Computing Professions and Master's Degrees *MSIS 2016*

Bipin Prabhakar, Indiana University

Mark F. Thouin, University of Texas at Dallas

Heikki Topi, Bentley University

Barbara H. Wixom, CISR, MIT Sloan School of Management

Nilmini Wickramasinghe, Deakin University / Epworth HealthCare

Recent reference curricula in computing

- Information Systems
  - Bachelor's 2010 ACM & AIS
  - Master's 2006 ACM & AIS
- Computer Engineering
  - Bachelor's 200? ACM & IEEE (revision ongoing)
- Computer Science
  - Bachelor's 2013 ACM & IEEE
- Software Engineering
  - Bachelor's 2014 ACM & IEEE (revision ongoing)
  - Master's 2009 ACM & IEEE
- Information Technology
  - Bachelor's 2008 ACM & IEEE (revision ongoing)

Task Force for Revising the Model Curriculum for Master of Science in Information Systems (MSIS) Degree

AIS

Eija Helena Karsten	Åbo Akademi, Finland	(co-chair)
Bernard C.Y. Tan	National University of Singapore	
Susan Brown	University of Arizona, USA	
João Alvaro Carvalho	Universidade do Minho, Portugal	

ACM

Heikki Topi	Bentley University, USA	(co-chair)
Brian Donnellan	National University of Ireland, Ireland	
Mark Thouin	University of Texas at Dallas, USA	
Jun Shen	University of Wollongong, Australia	

Task Force Schedule

2015	April	Task force F2F in Amsterdam
	June	ECIS panel for feedback
	June 30	First draft for comments (by August)
	July	PACIS panel for feedback
	August	AMCIS panel for feedback
	December	Task force F2F in Fort Worth
2016	Spring	Second draft for comments
	Summer	Conference presentations, panels
	August	Task force F2F – writing final draft
	September	Submitting to AIS and ACM for approval
	December	MSIS 2016 launched at ICIS Dublin

The MSIS 2016 Initiative

- Global focus
- Recognition of variations due to local contingencies (e.g. governmental digitalization strategies; differences in educational systems)
- Building a profession – not just occupations
- Key questions for the task force:
  - Entry requirements to the programs
  - Outcome expectations of the graduates
  - Structure of the curriculum
    - Program length, IS courses, domain courses, industry projects, thesis, internships, exchange periods, student work required, ...
- Body of Knowledge vs. competences
- Broadly specified continuing education and professional development not included (MBA, eMBA, certificates, short courses)

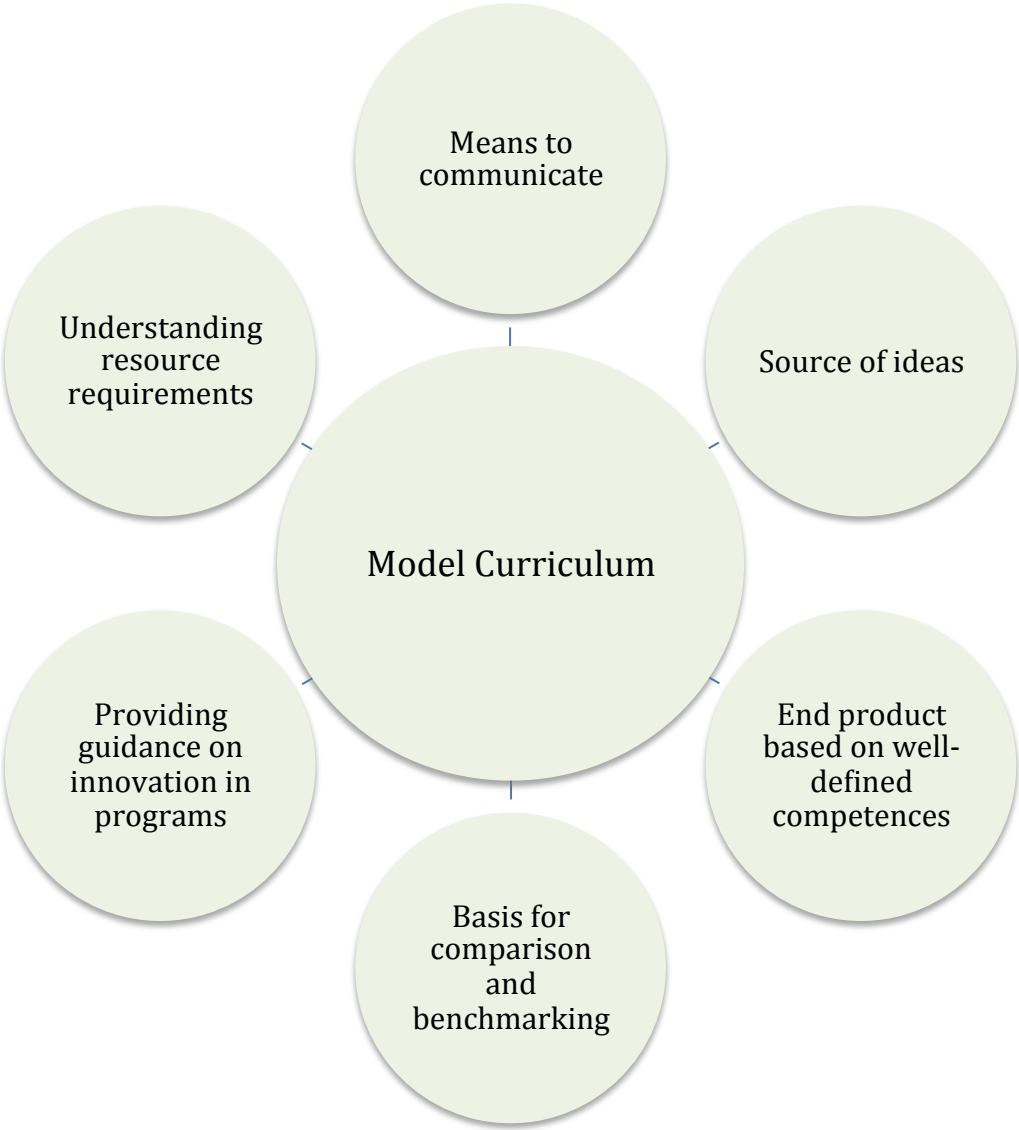
This Panel

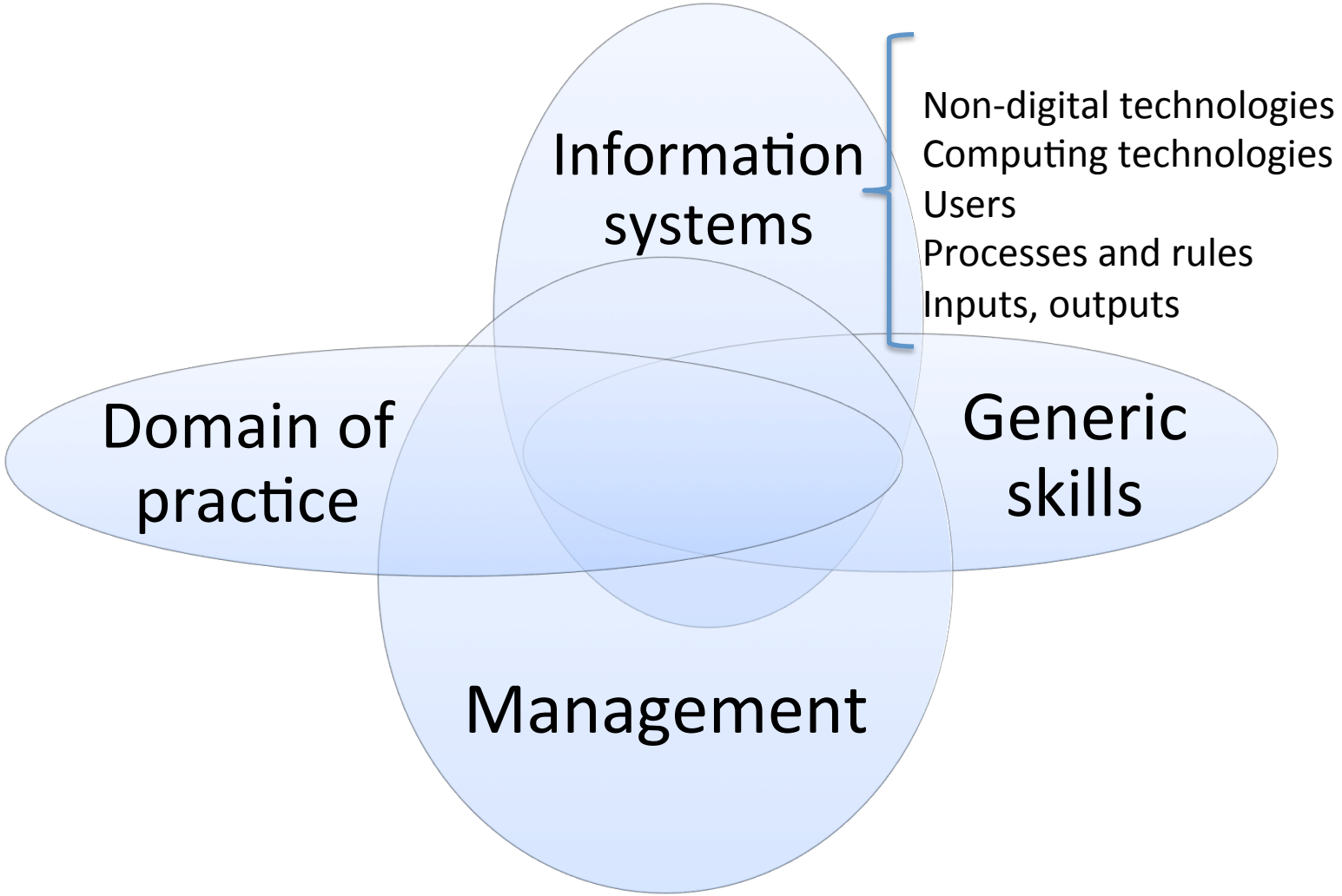
- Presents the principles that the task force intends to follow
- Seeks a response to these by panelists and by the audience
- Seeks ideas from the panelists and the audience
- Is integrated closely to the work of the task force

MSIS 2016 Postulates

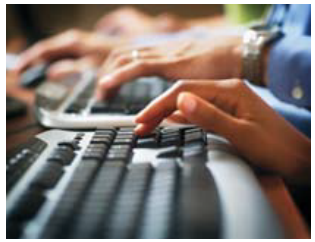
1. Producing curriculum recommendations in computing is a worthwhile activity
2. Entering an IS Master's degree program requires an appropriate Bachelor's degree
3. An IS Master's degree provides the competences needed for starting a professional career in computing
    1. The most meaningful way to specify the MSIS as a reference curriculum is to define it as a degree for those without prior professional experience in IS
4. Existing ICT competence frameworks (e-CF, SFIA, …) are a good starting point for MSIS curriculum development

PRODUCING CURRICULUM RECOMMENDATIONS IN COMPUTING IS A WORTHWHILE ACTIVITY


Means to communicate
Understanding resource requirements
Source of ideas
Model Curriculum
Providing guidance on innovation in programs
End product based on well-defined competences
Basis for comparison and benchmarking


Information systems
Non-digital technologies
Computing technologies
Users
Processes and rules
Inputs, outputs
Domain of practice
Generic skills
Management

An Industry Perspective: What Kind of People and Skills Are We Looking for?



Motivated, energetic and devoted people who are adaptive and comfortable with change

Willingness to readily take ownership of challenging tasks and problems

Thorough and analytical, with capability to apply logic to solve problems

Ability to handle multiple tasks concurrently and meet deadlines

Team players with effective interpersonal skills and the ability to collaborate effectively, strengthening relationships to achieve win-win solutions

Powerful communication skills to deliver a compelling and engaging response

A passion for innovative ideas, coupled with the ability to understand and assimilate different points of view

Global-minded with international experience

Maarit Palo, IBM

Becoming Professional

- By studying
  - Competences
  - Knowing what
  - Knowing how
  - Understanding
- By working
  - Qualifications
  - Life-long learning
  - Contributing to professional associations
  - Standards and ethical principles

Room for Debate

- Is developing a global curriculum recommendation for master's level in IS a meaningful activity, given
  - Regional differences
  - Variability in educational systems and traditions
  - Variety of student backgrounds at the master's level

Postulate 2

ENTERING AN IS MASTER'S DEGREE PROGRAM REQUIRES AN APPROPRIATE BACHELOR'S DEGREE

An Appropriate Bachelor's Degree

- For example:
  - Entry requirements for an IS Master's program in Cologne requires an appropriate Bachelor's degree in Wirtschaftinformatik which includes a minimum of:
    - Information Systems – 10 credits
    - Business – 15 credits
    - Informatics (CS) – 10 credits
    - Mathematics or Statistics – 5 credits

Different programs have implemented widely different practices

Pre-program / Foundation / Bridge Studies

- If candidates have a BSc degree in IT or CS but no studies in the domain of practice:
  - Required bridge studies in the domain of practice

- If candidates have a BSc degree in the domain of practice but no computing background
  - Required bridge studies in computing

Room for Debate

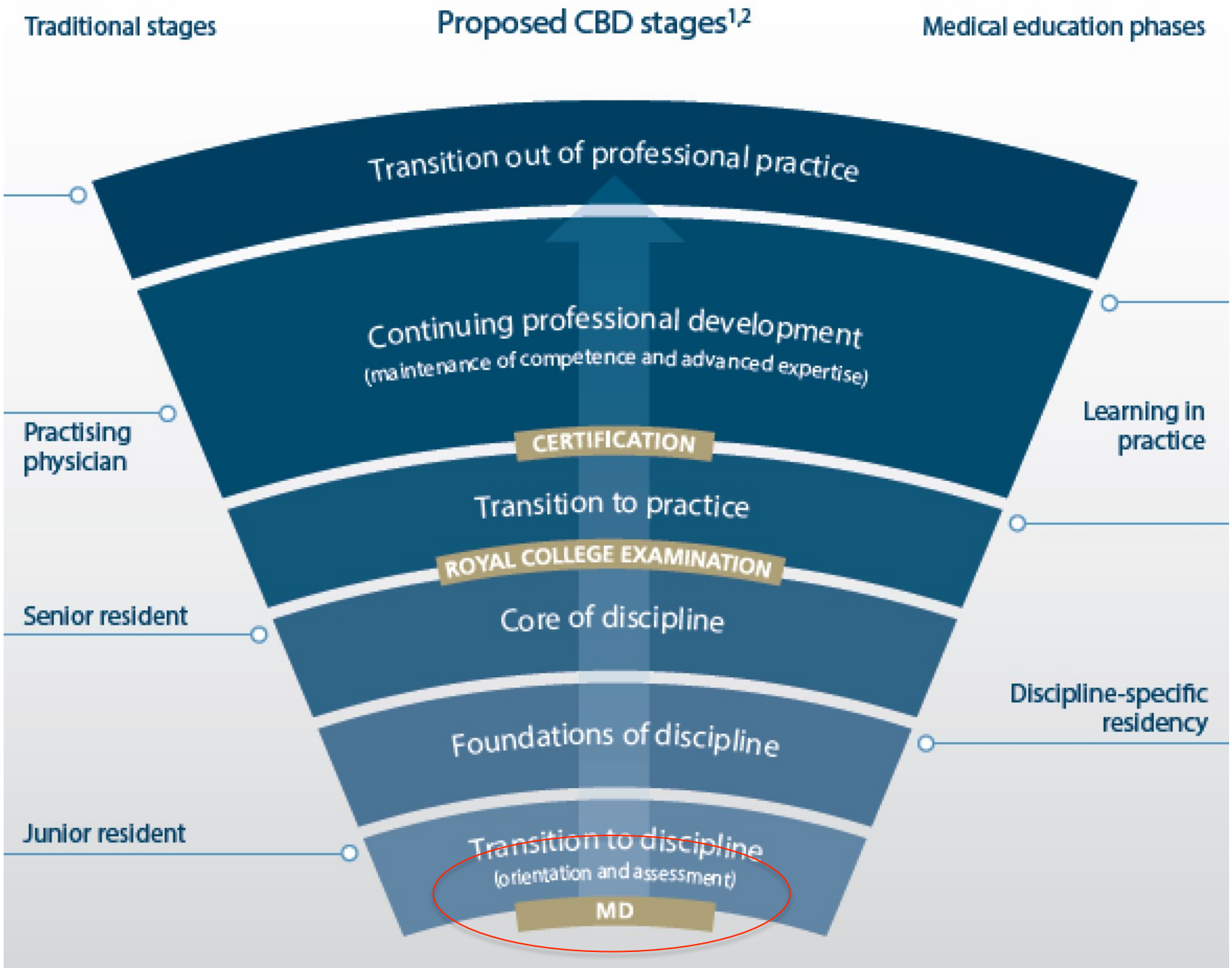
- Should MSIS 2016 specify explicit requirements for undergraduate prerequisites in
  - Computing and/or
  - Domain of practice (business, health care, etc.)

Postulate 3

AN IS MASTER'S DEGREE PROVIDES THE COMPETENCES NEEDED FOR STARTING PROFESSIONAL CAREER IN IS

An Example from Medicine

The Competence Continuum



Room for Debate

- Proposing to specify the MSIS explicitly as an entry level degree is a significant change that focuses but also narrows down the number of programs that can benefit from it. Do you agree with this approach?

Note: There are clearly many other possible post-baccalaureate degree types. The range of possibilities is, however, so broad that it is impossible to develop one recommendation for all of them.

Postulate 4

EXISTING ICT COMPETENCE FRAMEWORKS ARE A GOOD STARTING POINT FOR MSIS CURRICULUM DEVELOPMENT

Content-Focused
Traditional Perspective

- Body of Knowledge tells what content needs to be taught
- Students are expected to know the content

Competences

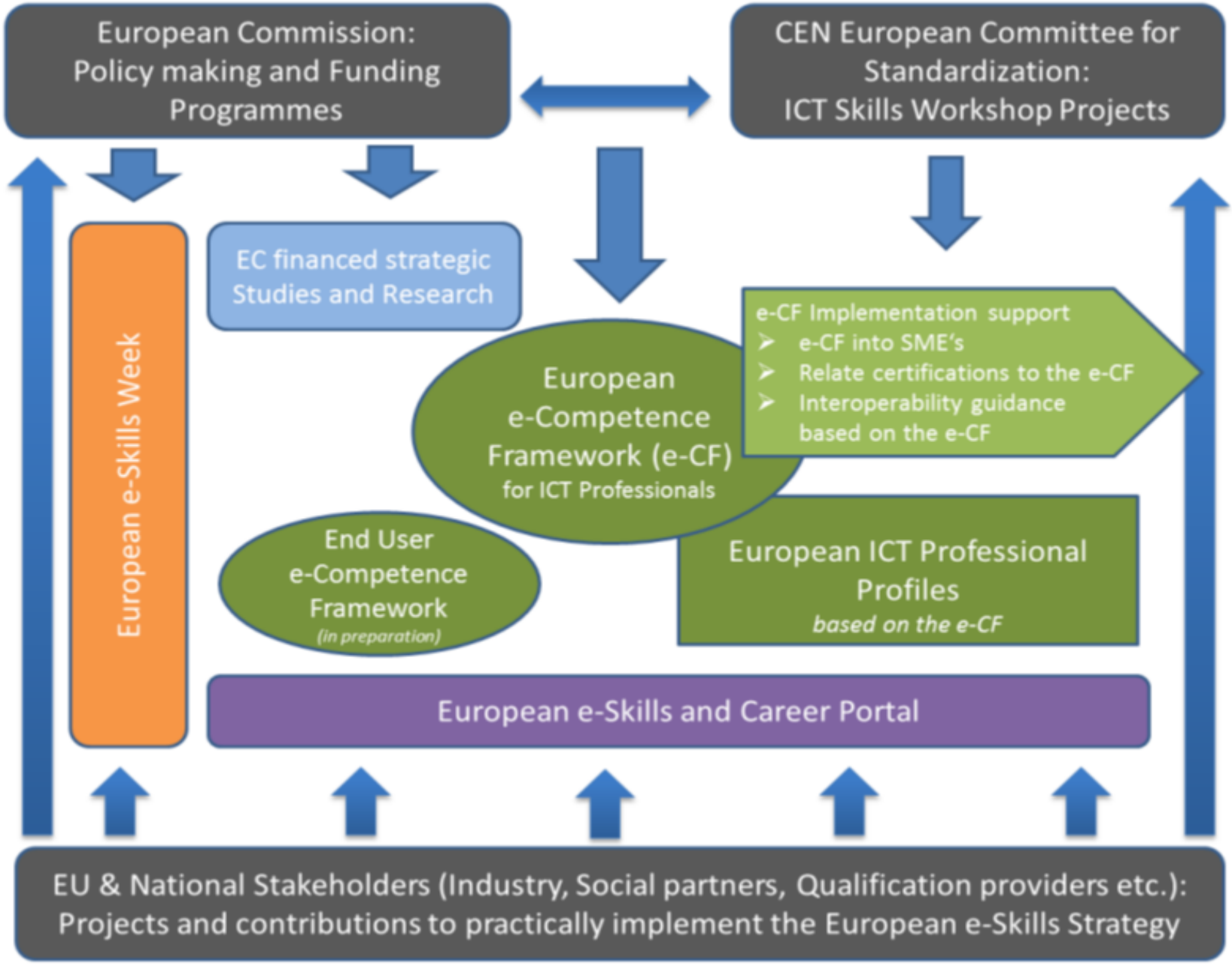
- “Competences represent a dynamic combination of cognitive and metacognitive skills, demonstration of knowledge and understanding, interpersonal, intellectual and practical skills, and ethical values. Fostering these is the object of all educational programmes.
- Competences are developed in all course units and assessed at different stages of a programme. Some competences are subject-area related (specific to a field of studies), while others are generic (common to any degree programme).
- It is normally the case that competence development proceeds in an integrated and cyclical manner throughout the programme.”

Tuning Guide:
http://www.unideusto.org/tuningeu/tuning-methodology.html

Competence *vs* Learning outcome

- "A **competence** […] is a quality, ability, capacity or skill that is developed by and that belongs to the student.
- A **learning outcome** is a measurable result of a learning experience which allows us to ascertain to which extent / level / standard a competence has been formed or enhanced. Learning outcomes are not properties unique to each student, but statements which allow higher education institutions to measure whether students have developed their competences to the required level."

Tuning Guide


European Commission:
Policy making and Funding Programmes
CEN European Committee for Standardization:
ICT Skills Workshop Projects
European e-Skills Week
EC financed strategic Studies and Research
European e-Competence Framework (e-CF)
for ICT Professionals
e-CF Implementation support
e-CF into SME's
Relate certifications to the e-CF
Interoperability guidance based on the e-CF
End User e-Competence Framework
(in preparation)
European ICT Professional Profiles
based on the e-CF
European e-Skills and Career Portal
EU & National Stakeholders (Industry, Social partners, Qualification providers etc.):
Projects and contributions to practically implement the European e-Skills Strategy

e-CF

European e-Competence Framework 3.0 overview

Areas:

PLAN

BUILD

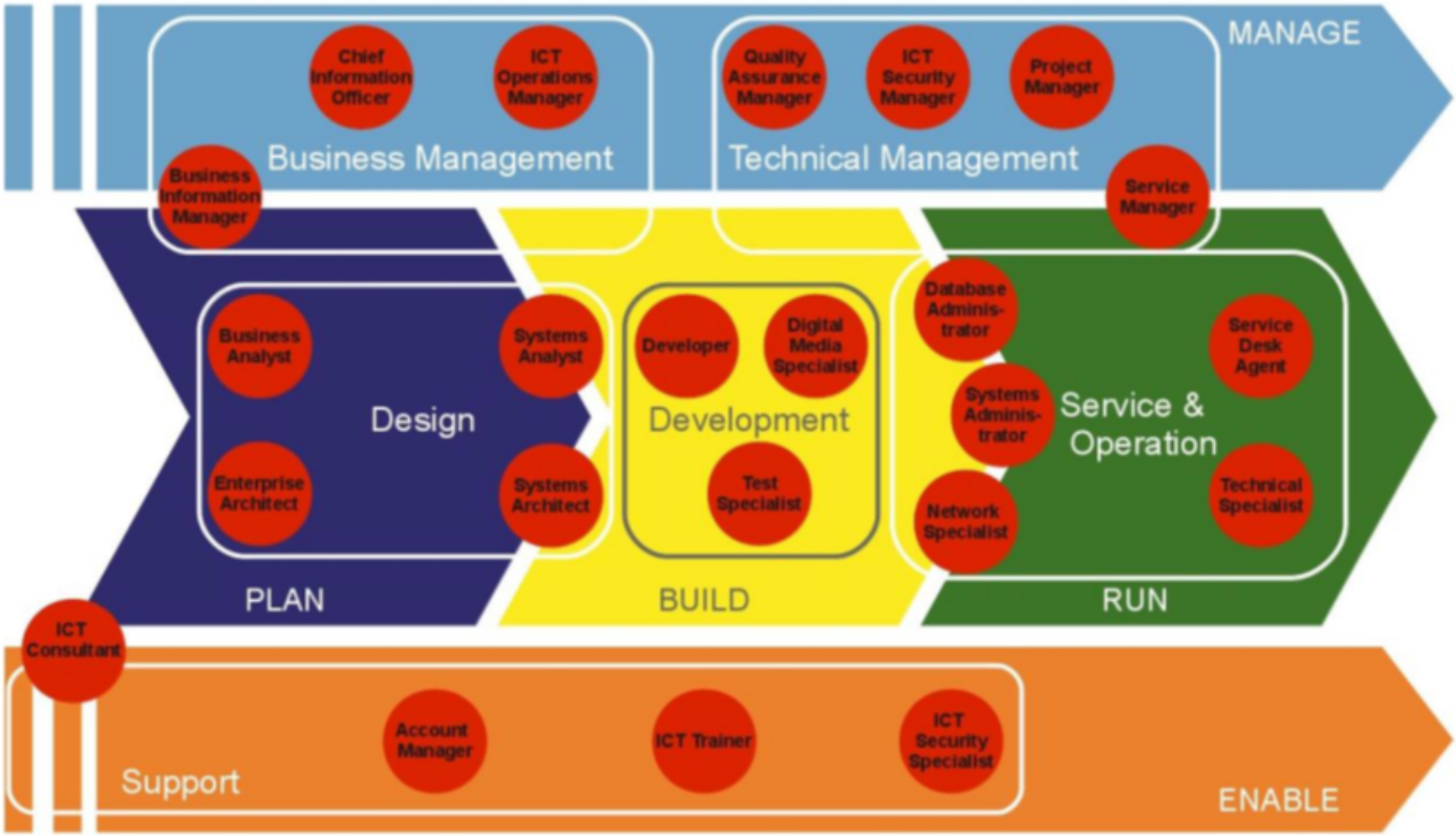
RUN

ENABLE

MANAGE

European e-Competence Framework 3.0 overview

Dimension 1 5 e-CF areas (A – E)	Dimension 2 40 e-Competences identified	Dimension 3 e-Competence proficiency levels e-1 to e-5, related to EQF levels 3–8				
		e-1	e-2	e-3	e-4	e-5
A. PLAN	A.1. IS and Business Strategy Alignment				■	■
	A.2. Service Level Management			■	■	
	A.3. Business Plan Development			■	■	■
	A.4. Product/Service Planning		■	■	■	
	A.5. Architecture Design			■	■	■
	A.6. Application Design	■	■	■		
	A.7. Technology Trend Monitoring				■	■
	A.8. Sustainable Development			■	■	
	A.9. Innovating				■	■
B. BUILD	B.1. Application Development	■	■	■		
	B.2. Component Integration		■	■	■	
	B.3. Testing	■	■	■	■	
	B.4. Solution Deployment	■	■	■		
	B.5. Documentation Production	■	■	■		
	B.6. Systems Engineering			■	■	
C. RUN	C.1. User Support	■	■	■		
	C.2. Change Support		■	■		
	C.3. Service Delivery	■	■	■		
	C.4. Problem Management		■	■	■	
D. ENABLE	D.1. Information Security Strategy Development				■	■
	D.2. ICT Quality Strategy Development				■	■
	D.3. Education and Training Provision		■	■		
	D.4. Purchasing		■	■	■	
	D.5. Sales Proposal Development		■	■		
	D.6. Channel Management			■	■	
	D.7. Sales Management			■	■	■
	D.8. Contract Management		■	■	■	
	D.9. Personnel Development		■	■	■	
	D.10. Information and Knowledge Management			■	■	■
	D.11. Needs Identification			■	■	■
	D.12. Digital Marketing		■	■	■	
E. MANAGE	E.1. Forecast Development			■	■	
	E.2. Project and Portfolio Management		■	■	■	■
	E.3. Risk Management		■	■	■	
	E.4. Relationship Management			■	■	
	E.5. Process Improvement			■	■	
	E.6. ICT Quality Management		■	■	■	
	E.7. Business Change Management			■	■	■
	E.8. Information Security Management		■	■	■	
	E.9. IS Governance				■	■


MANAGE
Chief Information Officer
ICT Operations Manager
Business Management
Business Information Manager
Quality Assurance Manager
ICT Security Manager
Project Manager
Technical Management
Service Manager
Business Analyst
Systems Analyst
Design
Enterprise Architect
Systems Architect
Developer
Digital Media Specialist
Development
Test Specialist
Database Adminis-trator
Service Desk Agent
Systems Adminis-trator
Service & Operation
Technical Specialist
Network Specialist
PLAN
BUILD
RUN
ICT Consultant
Account Manager
ICT Trainer
ICT Security Specialist
Support
ENABLE

Room for Debate

- Is the European work on competences a sufficient foundation or is it too narrow?
- Which other similar initiatives exist that the task force should take into account?
- There is no up-to-date IS Body of Knowledge. Should the discipline develop one?

Thank you!

- Your comments are very welcome! Please visit www.msis2016.org or provide comments by e-mail (**htopi@bentley.edu)**