

Trusted Digital Repositories Maturity Model (TDR-MM)

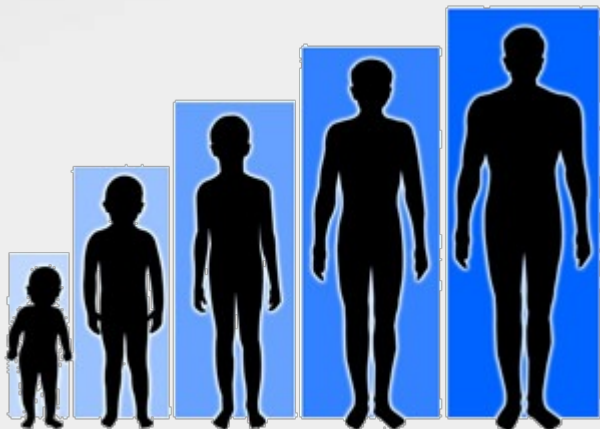
July 11, 2012

Namdo Cho

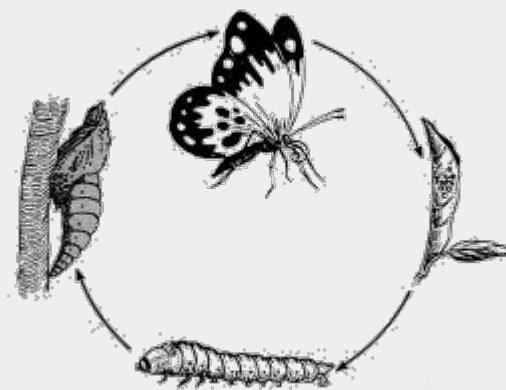
**McGill University
School of Information Studies**

Everything matures...step by step

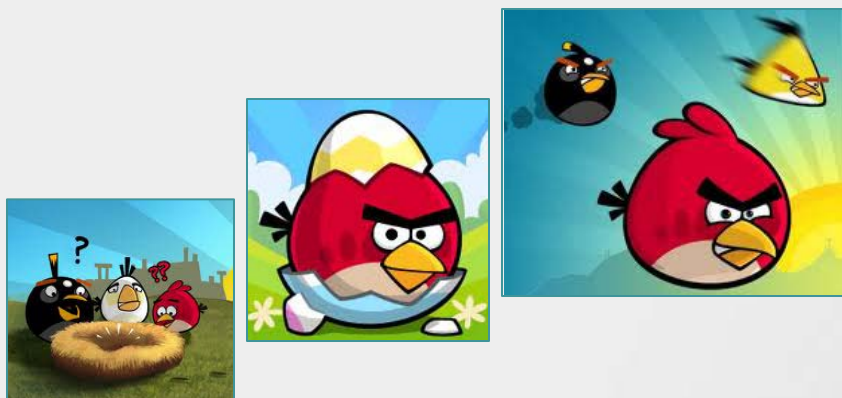
Humans



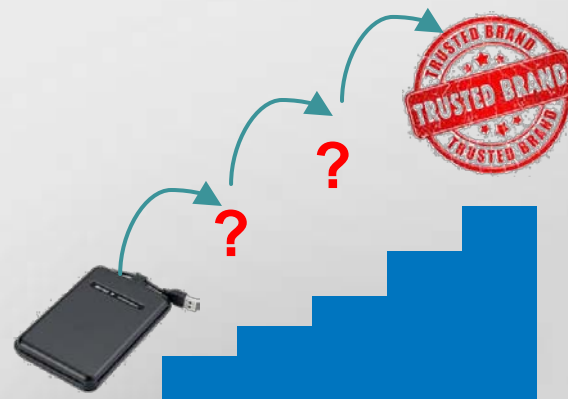
Butterflies



Birds



Digital Repositories



If we know maturity stages, we can...

- Understand current status
- Develop a vision of the desired future
- Establish a list of required improvement actions
- Prioritize these improvement actions
- Produce a plan to accomplish the actions
- Commit the resources to execute the plan



Trusted Digital Repository (TDR)

■ Definition of TDR

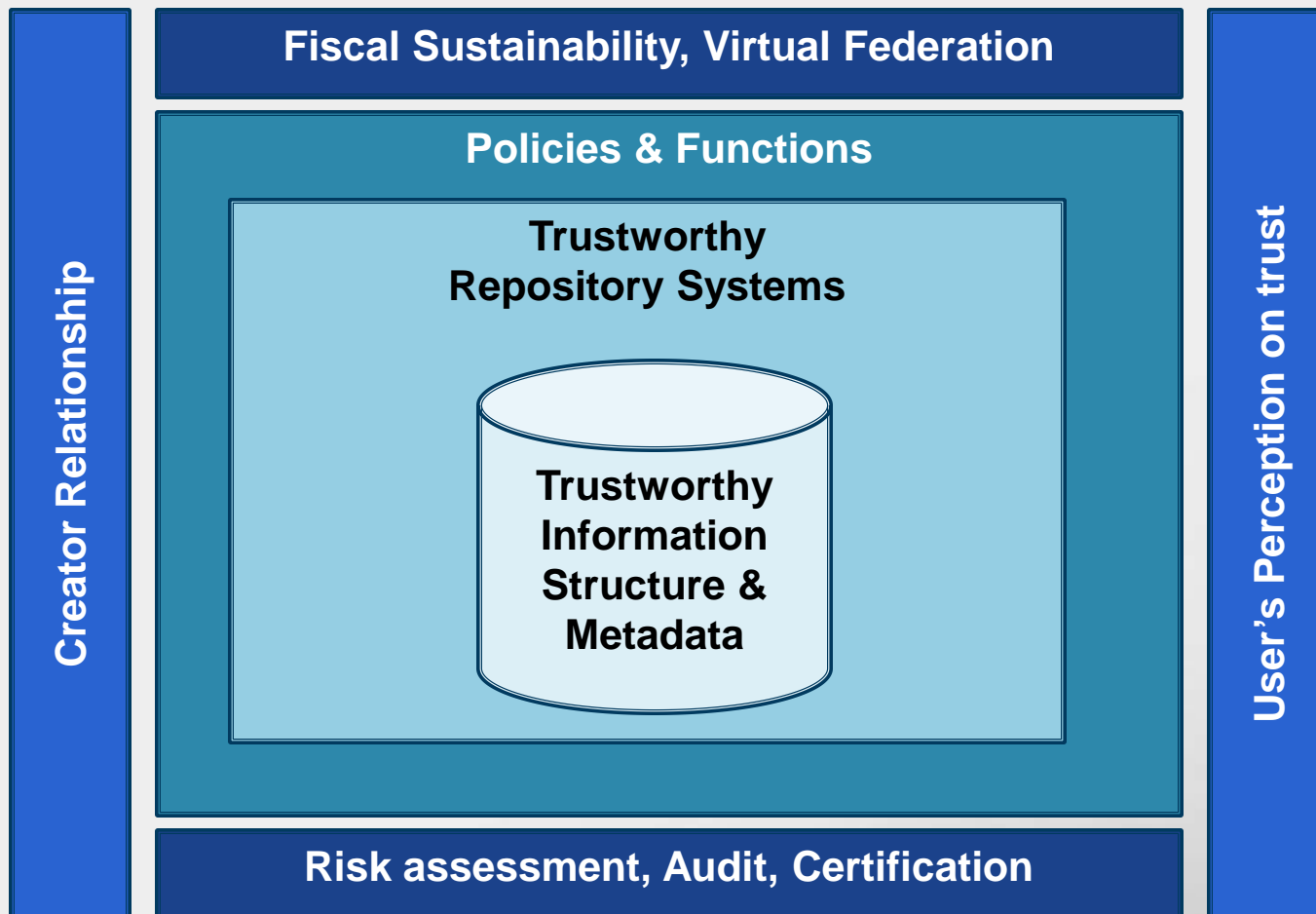
- “A critical component of digital archiving infrastructure is the existence of a sufficient number of **trusted organizations** **capable of** storing, migrating, and providing access to digital collections”
(Task Force on Archiving of Digital Information, RLG, 1996)
- “A trusted digital repository is one whose mission is to provide reliable, long-term access to managed digital resources to its designated community, now and in the future” (RLG-OCLC report, 2002)

■ Major properties of TDR

- Responsible for the **long-term** maintenance of digital resources
- Have an **organizational system** that supports long-term viability
- Demonstrate responsibility and **sustainability**
- Design its systems in accordance with conventions and **standards**
- Establish methodologies for **system** evaluation
- Have policies, practices, performances that can be **audited and measured**

Efforts to establish TDR (1/2)

■ Components for TDR



Efforts to establish TDR (2/2)

■ Audit & Certification for TDR

- ISO 16363 Audit and certification of trustworthy digital repositories
- Published in March 2012
- To objectively justify or prove trustworthiness of 'OAIS-compliant' digital repositories
- defines a recommended practice for assessing the trustworthiness of digital repositories

■ Structure of ISO 16363

- Organizational Infrastructure, Digital Object Management, Infrastructure and Security Risk Management
- Sections (*consist of*) Metrics (*that are satisfied by*) Evidences
- Conformance to these metrics is a matter of judgment
- Audit result can be used to judge overall suitability of a repository or to identify possible weakness of the repository

Audit & Certification vs. Improvement

■ ISO 16363 provides:

- Compliance requirements to get certified as TDR.
- Examples and discussions describing the requirements.

■ ISO 16363 does not provide:

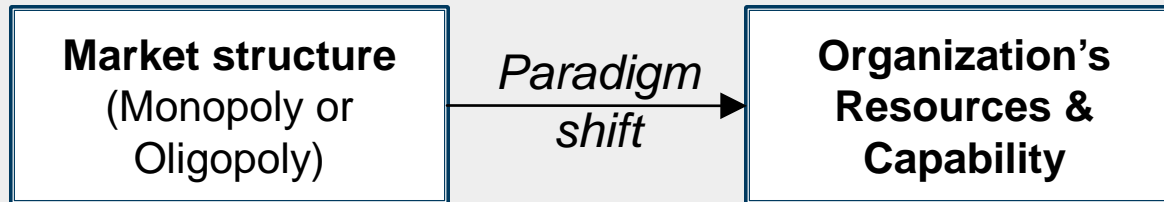
- How to control the performance of digital repositories
- How to improve organizational capabilities over time
- A step by step road map towards the goal



Organizational Capability

■ Resource-based view (from management filed)

- Source of competitive advantage or high performance:



- Resources: capital equipment, skills, people, money

■ Organizational capability

- Ability of an organization in acquiring, bundling and utilizing its resources to perform activities to achieve goals
- Built based on an organization's processes and routines that are practiced and internalized in the organization over time
- An organization can be viewed as comprised of a set of capabilities

Taxonomy of organizational capability

■ Governance capability

- Capability that can manage a TDR's overall strategy, legal status, and risks in order to ensure its business continuity.

■ Business capability

- Capability that can properly operate a TDR's business processes of digital object management
- Capability that can manage cross-functional processes to control and improve quality of the business

■ Cultural capability

- Capability that can encourage a TDR's organizational learning and innovation culture

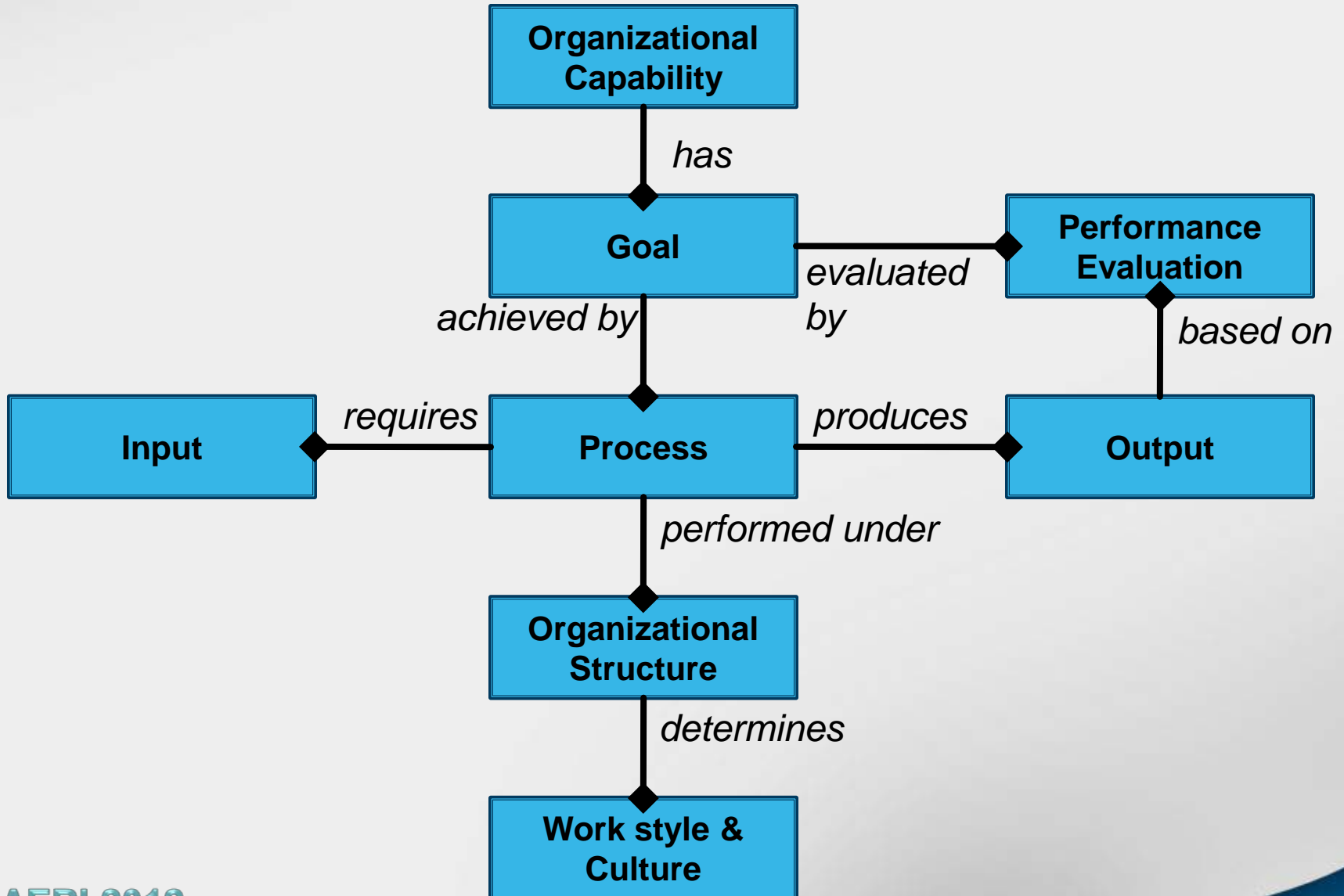
■ Resource capability

- Capability that can properly manage a TDR's resources

Taxonomy of organizational capability

Capability	Focus	Elements for DR (Example)
Governance Capability	<ul style="list-style-type: none"> • Mandate • Strategy • Business continuity • Legal status • Organizational risk 	<ul style="list-style-type: none"> • Visioning for DR's goal and mandate • Strategic planning for DR operation • Succession planning • Contract & license management • Risk management in DR operation and services
Business Capability	<ul style="list-style-type: none"> • Functional process 	<ul style="list-style-type: none"> • Acquisition of content • Creation of AIP • AIP preservation • Access management • Information management • Preservation planning
	<ul style="list-style-type: none"> • Cross-functional process (Control process) 	<ul style="list-style-type: none"> • Project management in digital preservation • User needs assessment / requirement management • Process management (cross-functional processes) • Quality management in digital preservation & access
Cultural Capability	<ul style="list-style-type: none"> • Organizational culture • Core values 	<ul style="list-style-type: none"> • Organizational learning • Knowledge sharing • Innovative culture
Resource Capability	<ul style="list-style-type: none"> • Financial resource • Technical resource • Human resource • Social resource 	<ul style="list-style-type: none"> • Financial management • Technical infra. / security management • HR management, HR development • Reputation management • Collaboration management

Structure of organizational capability



Maturity levels of organizational capability

■ Basic assumptions

- OC is embedded in and expressed as an organization's processes.
- OC can be developed and improved step by step over time.

■ 5 levels of organizational capability

- Adopted from 'CMMI (Capability Maturity Model Integration)'
- Originally developed to assess and improve software development processes. (by SEI at Carnegie Mellon University)
 - expanded as a general approach of assessing process maturity.

Level 1: **Initial**: The process is characterized as **ad hoc and chaotic**.

Level 2: **Repeatable**: Basic processes are established within a **project**.

Level 3: **Defined**: Processes are standardized across the **organization**.

Level 4: **Managed**: Productivity and quality are **measured and controlled**.

Level 5: **Optimizing**: Continuous process **improvement** is available.

Measuring maturity

■ Grid-based model

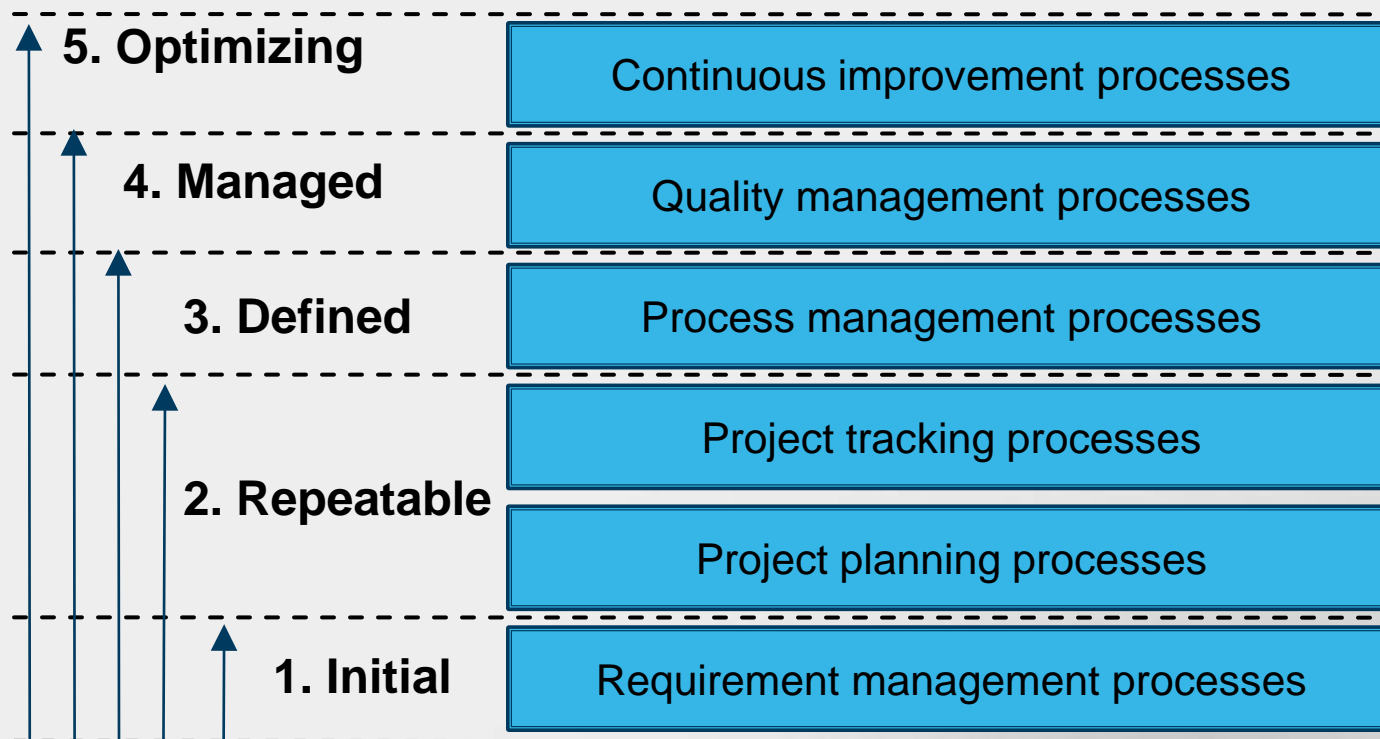
- Define and assess the maturity level of each process.
- Based on the prescriptive or descriptive cell text in each grid.
- Each cell describes goal, structured process, organizational structure, work style and culture

	Acquisition	AIP creation	AIP preservation	Access Management
5. Optimizing	<i>Description</i>	<i>Description</i>	<i>Description</i>	<i>Description</i>
4. Managed	<i>Description</i>	<i>Description</i>	<i>Description</i>	<i>Description</i>
3. Defined	<i>Description</i>	<i>Description</i>	<i>Description</i>	<i>Description</i>
2. Repeatable	<i>Description</i>	<i>Description</i>	<i>Description</i>	<i>Description</i>
1. Initial	<i>Description</i>	<i>Description</i>	<i>Description</i>	<i>Description</i>

Measuring maturity

■ Stage-based model

- Define and assess the maturity level of the whole organization.
- Based on the priority of process implementation.
- According to the implemented processes, the organization can be assessed as Initial, Repeatable, Defined, or Optimizing.



Next steps

■ Combine two approaches

- Grid-based model for functional processes of Business capability (e.g. Acquisition, Preservation, Dissemination, ...) and Governance / Resource capability
- Stage-based model for cross-functional control processes (e.g. Project management, Quality management, ...)

■ Multiple Case Study

- Document analysis: project reports, published articles, ...
- Describe each cell of the grid-based model.
- Identify more cross-functional control processes for stage-based model.
- Collect and describe good practices for each control processes

■ Apply & Evaluate the model

Thank you

Namdo Cho
namdo.cho@mail.mcgill.ca