Guidelines for the scientific organization of INRIM

CdD 2018

L'INRIM

- è *ente pubblico nazionale* con il compito di svolgere e promuovere **attività di ricerca scientifica**, nei campi della *metrologia*
- svolge funzioni di **istituto metrologico primario**
- **valorizza, diffonde e trasferisce le conoscenze** acquisite nella *scienza della misura* e nella *ricerca sui materiali*, allo scopo di favorire lo sviluppo del sistema Italia nelle sue varie componenti

3 missions:
- Research work - RW
- National metrology institute - NMI
- Knowledge transfer - KT

Decreto legislativo 21/01/2004, n.38

INRIM now

- 3 divisions (mainly RW)
  - Physical metrology
  - Nanosciences and materials
  - Metrology for the quality of life
- STALT (mainly NMI and KT)

Research groups now

- **MF1 Interferometry**
  X-ray/optical interferometry; Length metrology; Avogadro constant determination.
- **MF2 Time and Frequency**
  Timescale generation and dissemination of frequency standards and time.
- **MF3 Quantum Optics**
  Quantum imaging, metrology & sensing; Metrology for quantum photonics technologies.

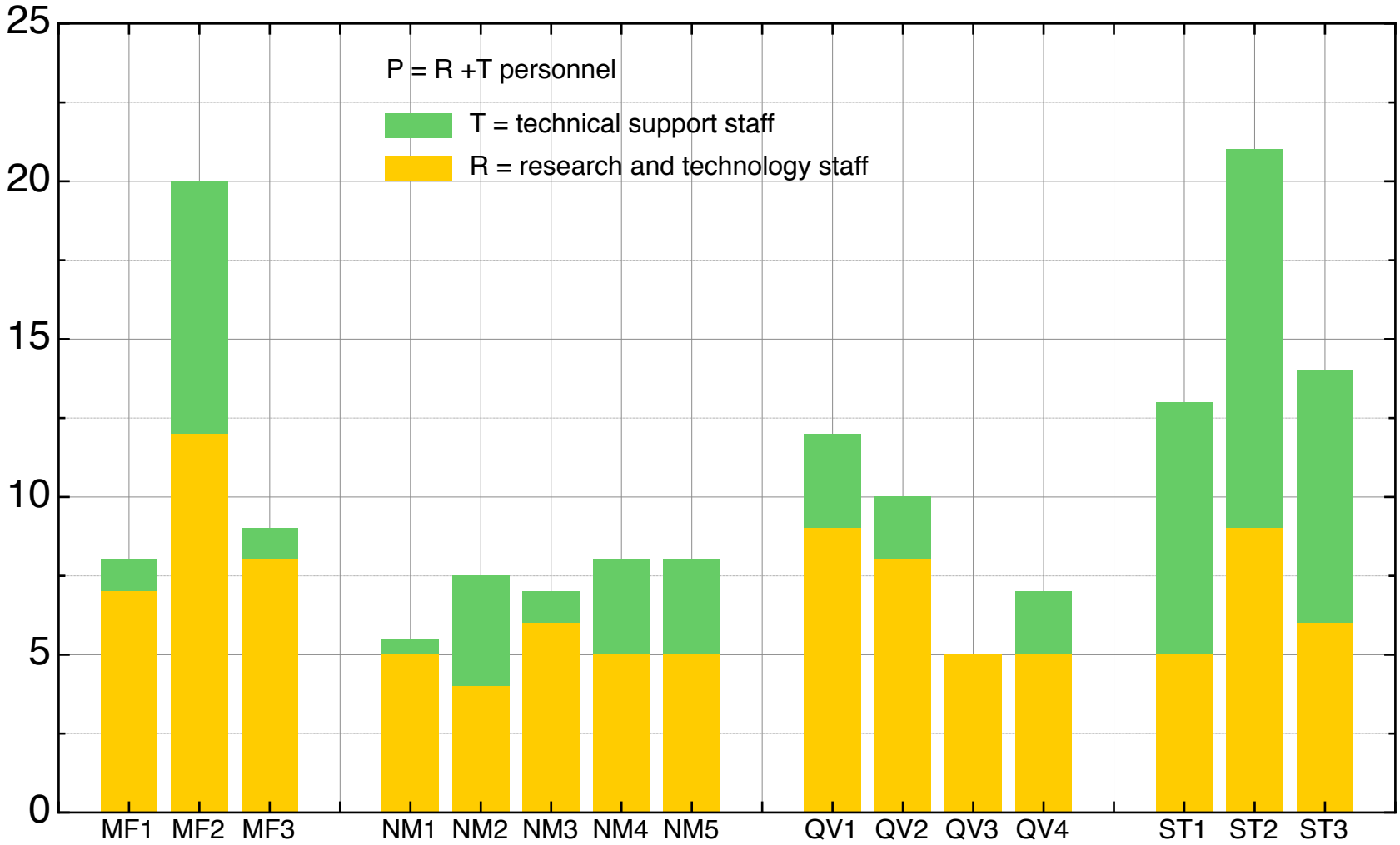
- **NM1 Quantum devices and nanosystems**
  Superconducting and semiconducting detectors. Quantum voltage metrology RF&MW power metrology.
- **NM2 Ampere metrology**
  Electrical resistance and impedance, 2D materials. Dissemination of electrical units.
- **NM3 Nanomagnetism and spintronics**
  Thin film deposition and patterning, nanoparticles synthesis. Magnetic measurements of nanostructures. Spintronics.
- **NM4 Functional materials**
  Magnetic materials for energy applications. Wideband characterization. Realization of magnetic units (Wb, T).
- **NM5 Photonics**
  Photometry and radiometry services, Development of detectors for Radiometry. Optical materials and nanostructures for photonics.

- **QV1 Biomedical Metrology**
  Electromagnetic & Ultrasound Dosimetry; In vitro analysis at molecular, cellular and tissue levels; Technologies for theranostic applications.
- **QV2 Energy and Environment**
  Smart Grids and e-transport systems; Clean transport fuels; Marine, pure and heavy water; Measurement for climate and meteorology.
- **QV3 Food Metrology**
  Food safety; Nanotechnology for food metrology; Food contact materials.
- **QV4 Temperature Metrology**
  Primary contact and radiation thermometry; Technological applications of temperature measurements.

- **ST1 Electromagnetic metrology**
  Voltages and currents, electromagnetic compatibility, lighting field.
- **ST2 Mechanical metrology**
  Length, Mass and Flow, Dynamometry and Vibrations.
- **ST3 Thermodynamic metrology**
  Acoustics, Hygrometry, Thermometry.

Personnel

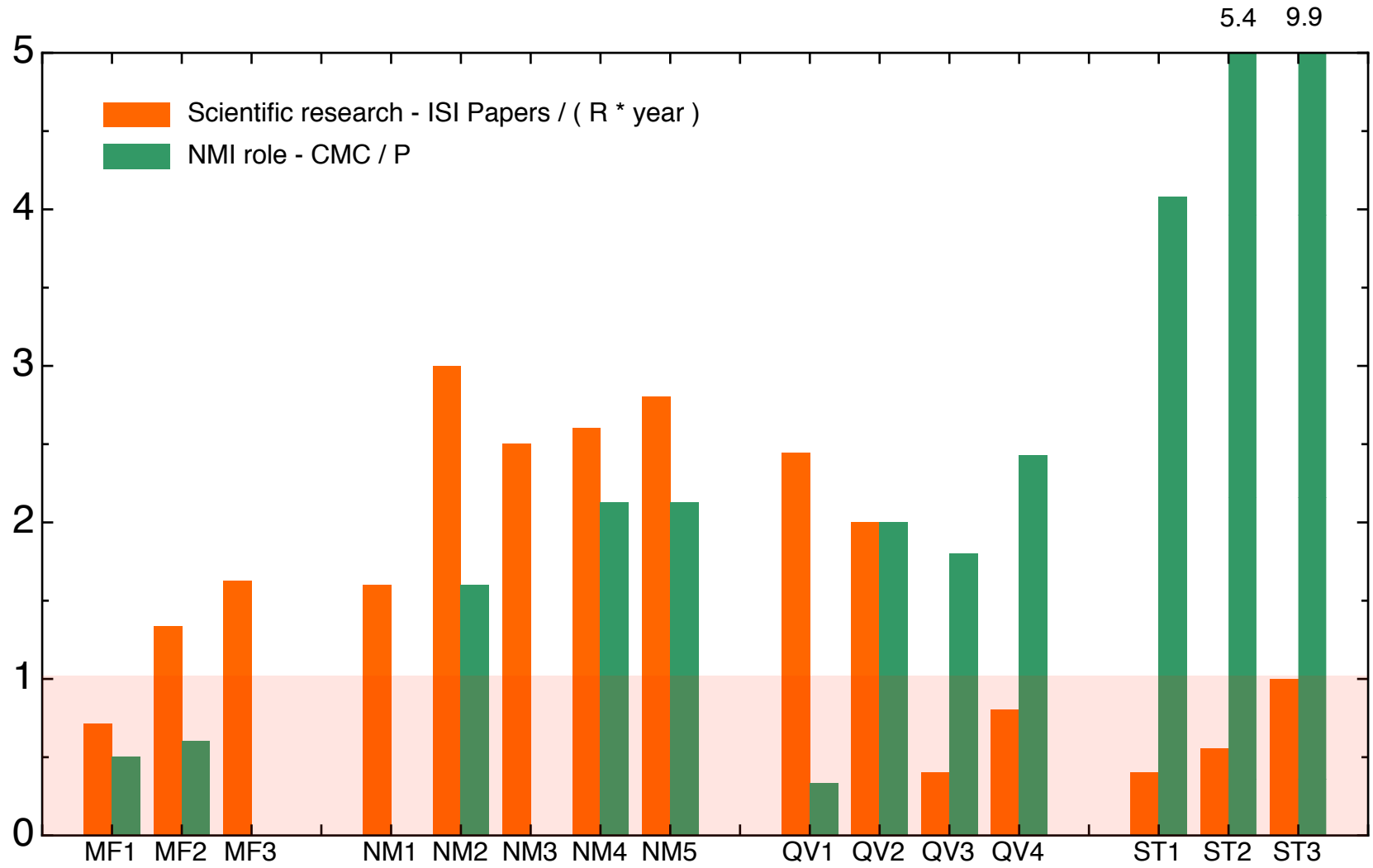
now



source: documento sul personale CdD 2018 (TI+TD)

Papers and CMCs

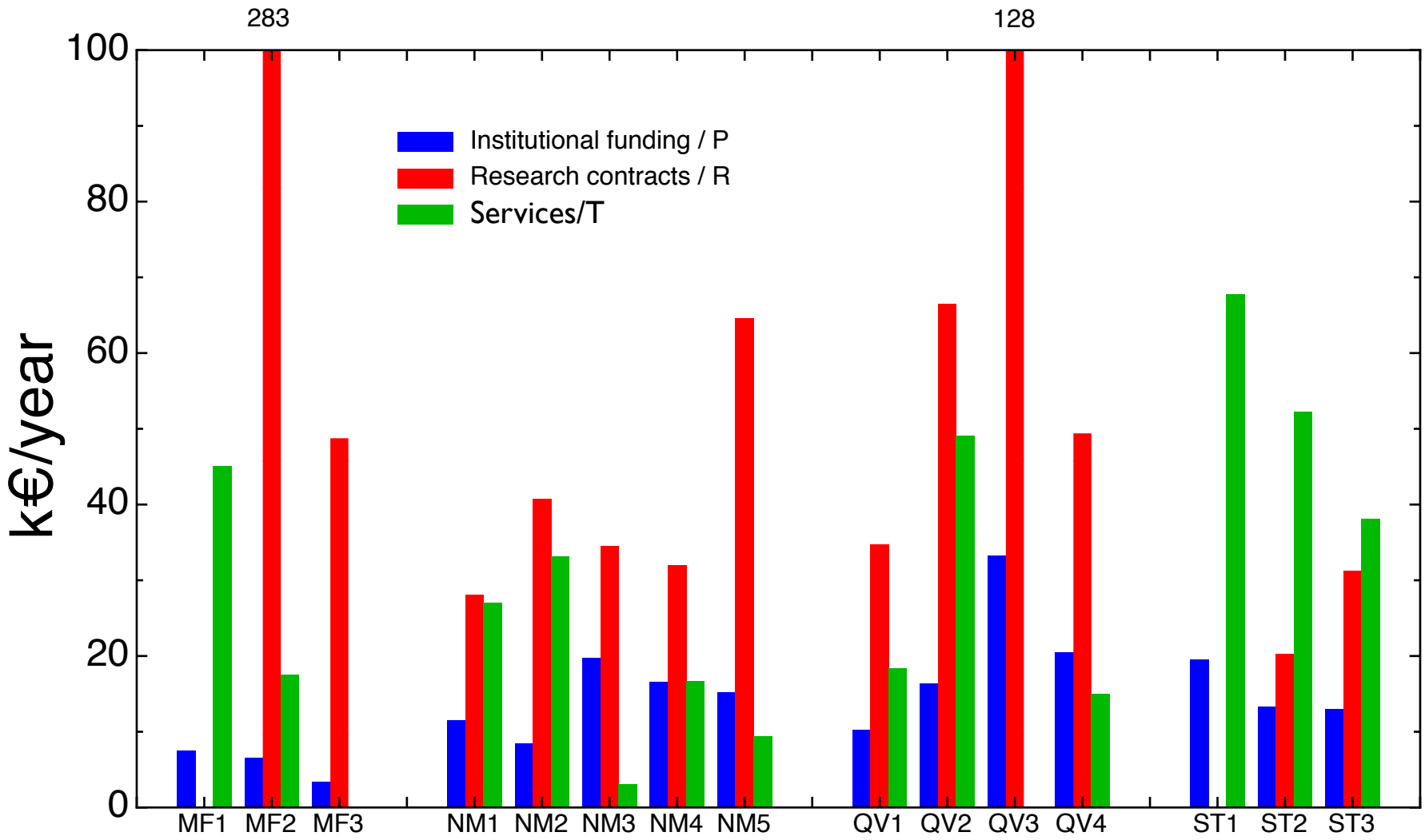
now



source: Papers R&D 2017; CMC schede autovalutazione

Budget

now



source: schede di autovalutazione, media 2015-2017

need for a new organization

- new statute (max 5 divisions, no STALT)
- three missions carried by the divisions

Evaluation by CS

with external experts

7-8 may 2018

Suggestions

1. Focus the **vision** (now is too broad)
2. Find a **“metric”** for the NMI and KT output
3. **Integrate** RW, NMI and KT into the (new) divisions
4. Improve **impact** (promote achievements better)

Evaluation by CS

with external experts

7-8 may 2018

Suggestions

1. Focus the **vision** (now is too broad)
    a. Introduce clear and ambitious objectives (for divisions)
    b. Make a deep evaluation of INRIM CMCs
    c. Take the leadership in EU funded projects

Evaluation by CS

with external experts

7-8 may 2018

Suggestions

2. Find a **"metric"** for the NMI and KT output

   a. Introduce a "broad balance" in personnel evaluation
   b. Use the "broad balance" for internal promotion
   c. Introduce "awards" for NMI and KT

Evaluation by CS

with external experts

7-8 may 2018

Suggestions

3. **Integrate** RW, NMI and KT into the (new) divisions
   a. Join activities with common technologies or disciplines
   b. Promote "hot" topics (i.e. quantum technologies)
   c. Promote "cross-divisional" projects

Evaluation by CS

with external experts

7-8 may 2018

Suggestions

4. Improve **impact** (promote achievements better)
    a. Identify national shakeholders needs
    b. Develop selective partnering

CdD activity

previous steps

- Brainstorming
- First set of proposals
- Enquiry/discussion within divisions
- Elaboration by CdD
- Call for groups/activities
- Formulation of the current proposals
- Today meetings

Disciplinary versus goal oriented

Disciplinary

Pros

- disciplines coherent with international committees
- Spontaneously aligned with activities

Cons

- funding sources are goal oriented: need for coordination
- n disciplines > 5 (max) divisions

CdD activity

june 2018

Work on:

3. **Integrate** RW, NMI and KT into the (new) divisions

→ common statement

a. Join activities with common technologies or disciplines

→ Proposal of activities collected
and also consider the existing divisions

b. Promote "hot" topics (i.e. quantum technologies)

→ different possibilities worked out
with reference to "hot" topics/challenges

c. Promote "cross-divisional" projects

3.a Join activities with common technologies or disciplines

Groups and proposed activities

1. Time and frequency
2. Quantum optics
3. Photonics
4. Advanced mechanics
5. Thermodynamics
6. Sound and ultrasounds
7. Electric and electronic measurements
8. Quantum electronics
9. Quantum devices and nanosystems
10. Magnetism and spintronics
11. Electrical and e-mobility grids
12. Biomedical
13. Food

The proposals

A

- Physical
- Nano
- Quality of life

3.b Promote “hot” topics

The challenges

- Quantum tech
- Nano tech
- Industrial
- Societal

The proposals

A

- Physical
- Nano
- Quality of life

B

- Quantum tech
- Nano tech
- Industrial
- Societal

C

- Quantum tech
- Industrial
- Societal

The proposals

A

- Physical (56)
  1. Time and frequency
  2. Quantum optics
  3. Photonics
  4. Advanced mechanics
- Nano (39)
  7. Electric and electronic meas.
  8. Quantum electronics
  9. Quantum devices and nanosystems
  10. Magnetism and spintronics
- Quality of life (47)
  5. Thermodynamics
  6. Sound and ultrasounds
  11. Electrical and e-mobility grids
  12. Biomedical
  13. Food

Pros:

- good balance among missions
- minimum perturbation
- good numerical balance
- traceability chains restored
- inline with positive CS review of existing divisions

Cons:

- no hot topic promoted
- no change
- full integration of the ex-STALT at risk

The proposals

B

- Quantum tech (40)
  1. Time and frequency
  2. Quantum optics
  3. Photonics
  8. Quantum electronics
- Nano tech (21)
  9. Quantum devices and nanosystems
  10. Magnetism and spintronics
- Industrial (53)
  4. Advanced mechanics
  5. Thermodynamics
  7. Electric and electronic meas.
- Societal (28)
  6. Sound and ultrasounds
  11. Electrical and e-mobility grids
  12. Biomedical
  13. Food

Pros:

- hot topics addressed
- strategic review
- traceability chains restored
- ambitious review of ex-STALT activities

Cons:

- bad numerical balance
- balance among missions at risk
- risk of "STALT 2.0"

The proposals C

- Quantum tech (46)
  1. Time and frequency
  2. Quantum optics
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  8. Quantum electronics
  9. Quantum devices and nanosystems
- Industrial (53)
  4. Advanced mechanics
  5. Thermodynamics
  7. Electric and electronic meas.
- Societal (43)
  6. Sound and ultrasounds
  10. Magnetism and spintronics
  11. Electrical and e-mobility grids
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  13. Food

Pros:

- good numerical balance
- hot topics addressed
- strategic review
- good balance among missions
- traceability chains restored
- ambitious review of ex-STALT activities

Cons:

- risk of "STALT 2.0"
- "nano" competences and facilities fragmented

The proposals

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Timeline

- 02 luglio 2018 CS
- 03 luglio 2018 CdA
- 11 luglio deadline for submitting “comments”
- luglio - scadenza responsabili di divisione
- ottobre - bilancio di previsione
- 01 gennaio 2019 nuova struttura in funzione