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ISYS90048 Managing ICT Infrastructure

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School of Computing & Information Systems

Semester 2, 2018, Week 5

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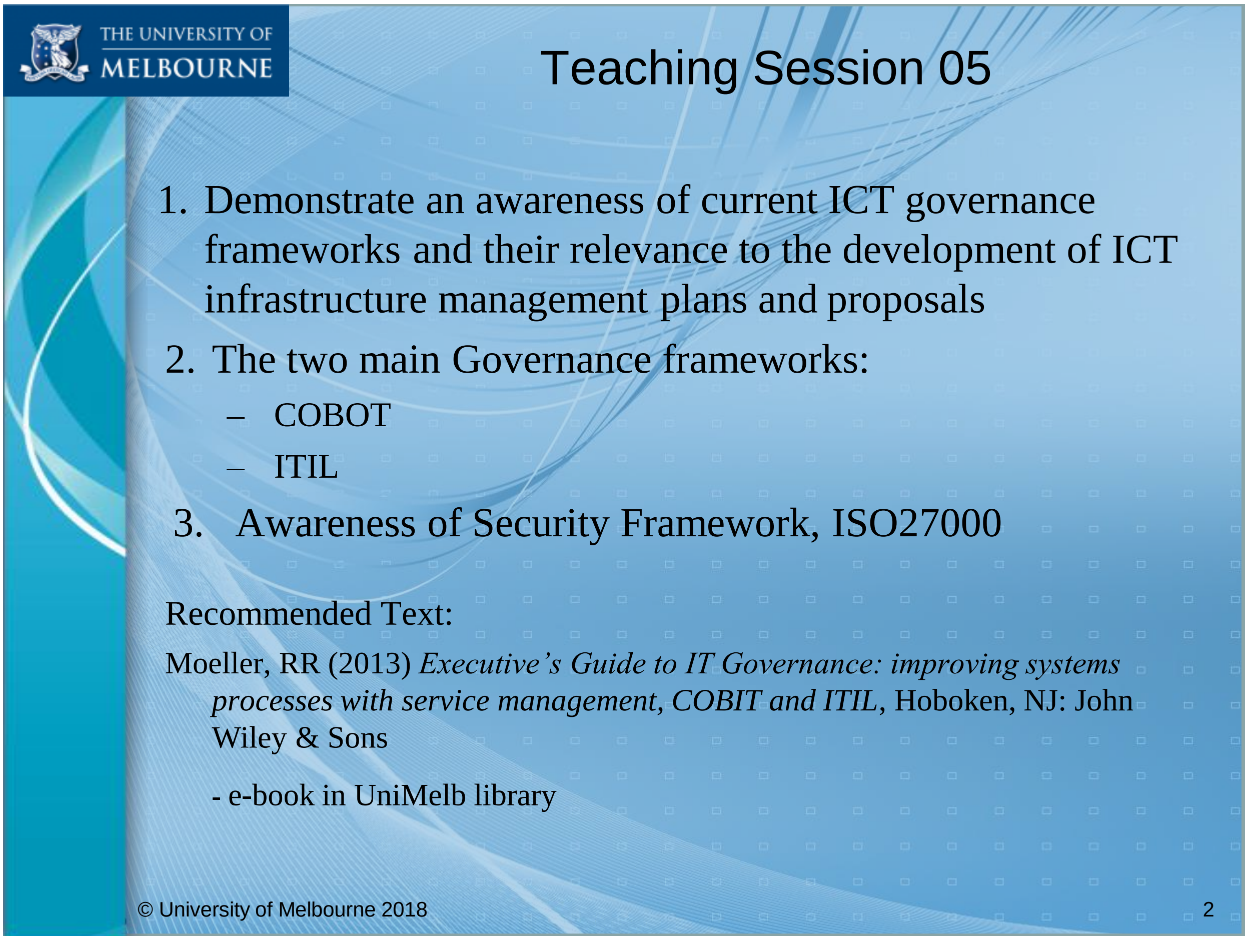

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Teaching Session 05

1. Demonstrate an awareness of current ICT governance frameworks and their relevance to the development of ICT infrastructure management plans and proposals
2. The two main Governance frameworks:
   - COBOT
   - ITIL
3. Awareness of Security Framework, ISO27000

Recommended Text:

Moeller, RR (2013) *Executive's Guide to IT Governance: improving systems processes with service management, COBIT and ITIL*, Hoboken, NJ: John Wiley & Sons

- e-book in UniMelb library

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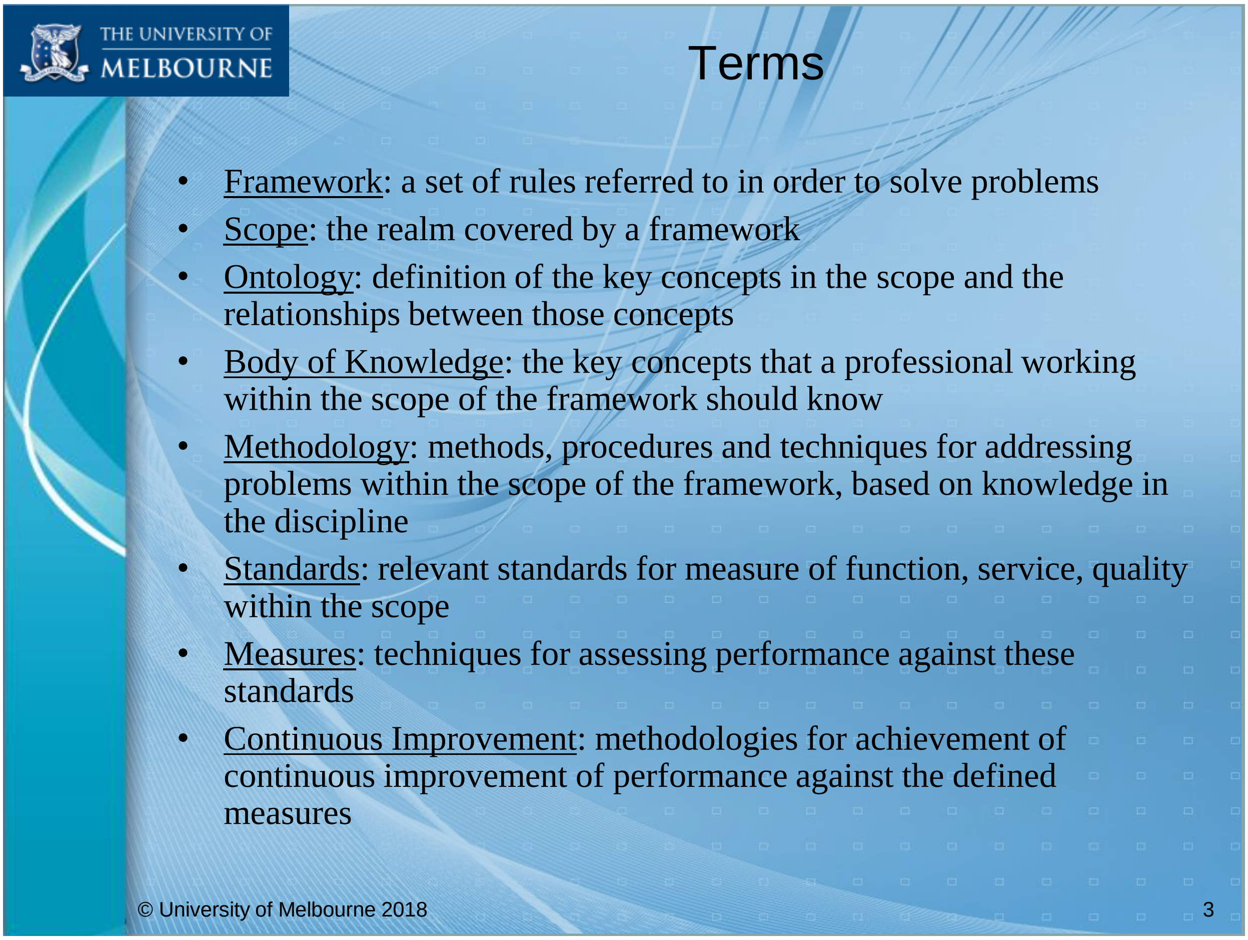

Terms

- Framework: a set of rules referred to in order to solve problems
- Scope: the realm covered by a framework
- Ontology: definition of the key concepts in the scope and the relationships between those concepts
- Body of Knowledge: the key concepts that a professional working within the scope of the framework should know
- Methodology: methods, procedures and techniques for addressing problems within the scope of the framework, based on knowledge in the discipline
- Standards: relevant standards for measure of function, service, quality within the scope
- Measures: techniques for assessing performance against these standards
- Continuous Improvement: methodologies for achievement of continuous improvement of performance against the defined measures

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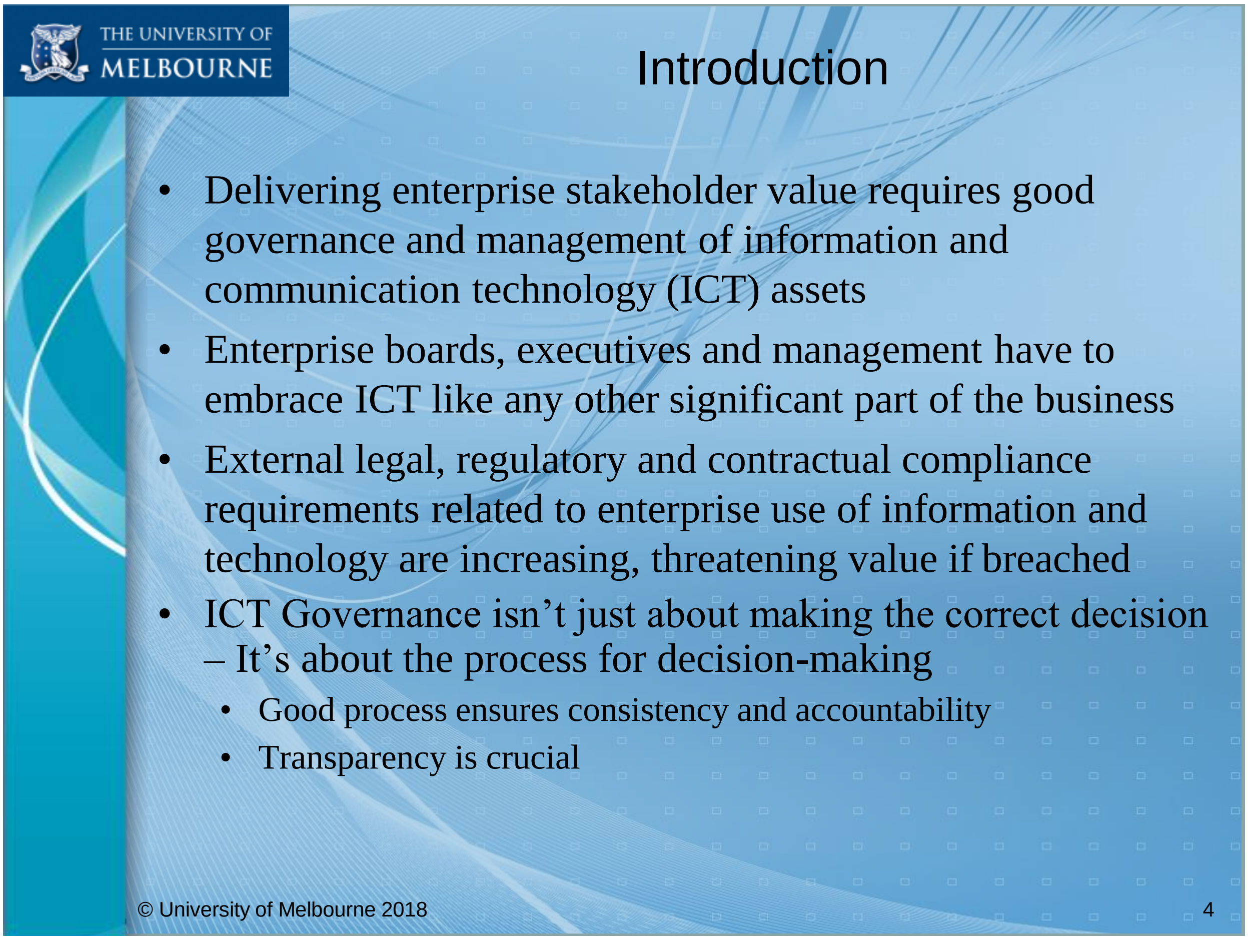

Introduction

- Delivering enterprise stakeholder value requires good governance and management of information and communication technology (ICT) assets
- Enterprise boards, executives and management have to embrace ICT like any other significant part of the business
- External legal, regulatory and contractual compliance requirements related to enterprise use of information and technology are increasing, threatening value if breached
- ICT Governance isn’t just about making the correct decision – It’s about the process for decision-making
  - Good process ensures consistency and accountability
  - Transparency is crucial

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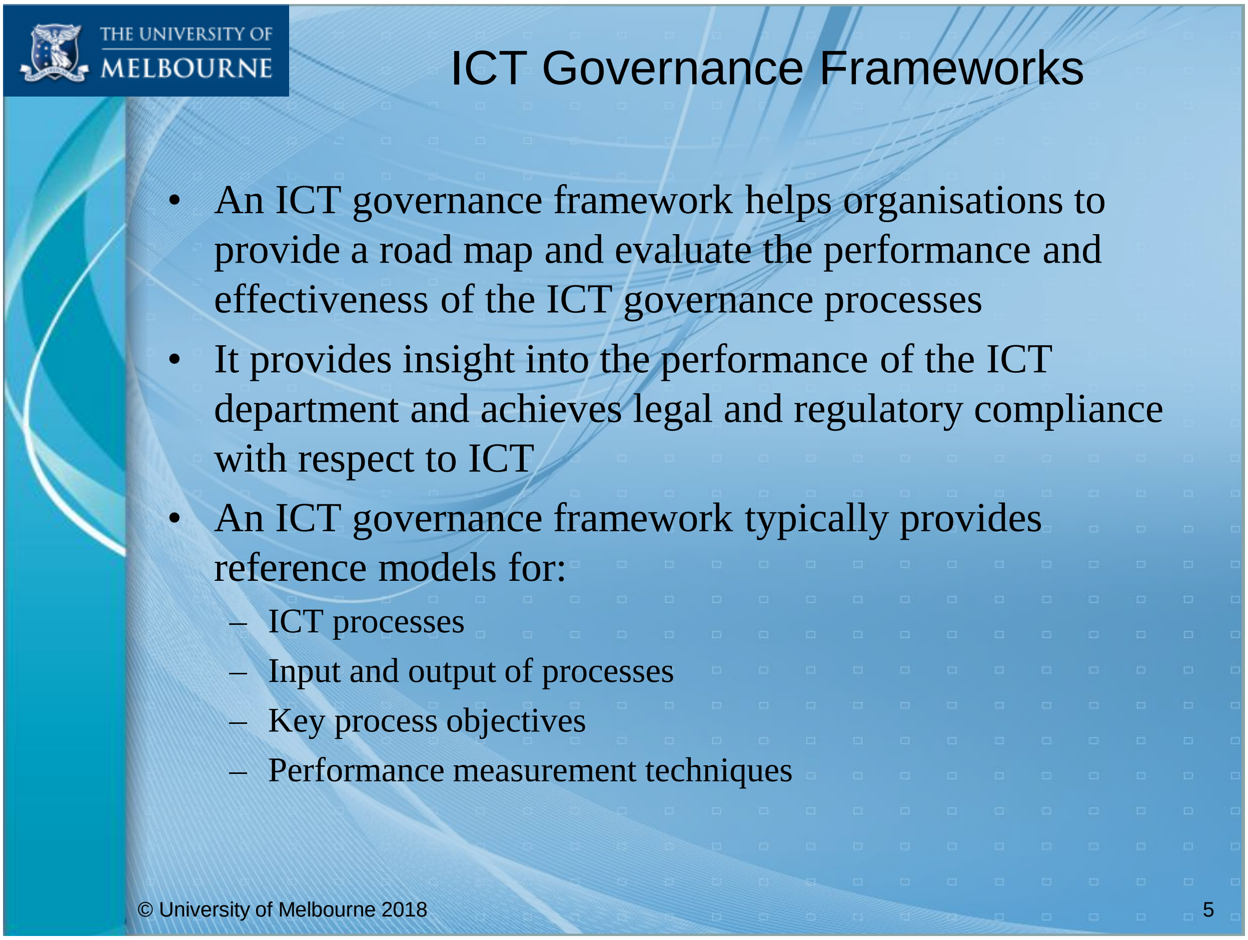
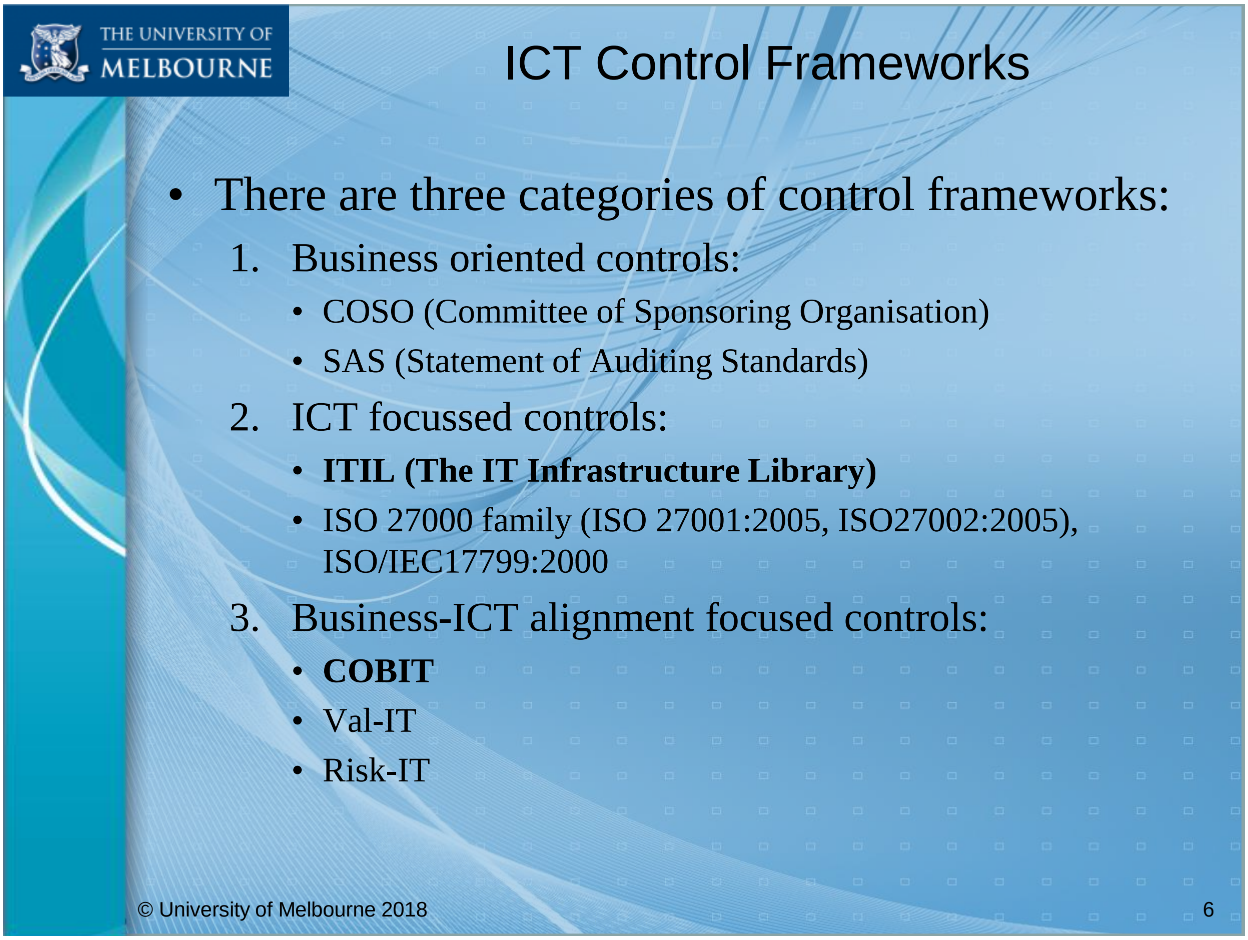


ICT Governance Frameworks

- An ICT governance framework helps organisations to provide a road map and evaluate the performance and effectiveness of the ICT governance processes
- It provides insight into the performance of the ICT department and achieves legal and regulatory compliance with respect to ICT
- An ICT governance framework typically provides reference models for:
  - ICT processes
  - Input and output of processes
  - Key process objectives
  - Performance measurement techniques



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ICT Control Frameworks

- There are three categories of control frameworks:
  1. Business oriented controls:
     - COSO (Committee of Sponsoring Organisation)
     - SAS (Statement of Auditing Standards)
  2. ICT focussed controls:
     - **ITIL (The IT Infrastructure Library)**
     - ISO 27000 family (ISO 27001:2005, ISO27002:2005), ISO/IEC17799:2000
  3. Business-ICT alignment focused controls:
     - **COBIT**
     - Val-IT
     - Risk-IT

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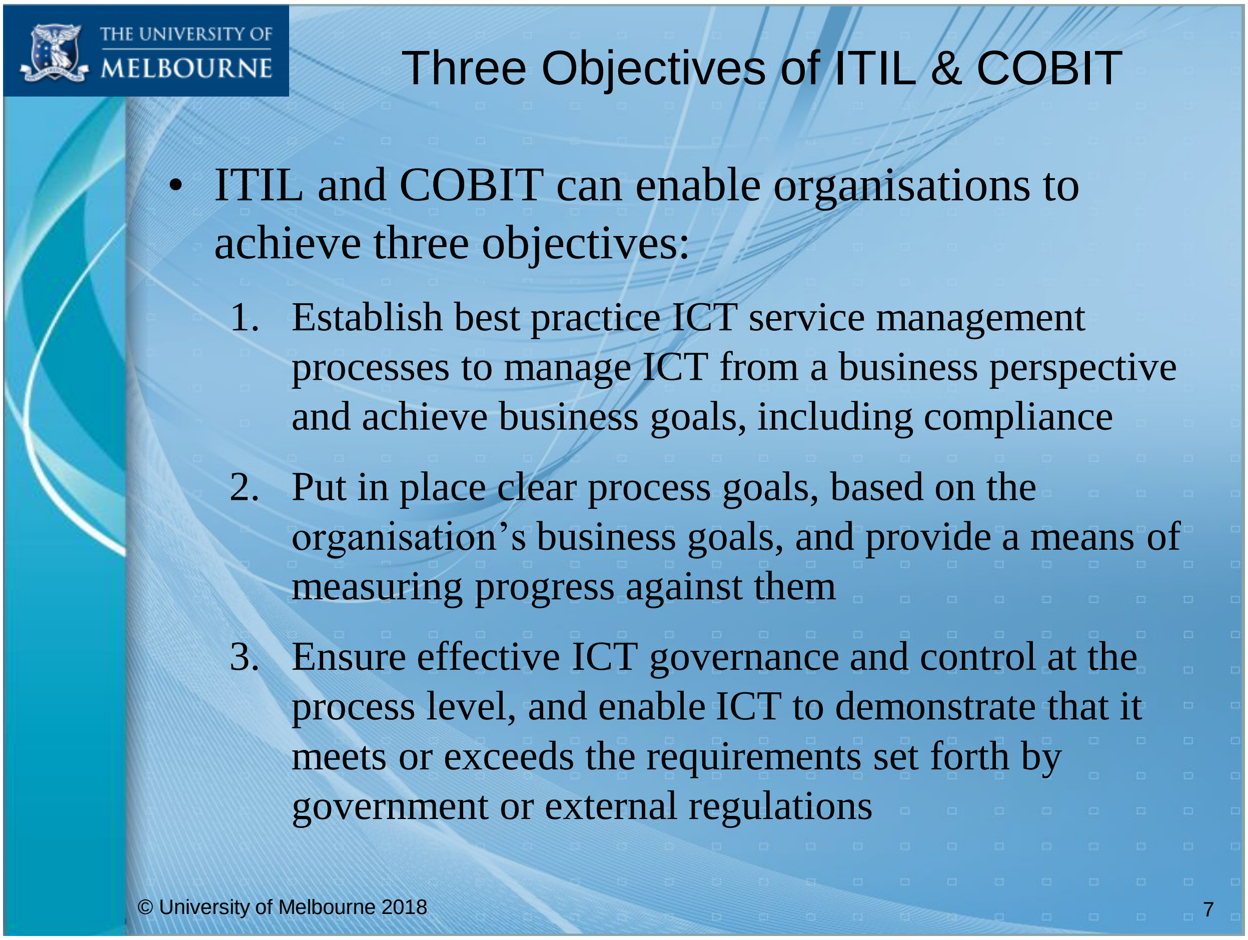

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Three Objectives of ITIL & COBIT

- ITIL and COBIT can enable organisations to achieve three objectives:
  1. Establish best practice ICT service management processes to manage ICT from a business perspective and achieve business goals, including compliance
  2. Put in place clear process goals, based on the organisation's business goals, and provide a means of measuring progress against them
  3. Ensure effective ICT governance and control at the process level, and enable ICT to demonstrate that it meets or exceeds the requirements set forth by government or external regulations

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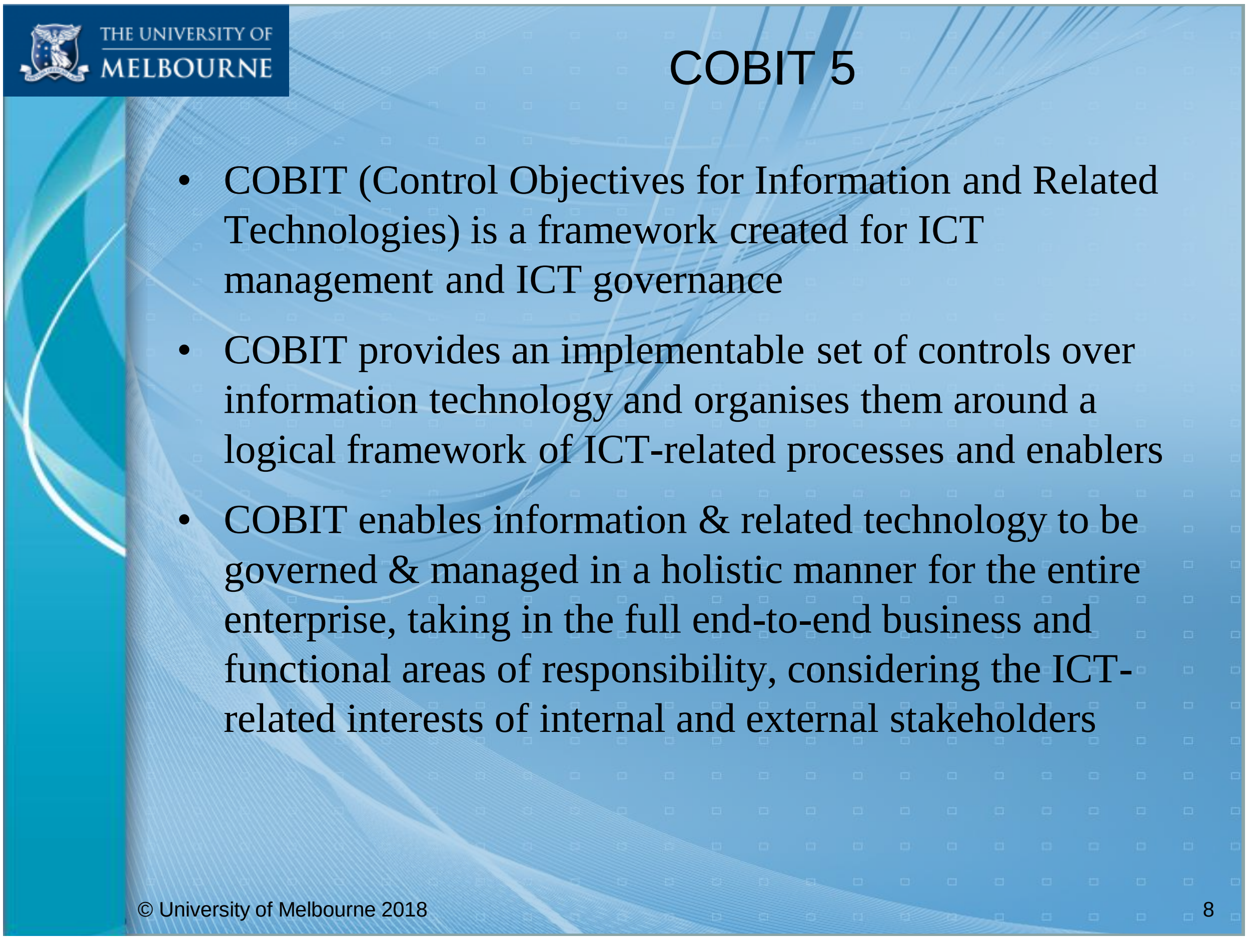

COBIT 5

- COBIT (Control Objectives for Information and Related Technologies) is a framework created for ICT management and ICT governance
- COBIT provides an implementable set of controls over information technology and organises them around a logical framework of ICT-related processes and enablers
- COBIT enables information & related technology to be governed & managed in a holistic manner for the entire enterprise, taking in the full end-to-end business and functional areas of responsibility, considering the ICT-related interests of internal and external stakeholders

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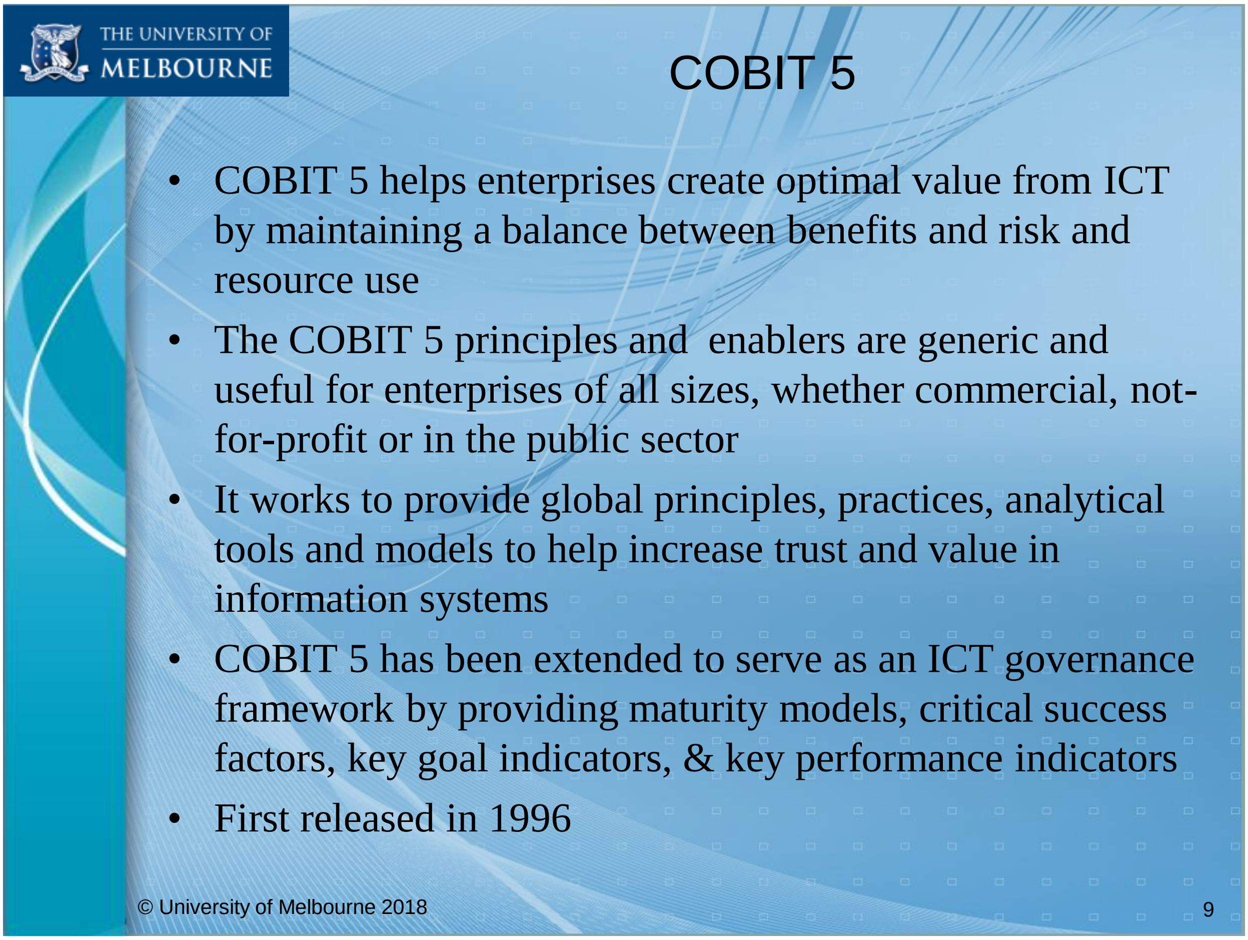

COBIT 5

- COBIT 5 helps enterprises create optimal value from ICT by maintaining a balance between benefits and risk and resource use
- The COBIT 5 principles and enablers are generic and useful for enterprises of all sizes, whether commercial, not-for-profit or in the public sector
- It works to provide global principles, practices, analytical tools and models to help increase trust and value in information systems
- COBIT 5 has been extended to serve as an ICT governance framework by providing maturity models, critical success factors, key goal indicators, & key performance indicators
- First released in 1996

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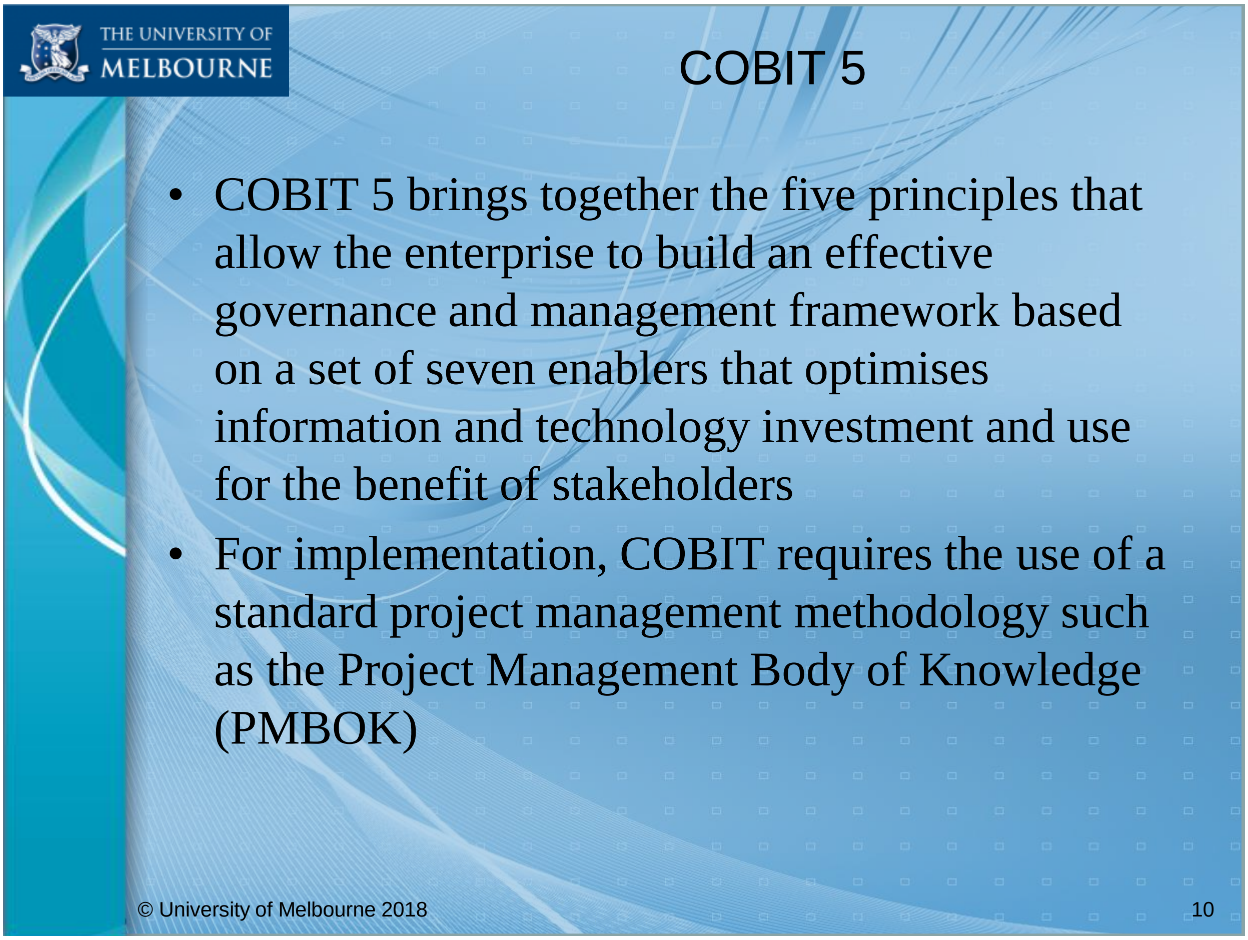
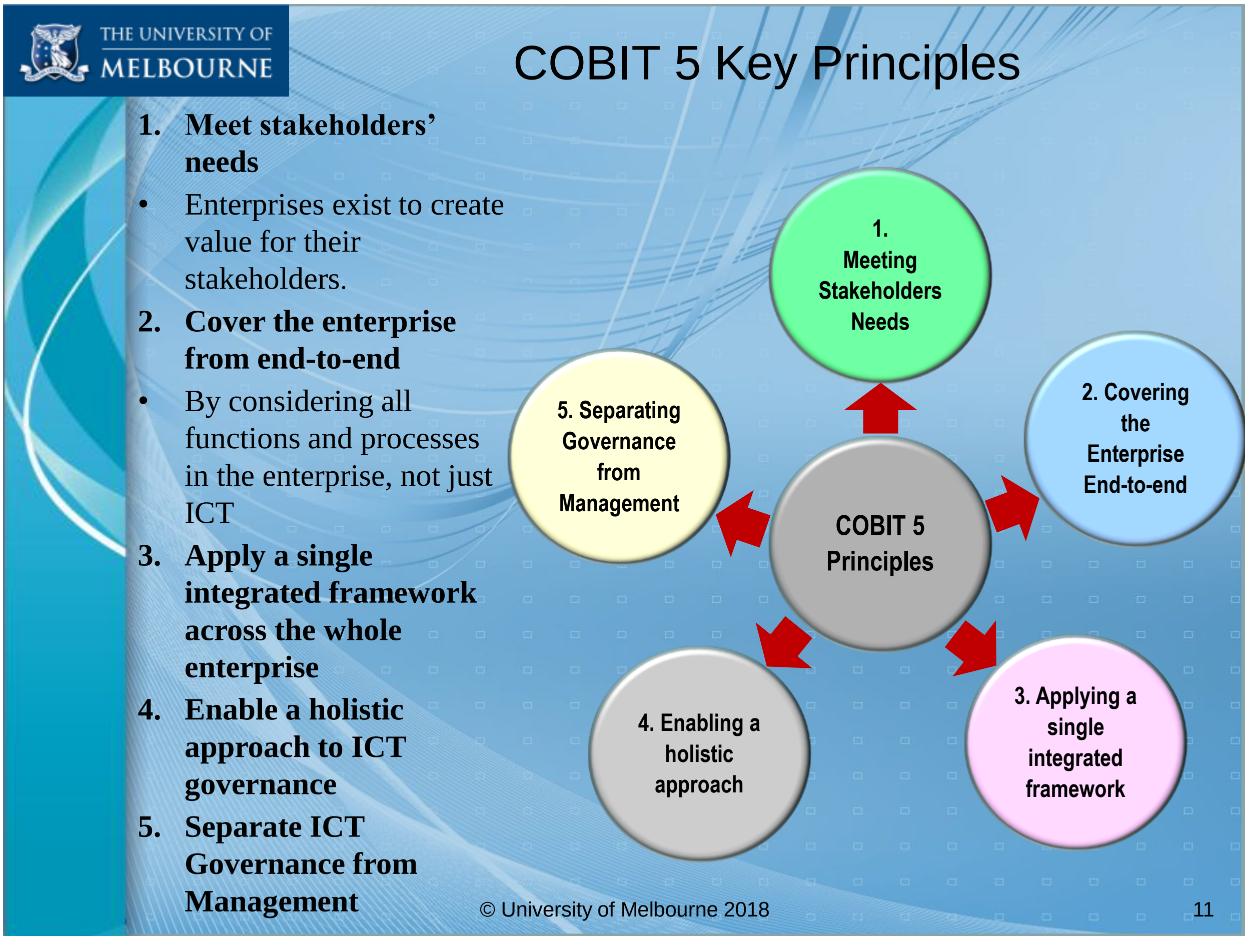


COBIT 5

- COBIT 5 brings together the five principles that allow the enterprise to build an effective governance and management framework based on a set of seven enablers that optimises information and technology investment and use for the benefit of stakeholders
- For implementation, COBIT requires the use of a standard project management methodology such as the Project Management Body of Knowledge (PMBOK)



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COBIT 5 Key Principles

1. **Meet stakeholders' needs**
   - Enterprises exist to create value for their stakeholders.
2. **Cover the enterprise from end-to-end**
   - By considering all functions and processes in the enterprise, not just ICT
3. **Apply a single integrated framework across the whole enterprise**
4. **Enable a holistic approach to ICT governance**
5. **Separate ICT Governance from Management**

1. Meeting Stakeholders Needs
2. Covering the Enterprise End-to-end
COBIT 5 Principles
5. Separating Governance from Management
4. Enabling a holistic approach
3. Applying a single integrated framework

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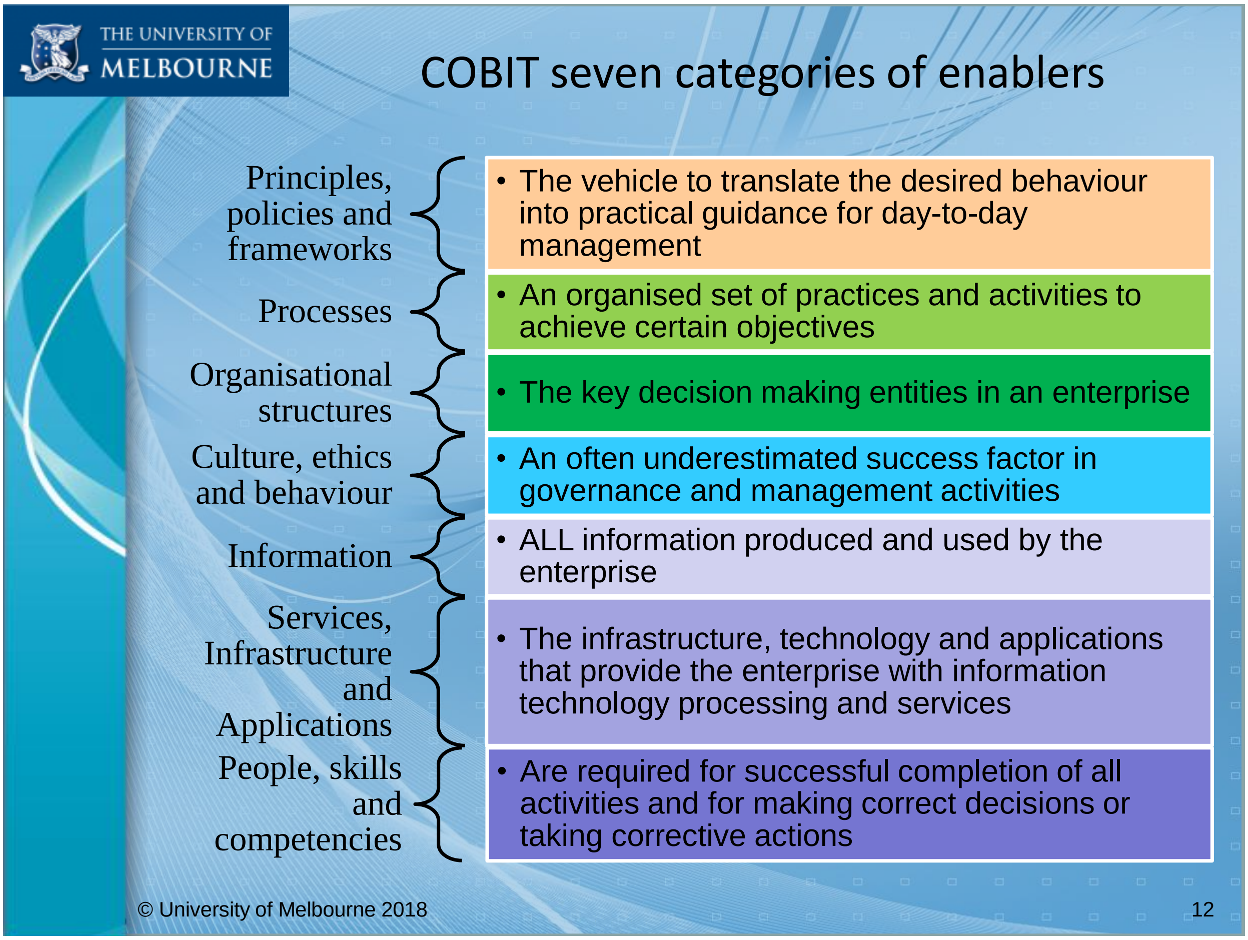

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COBIT seven categories of enablers

Principles, policies and frameworks	• The vehicle to translate the desired behaviour into practical guidance for day-to-day management
Processes	• An organised set of practices and activities to achieve certain objectives
Organisational structures	• The key decision making entities in an enterprise
Culture, ethics and behaviour	• An often underestimated success factor in governance and management activities
Information	• ALL information produced and used by the enterprise
Services, Infrastructure and Applications	• The infrastructure, technology and applications that provide the enterprise with information technology processing and services
People, skills and competencies	• Are required for successful completion of all activities and for making correct decisions or taking corrective actions

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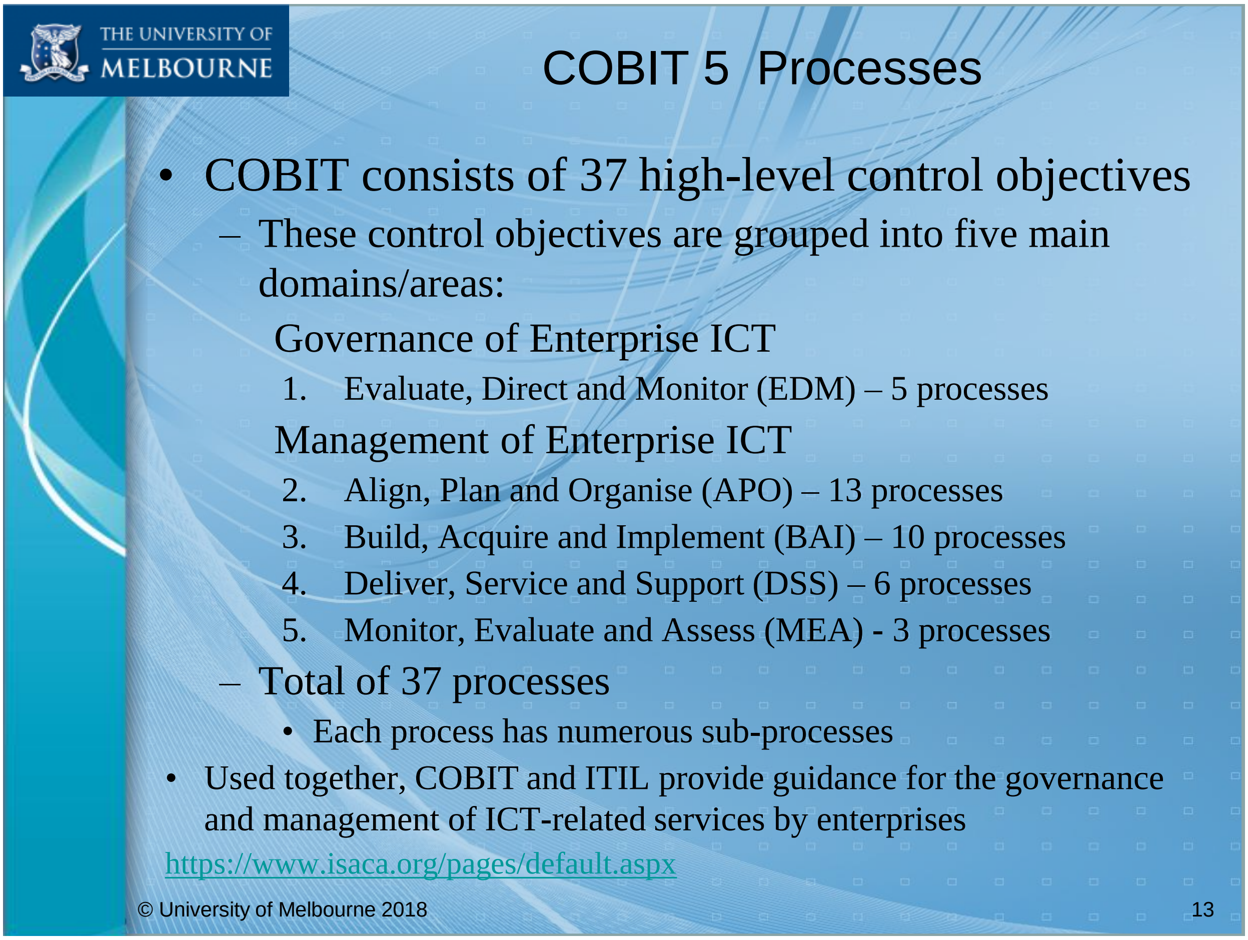

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COBIT 5 Processes

- COBIT consists of 37 high-level control objectives
  - These control objectives are grouped into five main domains/areas:

    Governance of Enterprise ICT

    1. Evaluate, Direct and Monitor (EDM) – 5 processes

    Management of Enterprise ICT

    2. Align, Plan and Organise (APO) – 13 processes
    3. Build, Acquire and Implement (BAI) – 10 processes
    4. Deliver, Service and Support (DSS) – 6 processes
    5. Monitor, Evaluate and Assess (MEA) - 3 processes
  - Total of 37 processes
    - Each process has numerous sub-processes
- Used together, COBIT and ITIL provide guidance for the governance and management of ICT-related services by enterprises

https://www.isaca.org/pages/default.aspx

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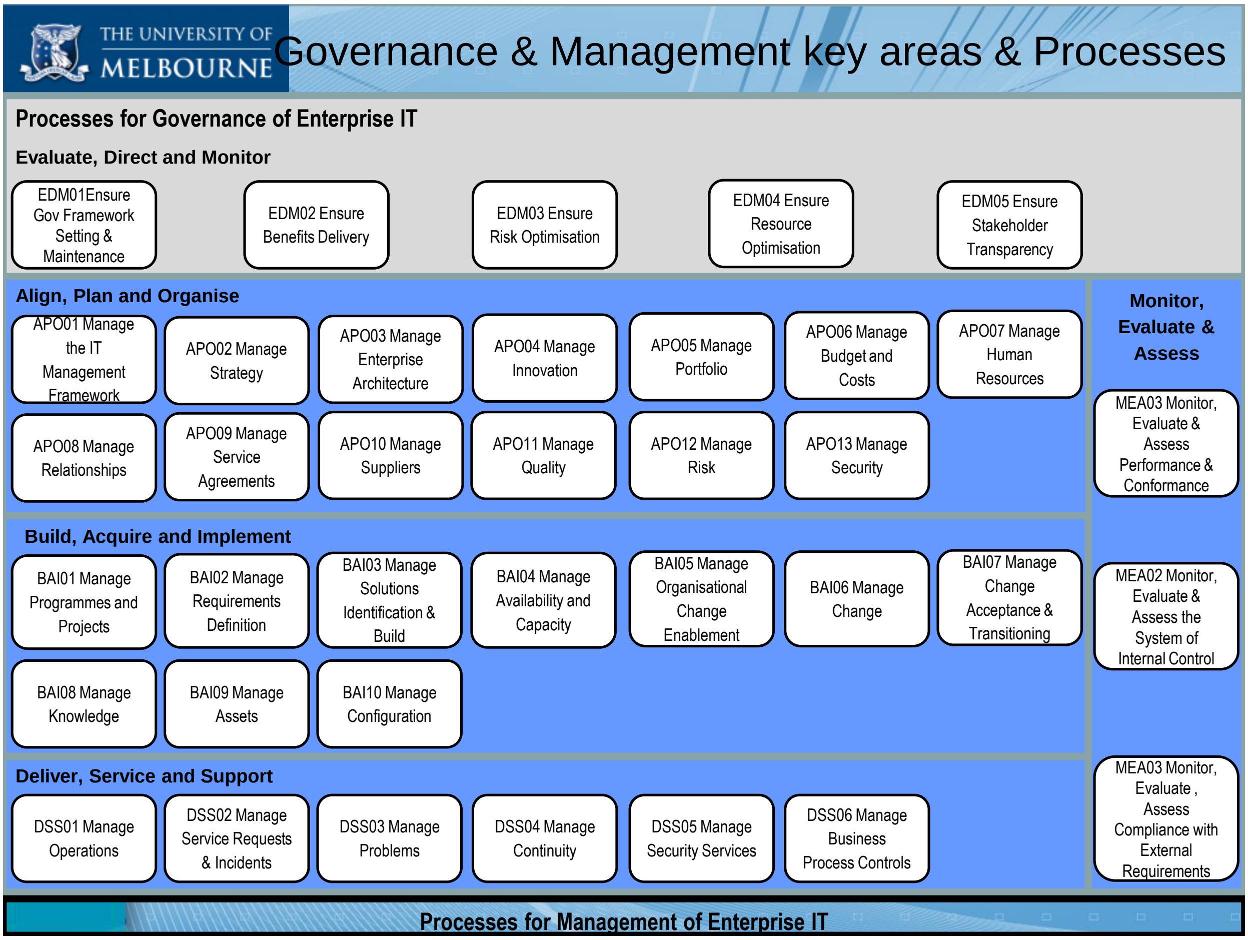

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Governance & Management key areas & Processes

Processes for Governance of Enterprise IT

Evaluate, Direct and Monitor

- EDM01Ensure Gov Framework Setting & Maintenance
- EDM02 Ensure Benefits Delivery
- EDM03 Ensure Risk Optimisation
- EDM04 Ensure Resource Optimisation
- EDM05 Ensure Stakeholder Transparency

Align, Plan and Organise

- APO01 Manage the IT Management Framework
- APO02 Manage Strategy
- APO03 Manage Enterprise Architecture
- APO04 Manage Innovation
- APO05 Manage Portfolio
- APO06 Manage Budget and Costs
- APO07 Manage Human Resources
- APO08 Manage Relationships
- APO09 Manage Service Agreements
- APO10 Manage Suppliers
- APO11 Manage Quality
- APO12 Manage Risk
- APO13 Manage Security

Build, Acquire and Implement

- BAI01 Manage Programmes and Projects
- BAI02 Manage Requirements Definition
- BAI03 Manage Solutions Identification & Build
- BAI04 Manage Availability and Capacity
- BAI05 Manage Organisational Change Enablement
- BAI06 Manage Change
- BAI07 Manage Change Acceptance & Transitioning
- BAI08 Manage Knowledge
- BAI09 Manage Assets
- BAI10 Manage Configuration

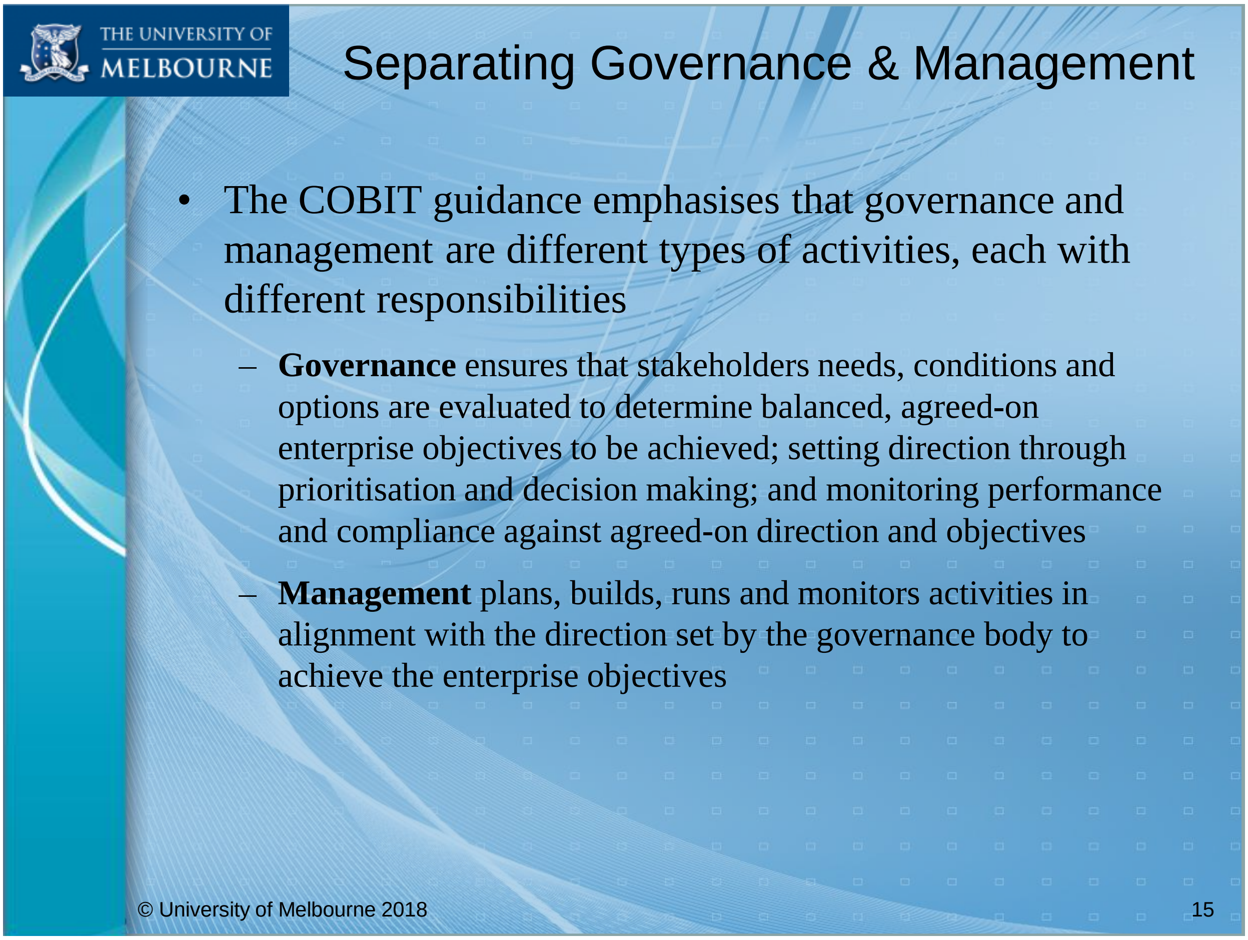
Deliver, Service and Support

- DSS01 Manage Operations
- DSS02 Manage Service Requests & Incidents
- DSS03 Manage Problems
- DSS04 Manage Continuity
- DSS05 Manage Security Services
- DSS06 Manage Business Process Controls

Monitor, Evaluate & Assess

- MEA03 Monitor, Evaluate & Assess Performance & Conformance
- MEA02 Monitor, Evaluate & Assess the System of Internal Control
- MEA03 Monitor, Evaluate , Assess Compliance with External Requirements

Processes for Management of Enterprise IT



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Separating Governance & Management

- The COBIT guidance emphasises that governance and management are different types of activities, each with different responsibilities
  - **Governance** ensures that stakeholders needs, conditions and options are evaluated to determine balanced, agreed-on enterprise objectives to be achieved; setting direction through prioritisation and decision making; and monitoring performance and compliance against agreed-on direction and objectives
  - **Management** plans, builds, runs and monitors activities in alignment with the direction set by the governance body to achieve the enterprise objectives

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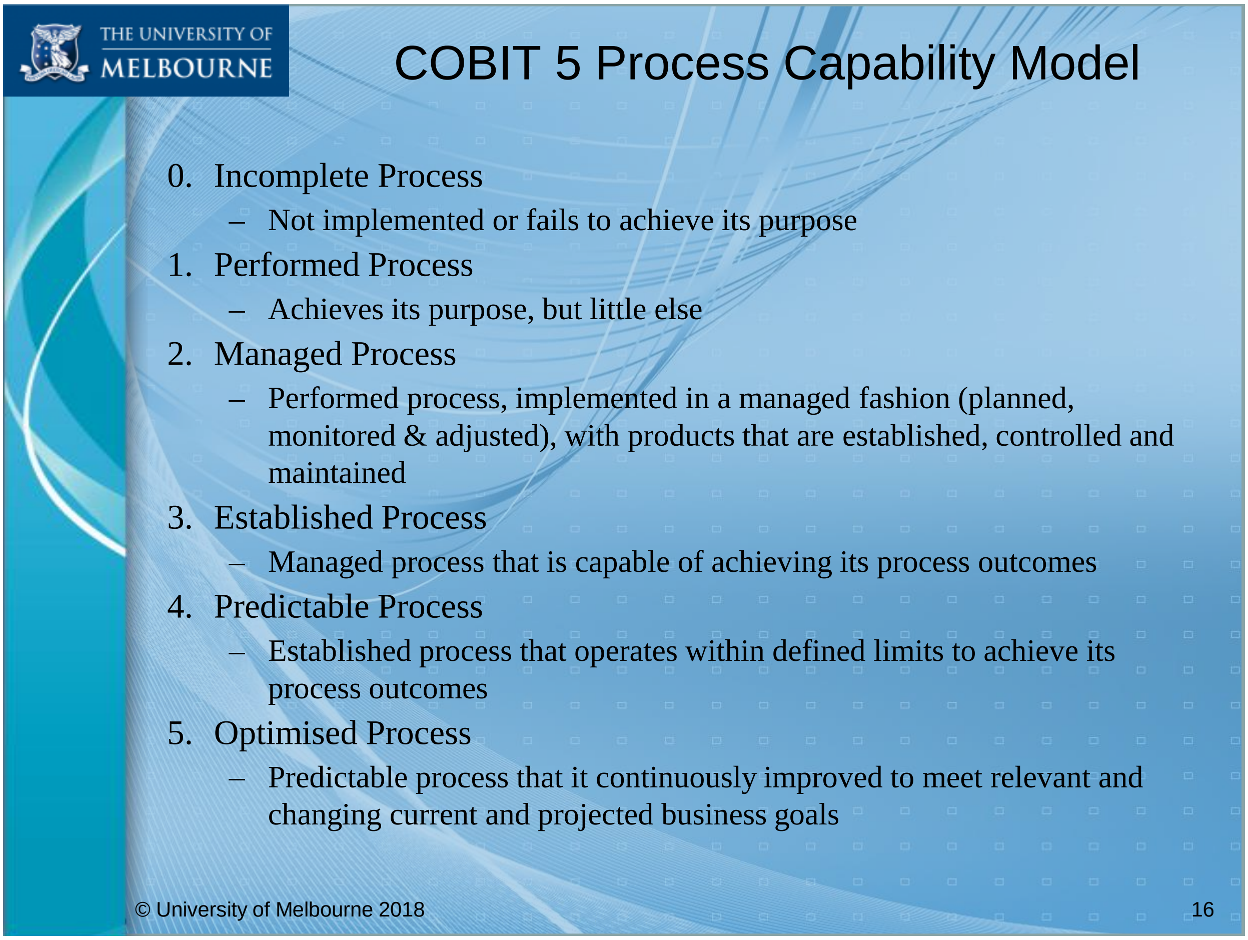

COBIT 5 Process Capability Model

0. Incomplete Process
   - Not implemented or fails to achieve its purpose
1. Performed Process
   - Achieves its purpose, but little else
2. Managed Process
   - Performed process, implemented in a managed fashion (planned, monitored & adjusted), with products that are established, controlled and maintained
3. Established Process
   - Managed process that is capable of achieving its process outcomes
4. Predictable Process
   - Established process that operates within defined limits to achieve its process outcomes
5. Optimised Process
   - Predictable process that it continuously improved to meet relevant and changing current and projected business goals

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ITIL

- ITIL is an integrated set of best-practice processes for delivering ICT services to customers
  - Consists of a series of books giving guidance on the provision of quality ICT services
  - At it’s core is the basic idea that value is provided in the form of business-aligned ICT Services
- ITIL doesn’t tell how, or how much of the framework to adopt, allowing organisation the flexibility to adopt the processes as and if needed to address their specific needs
  - Each individual process has value to the business, and can be adopted individually
    - Though they are highly interrelated and some processes are difficult to adopt in isolation
    - Organisations must determine the right balance of framework(s) and parts to adopt to meet their business needs

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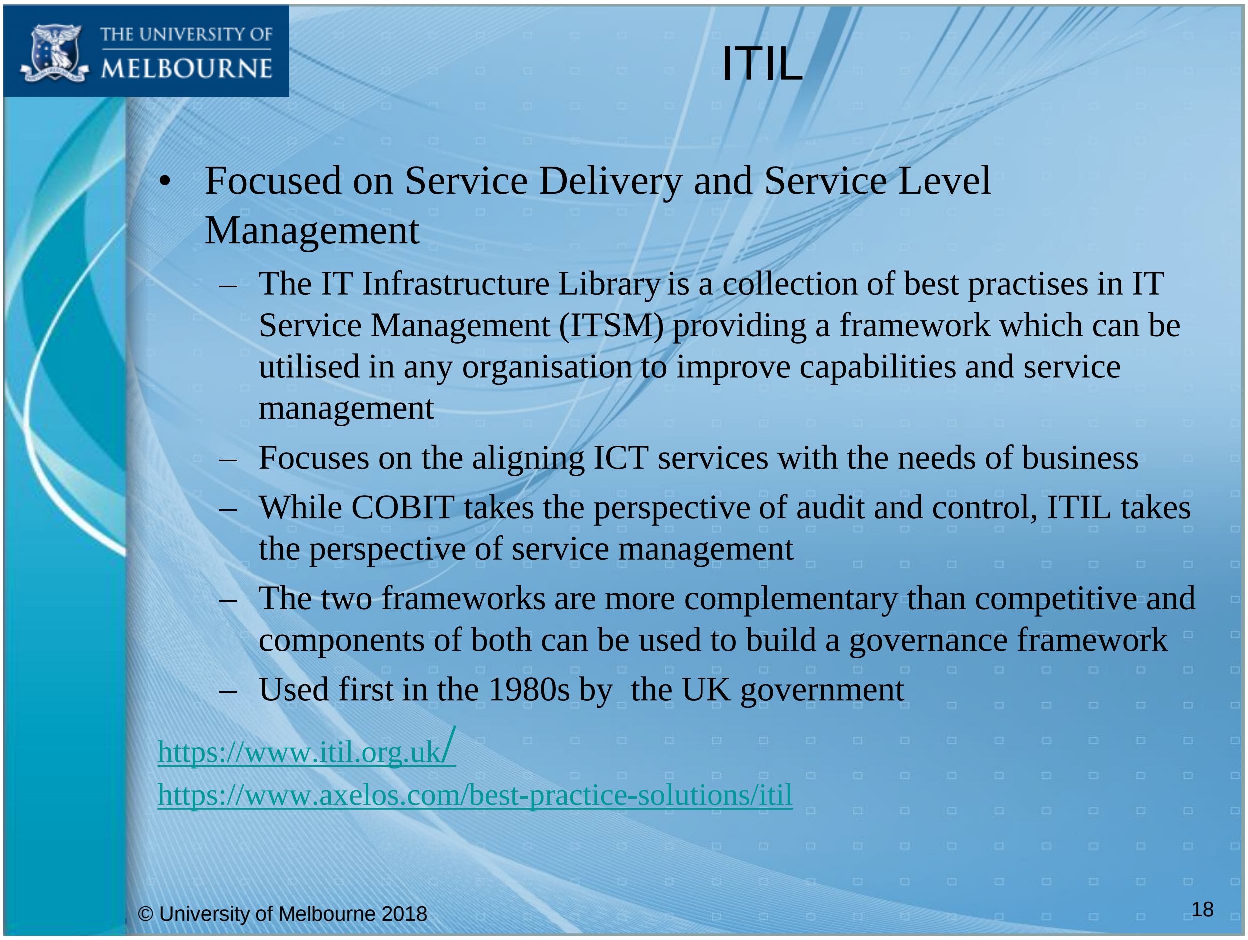

ITIL

- Focused on Service Delivery and Service Level Management
  - The IT Infrastructure Library is a collection of best practises in IT Service Management (ITSM) providing a framework which can be utilised in any organisation to improve capabilities and service management
  - Focuses on the aligning ICT services with the needs of business
  - While COBIT takes the perspective of audit and control, ITIL takes the perspective of service management
  - The two frameworks are more complementary than competitive and components of both can be used to build a governance framework
  - Used first in the 1980s by the UK government

https://www.itil.org.uk/

https://www.axelos.com/best-practice-solutions/itil

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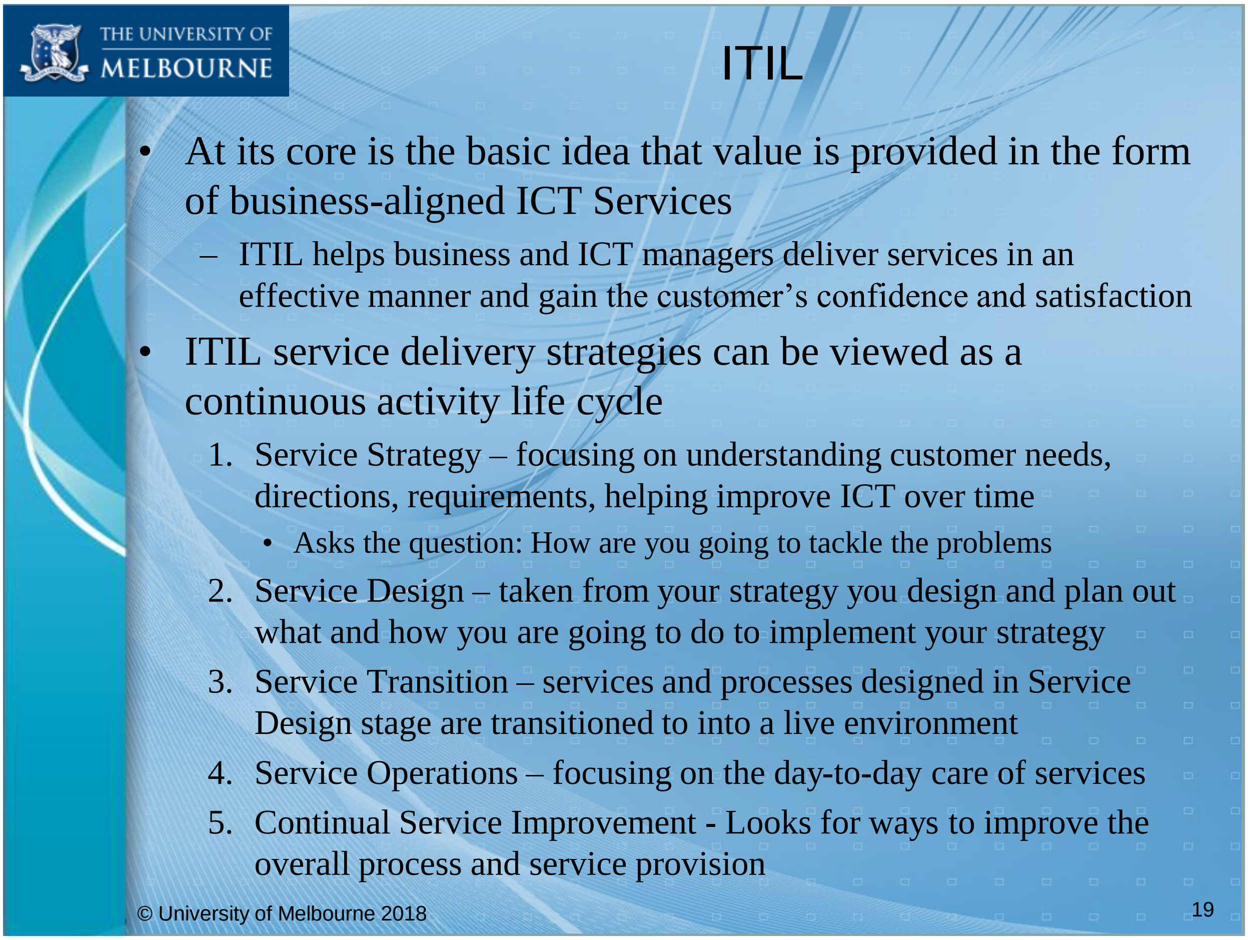

ITIL

- At its core is the basic idea that value is provided in the form of business-aligned ICT Services
  - ITIL helps business and ICT managers deliver services in an effective manner and gain the customer’s confidence and satisfaction
- ITIL service delivery strategies can be viewed as a continuous activity life cycle
  1. Service Strategy – focusing on understanding customer needs, directions, requirements, helping improve ICT over time
     - Asks the question: How are you going to tackle the problems
  2. Service Design – taken from your strategy you design and plan out what and how you are going to do to implement your strategy
  3. Service Transition – services and processes designed in Service Design stage are transitioned to into a live environment
  4. Service Operations – focusing on the day-to-day care of services
  5. Continual Service Improvement - Looks for ways to improve the overall process and service provision

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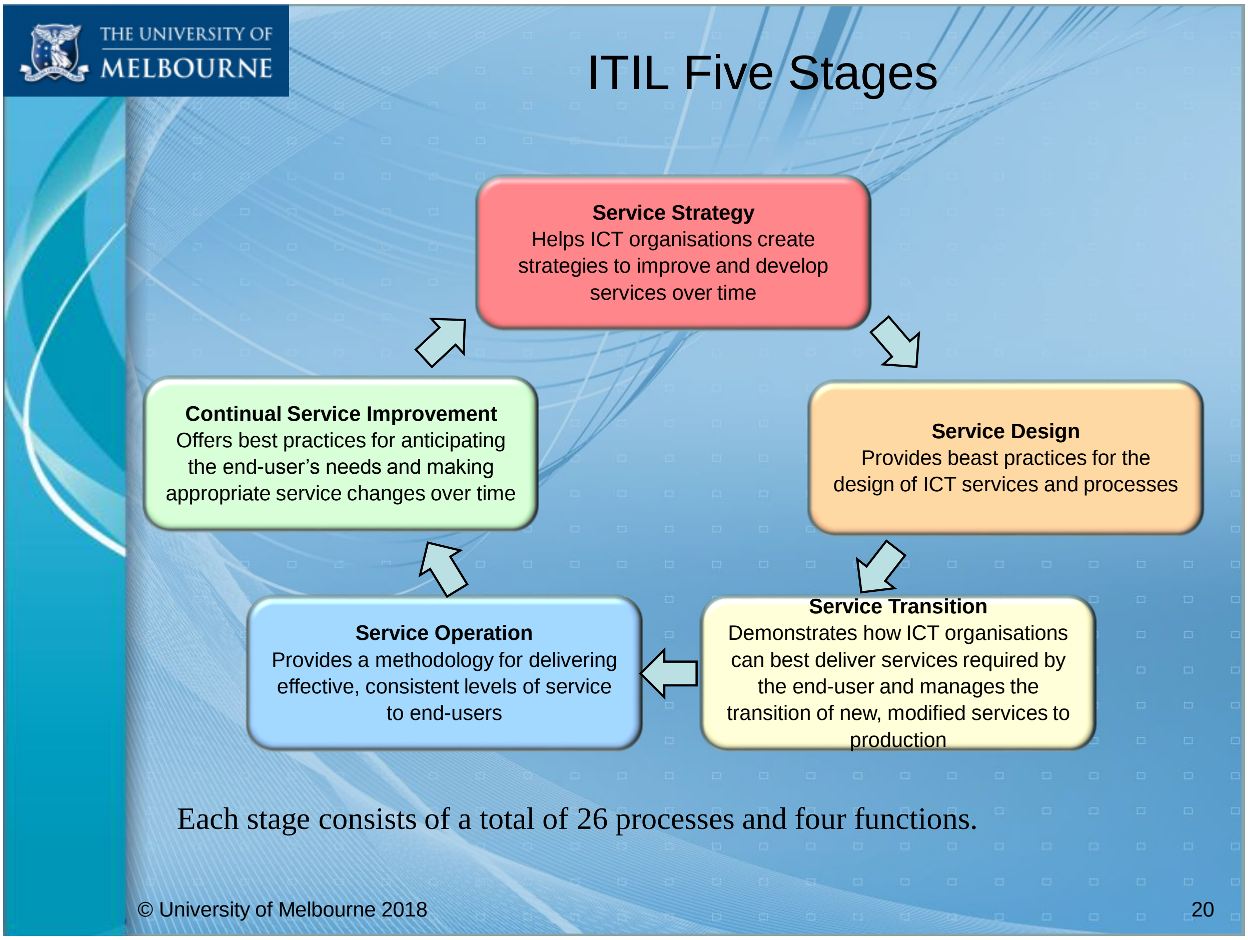

ITIL Five Stages

Service Strategy
Helps ICT organisations create strategies to improve and develop services over time

Service Design
Provides beast practices for the design of ICT services and processes

Service Transition
Demonstrates how ICT organisations can best deliver services required by the end-user and manages the transition of new, modified services to production

Service Operation
Provides a methodology for delivering effective, consistent levels of service to end-users

Continual Service Improvement
Offers best practices for anticipating the end-user's needs and making appropriate service changes over time

Each stage consists of a total of 26 processes and four functions.

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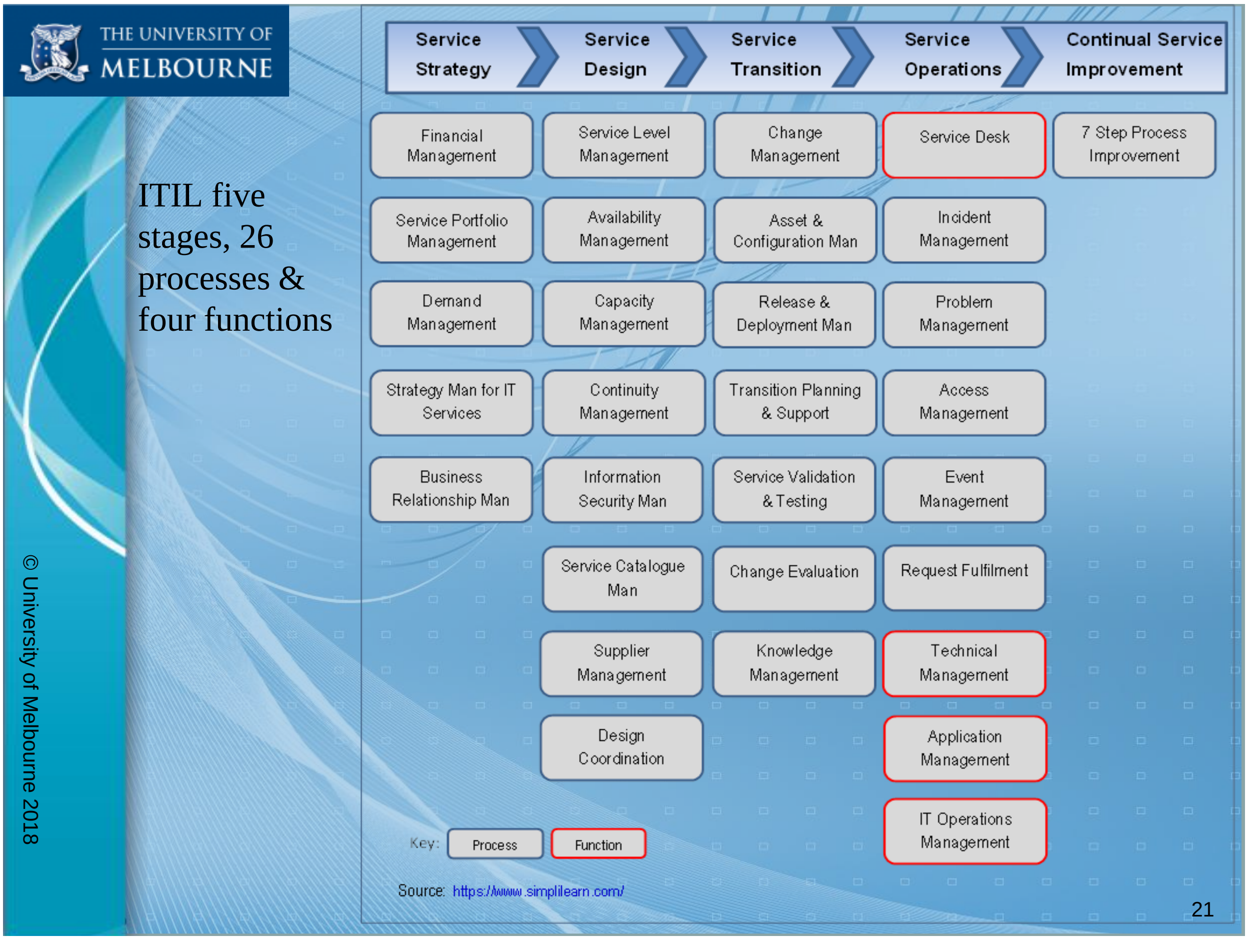

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ITIL five stages, 26 processes & four functions

Service Strategy	Service Design	Service Transition	Service Operations	Continual Service Improvement
Financial Management	Service Level Management	Change Management	Service Desk	7 Step Process Improvement
Service Portfolio Management	Availability Management	Asset & Configuration Man	Incident Management	
Demand Management	Capacity Management	Release & Deployment Man	Problem Management	
Strategy Man for IT Services	Continuity Management	Transition Planning & Support	Access Management	
Business Relationship Man	Information Security Man	Service Validation & Testing	Event Management	
	Service Catalogue Man	Change Evaluation	Request Fulfilment	
	Supplier Management	Knowledge Management	Technical Management	
	Design Coordination		Application Management	
			IT Operations Management	

Key: Process Function

Source: https://www.simplilearn.com/

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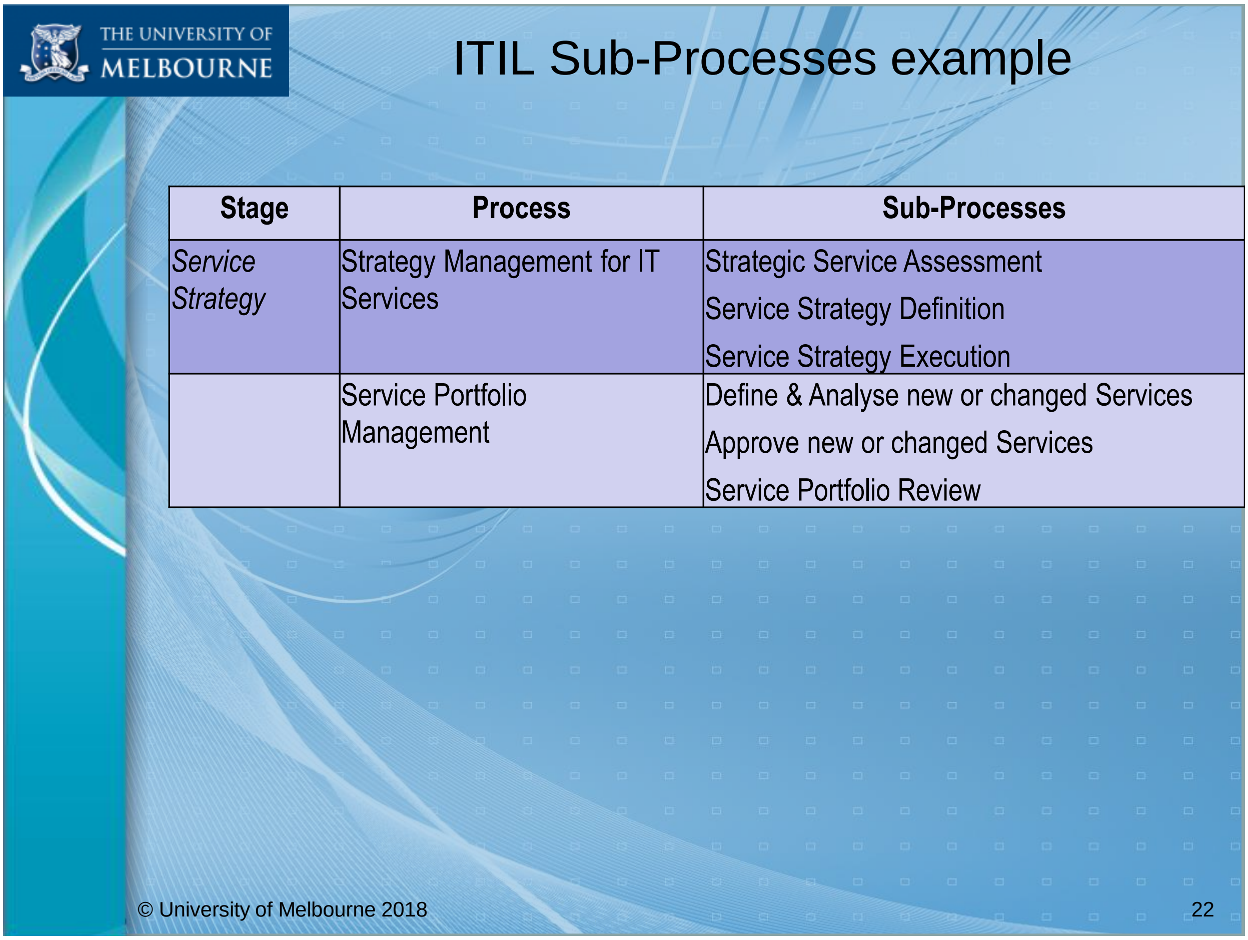

ITIL Sub-Processes example

Stage	Process	Sub-Processes
Service Strategy	Strategy Management for IT Services	Strategic Service Assessment Service Strategy Definition Service Strategy Execution
	Service Portfolio Management	Define & Analyse new or changed Services Approve new or changed Services Service Portfolio Review

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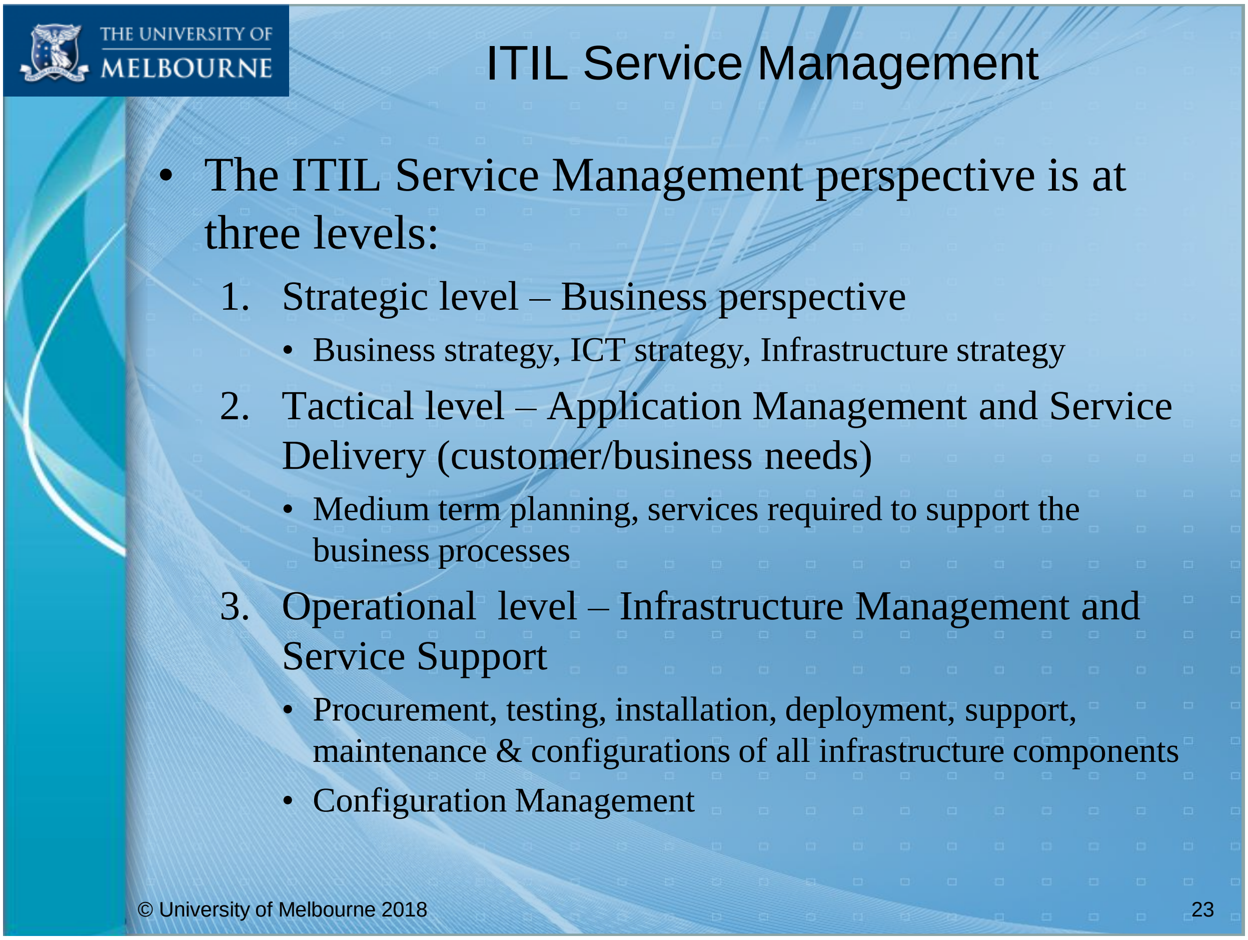

ITIL Service Management

- The ITIL Service Management perspective is at three levels:
  1. Strategic level – Business perspective
     - Business strategy, ICT strategy, Infrastructure strategy
  2. Tactical level – Application Management and Service Delivery (customer/business needs)
     - Medium term planning, services required to support the business processes
  3. Operational level – Infrastructure Management and Service Support
     - Procurement, testing, installation, deployment, support, maintenance & configurations of all infrastructure components
     - Configuration Management

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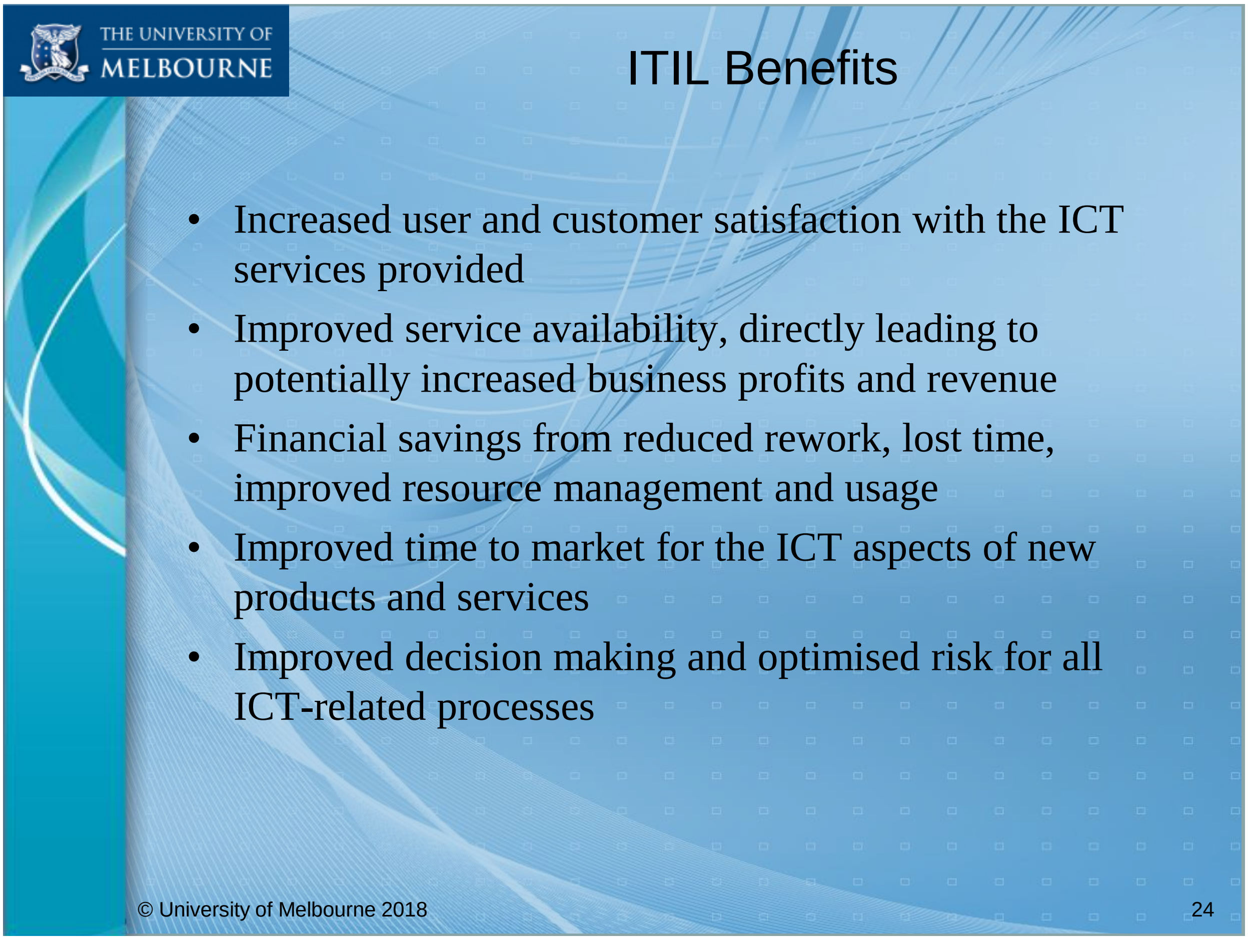

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ITIL Benefits

- Increased user and customer satisfaction with the ICT services provided
- Improved service availability, directly leading to potentially increased business profits and revenue
- Financial savings from reduced rework, lost time, improved resource management and usage
- Improved time to market for the ICT aspects of new products and services
- Improved decision making and optimised risk for all ICT-related processes

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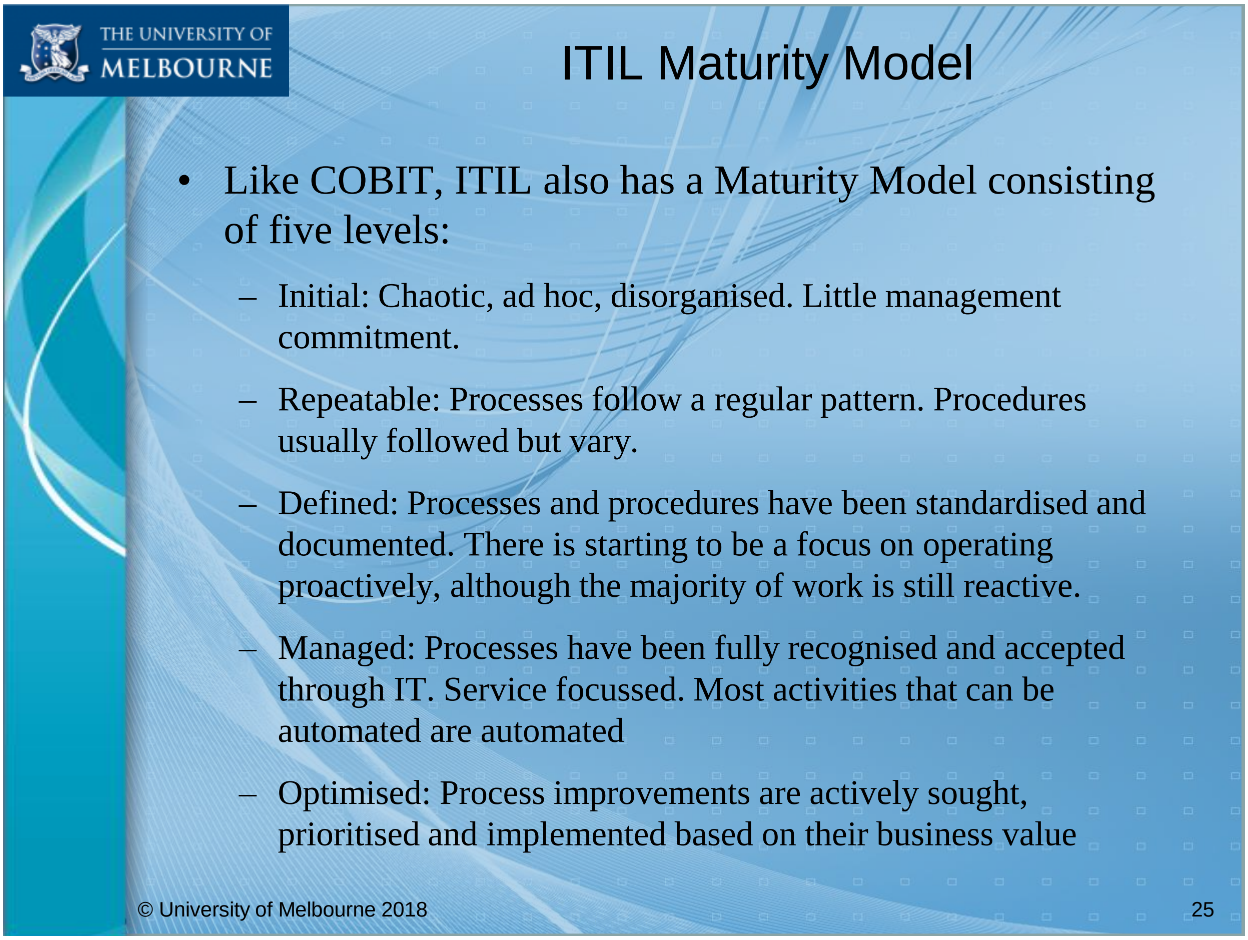

ITIL Maturity Model

- Like COBIT, ITIL also has a Maturity Model consisting of five levels:
  - Initial: Chaotic, ad hoc, disorganised. Little management commitment.
  - Repeatable: Processes follow a regular pattern. Procedures usually followed but vary.
  - Defined: Processes and procedures have been standardised and documented. There is starting to be a focus on operating proactively, although the majority of work is still reactive.
  - Managed: Processes have been fully recognised and accepted through IT. Service focussed. Most activities that can be automated are automated
  - Optimised: Process improvements are actively sought, prioritised and implemented based on their business value

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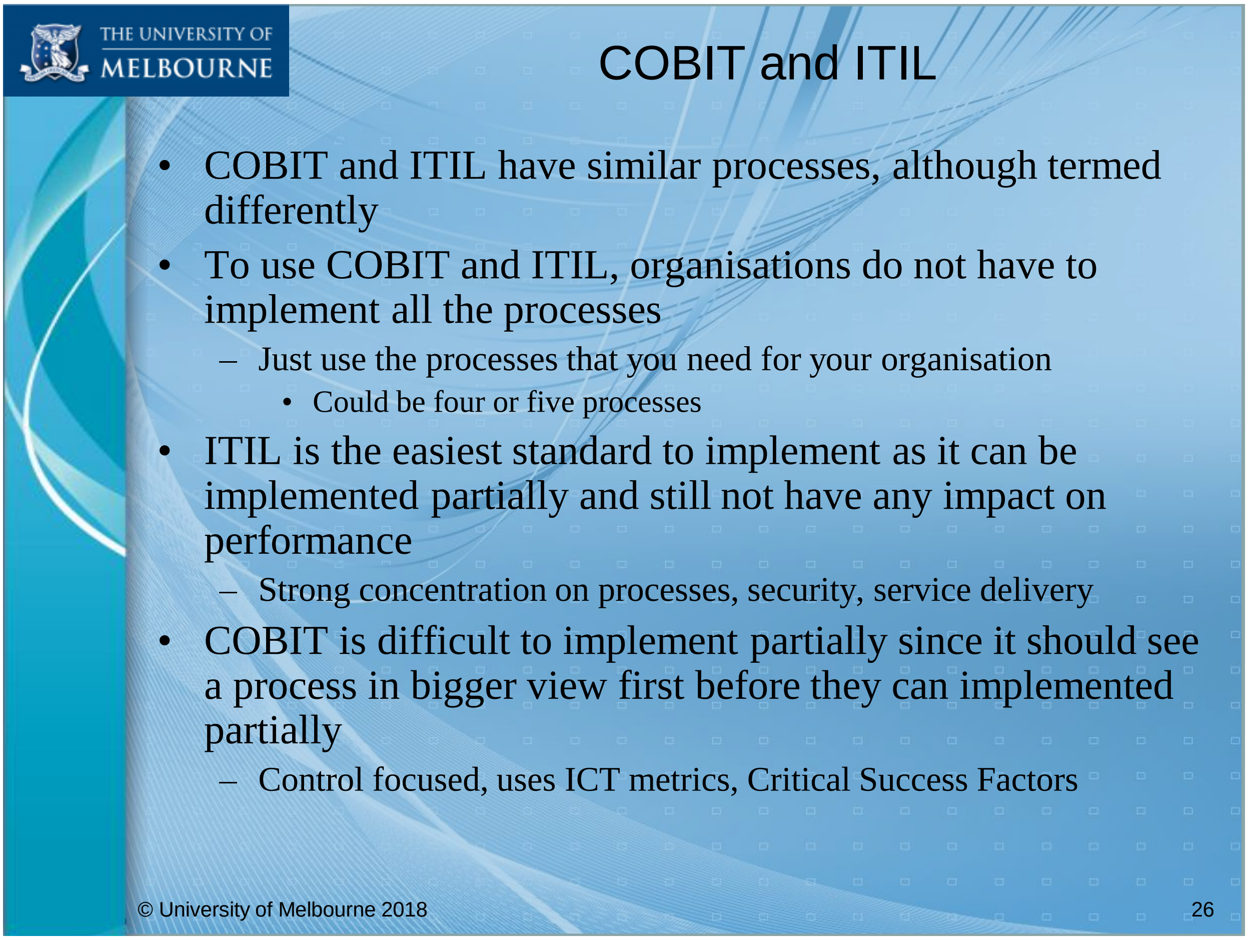

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COBIT and ITIL

- COBIT and ITIL have similar processes, although termed differently
- To use COBIT and ITIL, organisations do not have to implement all the processes
  - Just use the processes that you need for your organisation
    - Could be four or five processes
- ITIL is the easiest standard to implement as it can be implemented partially and still not have any impact on performance
  - Strong concentration on processes, security, service delivery
- COBIT is difficult to implement partially since it should see a process in bigger view first before they can implemented partially
  - Control focused, uses ICT metrics, Critical Success Factors

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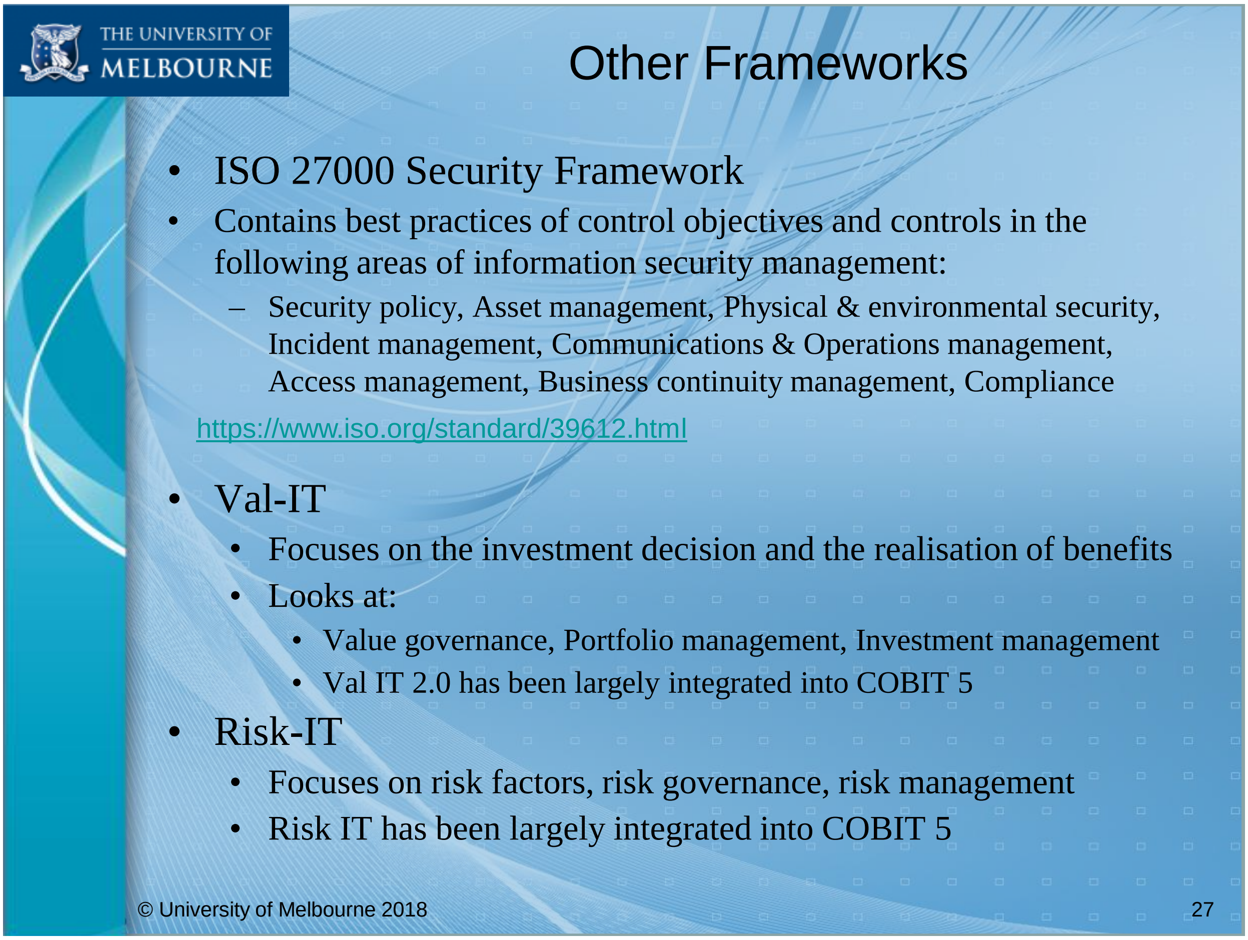
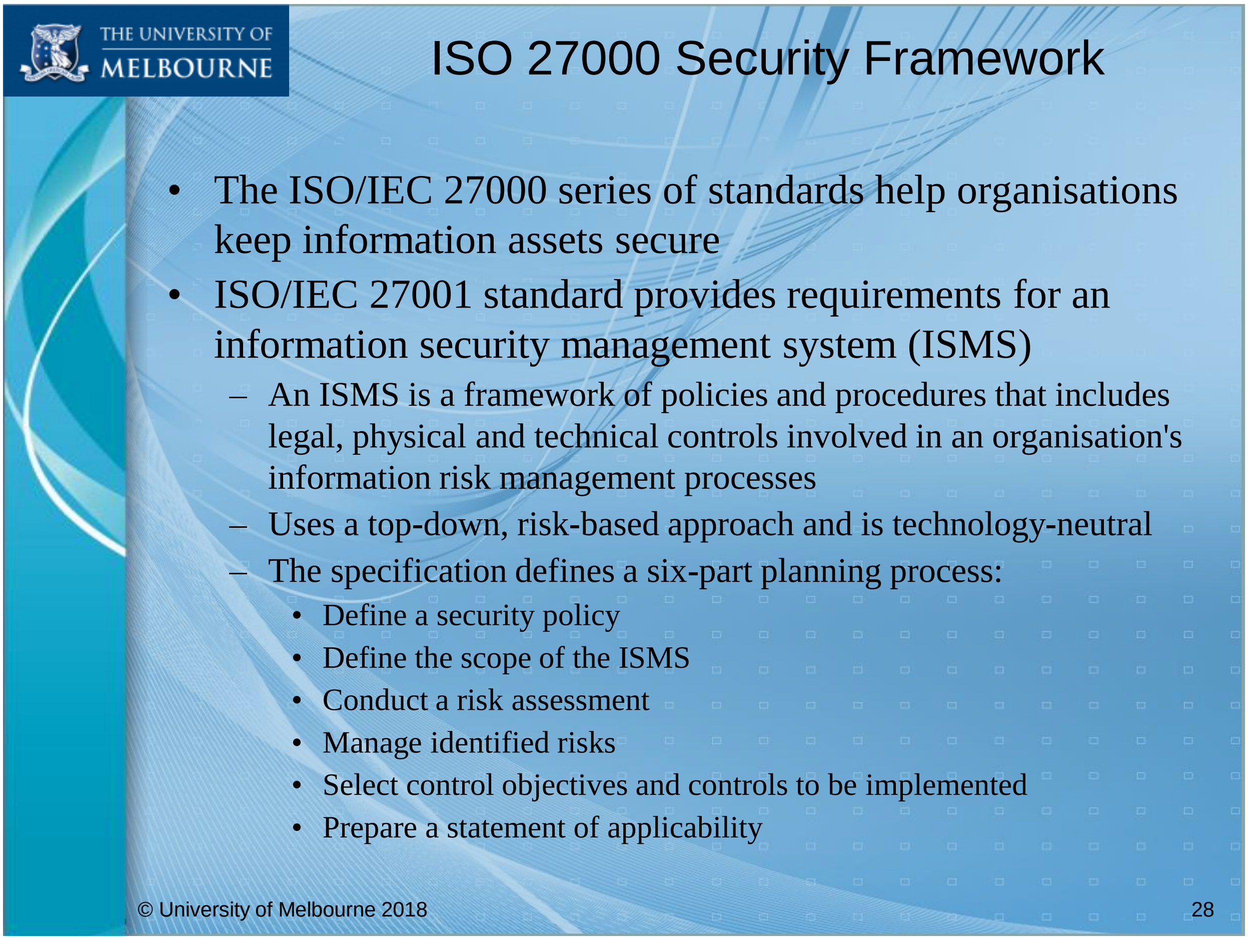


Other Frameworks

- ISO 27000 Security Framework
- Contains best practices of control objectives and controls in the following areas of information security management:
  - Security policy, Asset management, Physical & environmental security, Incident management, Communications & Operations management, Access management, Business continuity management, Compliance

https://www.iso.org/standard/39612.html

- Val-IT
  - Focuses on the investment decision and the realisation of benefits
  - Looks at:
    - Value governance, Portfolio management, Investment management
    - Val IT 2.0 has been largely integrated into COBIT 5
- Risk-IT
  - Focuses on risk factors, risk governance, risk management
  - Risk IT has been largely integrated into COBIT 5



ISO 27000 Security Framework

- The ISO/IEC 27000 series of standards help organisations keep information assets secure
- ISO/IEC 27001 standard provides requirements for an information security management system (ISMS)
  - An ISMS is a framework of policies and procedures that includes legal, physical and technical controls involved in an organisation's information risk management processes
  - Uses a top-down, risk-based approach and is technology-neutral
  - The specification defines a six-part planning process:
    - Define a security policy
    - Define the scope of the ISMS
    - Conduct a risk assessment
    - Manage identified risks
    - Select control objectives and controls to be implemented
    - Prepare a statement of applicability

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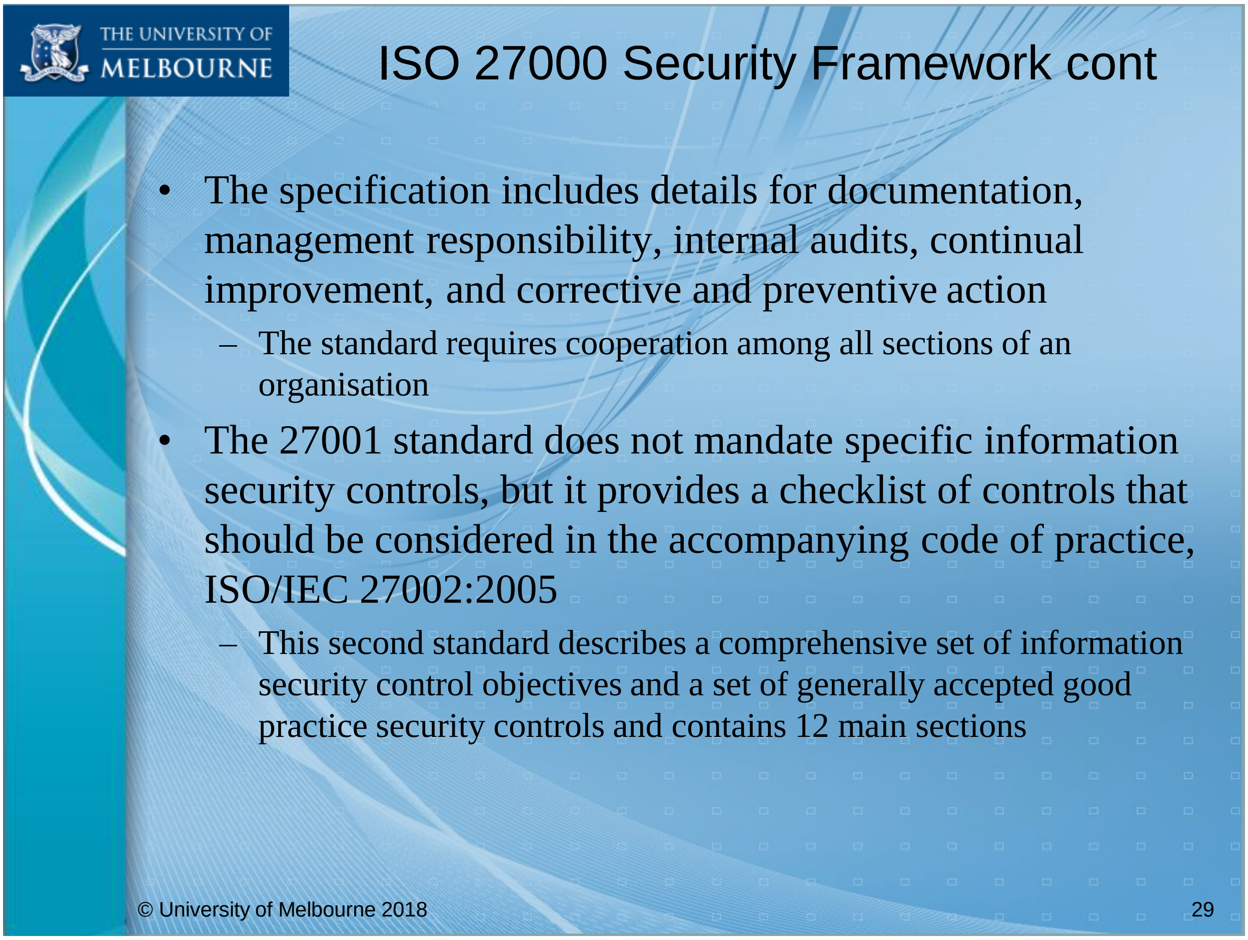

ISO 27000 Security Framework cont

- The specification includes details for documentation, management responsibility, internal audits, continual improvement, and corrective and preventive action
  - The standard requires cooperation among all sections of an organisation
- The 27001 standard does not mandate specific information security controls, but it provides a checklist of controls that should be considered in the accompanying code of practice, ISO/IEC 27002:2005
  - This second standard describes a comprehensive set of information security control objectives and a set of generally accepted good practice security controls and contains 12 main sections

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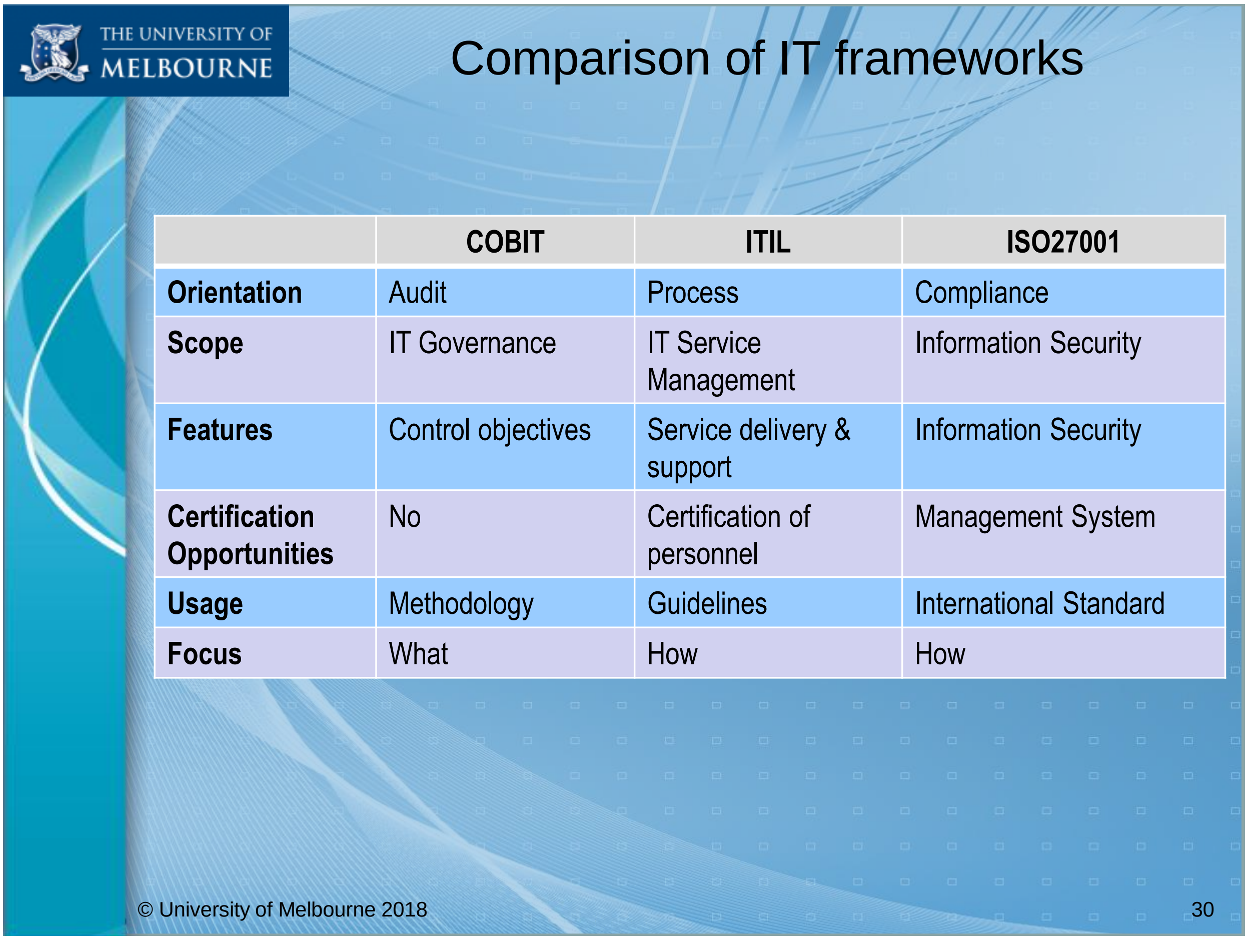

Comparison of IT frameworks

	COBIT	ITIL	ISO27001
Orientation	Audit	Process	Compliance
Scope	IT Governance	IT Service Management	Information Security
Features	Control objectives	Service delivery & support	Information Security
Certification Opportunities	No	Certification of personnel	Management System
Usage	Methodology	Guidelines	International Standard
Focus	What	How	How

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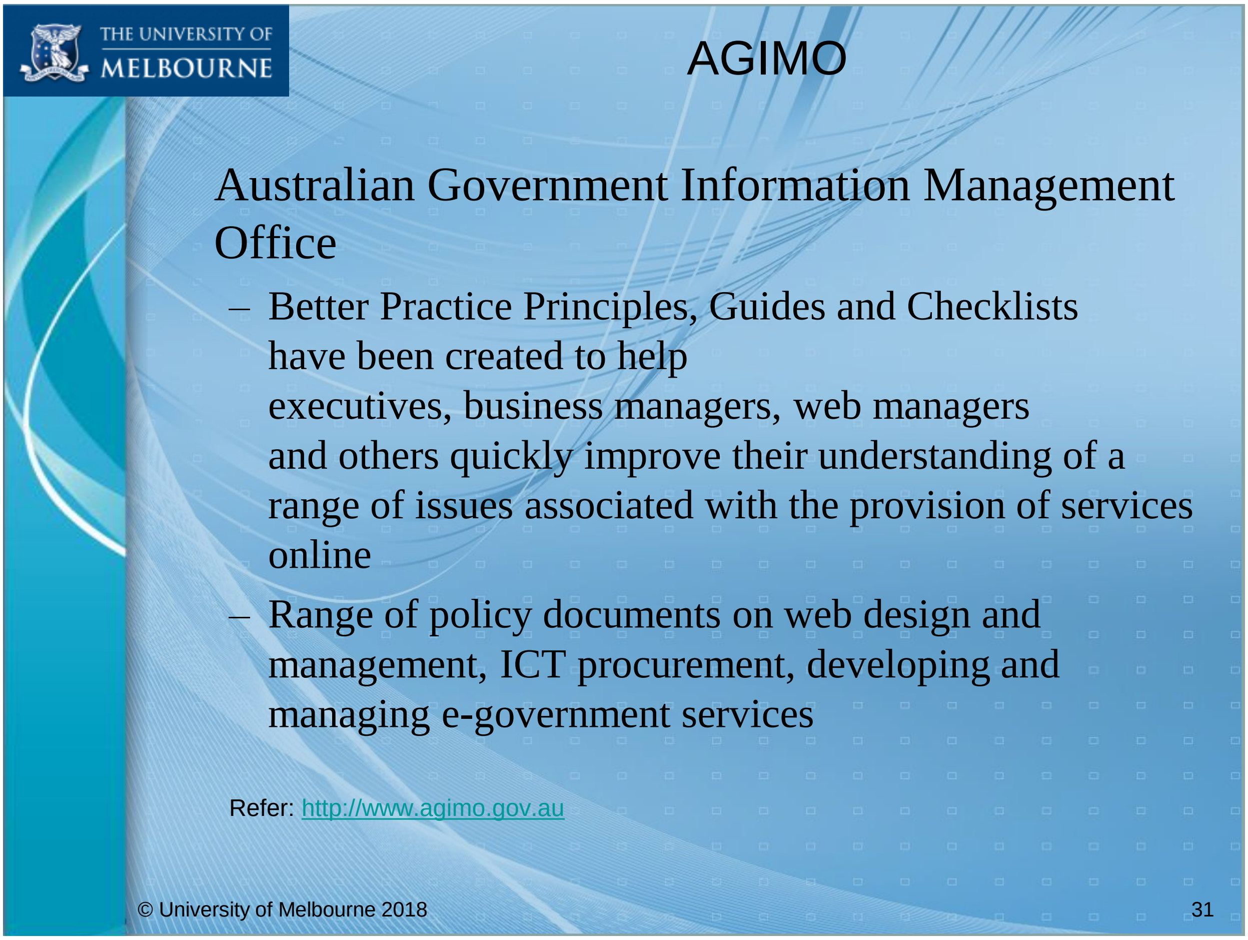

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AGIMO

Australian Government Information Management Office

- Better Practice Principles, Guides and Checklists have been created to help executives, business managers, web managers and others quickly improve their understanding of a range of issues associated with the provision of services online
- Range of policy documents on web design and management, ICT procurement, developing and managing e-government services

Refer: http://www.agimo.gov.au

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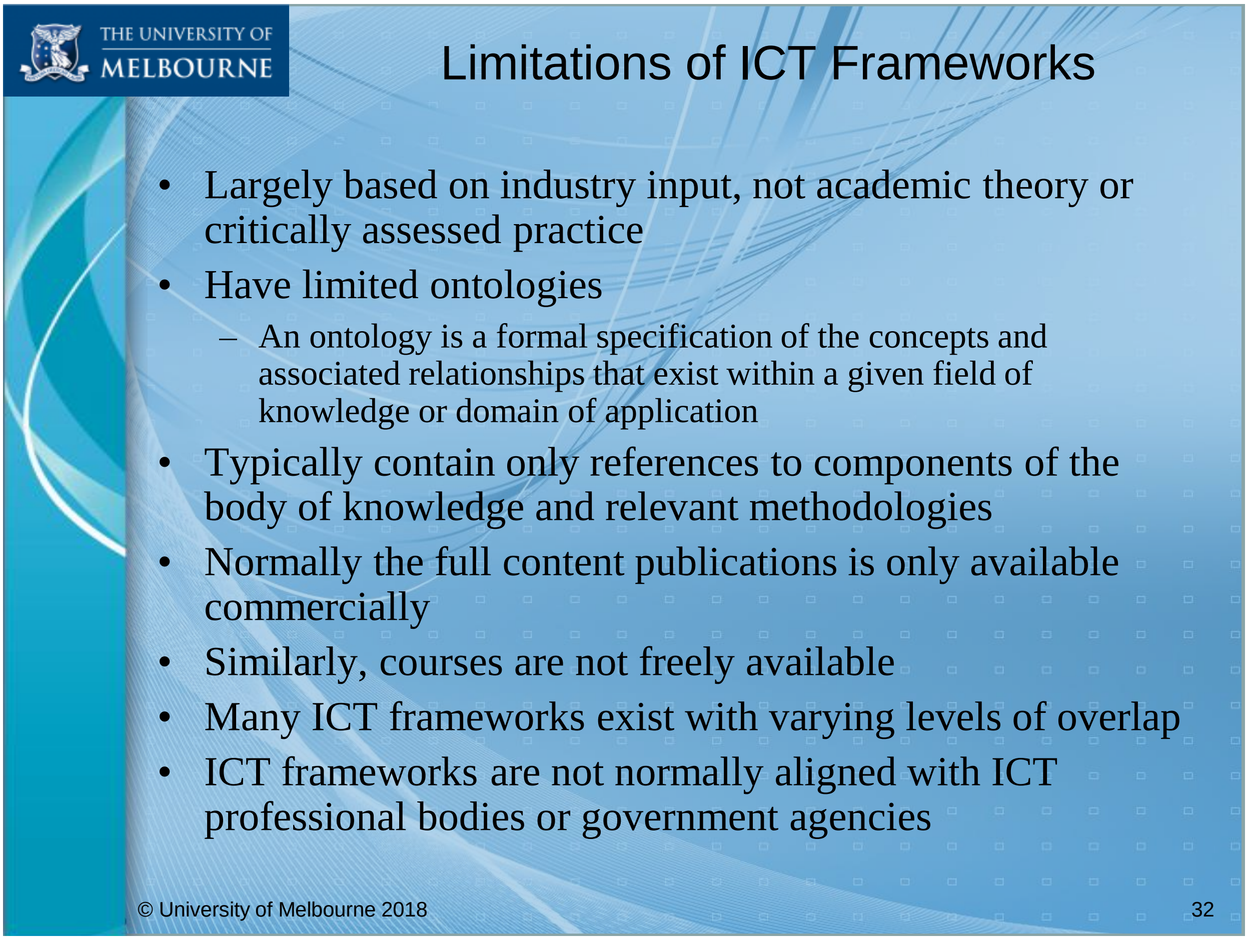

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Limitations of ICT Frameworks

- Largely based on industry input, not academic theory or critically assessed practice
- Have limited ontologies
  - An ontology is a formal specification of the concepts and associated relationships that exist within a given field of knowledge or domain of application
- Typically contain only references to components of the body of knowledge and relevant methodologies
- Normally the full content publications is only available commercially
- Similarly, courses are not freely available
- Many ICT frameworks exist with varying levels of overlap
- ICT frameworks are not normally aligned with ICT professional bodies or government agencies

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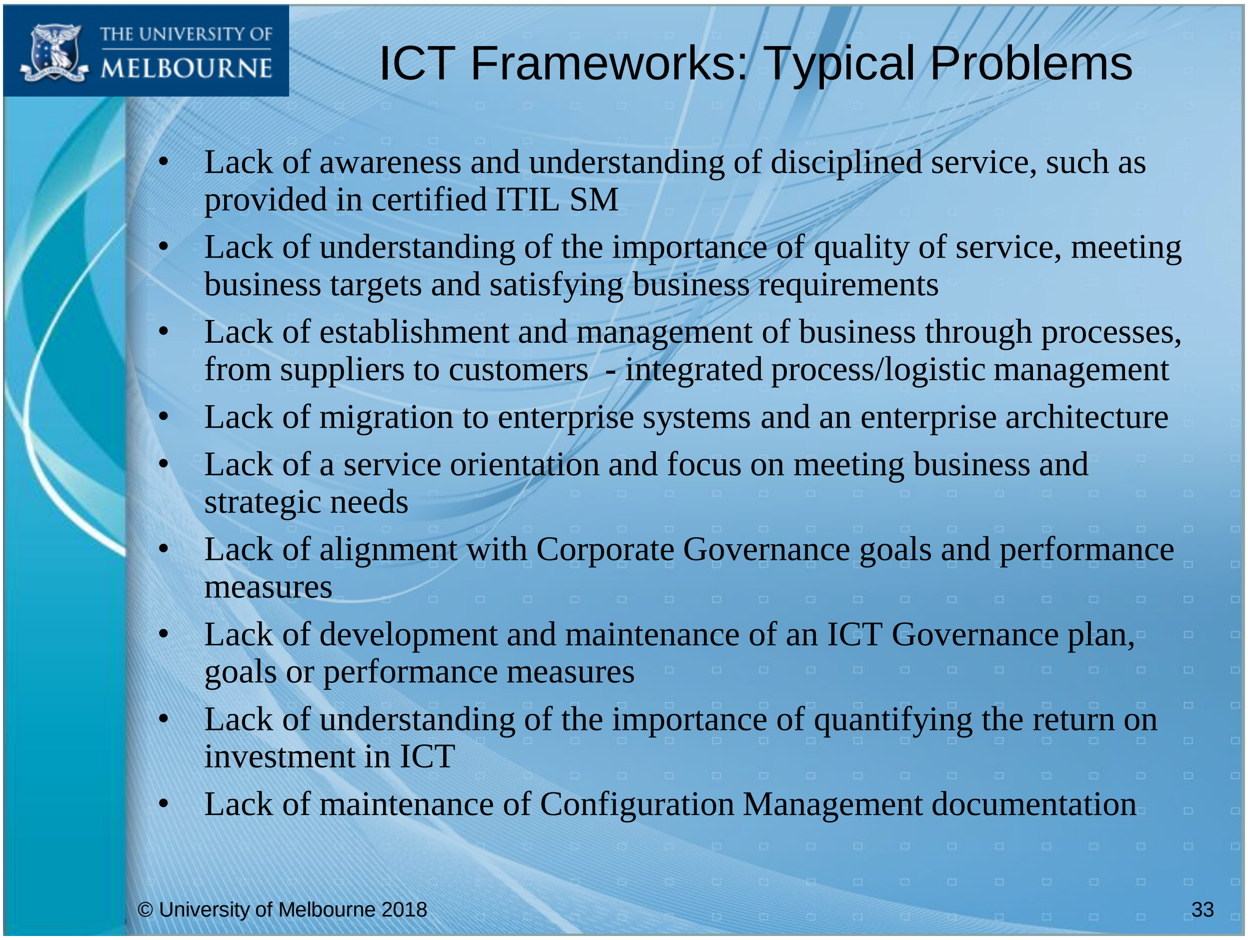
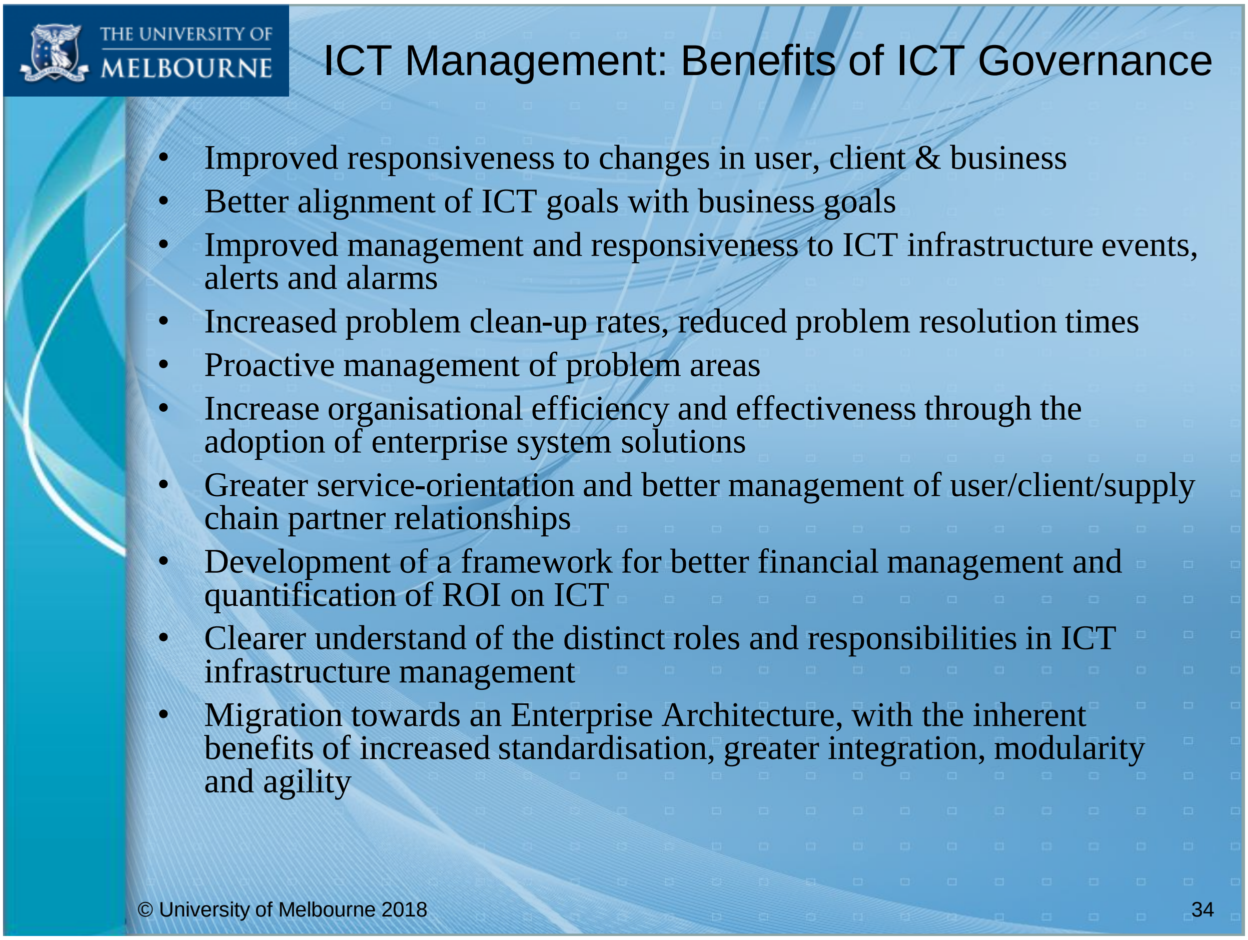


ICT Frameworks: Typical Problems

- Lack of awareness and understanding of disciplined service, such as provided in certified ITIL SM
- Lack of understanding of the importance of quality of service, meeting business targets and satisfying business requirements
- Lack of establishment and management of business through processes, from suppliers to customers - integrated process/logistic management
- Lack of migration to enterprise systems and an enterprise architecture
- Lack of a service orientation and focus on meeting business and strategic needs
- Lack of alignment with Corporate Governance goals and performance measures
- Lack of development and maintenance of an ICT Governance plan, goals or performance measures
- Lack of understanding of the importance of quantifying the return on investment in ICT
- Lack of maintenance of Configuration Management documentation



ICT Management: Benefits of ICT Governance

- Improved responsiveness to changes in user, client & business
- Better alignment of ICT goals with business goals
- Improved management and responsiveness to ICT infrastructure events, alerts and alarms
- Increased problem clean-up rates, reduced problem resolution times
- Proactive management of problem areas
- Increase organisational efficiency and effectiveness through the adoption of enterprise system solutions
- Greater service-orientation and better management of user/client/supply chain partner relationships
- Development of a framework for better financial management and quantification of ROI on ICT
- Clearer understand of the distinct roles and responsibilities in ICT infrastructure management
- Migration towards an Enterprise Architecture, with the inherent benefits of increased standardisation, greater integration, modularity and agility

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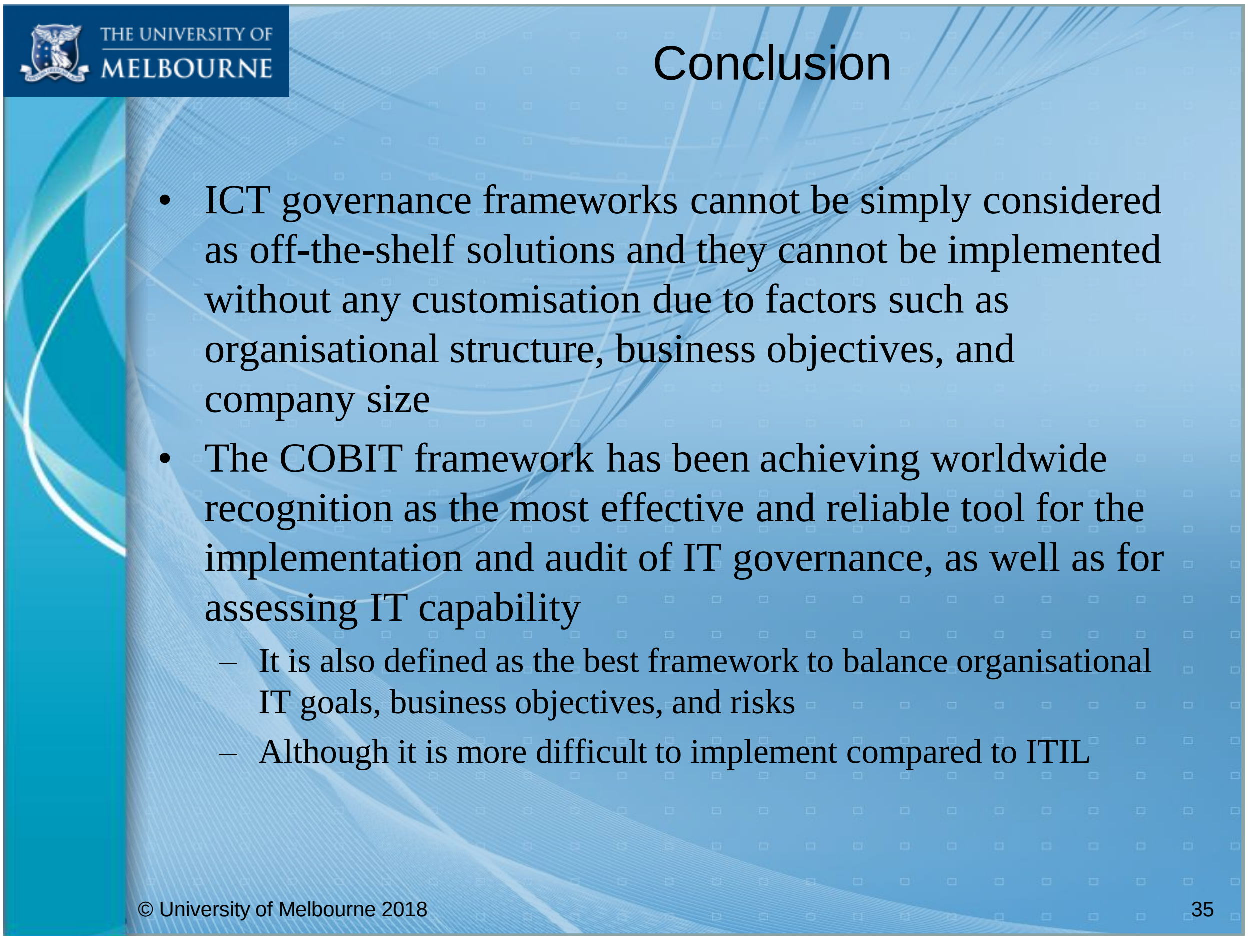

Conclusion

- ICT governance frameworks cannot be simply considered as off-the-shelf solutions and they cannot be implemented without any customisation due to factors such as organisational structure, business objectives, and company size
- The COBIT framework has been achieving worldwide recognition as the most effective and reliable tool for the implementation and audit of IT governance, as well as for assessing IT capability
  - It is also defined as the best framework to balance organisational IT goals, business objectives, and risks
  - Although it is more difficult to implement compared to ITIL

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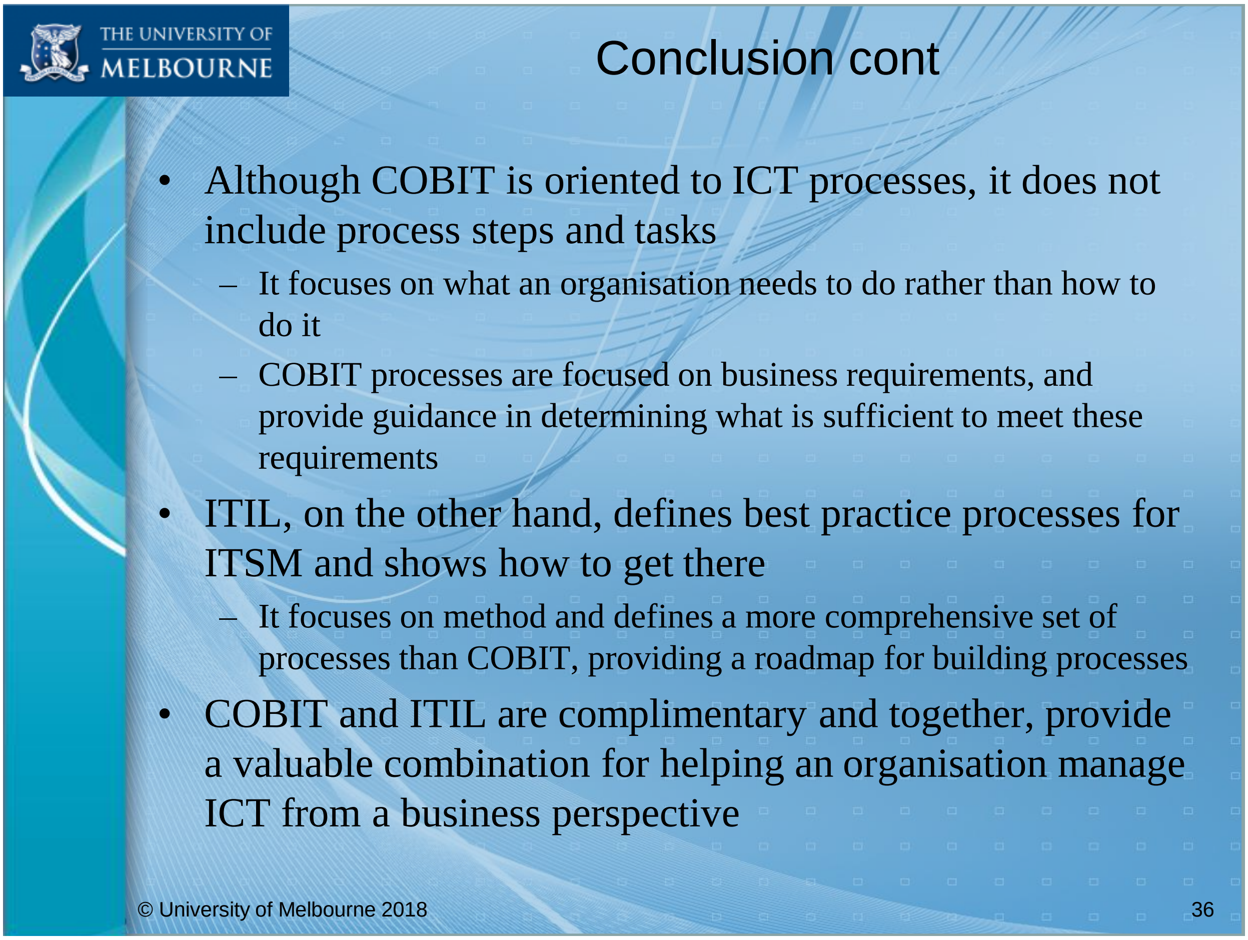

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Conclusion cont

- Although COBIT is oriented to ICT processes, it does not include process steps and tasks
  - It focuses on what an organisation needs to do rather than how to do it
  - COBIT processes are focused on business requirements, and provide guidance in determining what is sufficient to meet these requirements
- ITIL, on the other hand, defines best practice processes for ITSM and shows how to get there
  - It focuses on method and defines a more comprehensive set of processes than COBIT, providing a roadmap for building processes
- COBIT and ITIL are complimentary and together, provide a valuable combination for helping an organisation manage ICT from a business perspective

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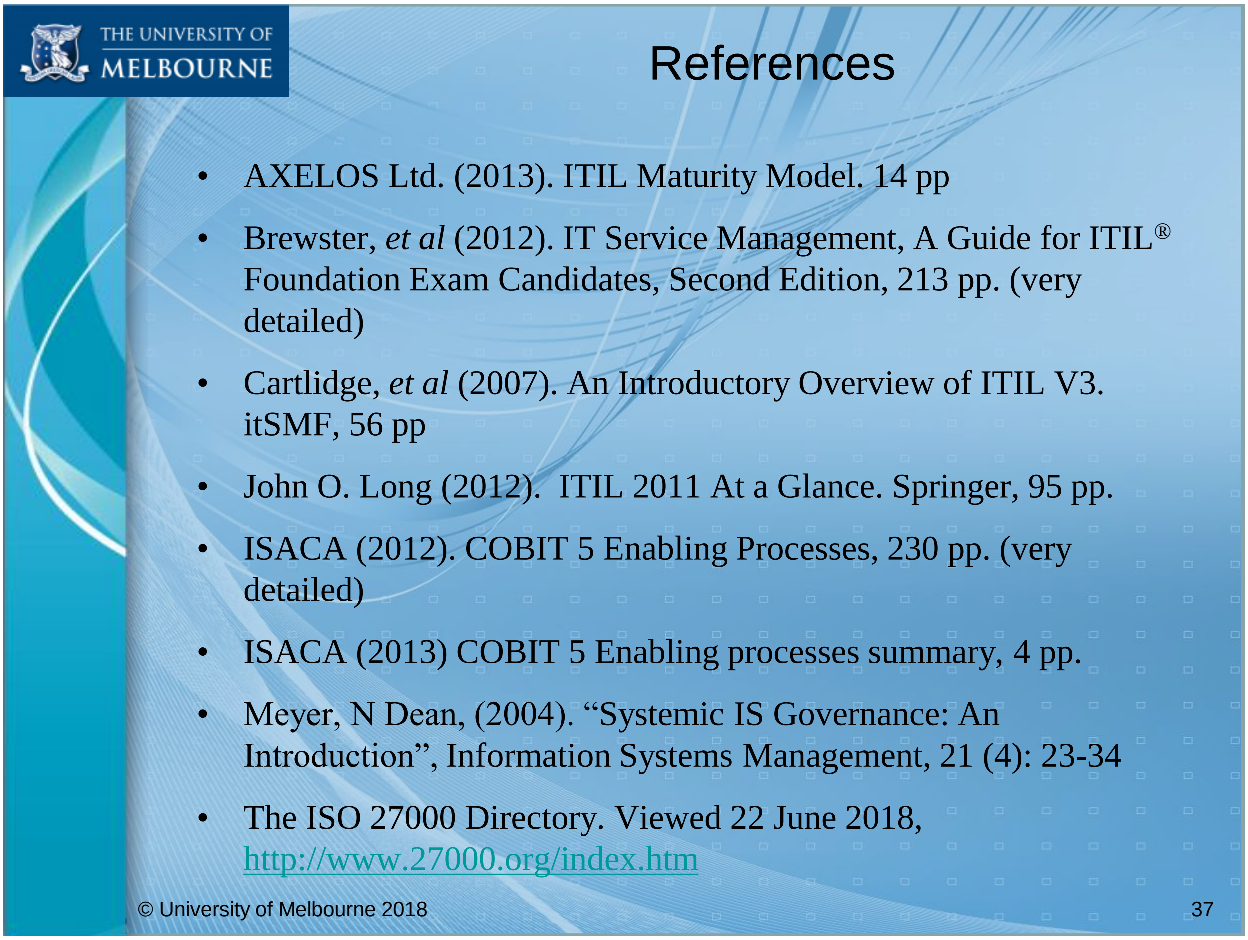

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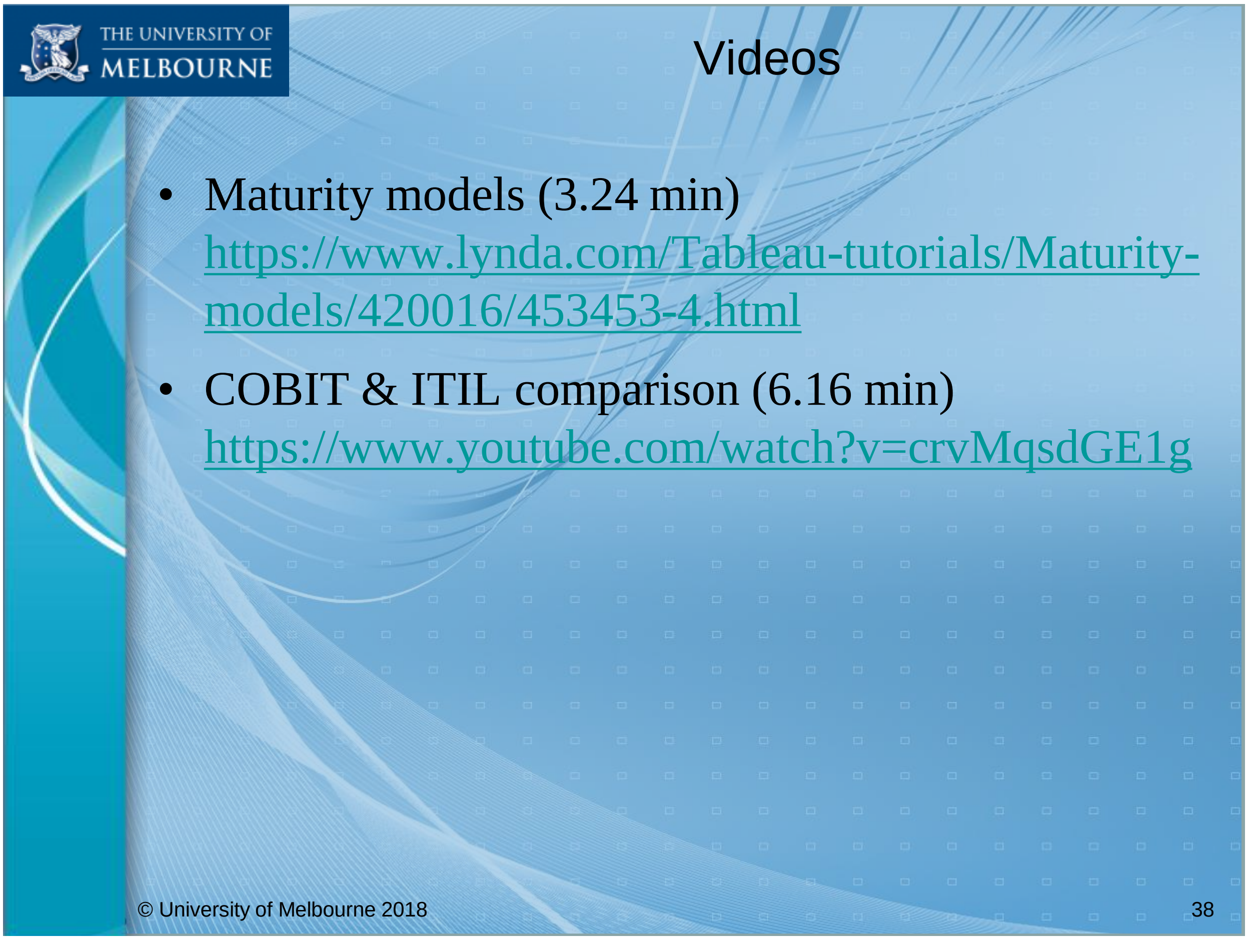

Videos

- Maturity models (3.24 min) https://www.lynda.com/Tableau-tutorials/Maturity-models/420016/453453-4.html
- COBIT & ITIL comparison (6.16 min) https://www.youtube.com/watch?v=crvMqsdGE1g