RAMIRI

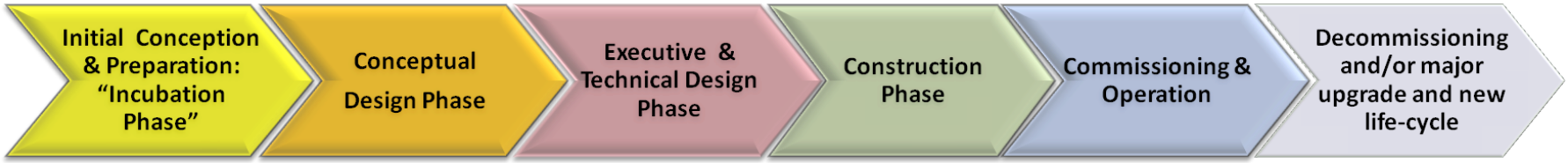
Chapter 2

Life Cycle of a Research Infrastructure

Michel van der Rest

Brussels, April 2013

The phases of the life cycle of a RI



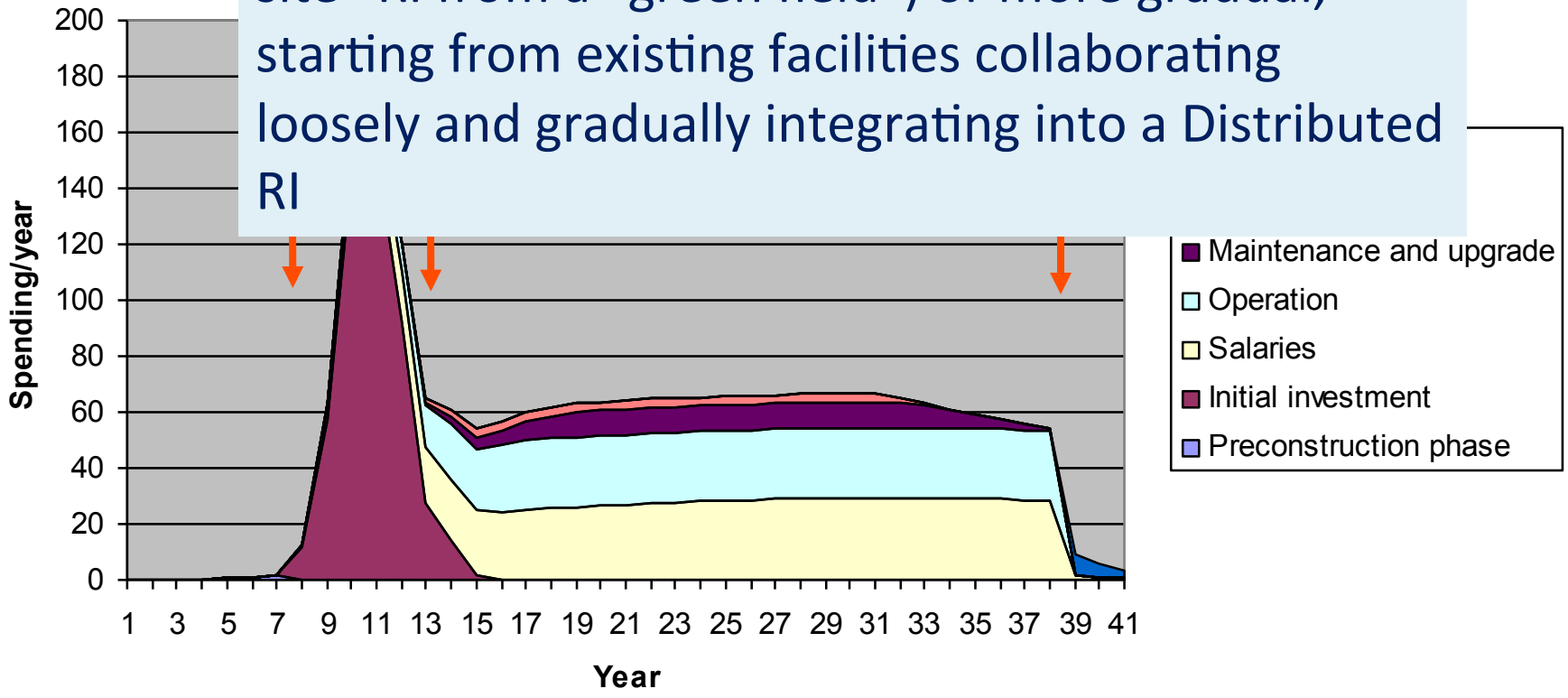
It will never be sufficiently emphasized the need to have, in all steps, the use of "external independent, international, peer review".

RI life cycle phases (ESFRI)

Phases	***Scientific & Technical maturity***	***Institutional, financial maturity, needed to reach next S&T phase***
Phase zero	Preliminary idea and concept.	Definition of user community, scientific organizations
Phase A	Conceptual design: detailed scientific concept , preliminary estimates for technical, feasibility and management aspects; preliminary cost estimate.	Supporting institution and/or known partnerships, capable to coordinate efforts. Availability of funding for feasibility studies
Phase B	Engineering design: elaborated technical concept and feasibility study; reliable cost estimate.	Institutional coordination and resources for feasibility studies and/or technology development
Phase C	Detailed engineering design: detailed technical concept required for construction, budgets and government decision	Legal Institution and (basic) partnerships/agreements, development of financing scheme
Phase D	Construction, commissioning and deployment.	Institutional/financial arrangement and commitments defined also for operation phase

Spending pattern for a 500 M€ facility

The development of the various phases and the transition between them can be very sharp (e.g. for the conception and construction of a "single site" RI from a "green field") or more gradual, starting from existing facilities collaborating loosely and gradually integrating into a Distributed RI



2.1.1 Initial conception and preparation: the incubation phase

In many cases the, most important ingredient for the successful start of a new RI is the involvement of one or few visionary and leading individuals who are capable to define the type and scientific scope of the new RI in a sufficient detail and clarity, and with enough energy and credibility, to get sufficient support from the scientific communities.

In this phase there may also be different “sociological phenomena” taking place: there may a “bandwagon effect” of large parts of a research community jumping-in and supporting the idea, but there may also be the all-out opposition by other researchers due to a (typical) academic reflex: “any increased funding of other groups is to the detriment of mine”.

The visionary and “selling” capability of the proposers can be “too successful” and may attract early political sponsorship and funding support to a still immature project.

2.1.2 Conceptual Design Phase

The transition from the “incubation” to the “conceptual design” phase is normally happening naturally due to the need to respond to questions and criticism coming from the interested scientific communities and the perspective funders, and normally its completion should be defined by the delivery of a complete document containing the most valid options and a reasonable approximation of costs (within less than 100% uncertainty).

2.1.3 Executive and Technical Design phase

If there is the appropriate funding, there may be the transition from the conceptual to a deeper technical feasibility and design study, which can go through few steps increasing in detail and definition.

This phase typically requires resources (funding and people) around 10% of those needed for construction.

The final outcome of this phase should be a technical document capable to give a sound base to the construction/assembly of the RI, explaining in detail the requests to cover funding needs and defining the major risks and corrective measures.

2.1.4 Construction phase

Starting the construction of a research infrastructure assumes that funding is in place, that a governance structure is in place to endorse priorities and budget allocations and that a strong management can direct the developments within budget and time.

It is crucial that, in this critical phase, there is already a well functioning governing body of the infrastructure "project".

As soon as the construction is started, the management is, then, responsible for the performance (cost, time and specifications control) in construction.

2.1.5 Commissioning and operation

To become operational implies that the facilities are tested and brought up to full performance (commissioning).

Users are informed about the capabilities and specifications, while the first calls are published to apply, specifying the access rules/selection and the support services they can get by accessing the RI.

With the new virtual RIs and distributed RIs, the separation is less obvious than for single sited RIs and can be gradual or there could even be a continuous overlap between construction (upgrading/updating) and operation.

The management must be aware and capable to respond to changing interests and requirements by users interests as well as be capable to follow relevant emerging scientific and technical developments. The role of scientific advisory boards and foresight exercises is important in this regard.

2.1.6 Decommissioning and/or Major Upgrades and new life-cycle

A RI losing its competitive edge does not always have to close down. It can be cost-effective and scientifically sound to consider a major upgrade, and in some cases to build totally new facilities while decommissioning old equipment.

Virtual RIs, and also some biomedical RIs are used to the permanent upgrades/updates of their facilities and instruments since the life cycle of their hardware and software is extremely short (3-5 years) while also new applications and new methods are constantly implemented.

In several cases, the RI must be shut down at the end of its useful life-cycle, and this is the **Decommissioning phase**, which can be very complex.

Planning this aspect is increasingly required by funding agencies, and in some countries the full life-time-costs must be well defined, before a new initiative is approved.

2.1.7 The FP7/ESFRI “Preparatory Phase"

The Roadmap of proposed new Research Infrastructures as developed by the ESFRI, resulted in the decision by the European Commission to fund the so-called Preparatory Phase of the identified ESFRI priorities (PP).

However, establishing RIs requires national financial commitments by national authorities, and these have more interest in solid business plans rather than scientific maturity or enthusiasm.

2.2. Project Cycles and Project Management

The role of the management is different in the successive phases in the life cycle of a RI, and should be aware of who is finally in charge to take key decisions and who is paying the project.

Management methods are explained in many books dealing with managing organizations and projects. The handbook makes reference to several methods adapted to different situations encountered during the life cycle of an RI.

It is key for the project management to communicate with all stakeholders, from project staff to decision makers and to external communities about what is planned, how is the progress and what are results.