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Empowering Education

Quality Assurance for Reform and Transformation of HEIs in Uzbekistan - QUARTZ

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Structures and infrastructures (adequacy for teaching, research and third mission)

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UNIVERSITÀ DEGLI STUDI DELL'AQUILA

DIIIE
Dipartimento di Ingegneria Industriale e dell'Informazione e di Economia

Measurement for automation and industries

Processing of data and measurement information

Building Structures and Infrastructures: Planning and Management

Universities must provide adequate building structures and infrastructure to support the fulfilment of their educational, research and community service missions. These facilities are not only places where daily activities take place, but also crucial elements in achieving the goals of the strategic policies set by the institution.

In addition, infrastructure such as the Internet, multimedia classrooms, learning management systems, and spaces for extracurricular activities are critical to integrate traditional learning with digital learning and promote a dynamic environment that meets the needs of students and faculty.

Building Structures and Infrastructures: Planning and Management

A university's strategic policies must therefore include investments in maintaining, upgrading, and building modern infrastructure that can foster academic growth, quality research, and a stimulating and inclusive learning environment.

The planning and management of building structures and infrastructure in the university is a crucial aspect of ensuring that the university can effectively carry out its functions and achieve the goals set out in its strategic policies.

Building Structures and Infrastructures: Planning and Management

Accessibility of facilities is another crucial element. Universities must be inclusive places that allow access to all people, regardless of their physical, socioeconomic, or cultural abilities. This implies carefully designing facilities so that they are easily accessible to students with disabilities (e.g., wheelchair ramps, elevators, braille signs, etc.).

In addition, inclusiveness is not only about physical access, but also about creating learning environments that can meet diverse cultural, linguistic, and background needs. This could include spaces for psychological support, orientation, intercultural activities, and diverse teaching resources.

Building Structures and Infrastructures: Planning and Management

Technology has a fundamental impact on the way universities interact with students, faculty, and the outside world.

Technology infrastructure is not only about Wi-Fi and e-learning platforms, but also about adopting advanced technologies, such as augmented reality (AR) or virtual reality (VR) for interactive experiments, or even creating spaces for distance learning (interactive digital classrooms).

Building Structures and Infrastructures: Planning and Management

Universities are not only places of study, but also centers of social life and cultural exchange. Common spaces, such as libraries, cafeterias, and break areas, as well as spaces for events and extracurricular activities, must be designed to foster socialization among students, faculty, and staff. Creating informal environments where students can meet, discuss ideas, and network is critical to stimulating creativity and interaction across disciplines and cultures.

To support the university's research mission, it is essential that appropriate spaces are created. These spaces must be equipped with modern equipment and resources that enable researchers to conduct advanced studies. Areas for laboratory work, but also for data management and international collaboration, are critical.

In order to achieve the aims and results foreseen in their policies, Universities must develop the capacity to manage tangible and intangible resources.

How can they assess the quality of the strategies and of the related implementation plans?

Tangible and intangible resources include:

- Human resources (Professor *Irina Petkova* presentation)
- Financial resources (Dr *Angelo Aloisio* presentation)
- **Structures, Infrastructures, Equipment and Technologies (this presentation)**

They are strictly connected and have Common Objective: How can Universities assess their capacity? Which are the indicators that measure the level of achievement and the quality of the results?

Building Structures and Infrastructures: Planning and Management

Universities

- must provide the needed building structures and infrastructures for the implementation of their missions and the achievement of the strategic policies goals
- have a planning and management system of such resources
- must be able to maintain over time their efficiency

Objective: How can Universities assess this capacity? Which are the indicators that ensure the full economic and financial sustainability of the activities carried out?

Building Structures and Infrastructures: Planning and Management

Building Structures and Infrastructures concern:

Teaching, Research, Third Mission, Stewardship

The assessment goes through all the steps:

planning->strategies adopted->implementation->results evaluation->planning->….

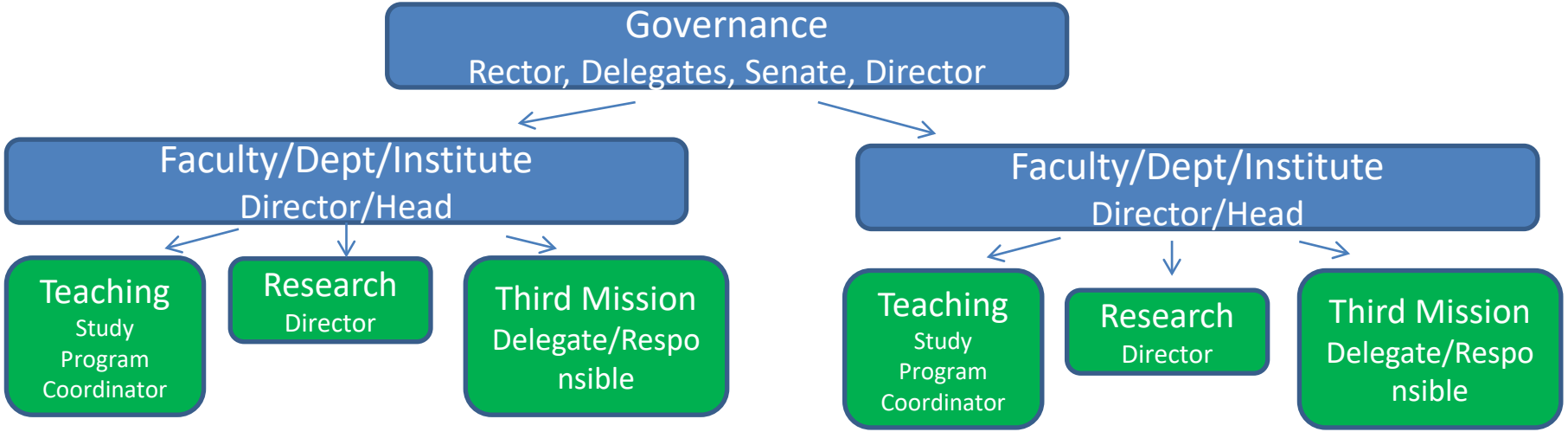
For a continuous improvement (Deming Cycle application)

Actors/Responsibles of the Building Structures and Infrastructures management

- Governance, that means academics and administrative staff supporting the highest decision-making levels;
- Teachers and administrative staff supporting the teaching activities at Faculty/Department level;
- Researchers and administrative&technical staff supporting the research in the labs;
- Administrative&technical staff working in the services offices/units.

Actors/Responsibles of the Building Structures and Infrastructures management

Universities are structured in Faculties/Departments/Centers/Institutes.
They all contribute to the 3 missions with some degree of freedom in the decision-making process, focused on their specific competencies but coherent with the University's Strategic Plan.



Building Structures and Infrastructures: Planning and Management

Human, Financial and Structures & Infrastructures resources are the tools/means for the implementation of the Universities' missions.
Thus they need to be integrated through a coherent planning and management that include

- The maintenance/development of the Building Structures (Labs, class rooms, …) and Infrastructures resources (physical, digital, …) for the implementation of the 3 missions,
- The accessibility to such Structures & Infrastructures to all, in a sound and efficient inclusive policy,
- The adequacy to the planned activities and expected results.

Thus the Quality Assurance system must include the assessment at PLANNING and MANAGEMENT level.

Building Structures and Infrastructures: PLANNING

The assessment of the quality of the **Structures & Infrastructures resources PLANNING**, that is the methods used for their distribution to the 4 dimensions of the university (teaching, research, third mission/social impact, institution/stewardship) must consider the requirements of the peripheral structures. Then it is needed:

- A **Strategic Plan** (that is the University's policies and strategies for the missions and other institutional and management activities, that includes a strategy for the development of such structures and infrastructures)
- an **adequate** definition and implementation, in accordance with its strategic planning, of a management strategy for its building structures and infrastructures to support its institutional missions and activities, balancing the effectiveness and efficiency of the structures with the needs and expectations of the staff (teaching and technical-administrative), students and other stakeholders.

Building Structures and Infrastructures: PLANNING

Strategic planning is the process aimed to

- Create a shared vision focused on its mission for the institution and its faculty, employees, and students
- Create a culture of quality and results impact for a continuous improvement
- Build a culture of risk management that provides mitigation measures and guardrails for administration
- Build structures/competencies/responsibles that enable administration to closely monitor the institution's progress towards the Plan
- Set a roadmap with goals, objectives, actions, and accountabilities for the institution and its people (indicators , measure units and targets)
- Maintain the financial health of the institution and adherence to its mission

Building Structures and Infrastructures: PLANNING

The **Strategic Plan** must also

- Grant planned and sustainable interventions, aimed at preventing the deterioration of structures and infrastructures and at improving their performance and durability over time, through ordinary and extraordinary maintenance,

- Guarantee the accessibility of the buildings to internal and external users, with particular attention to people with disabilities,

- Ensure an ecologically sustainable use of resources throughout their life cycle, also through the establishment of dedicated figures and functions (such as, for example, energy managers and mobility managers)

Building Structures and Infrastructures: MANAGEMENT

Universities must:

- Define and implement, in line with the goals of the Strategic Plan, a management strategy for building structures and infrastructures to support its institutional and management missions and activities

- Arrange and systematically verify the provision of adequate structural and infrastructural building resources available to the Schools/Faculties and Departments (or similar structures) for the performance of teaching, research and third mission/social impact activities that are easily accessible to teachers and students, including people with disabilities or special needs.

Planning and management of equipment and technologies

Strictly connected with the efficiency of building structures and infrastructures are the planning and management of equipment and technologies

These are the key tools for **teaching, research and third mission**.

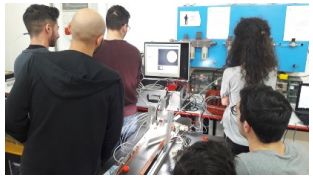
Thus, the University must define and implement, in accordance with its strategic planning, a management and maintenance strategy for equipment and technologies to support its institutional and management missions and activities, with particular attention to the University IT systems, with all the implications, cyber security included.

A QA system must develop indicators and measure units to assess the quality of the planning and management strategies, as described in this presentation

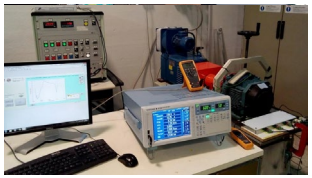
EXAMPLE

Laboratory activities are fundamental in the education of students and should be considered as a tool for skill building.

The department hosts 33 laboratories and 20 laboratory technicians who, together with professors, support students in experimental activities.





EXAMPLE

Create a laboratory where:

- Study .. together
- Work.. together
- Practice theory.. together
- Use "state-of-the-art" in instrumentation
- Stay in an open-space building where meet laboratory technicians and professor to exchange ideas on new systems

Results: From Lab to Spin-off → small and medium-sized company

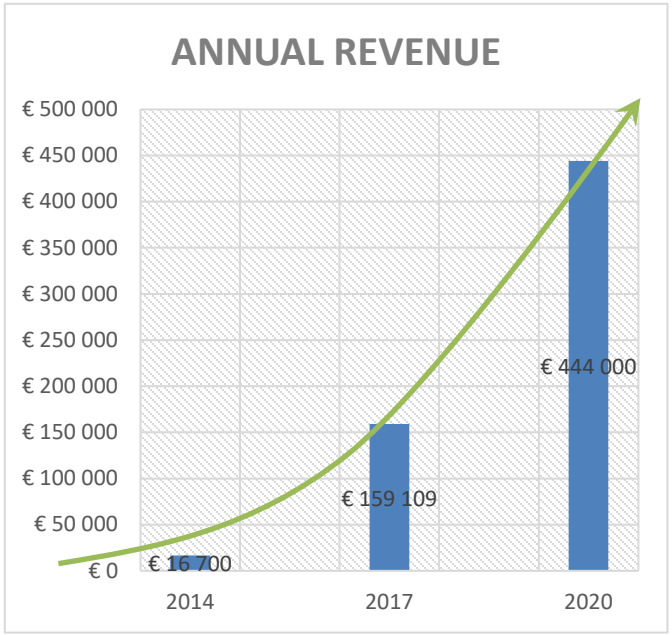
2014 R13 Technology was born within the Department of Industrial Engineering, Information and Economics (DIIIE) of the University.

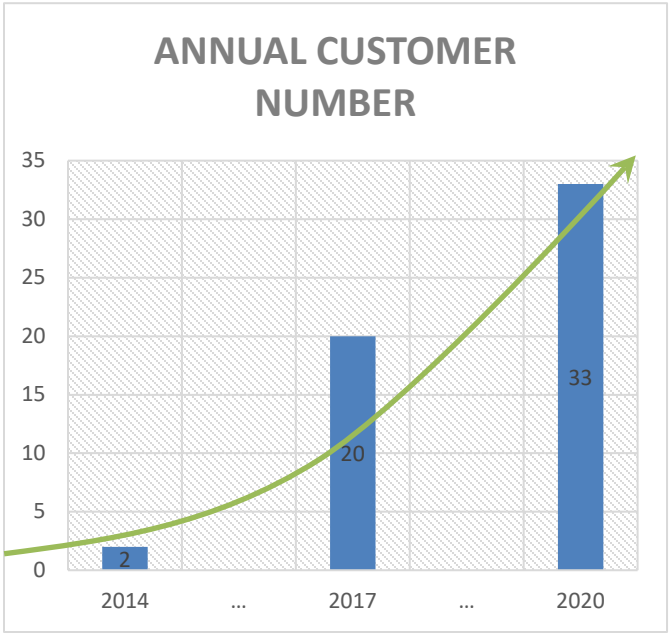
University (5%)
3 Professors (15%)
5 Phds (80%)

Today
- 4 Electrical Engineers
- 4 Electronic Engineers
- 2 Computer Engineers
- 2 Production site manager

R13TECHNOLOGY

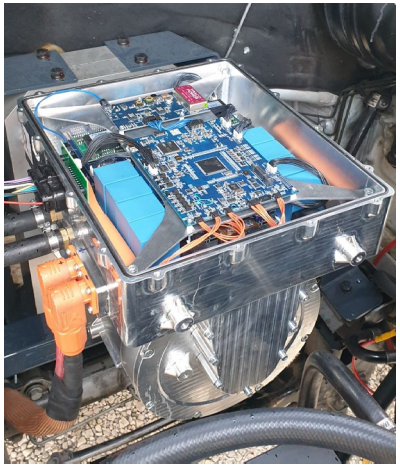
Results: From Lab to Spin-off → small and medium-sized company

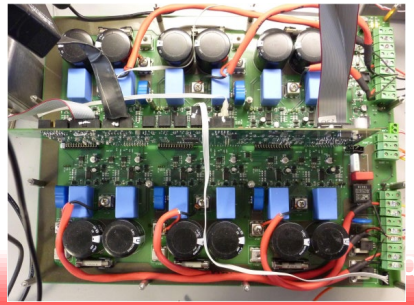


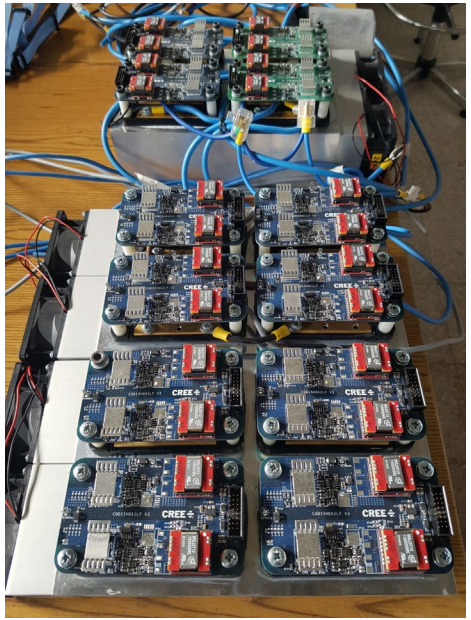


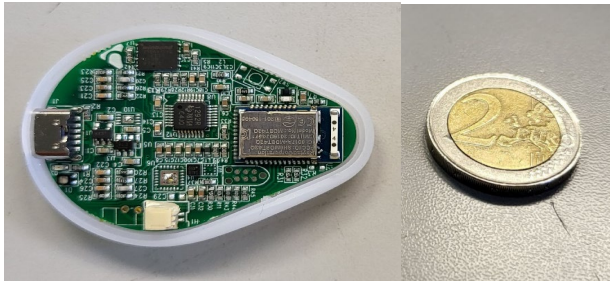
Balance of business always positive, since the first year.

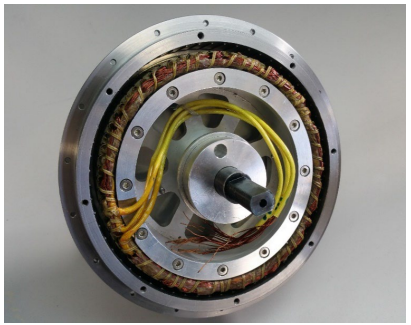
Results: From Lab to Spin-off → small and medium-sized company

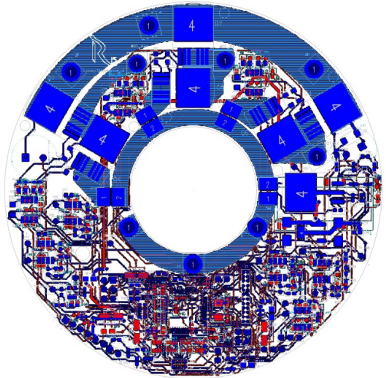












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Thank you for your attention!

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