry practice standards and the registry organizations unique challenges and goals. These can be classified as such:

- 1. Alignment of Strategy and Operations:** The TOM's strategic direction aligns seamlessly with the RCMM's process improvement objectives, ensuring that the organization's efforts are coherent and harmonized with broader strategic goals. Simultaneously, the guiding architectural principles aid in aligning technological and business innovations with the strategic direction.
- 2. Clear Vision and Objectives:** The TOM provides an unequivocal vision of the desired future state within the registry domain. This vision encompasses roles, processes, technologies, and capabilities needed to bring the vision to life. It serves as a target for RCMM evolving improvements, providing a shared vision that unifies the organization.
- 3. Process Optimization:** The TOM inherently includes well-defined processes and workflows designed to support the organization's strategic goals. These processes are optimized and streamlined, mirroring the best practices and the desired RCMM "maturity level". In this way, the TOM creates a blueprint for operational excellence, while the architectural framework help assess the impact of innovations on existing processes and structures.
- 4. Resource Allocation:** The TOM specifies the resources necessary for executing processes and achieving strategic objectives. By aligning these resource requirements with RCMM goals, organizations can effectively allocate resources to enhance process maturity. The guiding architectural principles provide a framework for evaluating the resource requirements of innovative solutions being deployed (e.g., leveraging AI/RPA)
- 5. Role Clarification:** A well-defined TOM addresses roles and responsibilities within the organization, bringing clarity to process ownership and improvement. This clarity is instrumental in achieving higher maturity levels in the RCMM, fostering accountability and ownership.



Figure 1: Collective Knowledge Base in the Pursuit of the Development of the RCMM

⁴<https://www.capstera.com/target-operating-model/>

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6. **Change Management:** A structured approach to change management is an intrinsic part of the TOM. This approach facilitates the transition from the current state to the desired future state, a critical aspect of implementing improvements associated with higher maturity levels. The guiding architectural principles assist in change management by providing a framework for assessing the overall impact of technology decisions and adaptive innovations on the organization's culture and structure.
7. **Continuous Improvement:** The TOM often incorporates a culture of continuous improvement, which harmonizes with the RCMM's philosophy of ongoing process enhancement. This culture encourages organizations to continue striving for higher maturity levels, even after achieving initial targets. The Guiding architectural principles serve as a critical compass for innovation adoption, ensuring that emerging technologies and practices align with strategic objectives, maintain interoperability, scale efficiently, enhance data security and privacy, optimize processes, and facilitate change management.
8. **Measurement and Monitoring:** The TOM outlines key performance indicators (KPIs) and metrics essential for monitoring progress toward achieving strategic objectives. These metrics align with process maturity evaluation as part of the RCMM assessment and improvement process. The guiding architectural principles help organizations select and implement relevant metrics to measure the impact of innovations on processes and capabilities.
9. **Governance and Compliance:** The TOM can integrate governance and compliance structures that align with the RCMM's requirements. This integration ensures that the organization follows best practices and adheres to regulatory and industry standards. The guiding architectural principles play a vital role in ensuring that innovations comply with these governance structures and industry regulations.

When the Target Operating Model, guiding architectural principles, best practices, and recent registry innovations come together, they create a dynamic and comprehensive framework for developing a CMM that is responsive to the unique challenges and opportunities within the registry domain.

This collaborative approach provides a well-defined framework that aligns the organization with recognized standards of excellence, strategic objectives, and practical implementation. It sets the stage for a journey of continuous improvement, with a strong foundation in best practices, architectural principles, and a clear vision of the future, enabling organizations to excel in the dynamic and innovative landscape of the registry domain. The RCCM provides a structured approach to evaluating registry operations and setting benchmarks for improvement. It typically consists of different stages of maturity, each with specific dimensions (outlined below) that are applied to assess and enhance capabilities.

In the following sections, we will delve deeper into the specifics of this collaborative approach, exploring how these elements work in unison to create a robust RCMM tailored to the registry domain's unique challenges and opportunities.

⁴<https://blogs.oracle.com/cloudsecurity/post/7-reasons-why-the-cloud-is-more-secure>

⁵<https://www.simplilearn.com/emerging-technologies-enabled-by-the-cloud-article>

⁶<https://www.cjck.com/data-localization-an-in-depth-analysis/#A11>

The RCMM As A Strategic Framework

The Registry Capability Maturity Model (RCMM) serves as a strategic framework aimed at elevating the operational and performance capabilities of registers within an organization, with a specific focus on enhancing data management, accuracy, and quality. This model is intricately designed to address key areas crucial for effective register management:

- 1. Data Quality and Integrity:** The RCMM empowers organizations to establish and uphold robust data quality standards, ensuring the accuracy, completeness, and currency of information stored in registers.
- 2. Compliance and Regulation:** Registries are subject to legislation, regulations and standards that require accurate registration and data profiles that are auditable. The RCCM will assist organizations in aligning their register management practices with regulatory requirements and compliance standards.
- 3. Risk Management:** Recognizing the potential risks associated with poorly managed registers, the RCMM aids in identifying and mitigating these risks through the implementation of improved data management practices.
- 4. Efficiency and Accessibility:** A mature register management process, guided by the RCMM, enhances the efficiency of data retrieval and accessibility. This is particularly critical for organizations requiring quick access to accurate data for decision-making and reporting.
- 5. Consistency and Standardization:** The RCMM promotes the standardization of data management practices, ensuring a consistent approach to storing and processing data throughout the organization.
- 6. Scalability:** In the face of evolving technological and business landscapes, the RCMM ensures that register management processes remain scalable and adaptable, accommodating the changing needs driven by technological and business innovations.
- 7. Organizational Learning:** Encouraging a culture of continuous improvement, the RCMM motivates organizations to learn from past experiences, apply best practices, and evolve their register management processes over time.
- 8. Performance Measurement:** By systematically assessing and enhancing register management capabilities, organizations can effectively measure and report on the performance of their data management functions, driving ongoing improvements.

The authors contend that while a universally recognized RCMM, like the Capability Maturity Model Integration (CMMI) in software development, does not exist, organizations should be encouraged to develop a tailored maturity model to address their specific register management needs. In simple terms, it is important for a register to understand where it is benchmarked at, before embarking on digital transformation and/or other initiatives to improve its performance. It is the author's strong view that the registry and regulatory domains are very light on any tangible assessment models, and generally in related operational and management theory, of how they as organisations, that govern or regulate legislation, should be organized, to derive efficiencies for all stakeholders.

There have been other very limited works around developing a valuable CMM for the registry domain. Norway Registers Development (NRD Companies) have developed a simplistic online assessment tool, with a limited 10 question profile that is entirely focused on website presence and the services, with no structure against any "Themes, Dimensions or Stages", and with no insights towards key focus areas for the future of register innovation, process or organizational improvements, development of the knowledge base, or the inclusion of stakeholder/client service dynamics.

While most evolved CMM's typically encompass multiple maturity levels, the value of each signifies a distinct stage of register management and operational capability. The overarching goal is to guide organizations toward achieving higher maturity levels, clearly identifying the gaps, reducing data-related risks, fostering continual digital transformation, enhancing interoperability, ensuring data quality, and facilitating the seamless integration of technological innovations into register processes.



The RCMM Dimensions

Establishing the dimensions across a Capability Maturity Model (CMM) are crucial as they provide a structured framework for assessing, informing, improving and evolving the capabilities of the organization. Each dimension addresses specific aspects that are fundamental to the success of the transformation journey. The authors have structured and classified the RCMM across six key dimensions (i.e., themes) that align to with our classification of the “Stages of Maturity”. These also are directly related to how we formulate of our assessment model and include key aspects and relevance across each dimension:

1. **People/Knowledge Base and Organizational Culture:** Building the organizational skills and capacity is essential for successfully navigating digital transformation. Key areas should include:
 - a. Strategies for managing culture and organizational change associated with the digital evolution of the registry.
 - b. Approaches for overcoming resistance and fostering a culture of innovation.
 - c. Skill development initiatives to enhance (and transform) capabilities in managing and maintaining digital systems and services.
 - d. Building workforce capable of adapting to evolving technologies

Digital transformation through this dimension of the RCCM often involves significant cultural and organization changes. Effective change management here will ensure a smooth transition to the next Stage, minimize resistance and will foster a culture of innovation and continuous improvement.

2. **Process/Operations:** Optimizing processes and operations enhances efficiency, reduces bureaucracy, and allows for improved service delivery. It enables the organization to respond more effectively to changing circumstances and demands (i.e., legislative, clients’ expectations, and technology innovations). This dimension of digital service delivery is vital. It ensures services are accessible, convenient, and aligned with expectations of the digital age. It is aligned with:
 - a. Streamlining and optimizing registry-related processes for efficiency
 - b. Continuous improvement practices to enhance process maturity.
 - c. Automation of data, tasks and workflow

Regular measurement and monitoring of these performance metrics provides insights into the effectiveness of processes and operations across evolving digital services. It helps the registry make key data-decisions, will identify areas for improvements through the RCCM stages and will demonstrate accountability.

3. **Technology/Innovation/Transformation⁵:** A modern and scalable registry platform is the backbone of the RCMM’s digital transformation roadmap. It will enable the organization to deploy and fully integrate innovation, enhance service delivery and adapt to evolving technological trends. At a minimum it should encompass:
 - a. Adoption of modern registry aware platforms with a scalable technology infrastructure
 - b. Use of cloud ready solutions and other advanced technologies
 - c. Ensuing infrastructure resilience and advanced security features and measures (i.e., both at the entity/asset level and the with natural persons being digitally identified, unified and certified across domains)

⁵ <https://www.oecd.org/tax/forum-on-tax-administration/publications-and-products/digital-transformation-maturity-model.pdf>

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4. **Legislation and Regulatory Compliance:** Organizations responsible for aligning the register with modern legislation and ever-evolving regulatory compliance and directives (i.e., transparency regimes), must adhere to these frameworks moving through the stages of the RCMM. Compliance ensures that digital services meet legal requirements, fostering trust, are fully auditable and are completely consistent with their fiduciary constructs. This dimension of the RCMM should at a transformation level ensure:
 - a. Alignment with relevant laws and regulations designed towards fully digital operations and services.
 - b. Compliance with data trust and transparency regimes, data protection obligations and all relevant privacy regulations.
5. **Stakeholders/Clients:** In moving through stages in this dimension, involving, where possible, citizens, businesses and other key stakeholders (i.e., across both private and public sector domains, domestically and internationally) in the digital transformation journey. Effective engagement builds trust, gathers valuable feedback, and aligns with the transformation and the diverse needs of the user community:
 - a. Ensuring consistent and ongoing collaboration that is mapped back to the digital transformation underway
 - b. Communication strategies for informing and involving key stakeholders in the process.
6. **Data Management and Governance:** Effective data management and governance are critical for ensuring the accuracy, security, and compliance of the registry. Proper handling of data enhances trust, transparency and decision-making:
 - a. Clear definition and management of data standards, inputs, and outputs
 - b. Governance practices are ubiquitous across the organization for ensuring data quality, security and compliance with legislation and regulations.
 - c. Integration and interoperability of data across different government registries

The RCMM dimensions collectively contribute to the overall maturity of the organization and the registries they govern and in the context of ongoing digital transformation, helps to assess current capabilities, clearly identify areas for improvement, and most importantly establish a TOM and roadmap for achieving higher maturity levels.



Stages of Maturity

The RCMM is a methodology used to develop, define and refine a registry organisation's digital transformation process. It is rooted in our premise that registers of the future will be entirely digital constructs. Our model describes a five-level evolutionary path of increasingly organized and systematically more mature processes for the operation of a register.

- 1. Emerging (Pre-Digital Register Operator)** At the initial entry level, the knowledge base is static, processes are disorganized, ad hoc, and even chaotic within the register. All processes are largely paper based. It is very difficult to maintain, and in some cases even achieve service levels with register stakeholders, as the organisation has a threshold of filings it can process, based on the number of staff that can process the received filings. The register is resistant to organisational change. Transformation is characterised by slow and difficult organisational restructuring, imaging, and document management projects for Business Continuity Planning (BCP) and public offices reorganisations. Legislation has remained unchanged for decades and is entirely predicated on paper-filings.
- 2. Developing (Partial Digital Register Operator)** Register service, both input and output processes are established, defined, and documented as being online or partially online. Online process largely mimics the paper processes of the paper register. Not all processes (forms) are online. Not all filings with the register are online. Transformation is characterised by the push to digitization of paper processes. Very little service redesign. In essence, the stakeholders of the register perform the key up of the inbound register filings. Legislation remains entrenched in the paper input and output processes of the past. Legacy register applications are reused and reengineered to process the online filings. Transformation is characterised by small projects to digitize and make 'forms' online. The register is searchable and limited products are available. The burden on public offices of the register becomes less.
- 3. Established (Digital Curator/Operator)** Register services are predominantly online; some may persist in paper only as they have not been worthwhile digitizing because of the volume. Applications and the technology underpinnings of the register have been refreshed. Stakeholders are content with their interactions with the register. Limited APIs are available and identity management systems are ad hoc and applicable to the register's specific services. The legislation accommodates for the digital world but does not accentuate the register's performance nor breadth of services provided. The register is passive in terms of data on its register and there is wholesale duplication of the data on its register, in terms of what is already available within its jurisdiction. Transformation is characterised by reengineering of internal processes to best make use of what is filed digitally. However, register services remain truly untransformed in terms of improving stakeholder services and the recognition that these stakeholders have changed and want customer-centric, self-service, reliable services.
- 4. Managed (Intelligent Register Operator)** The register deploys services that are customer-centric and that easily accommodate new types of stakeholders that are customers of the register. These services support and regulate the legislation accurately and efficiently. All basic input and output services of the register have been fully digitised. The technology supports the refined and defined processes with limited need for manual intervention. The register is focused on managing the accuracy of the register and analysing the register for anomalies. A whole host of AI tools have been deployed against the register, and staff have been redeployed to support the accuracy of the register and its role as Active Gatekeeper of the register.

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5. Aspirational (Optimised Register Operator/Vigilant Shepherd) The register recognises that its value to the jurisdiction's economy and government is not just solely to perform the basic functions of the register effectively. It is to promote more compliance by design processes within its register services, and explicitly within the context of the wider digital ecosystem of the jurisdiction. The register principle of 'canonical' is enforced and an extensive level of interoperability is implemented between the register and its peer agencies and data sources/services. The register is innately interconnected with and indeed respectful of other parts of government, the private sector, and civil society. There are more seamless processes across society which take account of societal concerns around access to and use of data as well as, privacy, accountability, and control mechanisms. The register recognises that as the single source of truth, with respect to the legislation underpinning its existence, that its benefit to the society in which it exists is larger than the value of the data on its register. The register has fundamentally changed as an organisation, it has a vision of the future, and its changes are in line with this vision.

Prevailing CCMs distinguish maturity levels/stages between 0 or 1 to 5. While it would seem consistent to define a similar number of levels, one could argue for limiting the number of levels in the context of organizational structures. The main argument here would be that level 5 (e.g., one that is fully optimized) is typically associated with frequent monitoring of relevant indicators and continuously adjusting performance based on (statistical) analysis of those indicators. This level thus suits organizations that generate lots of performance data and can be swiftly adjusted.

Aligned with the above Stages, we have structuring our RCCM against 6 main "Maturity Dimensions or Themes" (adding a 7th Dimension, the Digital Leader, enabling global benchmarking across the registry domain). We suggest that frequent monitoring (e.g., annually or at a minimum every 3 years) be instituted at each "Stage of Maturity", as the transformational elements we have detailed below are indicative across each can be then be assessed and improved either independently and globally.

Transitioning through the "Stages" demands that certain transformative activities are completed from the previous "Stage"

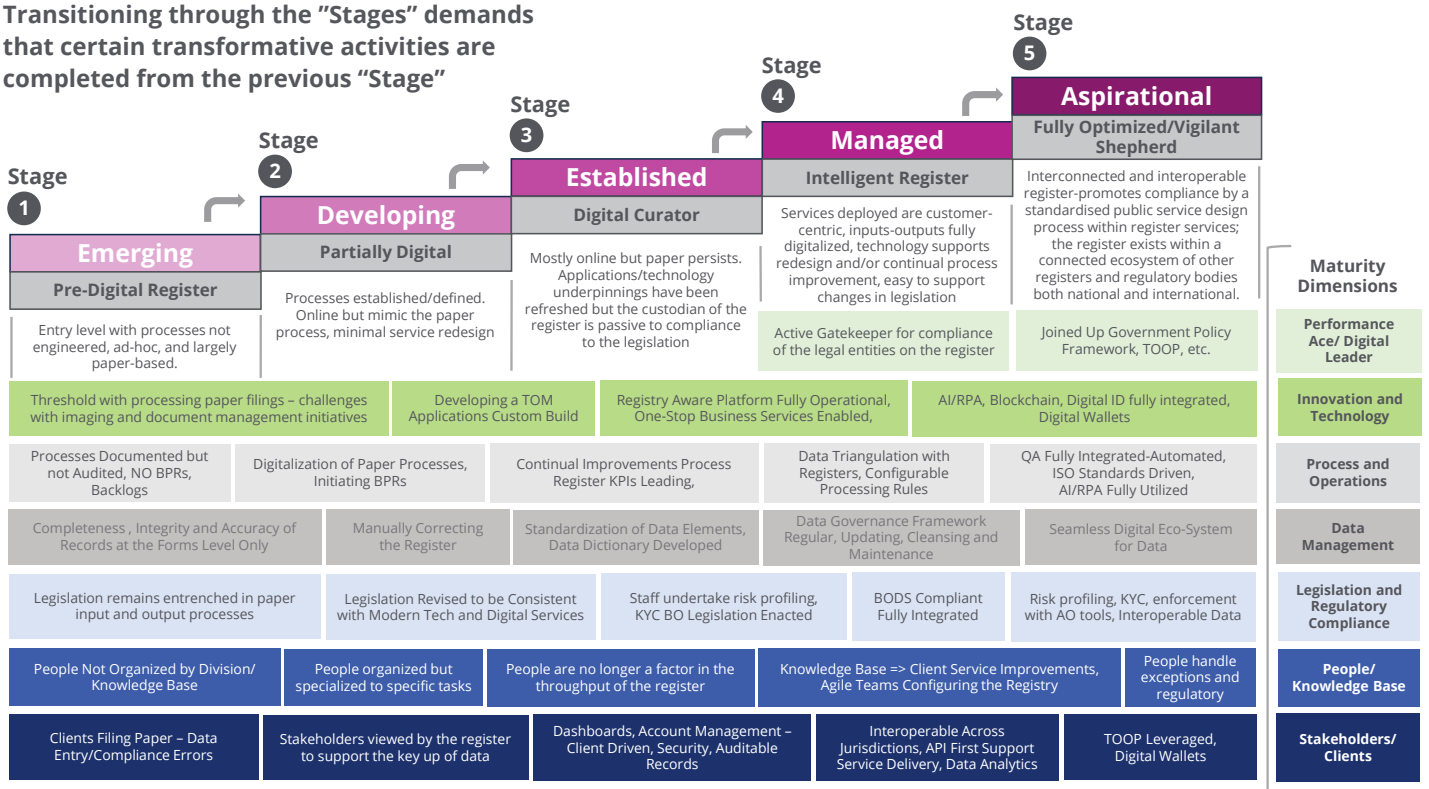


Figure 2: Registry Capability Maturity Model – Stages, Dimensions and Key Transformational Elements

RCCM Evaluation Themes and The Assessment Framework

An RCMM has been drafted based on our Statements of Best Practice (outlined in the next Section), from which we then use to support deriving a TOM and “Stages of Maturity” of the register/organization. We have included here the following as a reference template for the operators/custodians of registers to critically appraise their operations. To accurately conduct the RCMM assessment we advise cross-organization participation and guided assistance from an external registry “domain specific” expert moving through the process would be result in the most accurate outcomes. The RCMM as a reference template should include some standard sampling questions across these key “Themes”:

Theme: *People and Knowledge Base*

1. People

- a. Are your people organised into sections/divisions/knowledge base?
- b. Are your people trained specifically for different registration types/entities?
- c. Do you provide for capacity development of registry staff (i.e., focus on enhancing their performance and improving their knowledge of the new registration processes, ICT solutions and client orientation)?
- d. Do your people transition/alternate to different parts of the organisation on a designated basis?
- e. Do you maintain public offices or representation offices to assist customers?
- f. Do you operate a contact centre with personnel trained to the same level as registration personnel?
- g. How large is your customer support with respect to the total organisation size?
- h. How many of your staff undertake risk profiling, KYC, enforcement of your register?
- i. Are staff authorised to make decisions to help customers without requiring approval from management on every occasion?
- j. Do you have teams organized for agile ways of working (e.g., cross-functional, rapid prototyping, continuous improvement)?

Theme: *Process and Operations*

2. Process

- a. Are your current processes accurately documented?
- b. Have your processes undergone a review in the recent past in terms of a Business Process Reengineering (BPR) exercise?
- c. Are any/all register processes completed electronically?
- d. Have you identified any processes for redesign?
- e. Do you consider that all your current processes can be automated?
- f. Are processes consistent with the legislation?
- g. Have you implemented a continual improvement process that includes regular review and evaluation of performance, to ensure the register meets evolving user needs and policy requirements.
- h. Do your structure your workflows around outcomes or tasks?
- i. Do you capture information once and at source?

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- j. Have you adopted or implemented a single business number/unique identifier for entities across government departments?
- k. Do you undertake relationship reconciliation across your registers on a continual basis?
- l. Do you triangulate the data on your registers against available data sources within your jurisdiction or externally?
- m. Do you prioritise risk profiling, KYC, enforcement of your register?
- n. Have you codified your legislation into a set of processing rules that are configurable?
- o. Is business continuity factored into all processes?
- p. Are processes subject to quality assurance and or consistent with ISO quality standards?

3. Operational Outcomes

- a. Do you benchmark your processing outcomes and/or service levels?
- b. Do the results form part of your annual report?
- c. Do you outline how these results will be improved and how?
- d. Do you have the appropriate tools and resources to support data analytics and reporting across the registry?
- e. Do you actively manage risks across the organization?

4. Transparency

- a. Do you publish policies to assist compliance?
- b. Is BO data collection covered under your Legislation/Acts?
- c. Do you publish statistics relating to transactions, compliance, and other indicators of registry activity in a timely way.

5. International

- a. Is your organisation a member of any national or international registry association?
- b. Do you leverage published best practices or statements for the registry domain?
- c. Do you comply with international accessibility and useability standards (i.e., WAC3 Accessibility Guidelines)?
- d. Are you benchmarking against other international registry operators or jurisdictions?
- e. Is your register data interoperable with other international registers or are you sharing information across borders?



Theme: *Innovation and Technology*

6. Technology

- a. Is your current technical platform legacy?
- b. Is your platform custom built for your organisation?
- c. Is your platform/system cloud-hosted? Can they be moved easily to another infrastructure provider?
- d. Is your current platform interoperable with other registers?
- e. Do you offer a one-stop business/single outlet service to your client base for electronic fulfilment/compliance with other government authorities (i.e., tax office, business licences, etc.)?
- f. Do you have a roadmap or even a view of how your registry platform will be improved or enhanced over time, or make use of the latest innovations and technology trends?
- g. Have you built and extended new applications to meet legislative requirements?
- h. Can non-developers make form changes without recourse to your consultants or in-house IT?
- i. Is it easy to configure and add new register (support new legislation)?
- j. Have you ever started a 'transformation' project without a TOM defined?
- k. Is a technology refresh the sum ambition of any transformation initiatives?
- l. Can you onboard customers using real time Identity verification software?
- m. Does or will AI/RPA form part of your current or future vision?
- n. Is information cascaded through your registers (e.g., addresses) or are they entered multiple times?
- o. What percentage of your processes are manual?
- p. Have you adopted "standards" across your organisation where applicable (e.g., Beneficial Ownership Data Standards (BODS))?

Theme: *Legislation and Regulatory Compliance*

7. Legislation

- a. When was the last time your legislation was updated?
- b. Does your legislation restrict what you do operationally?
- c. Is your legislation consistent with modern technology trends and digital services?
- d. Does your legislation name statutory prescribed forms?
- e. Does your legislation provide for certificates, seals, and any other physical type constructs?
- f. Do you have any parts of your legislation that has been written, or changed, to enable for more efficient registry operations?
- g. Is your legislation and policies publicly available from your website?

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8. Regulatory Compliance

- a. Do you consistently review and enforce registry requirements?
- b. Do you publish and engage with stakeholders to actively promote regulatory compliance?
- c. Do you publicly report on your compliance rates across filing types?
- d. Do you name and shame?

Theme: *Data Management and Governance*

9. Data Management

- a. Do you undertake regular audits or sampling of the data in your register?
- b. Do you know the completeness, integrity, accuracy of your register records?
- c. Do you use KYC/Triangulation processes to validate your data?
- d. Do you have a centralized data repository on a registry for easy sharing and collaborations across departments and agencies?
- e. Do you prioritize data privacy through appropriate policies and procedures for handling personal information (e.g., implemented any privacy-by-design principles)?
- f. Do you manually correct anomalies on your register?
- g. Do you have data governance framework in place defining roles and responsibilities for data management for regular updating, cleansing, and maintaining data?
- h. Do you have an accurate data dictionary of your current register?
- i. Do you implement standardisation of data elements with respect to other registers in your jurisdiction?

10. Governance (alignment check)

- a. Do you outsource some or all the registry operations through a contractual or other legal arrangement that may involve public-private partnerships or the private sector?
- b. Are fees and services levels managed directly under the government authority or are they set under the outsourced service provider?

Theme: *Stakeholders and Clients*

11. Data Management

- a. Do you undertake regular stakeholder engagement?
- b. Do you utilise a Net Promoter Score (NPS) or similar survey of stakeholder satisfaction with your services?
- c. Do you interoperate with another jurisdiction? Multiple other jurisdictions?
- d. Do you have open APIs?
- e. Do you publish your data on Open Data initiatives?

Best Practice Statement Alignment in the Assessment Framework

While the authors recognise that a best practice statement may vary depending on the specific context, legal and regulatory environment, and, indeed, the goals and objectives of the Register, a statement of best practice for registers are primarily grouped into similar “Themes” as described above.

As outlined in our previous Paper under this Series⁶, the following are what the authors consider the characteristics of best practices within register operations and should be used in targeting the future transformation and continuous evolution of the Registry, the “dot on the horizon”.

This list is not exhaustive and requires further validation by register operators of a wide range of register types (i.e., legislative, and regulatory frameworks):

- 1. Customer (citizen and business) centric approach⁷:**
 - a. Customer-first/Customer centricity to provide a positive user experience and build long-term relationships.
 - b. A focus on customer value drives the design of processes, policies, and incentives (even for back-office processing).
- 2. Support all register channels and ecosystems:**
 - a. Registers will typically have complex/tiered channels to their stakeholders.
 - b. Recognition that most customers will interact with the Register through third-party products and separate implementations, not simply on designated Register Portals.
- 3. Self Service⁸:**
 - a. It should be possible for a customer to consume services independently of support channels.
 - b. Extensive context-sensitive support that allows a customer to fulfil a service without recourse to the Register.
- 4. Fully electronic registers:**
 - a. Every facet, every form and every service must be electronic.
 - b. In a post-covid world, if a register service is not electronic, it does not exist.
- 5. Register Process Automation⁹:**
 - a. Extensive use of AI and RPA.
 - b. AI and data analytics impact real-time registry operational decisions and outcomes.
 - c. Manual intervention in processes remains the exception to the processing of filings.
 - d. Throttling of the level of automation over time.

⁶<https://www.fostermoore.com/hubfs/PDF/Registers-The-New-Frontier-05-2023.pdf>

⁷New South Wales Government, 2021, Towards a Customer Centric Government, <https://www.nsw.gov.au/nsw-government/projects-and-initiatives/towards-a-customer-centric-government>

⁸<https://www.nsw.gov.au/nsw-government/projects-and-initiatives/towards-a-customer-centric-government>

⁹Gartner – Top 10 Government Technology Trends for 2023 <https://www.gartner.com/en/newsroom/press-releases/2023-04-17-gartner-announces-the-top-10-government-technology-trends-for-2023>

6. Extensible¹⁰:

- a. Register Authority must, with ease, support additional register types/legislation.
- b. Changes in the legislative and regulatory landscape cannot be predicted nor foreseen; the underpinning technology and related systems must support new register types within existing investments.

7. Cloud Hosted¹¹:

- a. Register physically deployed in the Cloud to use unlimited infrastructure services (throttling for peak periods).
- b. Business Continuity Planning is made more accessible by the entire register services deployed in the Cloud.
- c. Use of Public Offices/Counters eliminated.

8. Flexible/Configurable:

- a. Changes to the setup of the Register should be affected easily and quickly.
- b. Changes reflected across all services are ubiquitous, irrespective of the delivery channel.

9. Register Intelligence® / Analytics and Reporting:

- a. A fully automated electronic register relies on its ability to report in real-time and handle processing or transaction exceptions.
- b. Extensive analytics and reporting capabilities.

10. Benchmarking Performance Monitoring (BPM):

- a. Publish how the Register performs – annual report or live processing statistics.
- b. Performance of the Register is continually assessed to enable reconfiguration based on current environmental conditions and service demand.
- c. Use benchmarking in their operations to measure themselves against internal or external standards.

11. Continuous Improvements:

- a. Process of continually improving register services, preferably with shared services road maps.
- b. Use of COTS products with an inherent vision of future-proofing the technical underpinnings of the Register.

12. Absence of technical or functional obsolescence:

- a. Functional or technical systems are not allowed to degrade.
- b. The Register always deploys the latest process design and is supported by suitable technology.

¹⁰ United Kingdom Government, Government Digital Services, 2015, Characteristics of a Register, <https://gds.blog.gov.uk/2015/10/13/the-characteristics-of-a-register>

¹¹ New Zealand Government, Government Cloud Programme, <https://dns.govt.nz/digital-government/programmes-and-projects/cloud-programme/>

13. Standardisation¹² (Data and identity):

- a. Data across the registers is standardised, and identity management systems are consolidated. Minimum viable data set – no duplication.
- b. The Once Only Principle – citizens are not asked for data elements already provided while consuming other services.
- c. Data supplied to register is not requested multiple times.
- d. Interoperability and connections to other registers and data sources.

14. Published vision of public service:

- a. Roadmap of improvements to the public service.
- b. The recognition is that register services exist within a more comprehensive public services design with a consolidated approach to their delivery.

15. Public Service Design incorporates the views of citizens and businesses¹³:

- a. Service design is inclusive.
- b. Increased interconnection and diffusion.

16. Focus on the processes rather than the digitisation¹⁴:

- a. Differentiation of the efficiencies in processes to be supported rather than simple digitisation.
- b. Much of Register's past efforts have been digitising existing paper processes.
- c. Legislation is mainly premised on paper processes.

17. Know Your Customer (KYC):

- a. Implement systems that reduce the risk of placing natural persons on the Register that have not been validated, which may cause reputational risk for the Registration Authority.
- b. KYC processes for registers are wholly inadequate or non-existent.
- c. Implement minimum KYC processes for natural persons triangulated against available data sources.

18. Protects Citizens' identity concerning overarching privacy legislation or principles¹⁵:

- a. Identity Assurance Principles and privacy-related aspects of identity-related initiatives must be strictly adhered to.
- b. The Register shall not syndicate personal information from the Register that was supplied under specific conditions.
- c. The Register will deploy sufficient security infrastructure to protect the personal information retained on its Register from the public and its staff.

¹² Government of Ireland, DPER, Public Service Data Strategy, 2019-2023, <https://assets.gov.ie/7107/7ac4ae109cd944dc99c9e178962fa095.pdf>

¹³ United Nations Development Programme, UNDP, 2011, "Design Thinking for Public Service Excellence", Global Centre for Public Service Excellence, https://www.undp.org/sites/g/files/zskgke326/files/publications/GPCSE_Design%20Thinking.pdf

¹⁴ New Zealand Government, Strategy for a Digital Public Service, <https://www.digital.govt.nz/digital-government/about-digital-government/introduction-to-nzs-digital-transformation/>

¹⁵ European Union, Global Data Protection Regulation, 2018, <https://gdpr-info.eu>

19. Transformation of the Registers as part of broader e-Government initiatives:

- a. Coordinate with the other agencies of Government that the Registers remain the single source of truth – canonical.
- b. Transformation efforts of the Register are part of Government-Wide efforts to improve public services.

20. Support SMEs by the creation of new value-add products:

- a. Digital transformation will create a new set of potential products and or intermediaries that consolidate/ amalgamate and harmonise the product sets.
- b. The Register should make available its data in a consumable format to allow SMEs to create new products and increase the value and transparency of the Register.
- c. The Register Authority should resist the inclination to control and monopolise the data provided to the Register.

21. Targeted promotion and marketing efforts to motivate and increase the use and the correct use:

- a. Adopt reframed marketing strategy concerning changing stakeholder behaviour and improve it by reinforcing submission errors/send-back.
- b. The Register should always publicly aim to promote the efficient use of the Register.

22. Represents the operational view of the Register to promote legislative improvements:

- a. The Registration Authority seeks to modernise the legislative basis to improve the public service design.
- b. As the primary input to all register operating models, the legislation should provide feedback on the operational view to legislative change.

23. Reduction or absolute removal of paper/public offices in a post-Covid world¹⁶:

- a. Maintaining public offices with over-the-counter physical services is unsafe in a post covid world and delays the transformation possible.
- b. Removal of all public service offices and information counters.

24. Identity Validation Services¹⁷:

- a. All registry services should include online identity validation and removing physical identity processes.
- b. IDV should be incorporated into every onboarding process for customers of the Register.

25. Enforcement /Regulatory:

- a. Automated enforcement processes
- b. Risk profiling of entities and natural persons related to register entities.
- c. Automation of processes affords the Registration Authority more bandwidth for value-add regulatory processing.

¹⁶ World Economic Forum, How to transform your business model for a post-COVID future, 2020, <https://www.weforum.org/agenda/2020/11/transform-business-model-post-covid-future/>

¹⁷ United Kingdom, Companies House, Companies House Reform: Identity Verification, 2022, <https://companieshouse.blog.gov.uk/2022/12/12/companies-house-reform-identity-verification/>

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26. Interoperability¹⁸:

- a. Registers adhere to the principle of being canonical, whereby the Register only stores data pertaining to the legislation that instantiated it.
- b. Registers interrogate all other available data sources and registers to validate register entities or for triangulation.
- c. Interface layer

27. Primacy¹⁹:

- a. The Register is the single source of truth consistent with its legislation.
- b. The Register will exist within an ecosystem of other related bodies or government agencies that can interrogate it securely and efficiently.

28. Transparency:

- a. The ultimate function of a public register is to be transparent. Opening the Register to as broad an audience in terms of scrutiny is what makes the Register efficient.
- b. Use of Open Data and other platforms to increase the accessibility of the Register is essential.

29. Security²⁰:

- a. The security infrastructure, procedures and processes directly reflect on the reputation of the custodian of the Register.
- b. Misuse of the Register, fraudulent (strawman filings), identity theft and other nefarious transactions on the Register directly reflect on the Register – consider the Persons of Significant Control (PSC) in the UK leading to the latest Economic Crimes and Corporate Transparency Bill²¹

30. Data Integrity²²:

- a. The data integrity and the quality of the processes validating this data are the key metrics of the efficiency and effectiveness of a register.
- b. The Register should always seek to sample its register data to ensure anomalies are identified.

31. Compliance with Standards:

- a. Adopting and adhering to existing international and/or jurisdictional standards means the Register implements best practices and ensures greater interoperability for it and its peers—for example, XBRL and ISO OSI.
- b. The registration authority should cooperate in efforts to standardise its data at a jurisdictional level and with its peers at an international level.

¹⁸ Teranet, Enabling Digital Government: Interoperability and Data Exchange Between Registries, 2023, <https://www.teranet.ca/insights/enabling-digital-government-interoperability-and-data-exchange-between-registries/>

¹⁹ United Kingdom Government, Government Digital Services, 2015, Characteristics of a Register, <https://gds.blog.gov.uk/2015/10/13/the-characteristics-of-a-register>

²⁰ Gartner – Top 10 Government Technology Trends for 2023 <https://www.gartner.com/en/newsroom/press-releases/2023-04-17-gartner-announces-the-top-10-government-technology-trends-for-2023>

²¹ <https://bills.parliament.uk/bills/3339>

²² OECD, Good Practice Principles for Data Ethics in the Public Sector, <https://www.oecd.org/gov/digital-government/good-practice-principles-for-data-ethics-in-the-public-sector.pdf>

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It is intended that from this structured process of evaluation, that we can then formulate a Registry Capability Maturity Rating (*sample output below*) allowing for an initial comparative assessment of the current state, is domain agnostic, is easily discernible, and provides for identification of the Stages across Themes. This then becomes the initial roadmap for structured and targeted improvement areas across the register and organization.

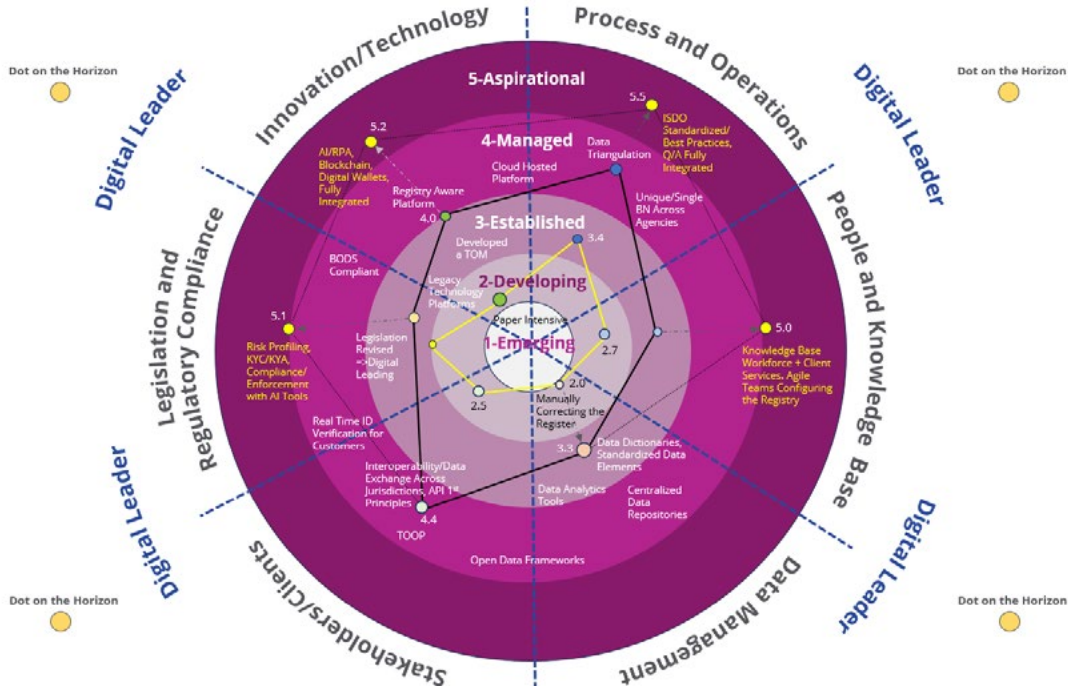


Figure 3: The RCMM Spider Diagram – Current and Future State Comparative Assessments

We visited one jurisdiction recently that uses their own scoring mechanism and has already derived a register maturity model. This is used to direct their change programmes and reinforce to their staff and stakeholders, where all their effort led to.

What defines the Registry?
...and where do we intend to improve

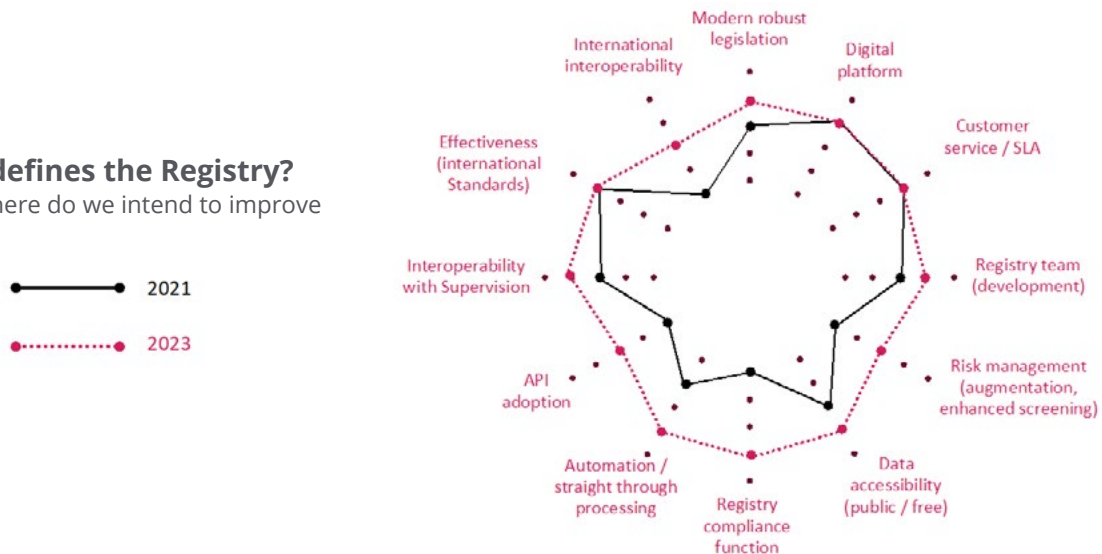


Figure 4: The RCMM Spider Diagram – Jersey Financial Services Commissions 2023

Conclusion

This Paper is the culmination of a substantial effort by the authors to derive a holistic approach towards digital transformation and to provide a highly effective evaluation framework for the registers and their custodians. This required us to create a statement of best practice, a maturity model, and the corresponding assessment model which would assist registers in correctly managing their transformation efforts, and to envision a realistic TOM.

However, the authors were struck at the dearth of management theory available with respect to register domains in general. In equal measure, the authors found that little work was undertaken by registers in assessing their COMs, how they defined their TOMs, and what they used to direct or assess their transformation programmes that they were wholly committed to. In simple terms, we found it difficult to understand what the guiding principles of these registers were and what vision they ascribed to.

A standard People Process Technology (PPT) framework is what most organisations we reviewed are using. However, this PPT framework is two-dimensional when it comes to assessing the operations, structure, and processes of a register, where there is an inherent legislative basis to their existence. We contend that what we propose here is a far richer means of understanding a register, where it is at in its evolution, where to focus its change efforts, and ultimately how it can be helped to perform most effectively.

A Register Capability Maturity Model helps all registers (domain agnostic) because it fully embraces:

1. **Process Improvement**²³ - provides a structured approach to process improvement. By assessing the maturity of current processes, organizations can identify areas for improvement and establish a roadmap for enhancing their capabilities.
2. **Benchmarking**²⁴ - it offers a means to benchmark against its peers and other regulatory organisations, which can provide a measure of its current capabilities. This benchmarking helps in setting realistic goals for improvement and provides a basis for comparing progress over time.
3. **Risk Management**²⁵ - Most registers are currently undertaking some form of transformation project in a post-covid world. This often involve changes to existing processes and the introduction of new technologies and applications. RCMM helps in identifying potential risks and weaknesses in the current processes, allowing registers to proactively address and mitigate these risks.
4. **Consistency and Standardization** - the RCMM promotes consistency and standardisation in processes. This is crucial in transformation projects where uniformity in how processes are executed can contribute to efficiency, reduced errors, and improved overall quality.
5. **Strategic Alignment**²⁶ - RCMM can assist in aligning process improvement efforts with register goals and TOMs. This alignment ensures that the transformation project is not just a technical endeavour but also addresses the strategic needs of the organisation.

²³ Rashid, Omar Adnan, and Mohamad Nazir Ahmad. "Business process improvement methodologies: an overview." *Journal of Information System Research Innovation* 5 (2013): 45-53.

²⁴ Warnecke, Danielle, Rikka Wittstock, and Frank Teuteberg. "Benchmarking of European smart cities—a maturity model and web-based self-assessment tool." *Sustainability Accounting, Management and Policy Journal* 10.4 (2019): 654-684.

²⁵ Ahmed, Ammar, Berman Kayis, and Sataporn Amornsawadwatana. "A review of techniques for risk management in projects." *Benchmarking: An International Journal* 14.1 (2007): 22-36.

²⁶ Sledgianowski, Deb, Jerry N. Luftman, and Richard R. Reilly. "Development and validation of an instrument to measure maturity of IT business strategic alignment mechanisms." *Information Resources Management Journal (IRMJ)* 19.3 (2006): 18-33.

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6. **Resource Optimisation**²⁷ – Understanding the maturity level of the register allows the register to allocate resources more effectively. It helps in identifying areas where investments in training, tools, or technology can yield the most significant improvements.
7. **Customer Satisfaction** – By improving processes, registers can enhance the quality of their products and services. This, in turn, can lead to increased customer satisfaction, a crucial factor in the success of any transformation or change initiative.
8. **Continuous Improvement**²⁸ – RCMM emphasises the importance of continuous improvement in a register. It provides a framework for the register to assess their maturity periodically and adjust their processes as needed, to move to the next maturity level.
9. **Change Management**²⁹ – Transformation projects often face resistance from employees accustomed to existing processes. RCMMs can be used as a communication tool to help employees understand the need for change and the benefits that the transformation will bring and how these efforts are a logical step to increasing the efficacy of the register.
10. **Measurable Results**³⁰ – RCMMs provide a structured way to measure progress. This enables registers to demonstrate tangible improvements over time, which is essential for justifying the investment in transformation projects.

The Registry Capability Maturity Model (RCMM) is more than a theoretical construct; it's a practical roadmap for organizations seeking to assess, enhance, benchmark and significantly optimize their registry operations. The RCMM offers a structured framework for organizations to evaluate their registers and organizations, set targeted improvement objectives, and to ultimately chart their own path towards optimal performance.

Finally, the authors welcome feedback on the contents of this Paper. We have intentionally not included a scoring mechanism for our RCCM until we have validated its usefulness to the register domain. We again contend that this would be a trivial exercise, one we would ideally develop collaboratively with targeted registries. In the interim, it would be valuable and more important as an initial step for the register to use these templates to self-assess and honestly score its Current Operating Model and extrapolate the relevant spider diagram to help represent their future Targeted Operating Model.



²⁷ Adekunle, Samuel Adeniyi, et al. "A Critical Review of Maturity Model Development in the Digitisation Era." *Buildings* 12.6 (2022): 858.

²⁸ Lindemulder, M. J. Development of a continuous improvement maturity model assessment instrument. BS thesis. University of Twente, 2015.

²⁹ Zephir, Olivier, Stéphanie Minel, and Emilie Chapotot. "A maturity model to assess organisational readiness for change." *International Journal of Technology Management* 55.3/4 (2011): 286-296.

³⁰ Phillips, Jack J., Timothy W. Bothell, and G. Lynne Snead. *The project management scorecard*. Routledge, 2012.

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Foster Moore®, a Teranet company, – is a global leader and specialist registry software company focused on digital services for modernizing government.

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Glossary

Application Programming Interface (API) – a means by which two or more computer programs can communicate with each other.

Artificial Intelligence (AI) - leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind.

Beneficial Ownership Data Standards (BODS) - defines a common data format that provides a consistent way to collect, use, exchange and publish beneficial ownership information; increases transparency of who owns, controls or benefits from companies and other organisations.

Capability Assessment Model (CAM) - A capability assessment is a structured and standardised framework for evaluating the capabilities, competencies of the subject, domain or organisation being assessed.

Capability Maturity Model (CMM) - A CMM is a methodology used to develop and refine an organization's software development process. The model describes a five-level evolutionary path of increasingly organized and systematically more mature processes. It is used in this paper's case to highlight the evolution of a register organisation in its attempts to evolve.

Current Operating Model (COM) – it is the current operating model instituted in terms of the configuration of people, processes, and technology to achieve the organisation's objectives.

Interoperability is the ability to share information and services or the ability of systems or components to exchange and use information or provide and receive services from other systems.

Know Your Asset (KYA) – knowing the identity and beneficial owner of a particular asset.

Know Your Customer (KYC) – it is the mandatory process of identifying and verifying a client's identity and bona fides to transact in a specific capacity.

Machine Learning (ML) - is an AI technique that teaches computers to learn from experience.

One-Stop-Shop/Business (OSS) - A one-stop shop (OSS), in public administration, is a government office where multiple services are offered, allowing customers to access these services in a centralized location rather than in different places.

Open Data - is defined as structured data that is machine-readable, freely shared, used and built on without restrictions.

Operator – the custodian of a register.

PPT - As a term, people, process, and technology (PPT) refers to the methodology in which the balance of people, process, and technology drives action: People perform a specific type of work for an organization using processes (and often, technology) to streamline and improve these processes. This can also be referred to as the PPP, People, Process and Platform, framework in a SaaS environment.

Register – a statutory register that persists legal entity records for a legislative purpose.

Registry Domain – a single grouping of similar legislative bases of register operators such as Land or Business/Corporate.

Robotic Process Automation (RPA) - is an optimisation method that uses AI, machine learning, or virtual bots to execute tasks humans would otherwise handle.

Target Operating Model (TOM) is a high-level blueprint that outlines how an organisation intends to operate in the future to achieve its strategic objectives.

The Once Only Principle (TOOP) - It means that citizens and businesses provide diverse data only once in contact with public administrations, while public administration bodies take actions to internally share and reuse these data – even across borders – always in respect of data protection regulations and other constraints.

Keywords

Target Operating Model; Register; Registry Domain; Transformation; Architectural Principles; Registry Platforms; Cloud Based Registries; Best Practices; Digital Government; Common Platforms and Registry Aware, Capability Maturity Model, Maturity Assessment, Digital Transformation; Maturity Stages