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Cloud Computing in Education :
Guidelines and Strategies

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An introduction to the

ITU WORLD

Getting to know the United Nations specialized agency for information and communication technologies

ITU

Our Members

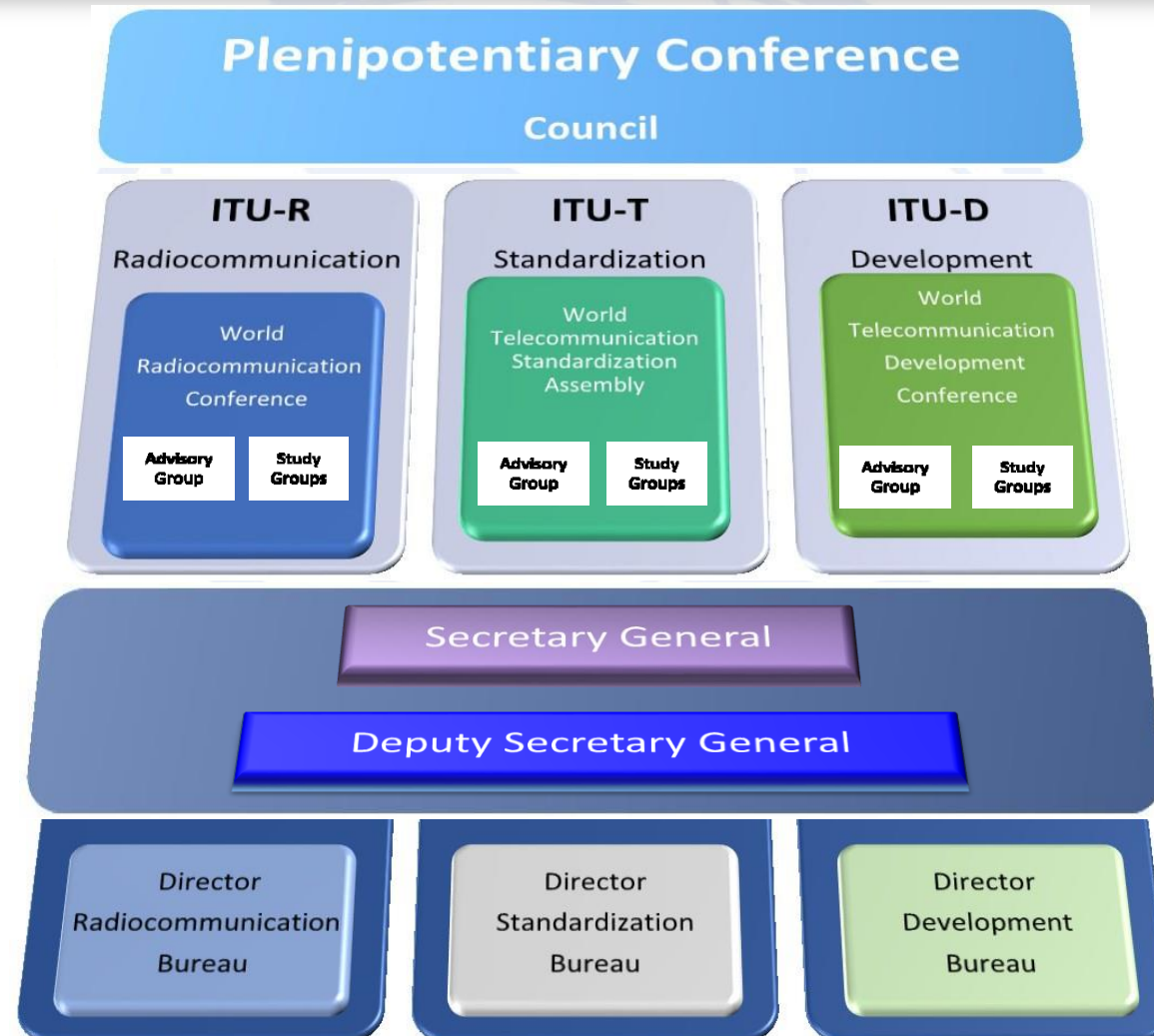**193** MEMBER STATES

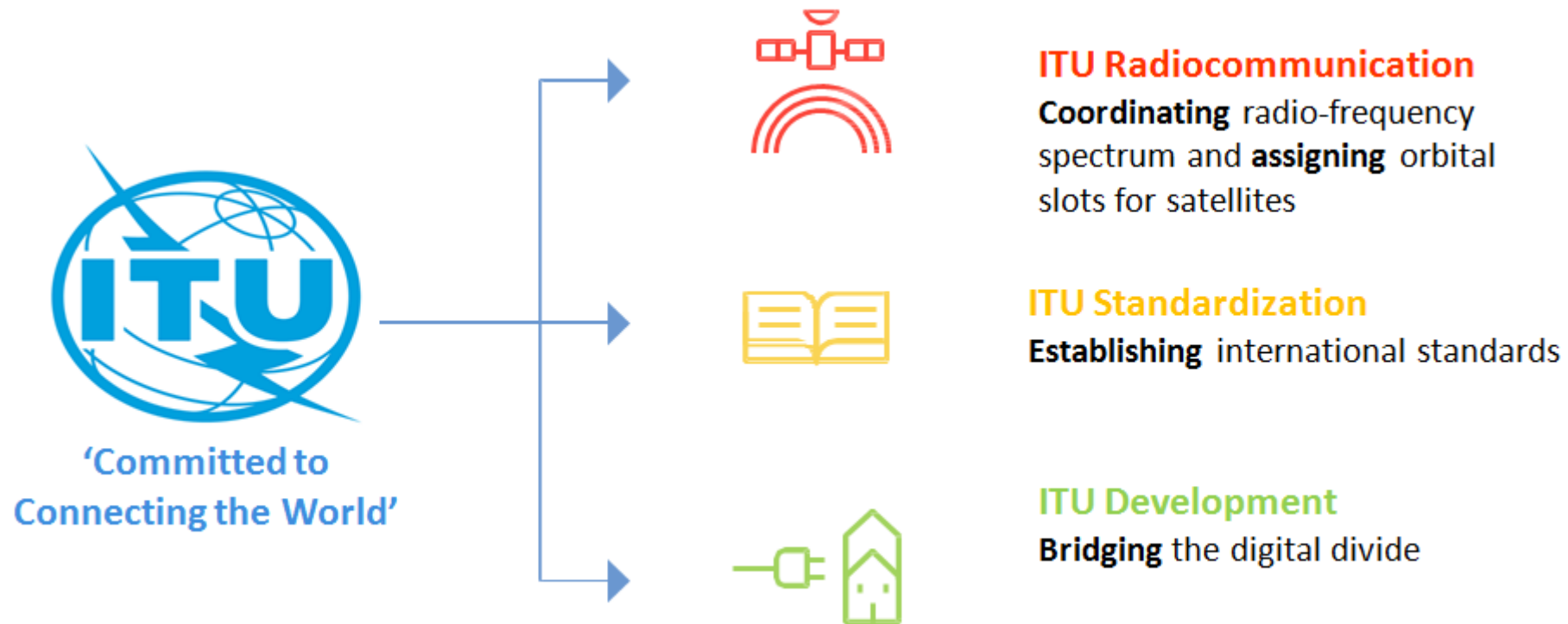**+800** PRIVATE SECTOR ORGANIZATIONS

120 ACADEMIA

Our Structure

Regional Offices

Our Governance

Meet the Sectors
Three ITU Sectors

'Committed to Connecting the World'

ITU Radiocommunication
Coordinating radio-frequency spectrum and **assigning** orbital slots for satellites

ITU Standardization
Establishing international standards

ITU Development
Bridging the digital divide

Our Areas of Action

Cybersecurity

Emergency telecoms

IoT and Smart cities

Climate Change

Gender

Future of ICTs

Accessibility

Academia

ICTs for Sustainable Development

ITU-ALECSO Work on Cloud Computing in Education

☐ **ALECSO-ITU Guidelines to improve the use of Cloud Computing Technology in Education in Arab Countries** *(December 2016)*

☐ **ALECSO-ITU National Strategic Implementation plan for using Cloud Computing in Education** *(Draft)*

Policy recommendations

- Based on findings related to cloud adoption in the world and particularly in educational institutions

- Refer to the state of infrastructure and ICT development in the Arab world

- **4 key policies**

  (Structured according to major stakeholder's profiles: ministerial departments, universities and educational institutions)

1	High quality network
2	Always Public cloud first
3	"Cloudify" the existing local infrastructures and applications
4	Adopt a cloud friendly governance model for IT

Key Policy 1: *High Quality Network*

- **Prerequisite:** *Give to investment in a high quality network (intranet + access to Internet) the highest priority*

- **Main guidelines for the implementation of key policy 1**

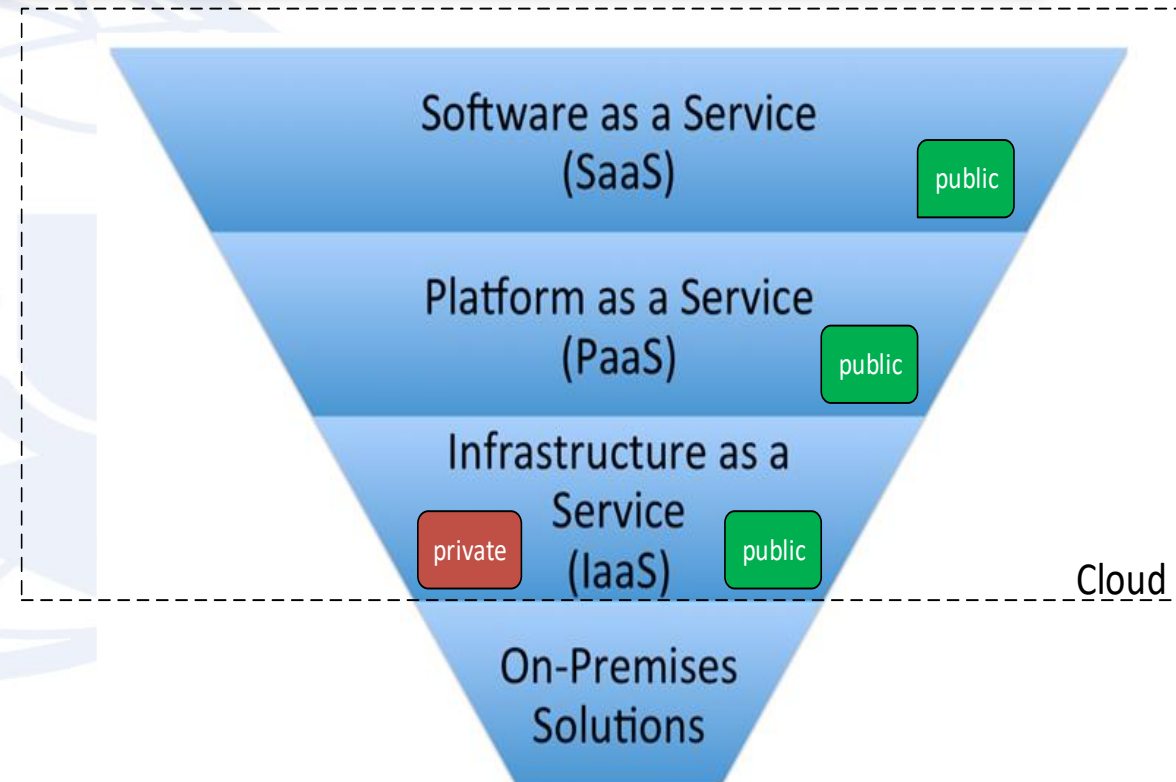| Ministries in charge of higher education and research	Universities/ higher education institutions
• **Negotiate contracts' frameworks and SLAs at national level with Telcos** to provide a best of breed network access to all institutions regardless of their locations and size • **Coordinate with the different ministries** in order to implement a framework of incentives promoting universal access to the internet	• **Allocate the right budgets** to deploy a redundant/reliable high-quality intranet, properly sized and supported • **Negotiate with hardware providers** to lower the barrier for acquiring laptops + **negotiate with Telcos** to lower the barrier for gaining 3G/4G internet access on mobile devices to all students, teachers and researchers

Key Policy 2: *Always public cloud first*

- Use of public cloud as the first choice wherever possible and hence enabling educational institutions **fast access to advanced IT and catching up with international practice**

- Always SaaS first and use public PaaS/IaaS instead of local infrastructures

- Existing on-premise applications that (i) have critical constraints or (ii) wouldn't benefit from public or private clouds or (iii) can't be **cloudified,** should continue operating on-premises

Software as a Service (SaaS) — public

Platform as a Service (PaaS) — public

Infrastructure as a Service (IaaS) — private / public

Cloud

On-Premises Solutions

Public/private cloud Services

Key Policy 2: *Always public cloud first*

Main guidelines for the implementation of key policy 2

Ministries in charge of higher education & research	Universities/ higher education institutions
• **Negotiate contracts' frameworks** with the key global and local cloud providers • **Engage in ambitious partnerships** with those players (such as Google, Microsoft, Amazon, etc.) in order to make the use of cloud in education part of a larger framework of cooperation, promotion of innovation and adoption of **cutting-edge IT solutions** throughout the country • Put in place **communication strategies** contributing to a **mindset shift** about pervasiveness of cloud solutions	• **Review** all services and applications in use, **benchmark existing SaaS alternatives** and migrate if a mature and satisfactory solution exists which also respects the different constraints and legal rules of the institution • For PaaS/IaaS migration, IT departments should train their members on technologies such as **containers and clouds automation APIs and tools**. They should expose selfservice portals to the end user and automate user interaction with tools and applications as much as possible

Key Policy 3: *"Cloudify" the existing local infrastructures and applications at institutional level*

Main guidelines for the implementation of key policy 3

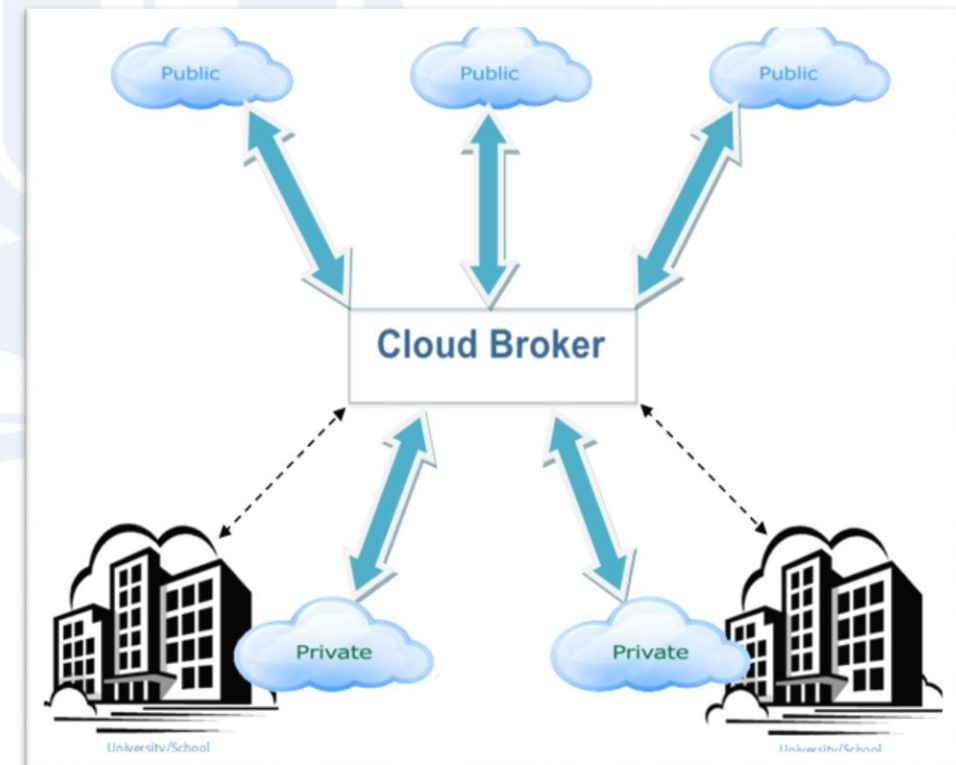| Ministries in charge of higher education and research	Universities/ higher education institutions
• Put in place a program for pilot projects **to show case the cloudification** using containers and cloud toolkits of typical institutions' infrastructures. publish and disseminate results, know-how and lessons learned	• Universities/higher education institutions IT departments should **train** their members on technologies such as containers, virtualization technologies and clouds toolkits • Pilot projects must be put in place to help making **informed decisions** about the specific container orchestration technology and cloud toolkit that would best fit the needs of the institution

Key Policy 4: *Adopt a cloud friendly governance model for IT*

- The migration to the cloud requires a change in IT governance models and practices, offers to be made available to users must meet two main requirements: **ease of use and flexibility**

➔ it is advisable to:

- **Redefine** the role of the IT department to become a **service** and support provider without limiting the scope of initiatives that users may want to take

- Create an **entity at national**, regional or institutional level that deals with **brokerage** and procurement in a centralized way

Key Policy 4: *Adopt a cloud friendly governance model for IT*

Main guidelines for the implementation of key policy 4

Ministries in charge of higher education & research	Universities/ higher education institutions (If no national entity)
• Arbitrate between public and **private** entity options and if the latter option is chosen, select a company based on the legal rules in place • Arbitrate between the creation of a new public entity and the **delegation of the new role to an existing** one that has the operational capacity for that • Make sure that the entity is **governed** in a way that gives to the end users/institutions power to contribute to the strategical decision making	(i) Create that entity (ii) or attribute its role to a team within the IT department (iii) or contract with a company

Requirements

- **Overcome most significant perceived barriers to cloud adoption**
    - Security issues
    - Integration with Existing systems
    - data protection and / or privacy Concerns

    How ?
    - Develop a vision
    - Develop a strategy associating all stakeholders

- **Components of strategies to break barriers**
    - Capacity building
    - Change management
    - Change mindsets by creating opportunities to learn through experimentation at different levels

Digital University

- A digital University is one In which, all staff, academics and students should **use** technology tools **on a day to day basis**

- A digital University is one that **runs all aspects of its business with digital technology** in the objective to:

  - Achieve academic **excellence**

  - Enhance **brand**

  - Interact & work closely with **ecosystems**

  - Perform internationnally **recognized** research

  - Achieve **financial** stability & efficiency

Digital University : a Model

- A Digital University may be represented as composed of 6 components:

  - **4 vertical pillars**

DU1 : Digital Campus Management	**DU2:** Digital Teaching & Learning	**DU3:** Digital Research	**DU4:** Ecosystem digital links

  - **2 transversal layers**

Digital Strategy & Vision layer	**The IT service delivery Platform**

- Each component includes **specific objectives**

- Achieving objectives requires a set of specific **IT applications** in addition to common IT applications

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Model of a Digital University
Top Layer : Digital University Vision and Strategy

- **Objectives**

  – Establish Brand

  – Deliver best outcomes

  – Promote Academic Values

  – Improve experience

  – Control Costs

  – Increase Revenues

- **IT Specific Applications**

  – Strategy Planning App

  – Strategic intelligence and analysis App

  – Strategy Monitoring, KPIs, Dashboards App

  – **Communication & Collaboration Services**

Model of a Digital University
Communication & Collaboration Services

- Unified Communications **Emails, Web Conferencing** and Collaboration

- **Video** Conferencing

- Collaborative **Office** Suite

- Video Capture & Storage

- **Social** Media Tools

- Information Sharing Tools

- University **Portal**

- **Storage** services

Model of a Digital University
IT Service Delivery Platform

IT infrastructure that supports all IT apps and services

- Wired and **Wireless** Network (end-to-end infrastructure)

- **IoT Network**

- Secure **Remote** Access

- Identity Federation

- **Data Center** / Private **Cloud**

- Brokers

- Community Cloud

- Public Clouds

Multi Layered Strategic Vision
for Higher Education by Country

- **S1:** Ministry-driven strategy

- **S2:** Ministry and University driven strategy

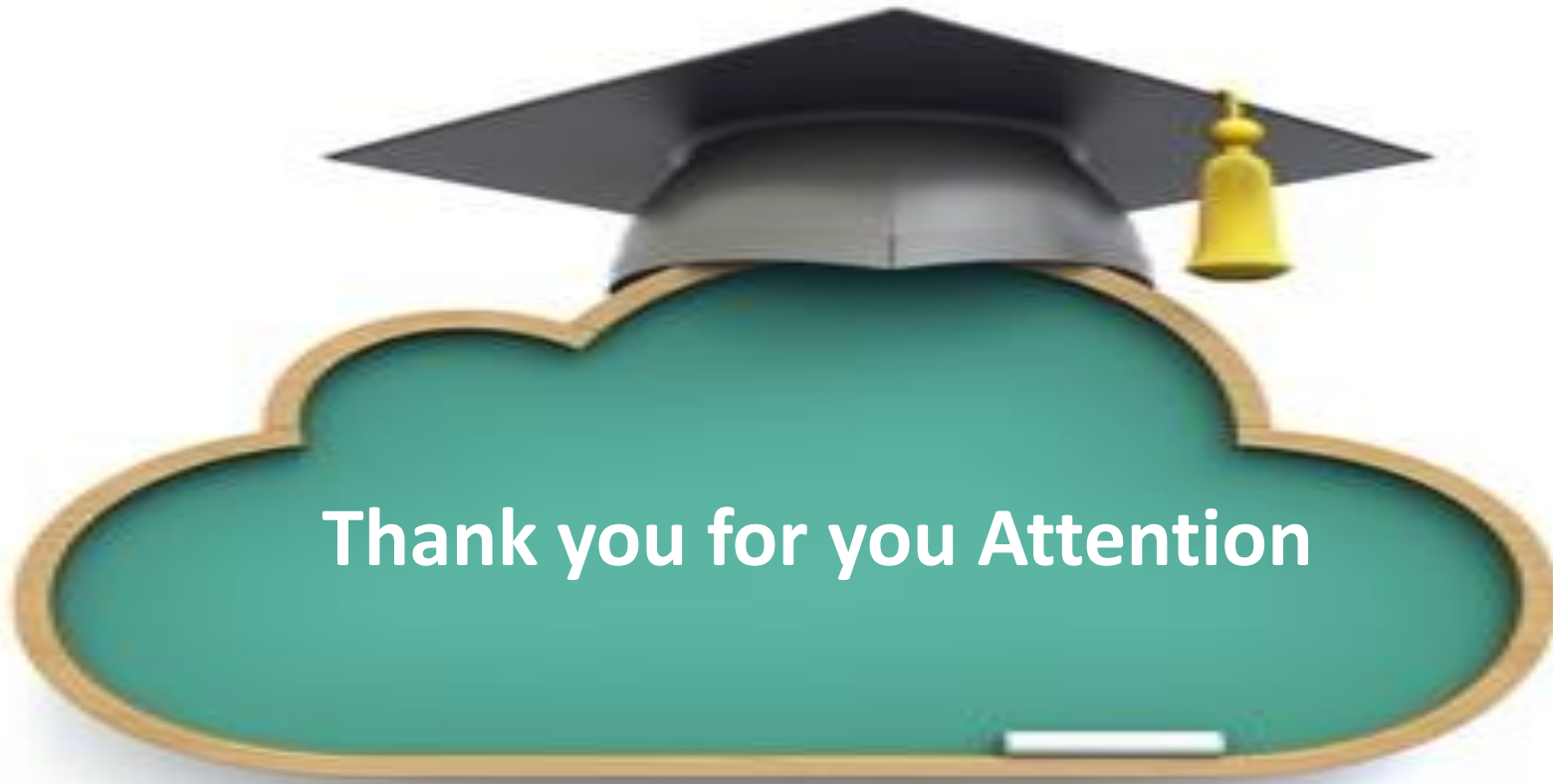- **S3:** Ministry, University and Institution driven strategy

Ministry → **University** → **Institution**

Strategic Decision Making

Thank you for you Attention

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