

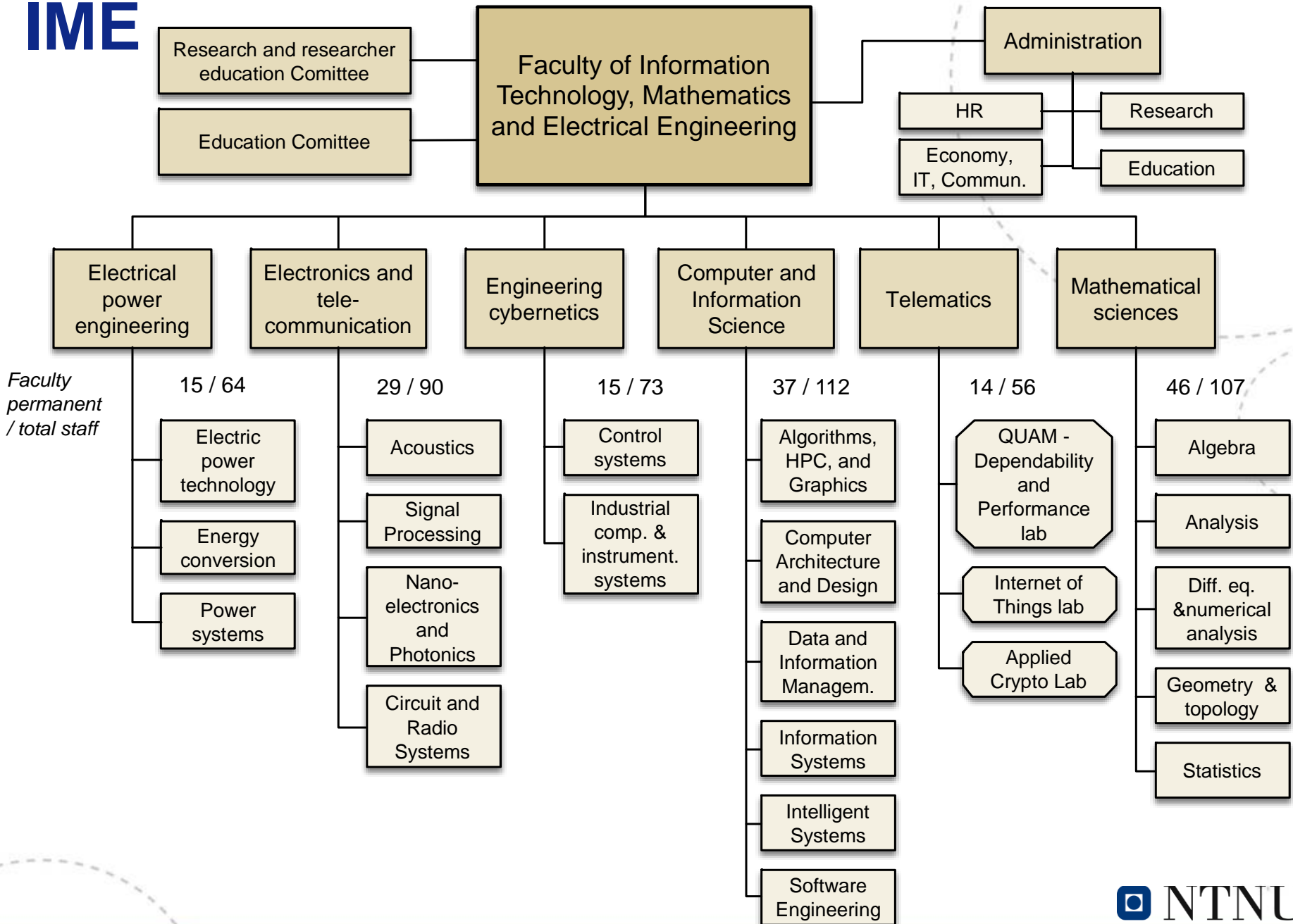
Quality Assurance of PhD Studies @ IME

2015-06-06

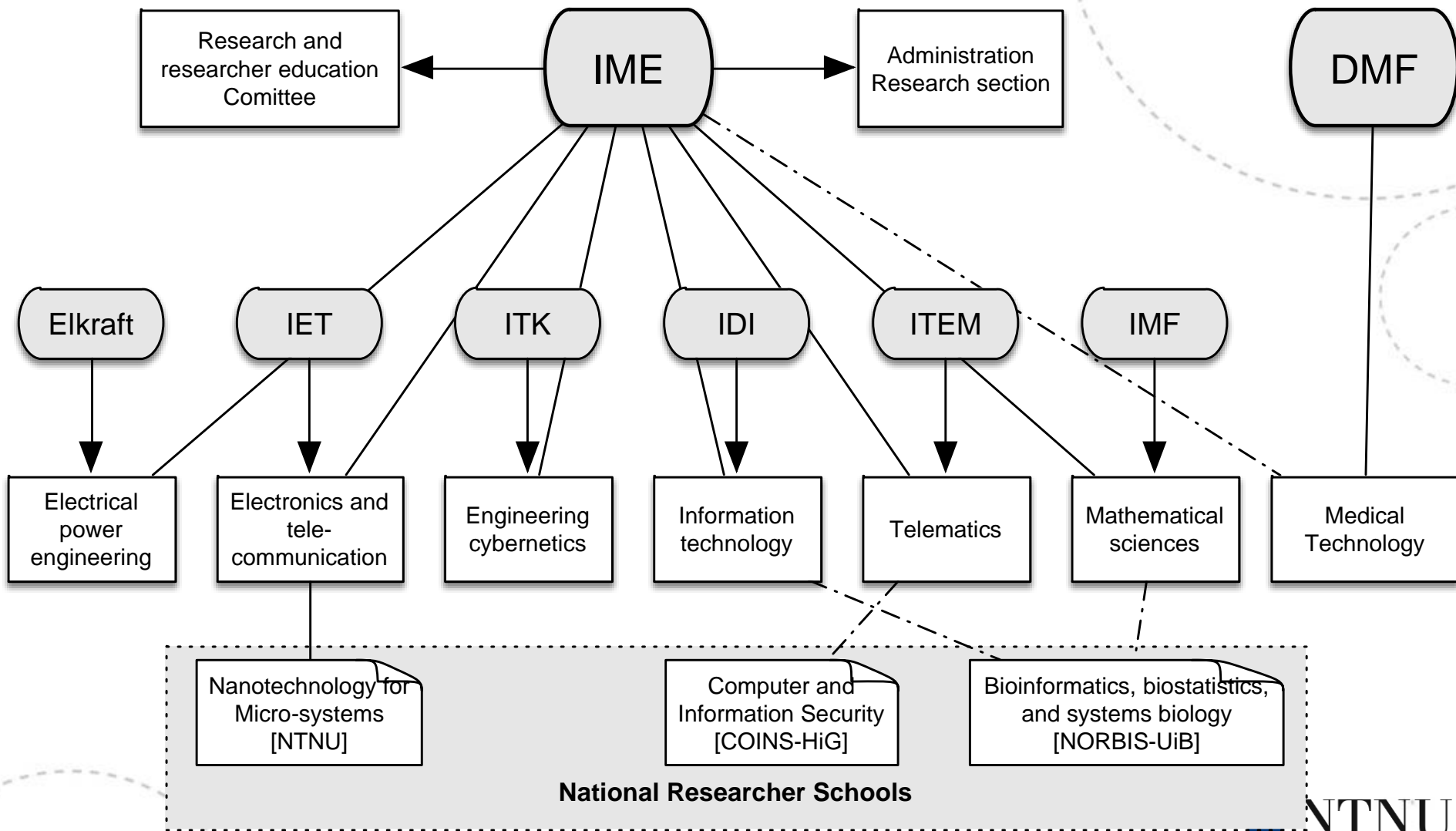
Vice Dean of Research Bjarne E. Helvik

Outline

- Organization
- Some statistics
- The Qualification Framework [KRV]
- Quality Assurance activities in IMEs PhD education
- On our agenda



IME's ph.d. programme participation



Internasjonalisering av forskerutdanningen

■ *Mål:*

Alle NTNUs ph.d.-kandidater skal være del av et internasjonalt forskningsmiljø, som innbefatter aktiv deltagelse i internasjonale konferanser, publisering i anerkjente internasjonale tidsskrifter med fagfellevurdering og samarbeid med forskningsgrupper i andre land.

■ *Tiltak:*

Ph.d.-programmene skal sikre at det foreligger en plan for internasjonalisering for hver enkelt ph.d.-kandidat og utvikle rutiner for å sikre at planene gjennomføres.



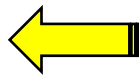
Means @ IME

■ Elements in PhD programmes

- Plan for residence abroad
- Co-op with international research groups
- Courses at other univ. [Optional], N5T
- Follow up through annual reporting

■ International co-op

- **EU - ITN** (Innovative Training Networks)
 - **ETN** European Training Networks
 - **EID** European Industrial Doctorates
 - **EJD** European Joint Doctorates
- **Supervision**
 - International co-supervisors
 - Cotutelle
 - Joint Degree



Avtaler



Navn	Forskningsfelt	Institutt NTNU	Partnerinstitusjon	Veileder NTNU	Del av prosjekt/ finansiering	Land
Signerte avtaler						
Gilbert Begna		ELKRAFT	SUPELEC	Marta Molinas		Frankrike
Nemanja Zdravković	Electronics and telecommunication	IET	Niš (Uniś)	Kimmo Kansanen	NORBAS	serbia
Miodrag Spasić	Control systems	ITK	Niš (Uniś)	Morten Hovd	NORBAS	serbia
Christopher Carr	Information Security	ITEM	Queensland University of Technology	Colin Boyd		Australia
Yahya Yassin	Elektronikk og telekommunikasjon	IET	KU Leuven	Per Gunnar Kjedsberg		Belgia
Iason Filippopoulos	Elektronikk og telekommunikasjon	IET	KU Leuven	Per Gunnar Kjedsberg		Belgia
Mladen Skelin	Teknisk kybernetikk	ITK	KU Leuven	Sverre Hendseth		Belgia
NTNU - DTU	AMOS	ITK (IME) og MARINTEK (IVT)	Danmarks Tekniske Universitet (DTU)	Thor I. Fossen (AMOS)	AMOS	Danmark

Avtaler under arbeid



Navn	Forskningsfelt	Institutt NTNU	Partnerinstitusjon	Veileder NTNU	Del av prosjekt/ finansiering	Land
Avtaler under arbeid						
Rekruttering initiert, avtale ikke avklart		IET	Macquarie University	Ilangko Balasingham		Australia
Hans Moen		IDI	Turku University	Øystein Nytrø	EviCare	Finland
Mladen Veletić	Digital signal processing	IET	Banja Luka (UBL)	Ilangko Balasingham	NORBAS	Bosnia Herzegovina
Dijana Vuković	Web application security	ITEM	Banja Luka (UBL)	Danilo Gligoroski	NORBAS	Bosnia Herzegovina
	ERCIM				ERCIM	
		IDI	Univesity of Palermo (UNIPA)			

- I tillegg til disse har det kommet 3 øvrige forespørsler vedrørende avtaler om samveiledning.
- Og 2 forespørsler er avsluttet uten at avtale er blitt inngått.

Program councils

- Organization (members appointed by Head of Dept.)
 - Chaired by Dept.'s FU member, i.e., programme manager
 - Department research council; IMF, IDI
 - Dept.'s management team/Sci staff meeting; IET, Elkraft, ITEM, ITK
- Recommends program content;
 - Sci. & tech. development
 - Research strategy
- Courses given by dept.
 - Changes in portfolio
 - QA of PhD topics
- QA of departmental activities
 - PhD education: Activities, infrastructure, supervision, research environment,
 - Learning objectives attained? (Cf. KRV)
- Tasks delegated from FU concerning the individual study (to FU-member)
 - Assurance and recommendation of applications
 - Changes of courses taken
 - Approval of individual research plans

Excerpt of FU mandate; PhD education

The research and research training council has as its main objective to promote basic and applied research at IME and develop research in volume and quality.

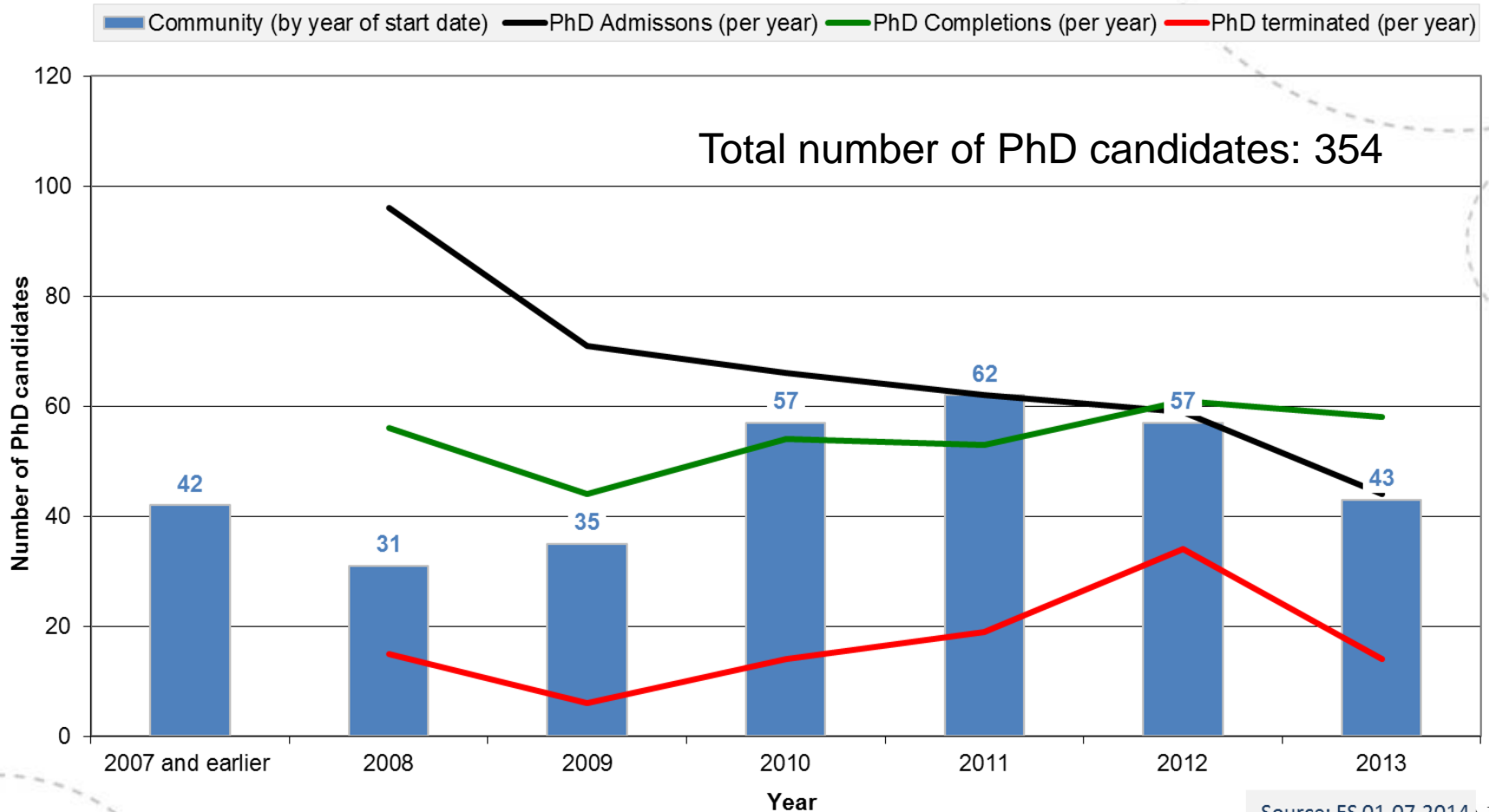
- It rests with the Committee to
 - Responsible for information exchange and contribute to the establishment of a common "best practice" within
 - Researcher education
 - ...
 - ...
- The committee will discuss and make recommendations to the decision-making body at the IME in matters relating to:
 - All matters concerning research training, including
 - Curricula and startup
 - Quality Monitoring, including evaluation
 - Management of dr.philos
 - Appointment of evaluation committees.
- Delegated decision-making authority in matters related to the PhD programmes:
 - Admission to the PhD program.
 - Approval of changes in curriculum and guidance.

The PhD community at IME 2013



at a glance: PhD Community at IME

Faculty of Information Technology, Mathematics and Electrical Engineering

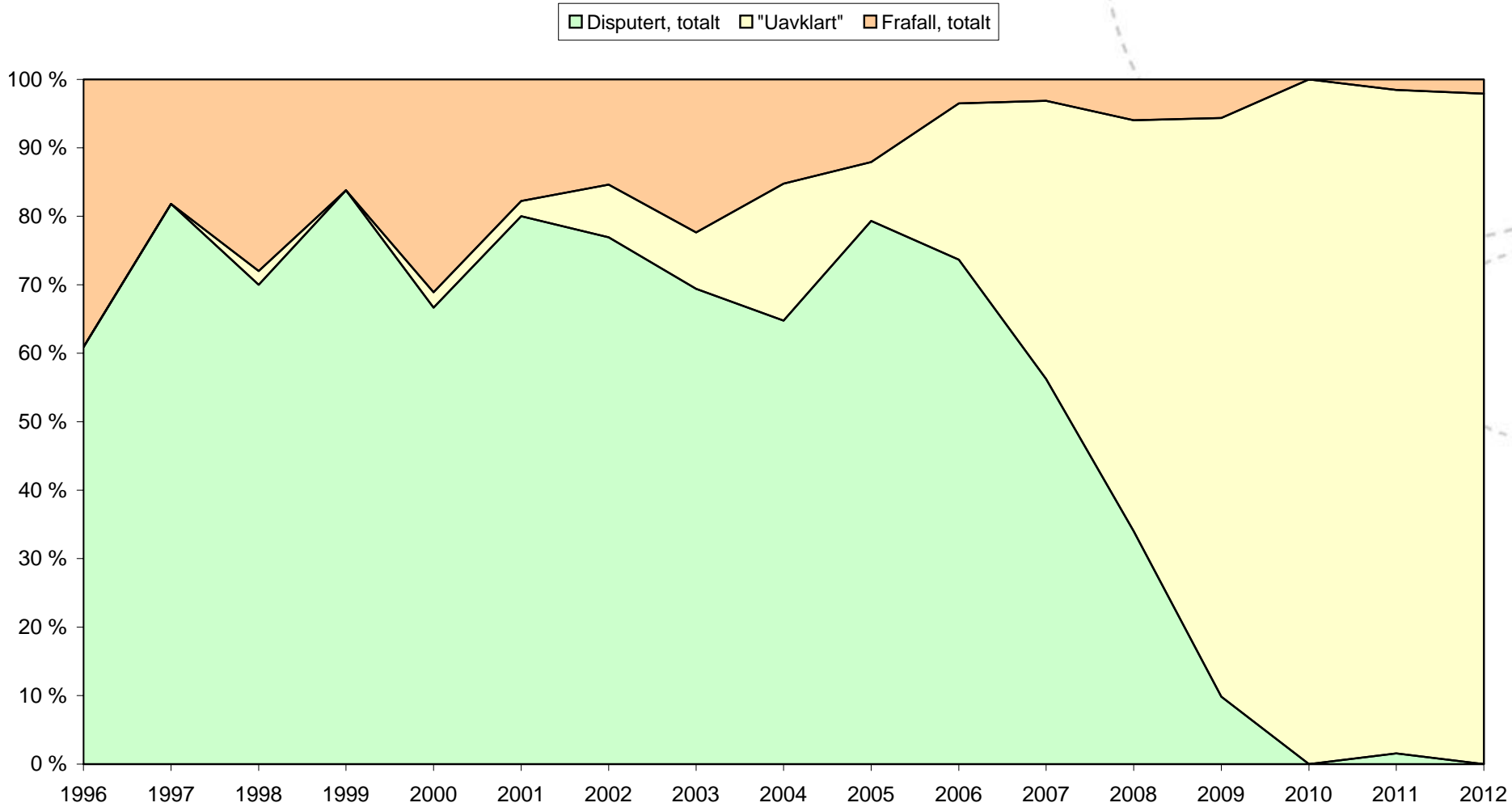


Source: FS 01.07.2014



Status PhD education at IME

Status for forskerutdanningen ved IME 1996-2012



Opptaksår

46 33 50 37 45 45 52 85 105 58 57 64 100 71 65

NTNUs system for kvalitetssikring av utdanning

02. oktober 2013

NTNU
Norges teknisk-naturvitenskapelige universitet

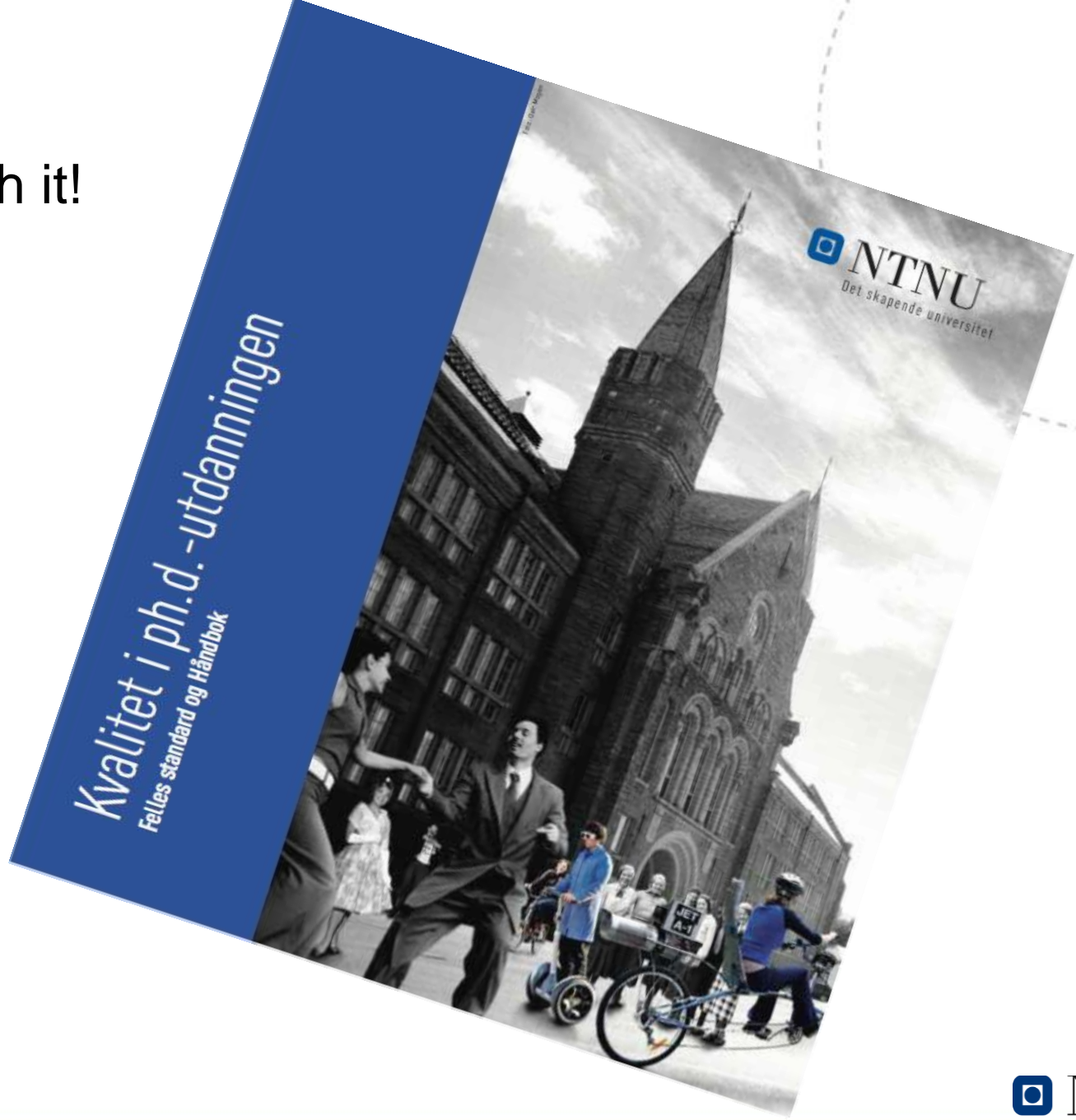
Vedlegg 2: NTNUs system for kvalitetssikring av utdanning

Felles standard for NTNUs ph.d. - utdanning

A. Rekruttering

Rolle/Ansvar	Oppgave	Aktivitet	Tiltak	
Rektor	Informasjon og rekruttering	Informere om ph.d.-utdanningen	Informasjon om ph.d.-utdanningen på norsk og engelsk skal være lett tilgjengelig på nettsidene.	
Dekanus		Utlysning av stipendiatstillinger	Det skal foreligge rutiner for utlysning av stipendiatstillinger, behandling av søknader og informasjon til søkere.	
Instituttleder		Rekruttering	Et aktivt rekrutteringsarbeid kreves for å nå de beste kandidatene.	
Instituttleder				Fagmiljøet og foreslåtte veilederes kompetanse, kvalitet og kapasitet skal vurderes for hver rekruttering. Alle kandidater skal normalt ha minst 2 veiledere.
Instituttleder og ph.d.-programleder				Krav til formell kompetanse hos søker samt motivasjon og egnethet skal innhentes før tilbud om stilling. Det skal gjennomføres intervju for å kartlegge kandidatens motivasjon og egnethet.
		Krav til formell kompetanse må vektlegges for søkere med utenlandsk grunnutdanning.		

Look through it!



Quality Assurance; IME PhD education

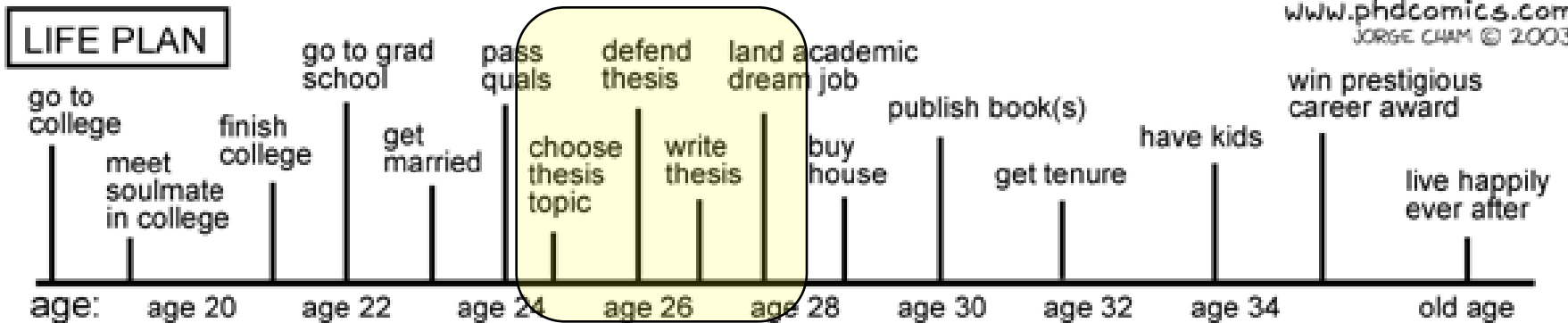
- The *Qualification Framework* [KRV]
- Revision of PhD programmes and courses
- Training of supervisors
- Selection of PhD candidates
- Admittance to ph.d.study
- Awareness of PhD candidates
 - > Introduction course
- Research plan
- Research environment, supervision
- Status reporting and follow up
- Mid-study review
- Evaluation committee and disputation



Life plan vs. Life reality

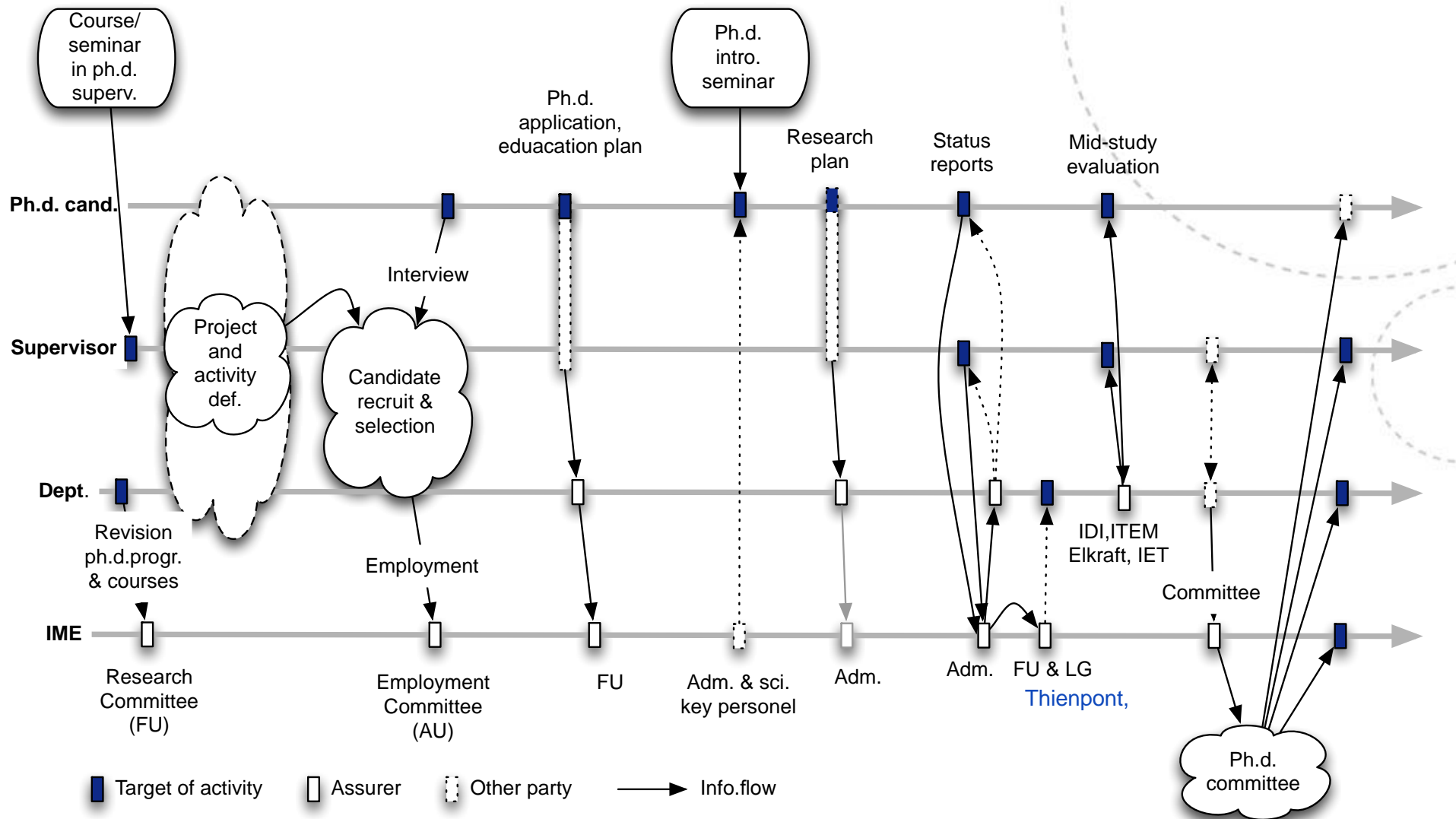
Piled Higher and Deeper *by Jorge Cham*

www.phdcomics.com

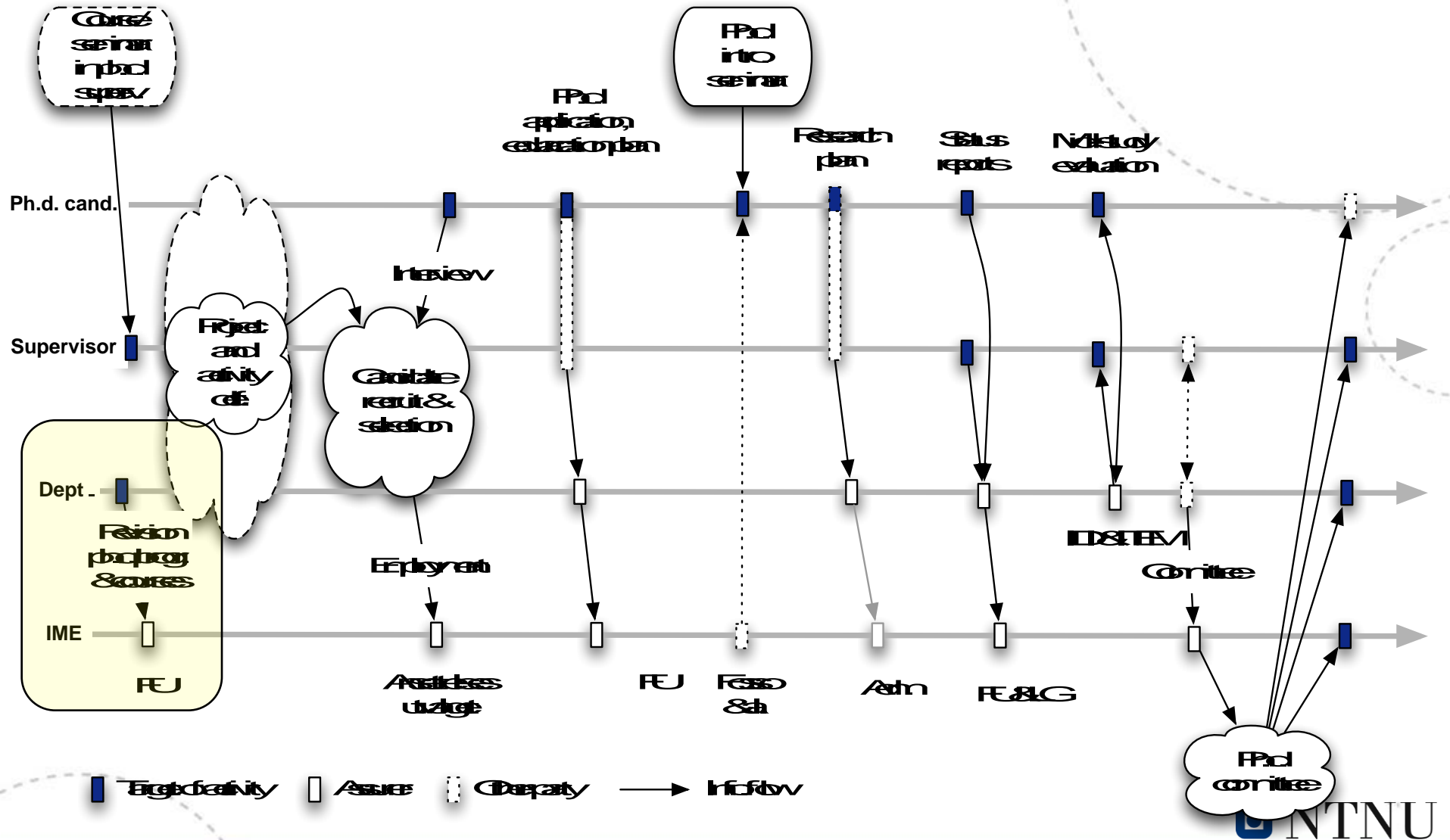


www.phdcomics.com
JORGE CHAM © 2003

QA activities @ IME




Yearly revision of ph.d. programmes and courses



The Norwegian (and European) qualification framework

Obs. MSc translated by google

KNOWLEDGE

The BSc candidate:	The MSc candidate:	The PhD candidate:
<ul style="list-style-type: none">- Have broad knowledge of key issues, theories, issues, processes, tools and methods in the field	<ul style="list-style-type: none">- Have advanced knowledge in discipline and specialized knowledge in a limited area	<ul style="list-style-type: none">Be in front regarding knowledge within their field of study and master the subject area of science and / or artistic approaches and methods
<ul style="list-style-type: none">- Familiar with the research and development in the field	<ul style="list-style-type: none">- Have a thorough knowledge of subject area scientific or artistic theory and methods	<ul style="list-style-type: none">- To assess the appropriateness and application of various methods and processes in research and professional and/or artistic development
<ul style="list-style-type: none">- To update their knowledge in field	<ul style="list-style-type: none">- Use your skills in new areas in the field	<ul style="list-style-type: none">- May contribute to the development of new knowledge, new theories, methods, interpretations and documentation forms within field
<ul style="list-style-type: none">- Have knowledge of the subject area's history, traditions, character and place in society	<ul style="list-style-type: none">- To analyze technical issues based on subject area history, traditions, character and place in society.	

SKILLS

The BSc candidate:	The MSc candidate:	The PhD candidate:
- Use your professional knowledge and relevant results from research and development on practical and theoretical issues and make reasoned choices	- To analyze existing theories, methods and interpretations within discipline and work independently with practical and theoretical problem solving	- Can express problems, plan and carry out research and academic and/or artistic development
- Can reflect on their professional practice and adjust this under the guidance	- Use appropriate methods for research and professional and/or artistic development	- Can conduct research and professional and/or artistic development of high work in an independent manner the international level
- Can locate, assess and refer to information and technical material and present this so that it highlights a problem	- To analyze and think critically about various information sources and use these to to structure and formulate scientific reasoning	- Can handle complex academic question and challenge established knowledge and practice in the field
- Can master the relevant disciplinary tools, techniques and forms of expression	- Can carry out an independent, limited research or development project under guidance and in line with current ethical standards	

Obs. MSC translated by google

GENERAL COMPETENCE

The BSc candidate:	The MSc candidate:	The PhD candidate:
- Have insight in relevant professional and ethical issues	- To analyze the relevant academic, vocational and ethical issues	- Identify new relevant ethical issues and pursue their research with professional integrity
- To plan and implement varied tasks and projects stretches of time alone and participant in a group, and in accordance with ethical requirements and guidelines	- Can apply their knowledge and skills in new areas to implement advanced tasks and projects	- Can manage complex interdisciplinary work and projects participate in
- Can communicate key subject matter like theories, issues and solutions both in writing, orally and through relevant concepts and terms	- Can communicate extensive independent work and master the concepts and terms of the subject area	- Can communicate research and development through recognized national and international channels
- To exchange views and experiences with others with backgrounds in area and thereby contribute to development of good practice	- Can communicate about academic issues, analysis and conclusions in the field, both specialists and the general public	- Can participate in debates within field in international forums
- Knowledge and innovation innovation processes	- Can contribute to innovation and innovation processes	- To assess the need, take the initiative and drive innovation
		- Can quickly acquire new knowledge in the disciplines

Obs. MSC translated by google

IME:

Learning objectives

■ KNOWLEDGE

- achieve excellent knowledge within their field of study and master the subject area of science and methods
- assess the appropriateness and application of various methods and processes in research and professional development
- contribute to the development of new knowledge, new theories, methods, interpretations and documentation in the field

■ SKILLS

- formulate research questions, carry out plans and research, and professional development
- conduct research and professional development at a high international level
- deal with complex technical questions and challenge established knowledge and practice in the field

■ GENERAL COMPETENCE

- exercise research with professional and ethical integrity
- participate in and contribute to complex interdisciplinary work and projects
- provide research and development by recognized national and international publication channels
- participate in debates in the field in international forums - assess the need for, initiate and be a driving force for innovation
- quickly acquire new knowledge within the disciplines

Actions

■ Academic Training

- Targeted PhD topics with emphasis on methods and state of the art in the theory, application and methodology (incl. methodological tools)

■ Guidance

- Direction and content of the research work
- Promotion of early and frequent publication and participation in conferences
- Discussions on the choice of method and approach
- Introduce candidate to (foreign) research partners
- Reviewing industrial and social implications of the research work

■ Department / PhD Program Council

- Colloquia and discussion forums in the field of research
- Presentation by Candidate and Critical and Constructive discussions
- Arrangements for stays at universities abroad

■ Faculty

- PhD Introduction-seminar; PhD Supervisors seminar
- Quality Assurance
- Other activities: courses, seminars etc.

4 Quality Assurance Framework

- 1 - Affect
- 2 - Contribute
- 3 - Strongly contribute

Academic Training

Targeted PhD topics with emphasis on methods and state of the art in the theory, application and methodology (incl. methodological tools)

Direction and content of the research work

Promotion of early and frequent publication and participation in conferences.

Discussions on the choice of method and approach

Introduce candidate to (foreign) research partners

Reviewing industrial and social implications of the research work

The Candidate shall...

	Academic Training	Direction and content of the research work	Promotion of early and frequent publication and participation in conferences.	Discussions on the choice of method and approach	Introduce candidate to (foreign) research partners	Reviewing industrial and social implications of the research work	
KNOWLEDGE	- achieve excellent knowledge within their field of study and master the subject area of science and methods	2	3	2	1	2	1
	- be able to assess the appropriateness and application of various methods and processes in research and professional development	3	1		3		
	- be able to contribute to the development of new knowledge, new theories, methods, interpretations and documentation in the field	1	3	1	1		
SKILLS	- be able to formulate research questions, carry out plans and research, and professional development		3		2		1
	- be able to conduct research and professional development at a high international level	2		3		3	1
	- be able to deal with complex technical questions and challenge established knowledge and practice in the field	1	3		1		1
GENERAL COMPETENCE	- be able to exercise research with professional and ethical integrity		3				3
	- be able to can participate in and contribute to complex interdisciplinary work and projects		2		1		2
	- be able to provide research and development by recognized national and international publication channels			3			
	- be able to participate in debates in the field in international forums			3			



Quality Assurance Framework

- 1 - Affect**
- 2 - Contribute**
- 3 - Strongly contribute**

The Candidate shall...

- achieve excellent knowledge within their field of study and master the subject area of science and methods

- be able to assess the appropriateness and application of various methods and processes in research and professional development

- be able to contribute to the development of new knowledge, new theories, methods, interpretations and documentation in the field

- be able to formulate research questions, carry out plans and research, and professional development

- be able to conduct research and professional development at a high international level

- be able to deal with complex technical questions and challenge established knowledge and practice in the field

- be able to exercise research with professional and ethical integrity

- be able to can participate in and contribute to complex interdisciplinary work and projects

- be able to provide research and development by recognized national and international publication channels

- be able to participate in debates in the field in international forums

PhD Program Council / Department

Faculty

Colloquia and discussion forums in the field of research

Presentation by Candidate and Critical and Constructive Discussion

Arrangements for stays at universities abroad

PhD Introduction-seminar; PhD Supervisors seminar

Quality Assurance

Other activities: courses, seminars etc.

2

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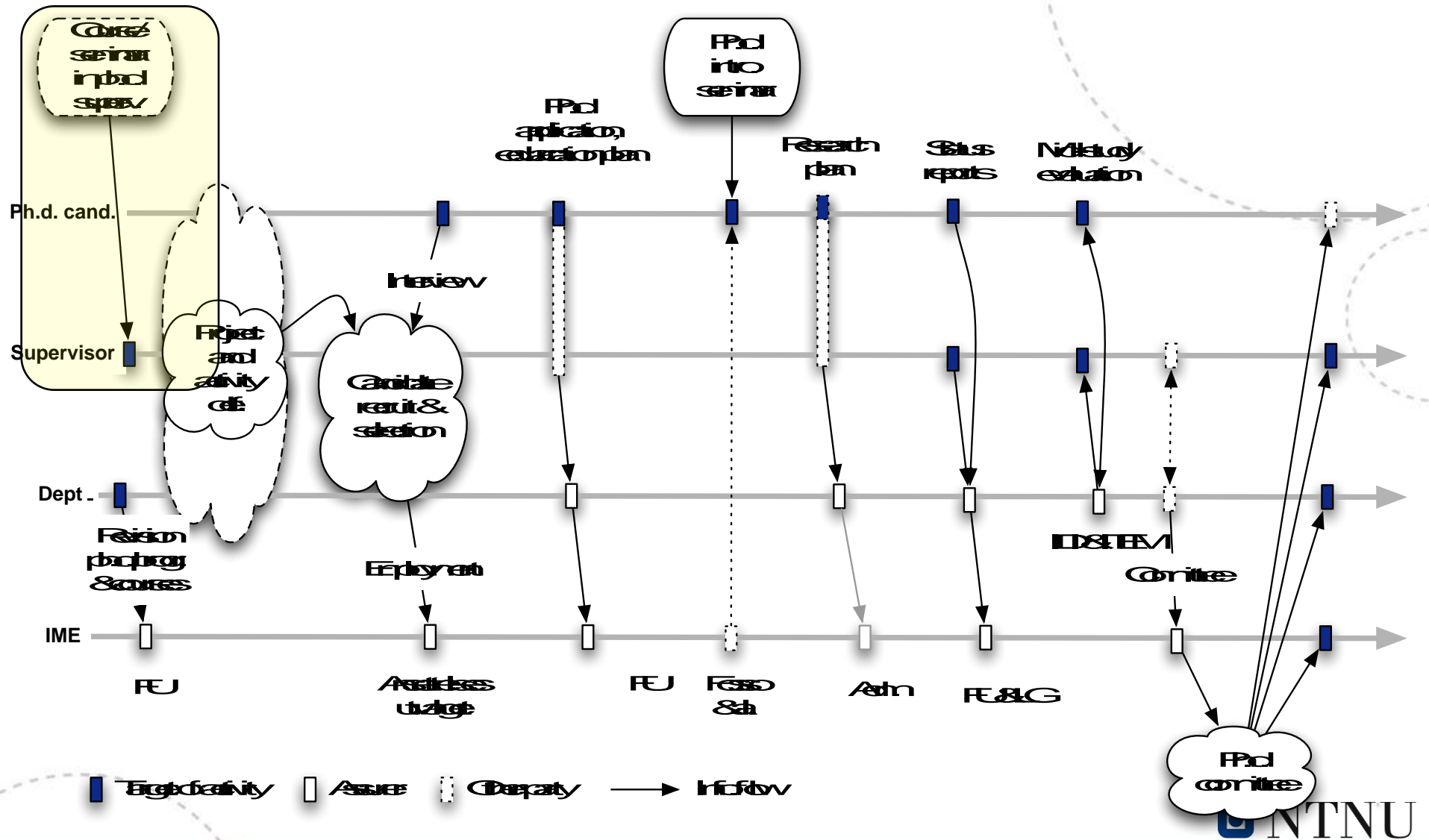
3

1

2



Seminar/course for (new) supervisors

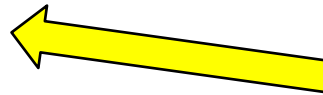


PhD supervisor workshop @ IME

- Annual
- Two day – out of office – event
- Mix of experienced and novice supervisors (≈ 20)

■ Presentations

- Experienced supervisors – experiences, best practice
- Experts (external)
- PhD candidate(s)
- Management and organizers



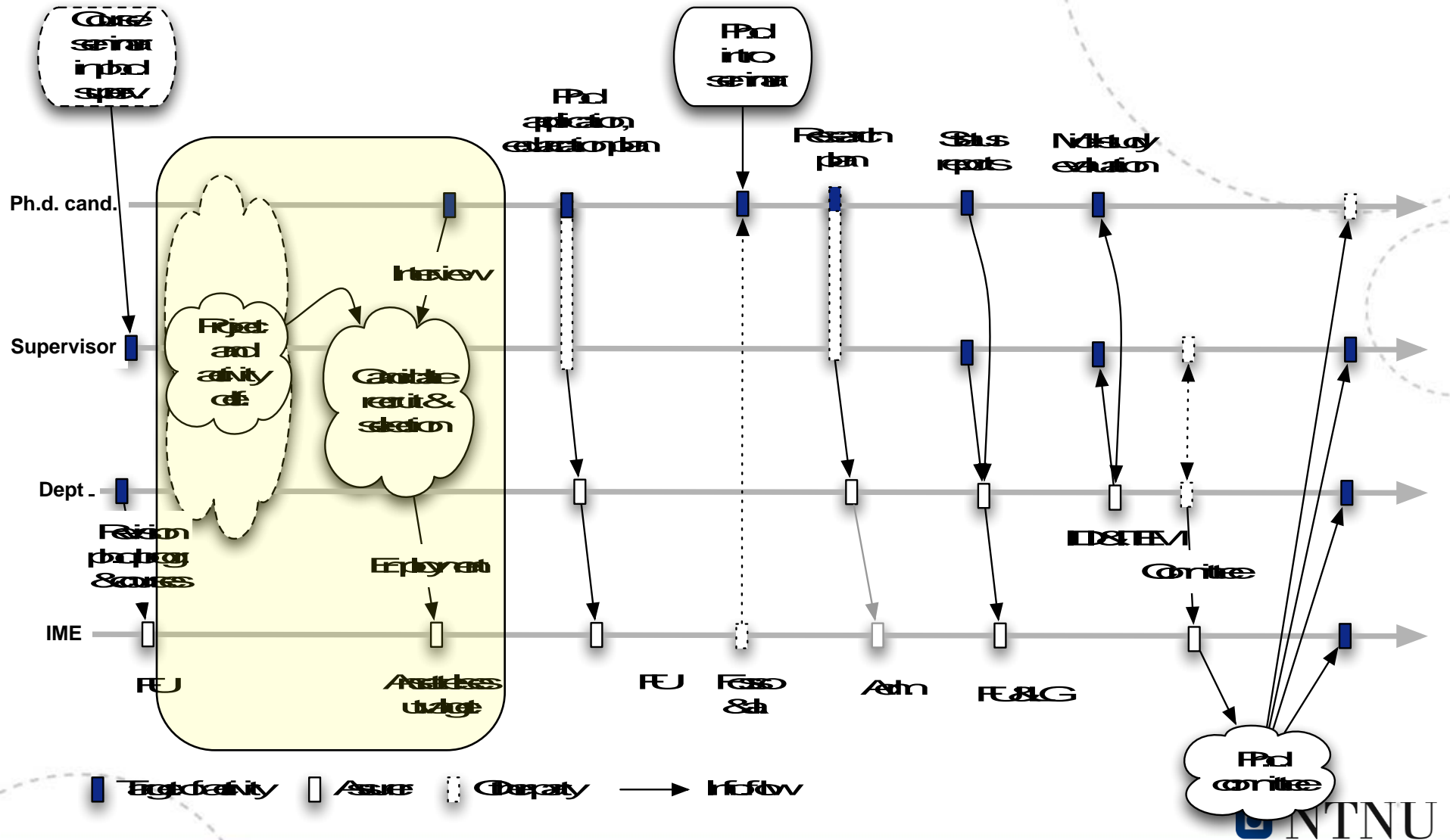
■ Group discussions, e.g.:

- Mid-study evaluation/review
- Early contact with international networks; work in research teams
- The 10 advices for effective supervision
- How to deal with cultural differences?

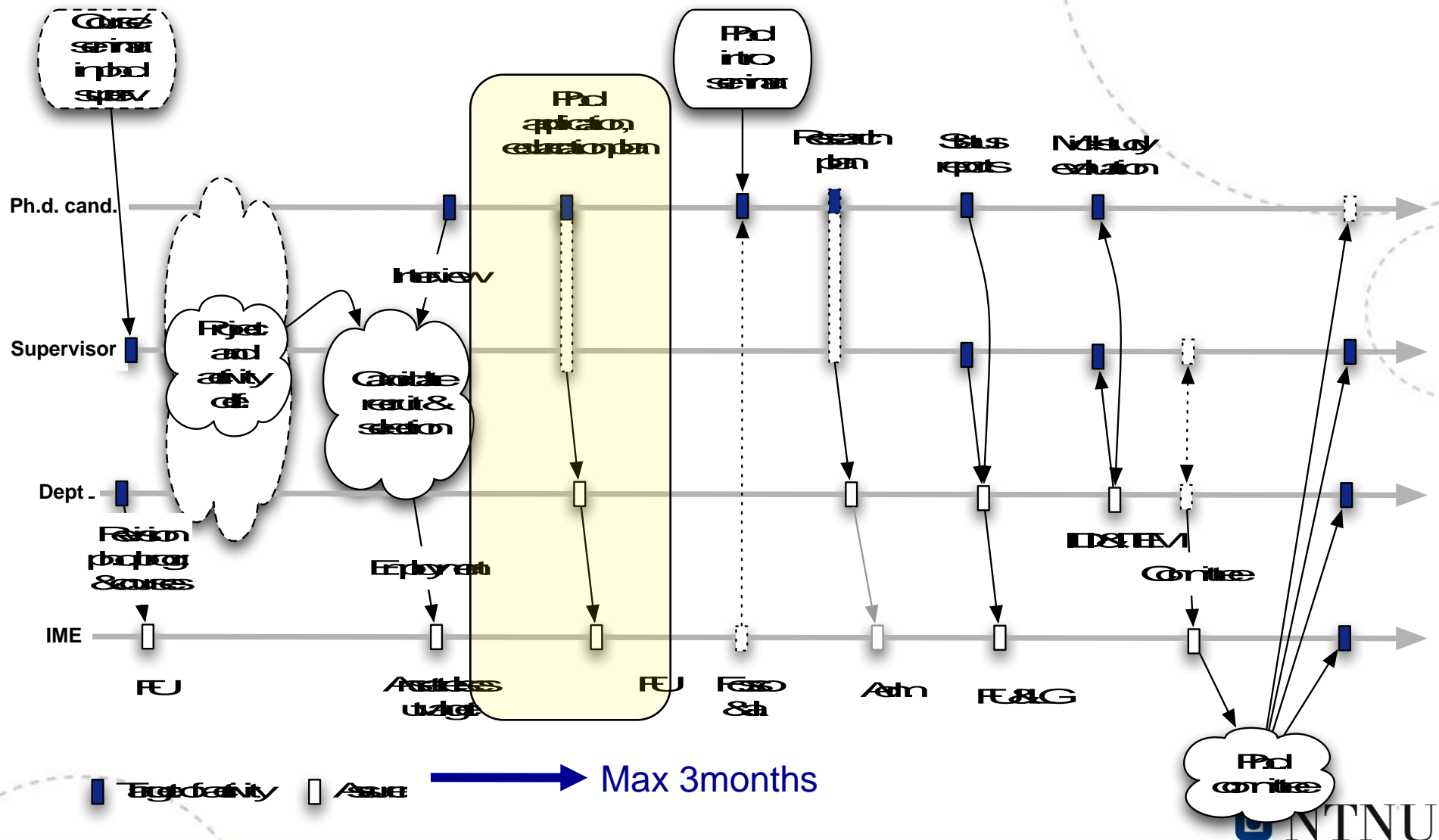
■ Modules on NTNUs agenda

- Pedagogics; PhD supervision as a craft
- Supervision in a plurality perspective
- Conflict management and the “difficult conversation”
- The supervisor as a coach

Project planning and recruitment of candidates

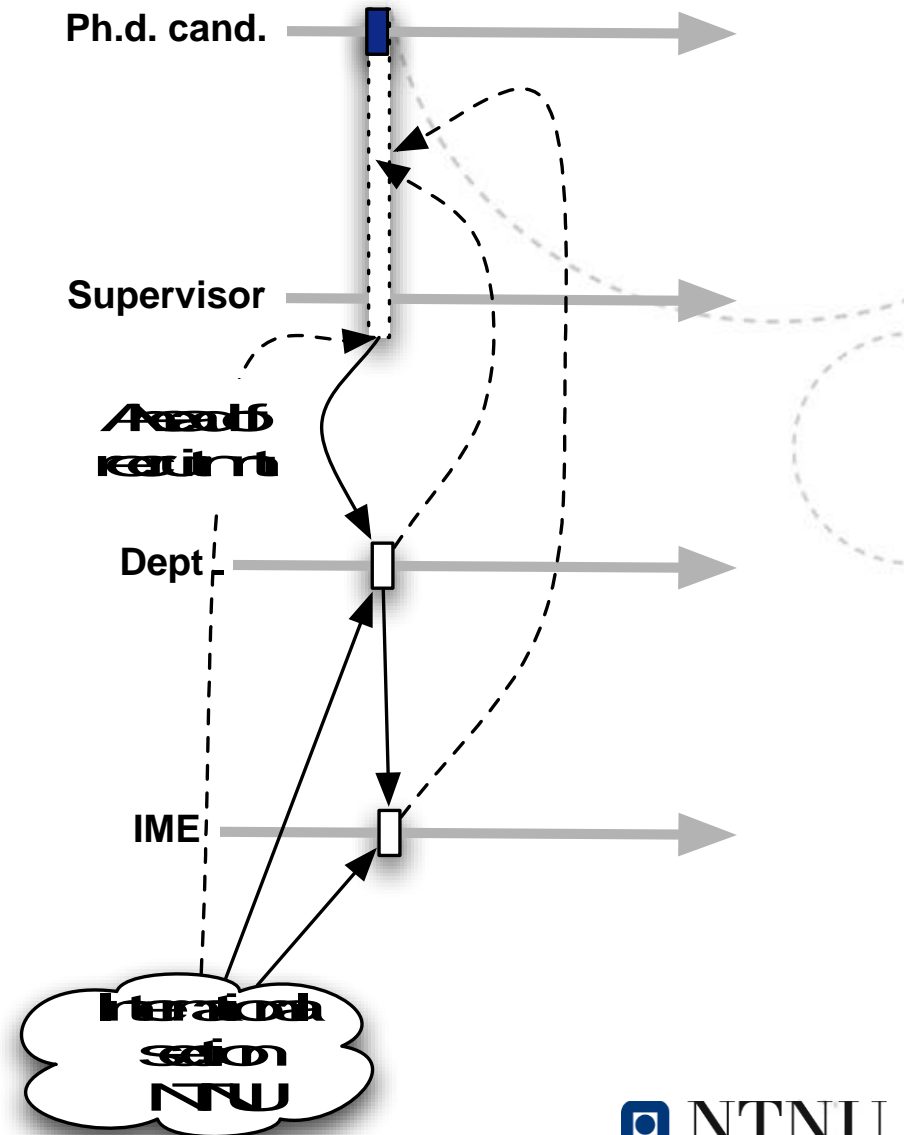


Admittance to the ph.d. study, education plan, preliminary research plan

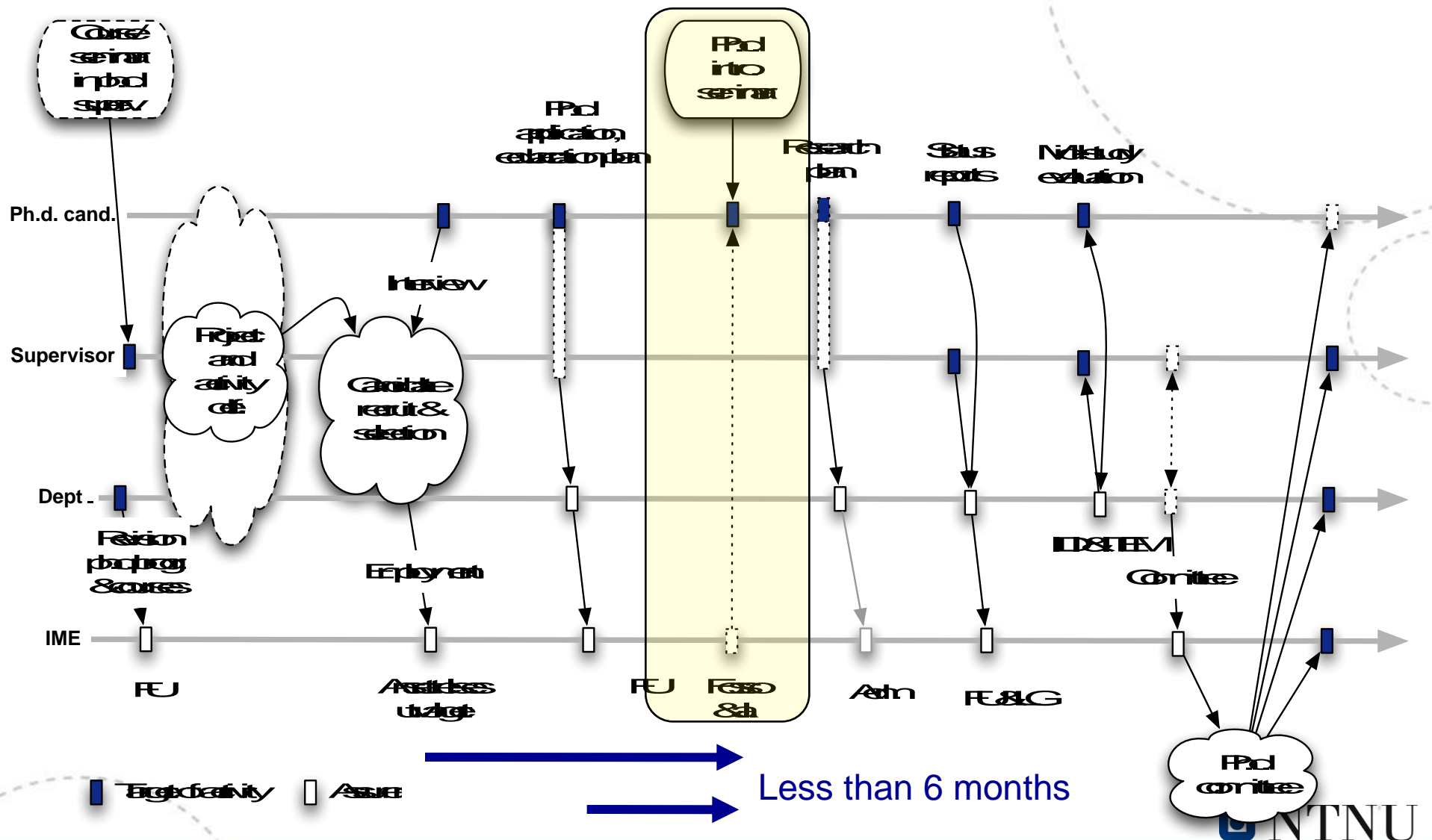


Assessment of ph.d. applications, ensuring

- Candidate qualifications
 - “Level” of courses
 - Course content
 - Appropriate methodical and disciplinary training
- Preliminary plan for
 - Research and
 - Dissemination (Early publication)
- Supervision
- Working environment
 - Local/national
 - International
- Resources available



Ph.d. introduction seminar



Objectives of the introduction seminar

■ Background information

- Efficient
- Complete
- Sort out pending questions

■ Increased awareness on

- Responsibilities and expectations
- Ethics
- Publication (and international presence)
- ...

■ Get candidates started

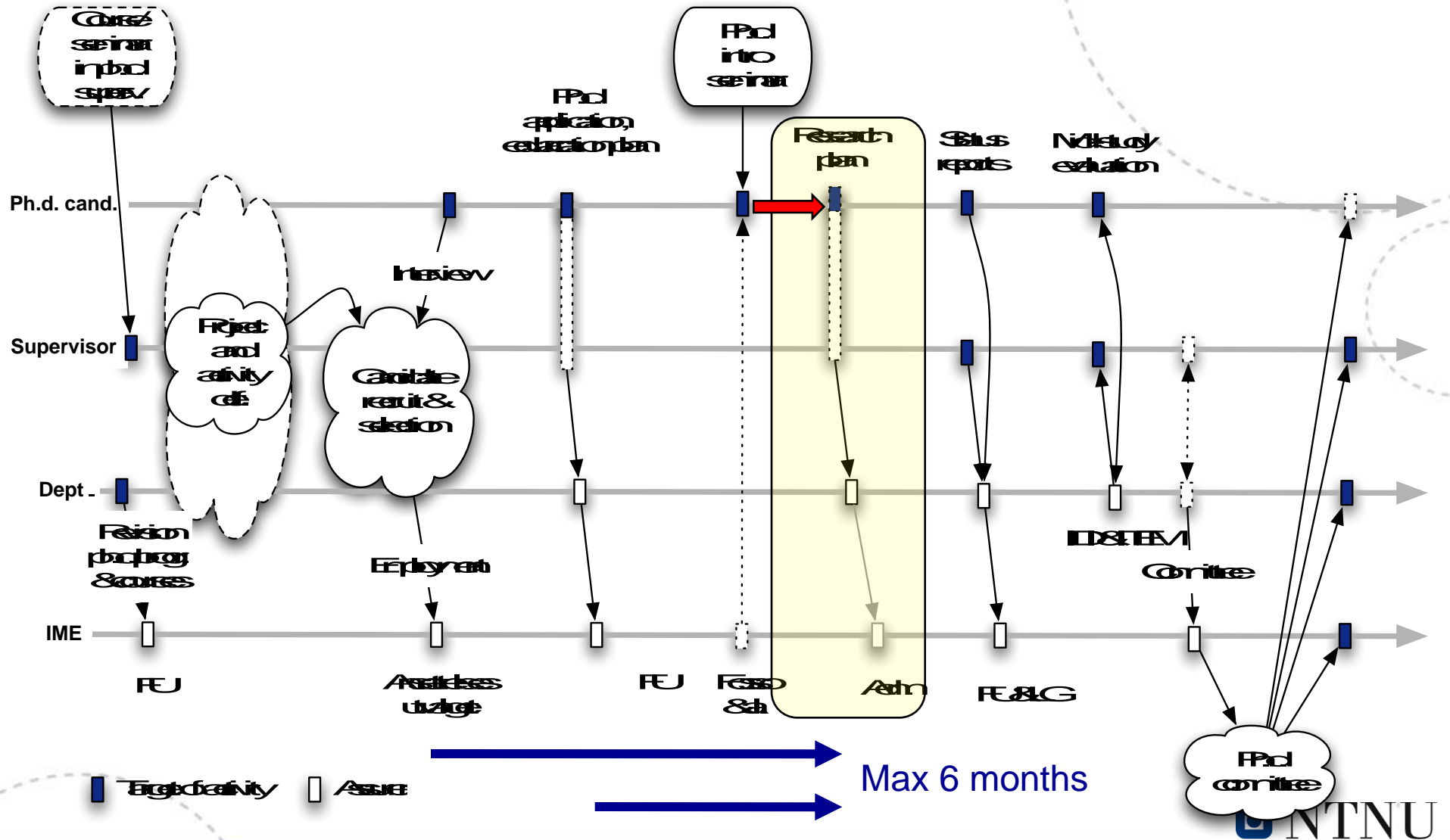
■ Improve quality

- Better research results
- Increase the completion ratio and hold duration close to nominal

■ Improved skills in scientific writing (one day course)



Compulsory research plan



The research plan

Content

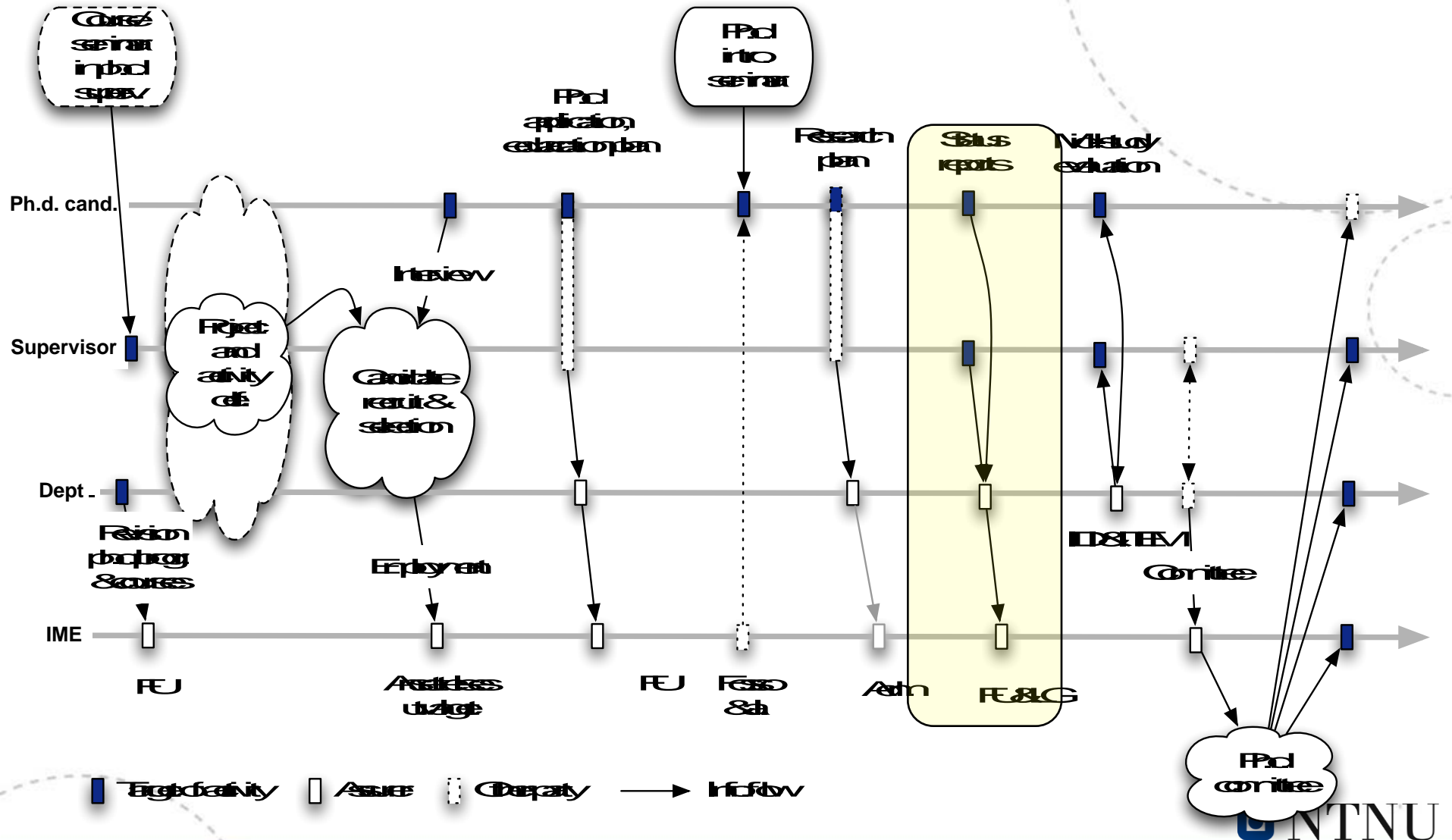
- Background
- Objectives
- Scope
- Research methods
- Expected results
- Work plan
- References

Issues

- Preliminary or complete at admittance
- Max six months after (employment | admittance)
- Six – ten pages
- Candidate is in charge; build his/her view of the “world”
- Presentation in group seminar

- **Living document**  **NTNU**

Yearly status reporting and assessment



PhD Supervisor's Report

■ About the PhD candidate

- Collaboration satisfactory
- Academic discussion frequency
- Comments

■ Progress

- Status wrt. Qualification FrameWork
- Guidance wrt. Qualification FrameWork
- Candidates act. in the research group/environment
- Stay at university abroad
- Comments / 'best practices' / potential improvements

■ Completion

- Check of dates in plan
- Tentative thesis delivery date
- Final remarks
- Confidential issues



A number of sub-questions

PhD Candidate's Progress Report

■ Supervision

- Supervisors
- Satisfactory
- Academic discussion frequency

■ Academic training

- PhD Introduction seminar
- Research plan; Status, Last revised
- Passed courses
- If nonconformance, why
- Formal leave of absence last year
- *Assessment of courses followed*

■ Content of supervision

- Issues discussed in supervision
- Midway evaluation
- Scientific cooperation related to the supervision

■ Progress, publication and ethics

- Progress report, self-assessment
- Registration of publications
- Papers; Last year, In total
- Ethical challenges

■ Assessment

- Co-op; All kinds
- Own professional activity
- Stay at university abroad

■ Completion

- Check of dates in plan
- Tentative thesis delivery date
- Expect to succeed
- Funding
- Full time on PhD
- Final remarks
- Confidential issues

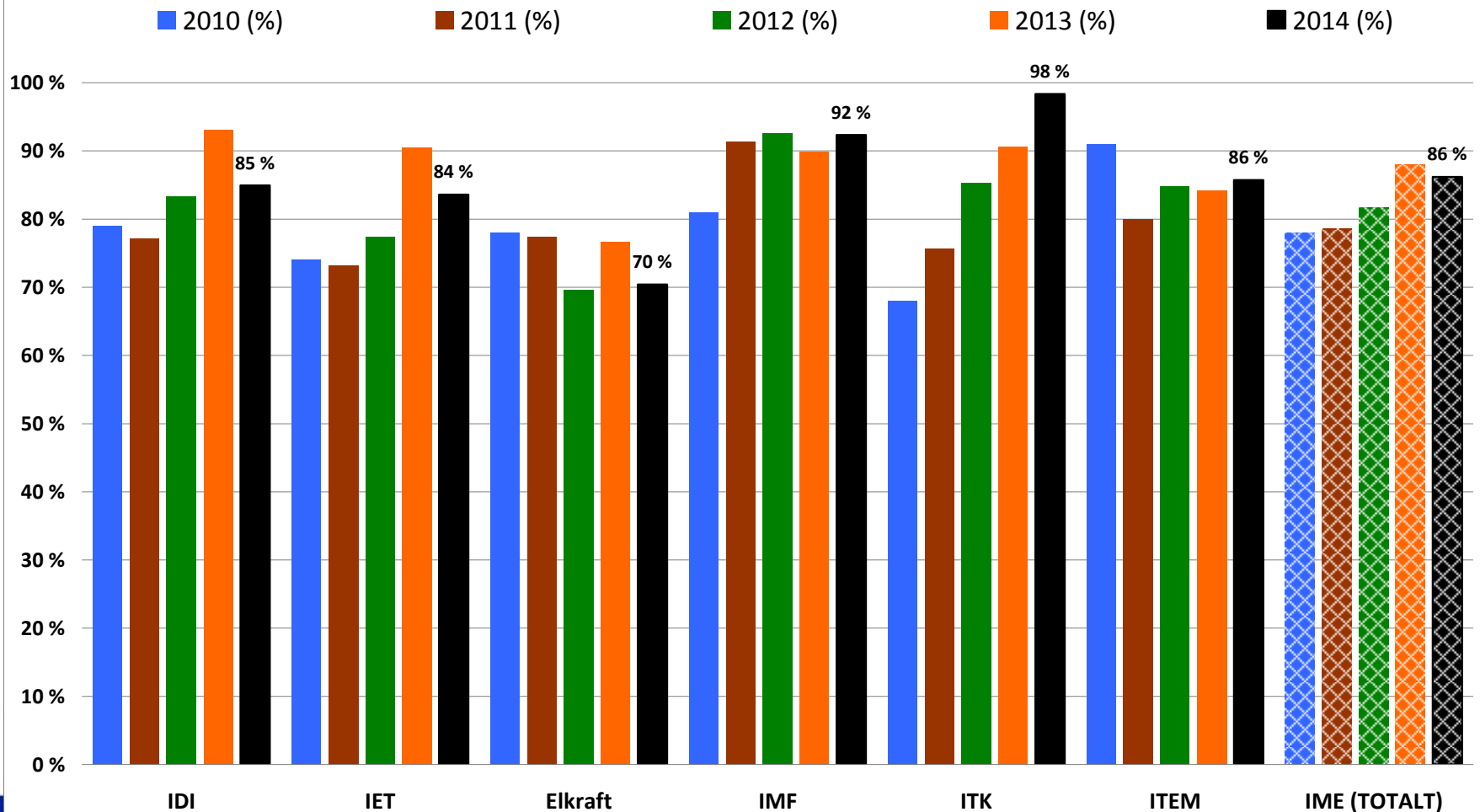
sub-quest.



Annual Reporting by PhD candidates 2010-2014

Annual reporting by PhD candidates 2010-2014

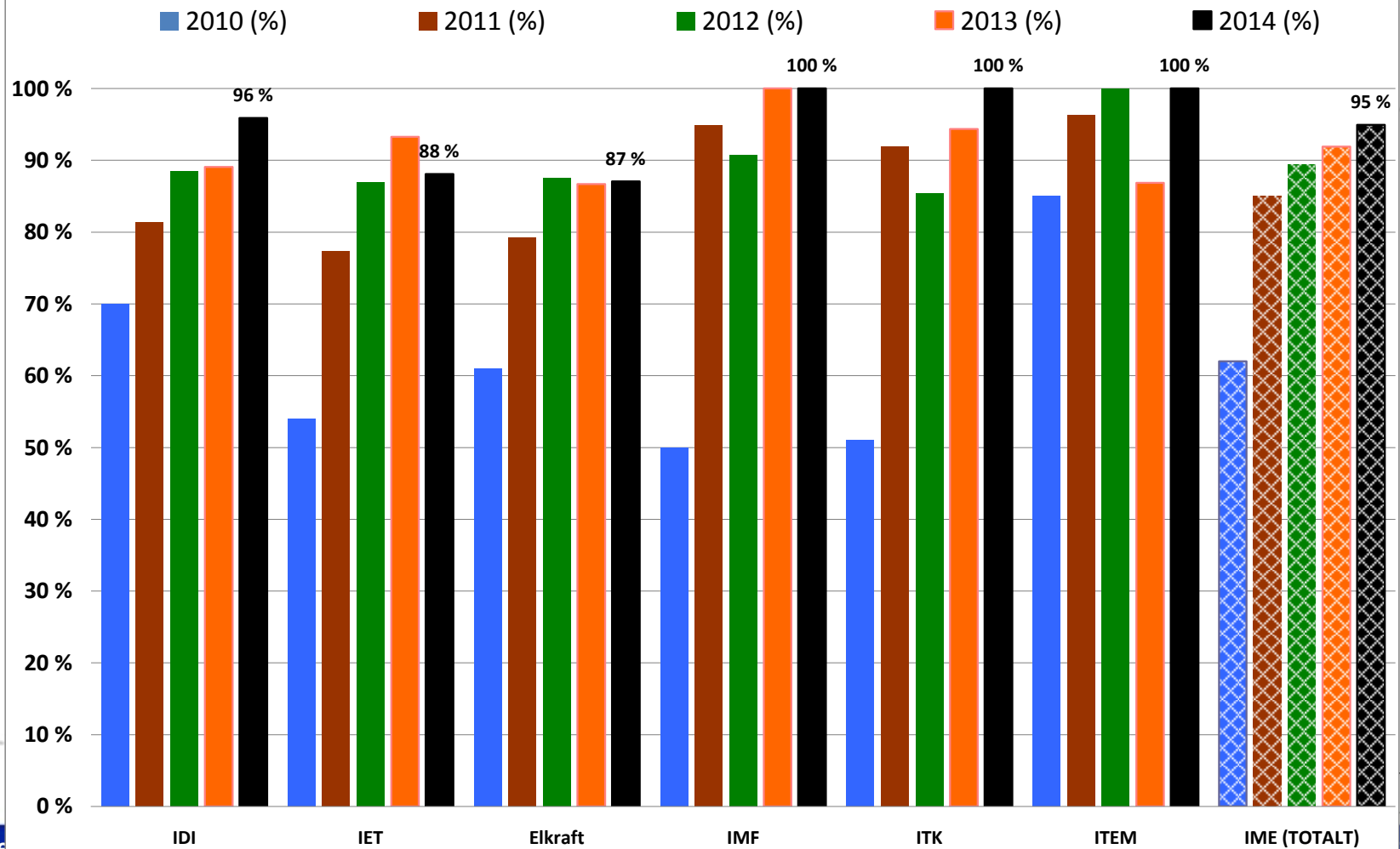
Implementing online progress reporting forms at the IME faculty that includes default data



Annual Reporting by PhD Supervisors 2010-2014

Annual reporting by PhD Supervisors 2010-2014

Implementing online progress reporting forms at the IME faculty that includes default data



Academic discussions

■ PhD

Antall av How often do you have academic discussions with your supervisor- attribut							
How often do you have academic discussions with your supervisor-	ELKRAFT	IDI	IET	IMF	ITEM	ITK	Totalsum
Have not had any contact in the past semester	5 %	2 %	4 %	2 %	0 %	0 %	2 %
Monthly	32 %	38 %	31 %	27 %	33 %	37 %	33 %
Rarely, but every semester	16 %	5 %	4 %	7 %	0 %	7 %	6 %
Regularly, but less than every month	37 %	12 %	16 %	8 %	13 %	14 %	16 %
Weekly	11 %	43 %	45 %	56 %	53 %	42 %	43 %
Totalsum	100 %	100 %	100 %	100 %	100 %	100 %	100 %

■ Supervisors

Antall av How often do you have academic discussions with the PhD candidate- attribut							
How often do you have academic discussions with the PhD candidate-	ELKRAFT	IDI	IET	IMF	ITEM	ITK	Totalsum
Monthly	57 %	19 %	42 %	21 %	31 %	58 %	37 %
Rarely, but every semester	10 %	12 %	9 %	11 %	16 %	3 %	10 %
Regularly, but less than every month	14 %	12 %	5 %	6 %	6 %	10 %	9 %
We have not had any contact in the past semester	0 %	3 %	4 %	5 %	0 %	2 %	3 %
Weekly	19 %	54 %	40 %	57 %	47 %	27 %	42 %
Totalsum	100 %	100 %	100 %	100 %	100 %	100 %	100 %

- 11 PhD candidate (4%) responded that the supervision do not work satisfactorily.
- 35 Supervisors (10%) responded that the supervision with the candidate do not work satisfactory.

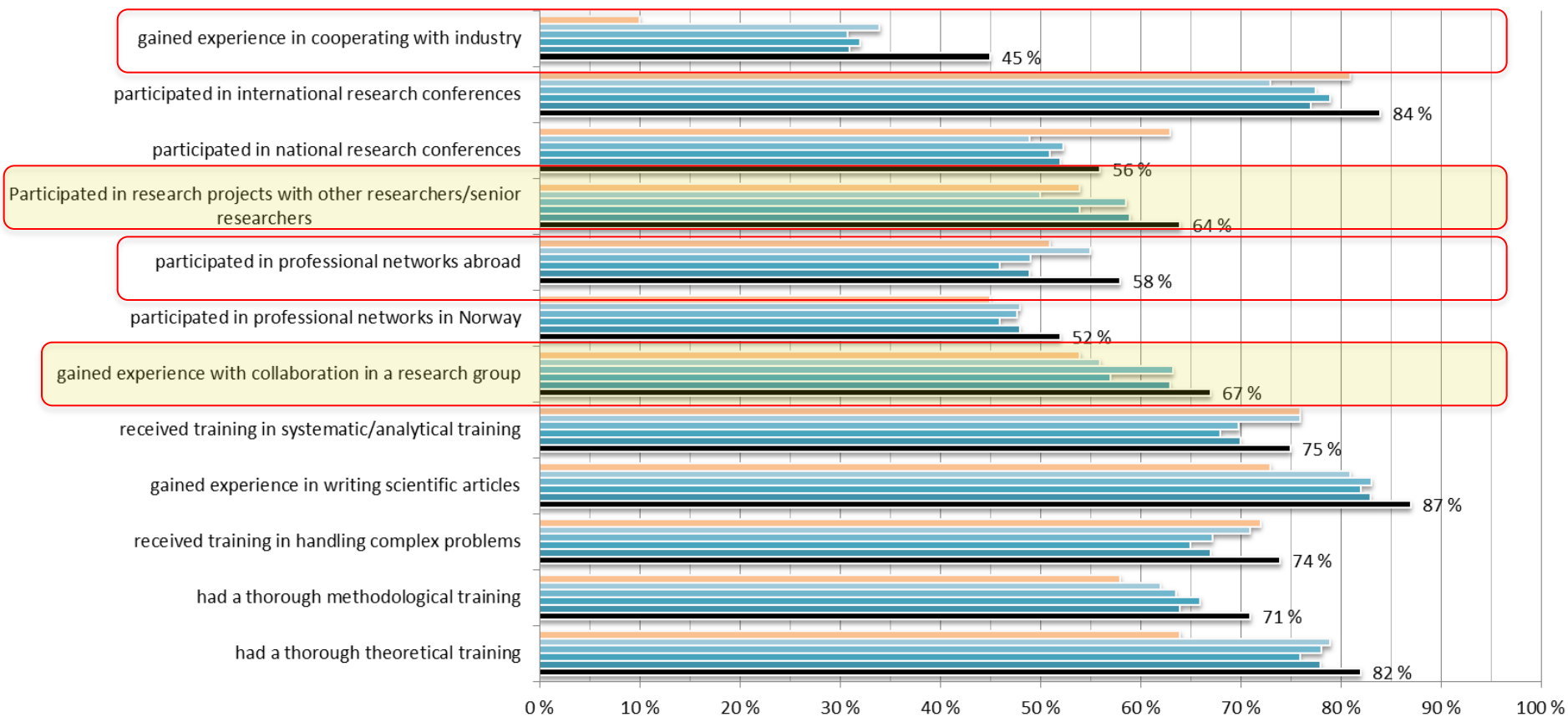
4	PHIT	PHELKT	PHET	PHMA	PHTK	PHTELE	onths.
	59%	39%	42%	41%	47%	50%	

PhD – Academic Assessment

PhD - Academic Assessment

Please respond to the following statements regarding your doctoral/fellowship period to date? So far, I have ...
(Percentage of PhD candidates strongly or partly agreeing to the given statements)

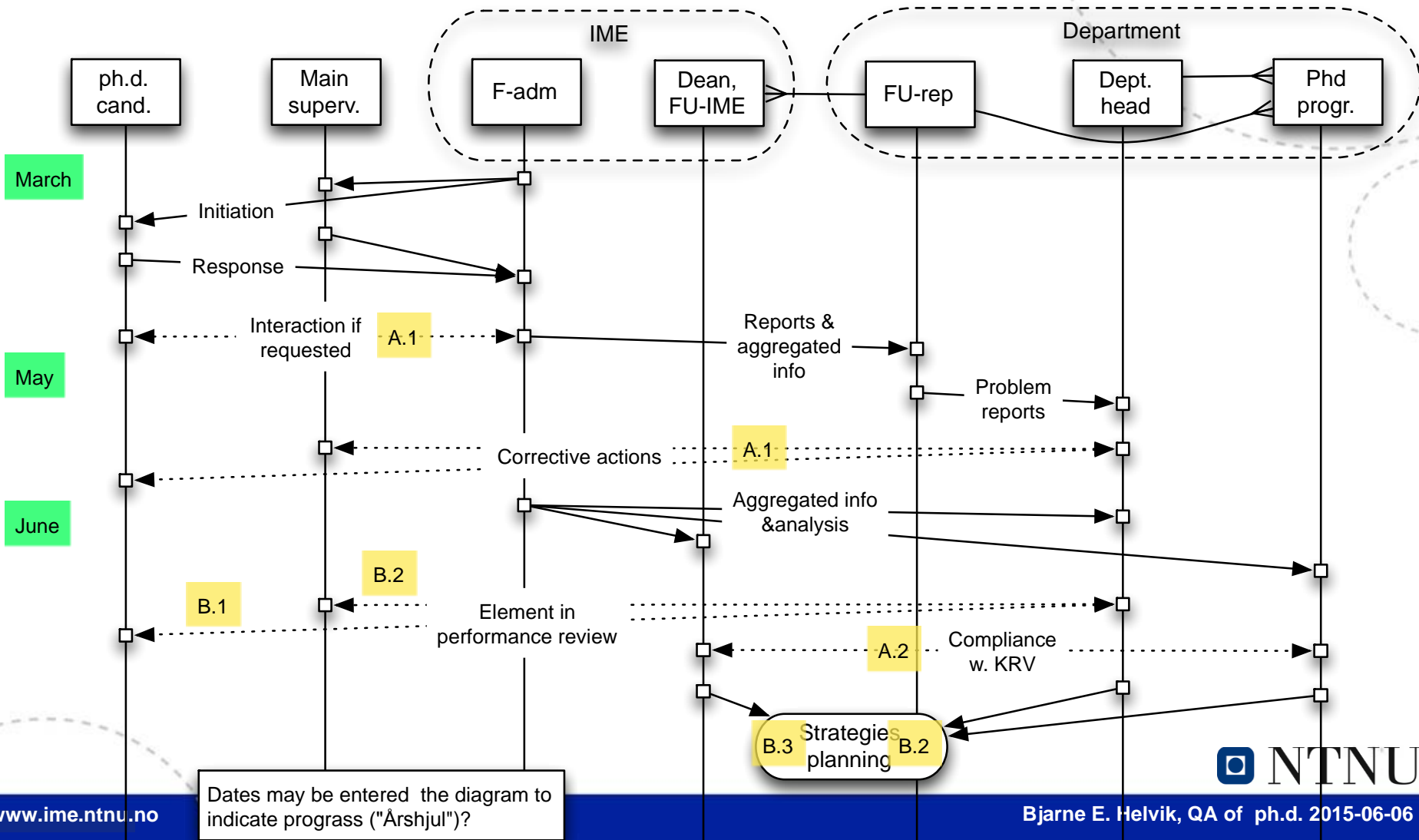
■ MN 2009* ■ IME 2010 ■ IME 2011 ■ IME 2012 ■ IME 2013 ■ IME 2014



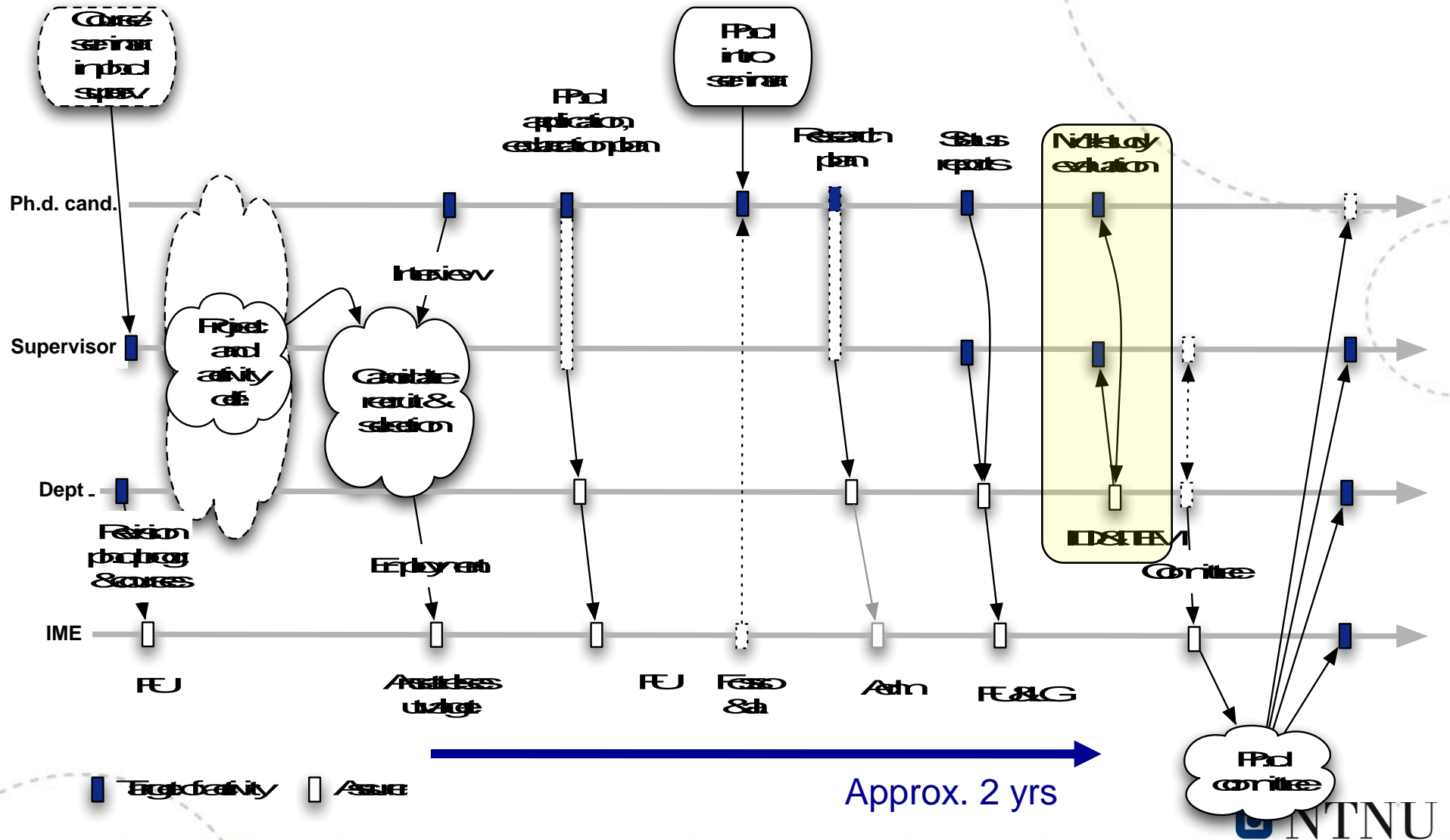
* Undersøkelse blant forskerforbundets stipendiatmedlemmer innen fagområdet matematikk og naturvitenskap, NIFU STEP Rapport 38/2009

Annual reporting and follow-up proc. (Draft)

2013 procedure



Mid-study evaluation [IDI, ITEM, Elkraft, optional]



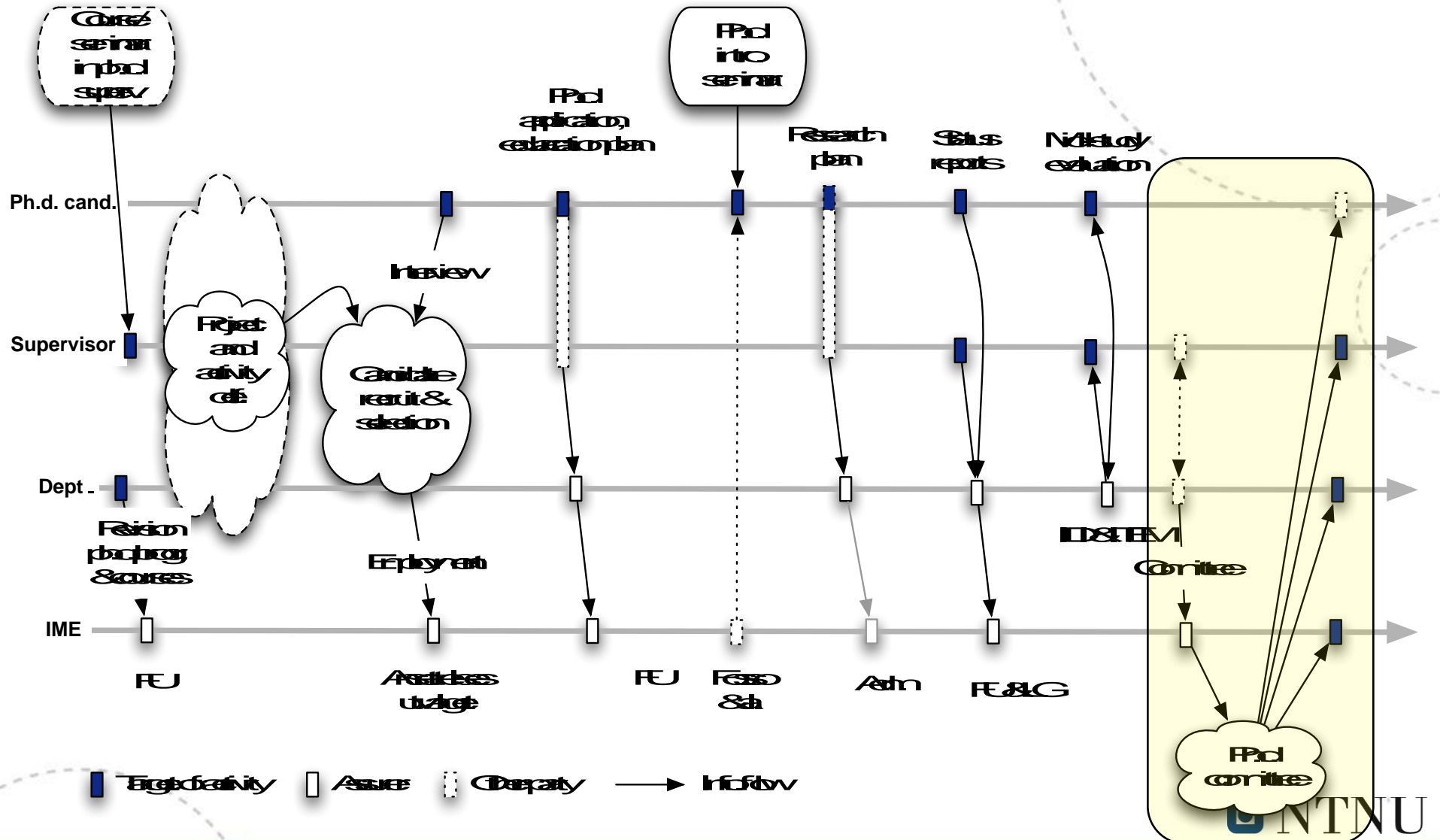
Mid-study evaluation

Department	Computer & Info Sci. - IDI	Telematics - ITEM
Committee	<ul style="list-style-type: none"> • 3 Supervisors • IDI section FU rep. (w/o confl.) 	<ul style="list-style-type: none"> • Research area coordinator, (w/o) • Most “expert” (w/o conflicts)
Basis	<ul style="list-style-type: none"> • Revised and extended research plan • Oral presentation (Status and plans) 	<ul style="list-style-type: none"> • Draft introductory part of thesis • Completed work/papers • Detailed plan for completion • Oral presentation
Form	<ul style="list-style-type: none"> • 2 h meeting. Open – low attendance. • Presentation, Q-A, discussion. • Closed committee disc. 	<ul style="list-style-type: none"> • 2 h research area meeting. Open – high attendance • Presentation, Q-A, discussion. • Closed committee disc.
Feedback	<ul style="list-style-type: none"> • Oral during meeting • Written with “conclusion”, recommendations, tentative revision requirement 	<ul style="list-style-type: none"> • Oral during meeting • Written with “conclusion”, recommendations, tentative follow up from the department

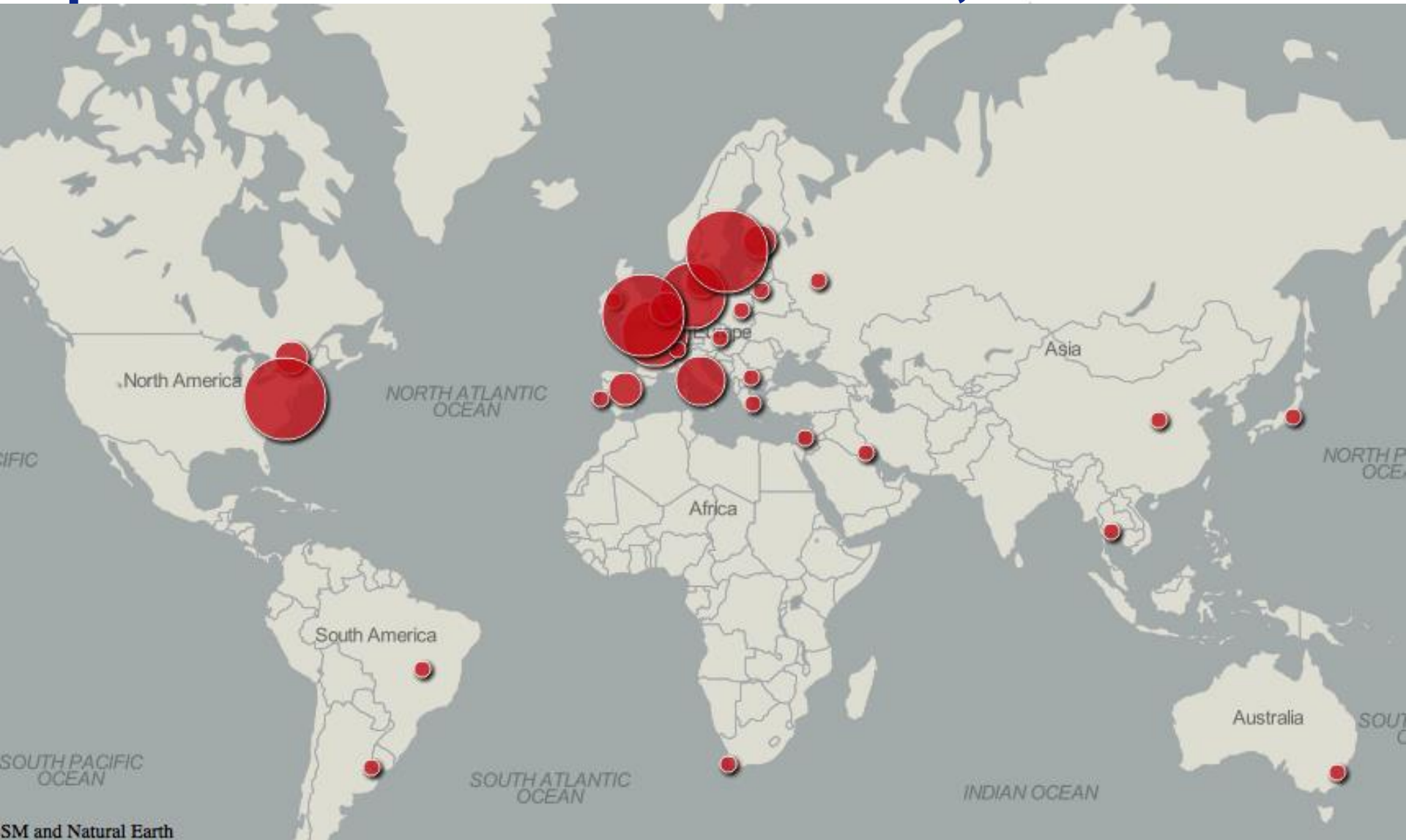
Mid-study evaluation II

Department	Power Engineering. - Elkraft	Electronics and Telecom.
Committee	<ul style="list-style-type: none"> • Supervisors • External member <ul style="list-style-type: none"> - International member - NTNU sci. staff 	<ul style="list-style-type: none"> • Supervisor • One member from group • One member outside group
Basis	<ul style="list-style-type: none"> • The entire project is subject (not just the candidate) • ≥ 1 week preparations • Oral presentation 	<ul style="list-style-type: none"> • Work performed, planned • Publications, visits, presentations • Duty work, other activity • Oral presentation
Form	<ul style="list-style-type: none"> • 30 min. presentation • Closed committee and student meeting. Content, progress, plans, adjustments, supervision, conflict handling 	<ul style="list-style-type: none"> • Department-wide seminar • 30 min presentation • Committee evaluation • Social arrangement
Feedback	<ul style="list-style-type: none"> • Signed report motivating alt.: <ul style="list-style-type: none"> - On track - Actions to improve progress - Why it should be aborted. 	<ul style="list-style-type: none"> • General progress • Strong points • Proposals for issues to focus on

Evaluation of thesis - disputation



Origin of international members of ph.d. assessment committees, 2008-2012



International Evaluation of PhDs at IME 2008-2012

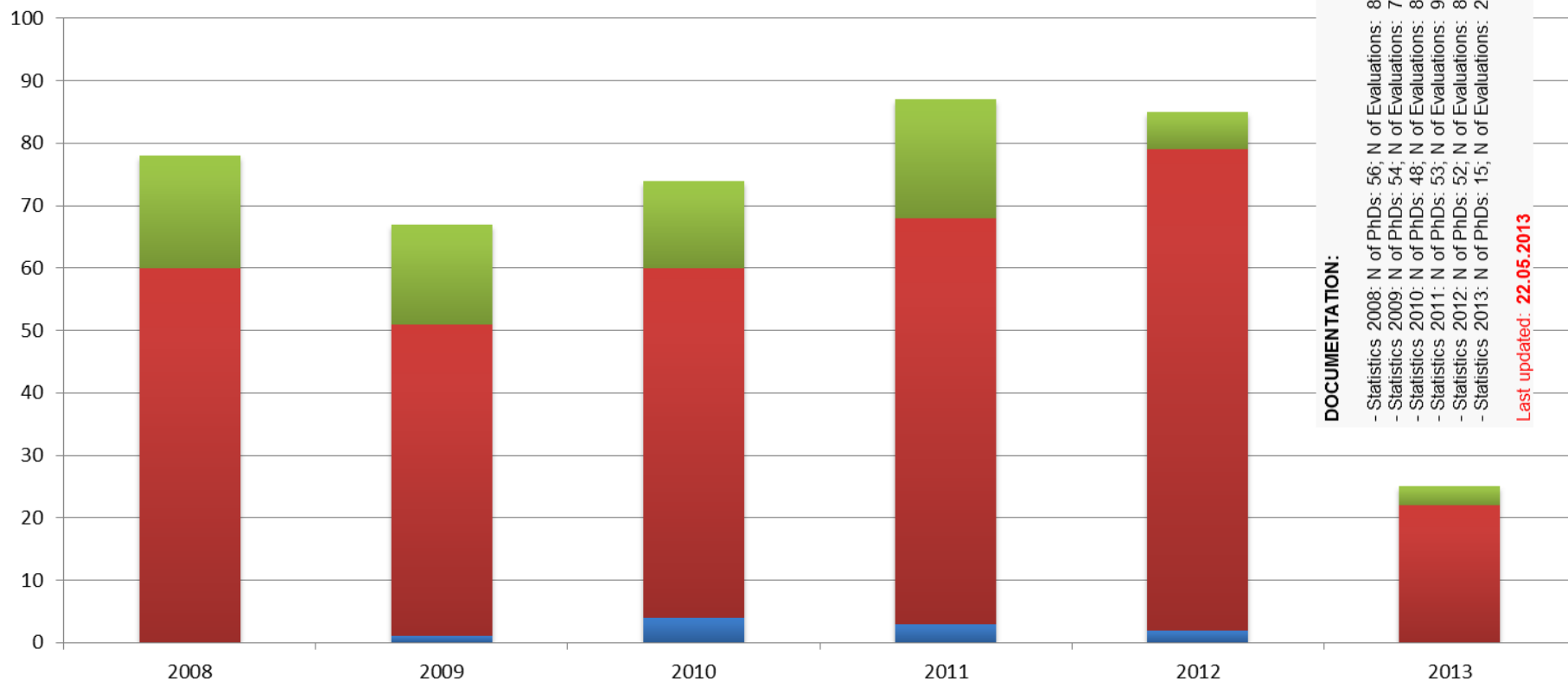
Count of Evaluation (Quartiles)

International Evaluation of PhDs at IME, 2008-2012

Indication of quartiles are based on statements by international evaluators

Evaluation (Quartiles) ▾

■ Q1: Lower quarter ■ Q2 & Q3: Mid-quarters ■ Q4: Upper quarter



Year of Completion ▾

DOCUMENTATION:

- Statistics 2008: N of PhDs: 56; N of Evaluations: 85, whereof na: 7
- Statistics 2009: N of PhDs: 54; N of Evaluations: 71, whereof na: 4
- Statistics 2010: N of PhDs: 48; N of Evaluations: 80, whereof na: 6
- Statistics 2011: N of PhDs: 53; N of Evaluations: 90, whereof na: 3
- Statistics 2012: N of PhDs: 52; N of Evaluations: 85, whereof na: 1
- Statistics 2013: N of PhDs: 15; N of Evaluations: 25, whereof na: 0

Last updated: **22.05.2013**

* Complete documentation is given in own textbox.

On the agenda

How to approach the Norwegian labour market for intern. PhDs.

Continued development of the status reporting and associated QA process

Get supervisor course/seminar up and running annually

Follow up the implementation of NTNUs QA system; Reporting & actions; Dept.s – IME - NTNU

International co-operation on PhD education

Mid-study evaluation process in all programmes; Sharing of experience

Continued enforcement of QA activities; cf. general NTNU measures (e.g. handbook/guidelines)

Improved start up procedures: Candidate assessment, Prestart research plan, Shorter initial lead times

In depth evaluation of PhD programmes 2016

