Faculty of Information Technology, Mathematics and Electrical Engineering
Norwegian University of Science and Technology

PhD progress report

Annual reporting from PhD candidates and supervisors

Faculty PhD programmes:

Electric Power Engineering (PHELKT)

Electronics and Telecommunication (PHET)

Engineering Cybernetics (PHTK)

Information Technology (PHIT)

Mathematical Sciences (PHMA)

Telematics (PHTELE)

[Research and Researchers Education Committee]

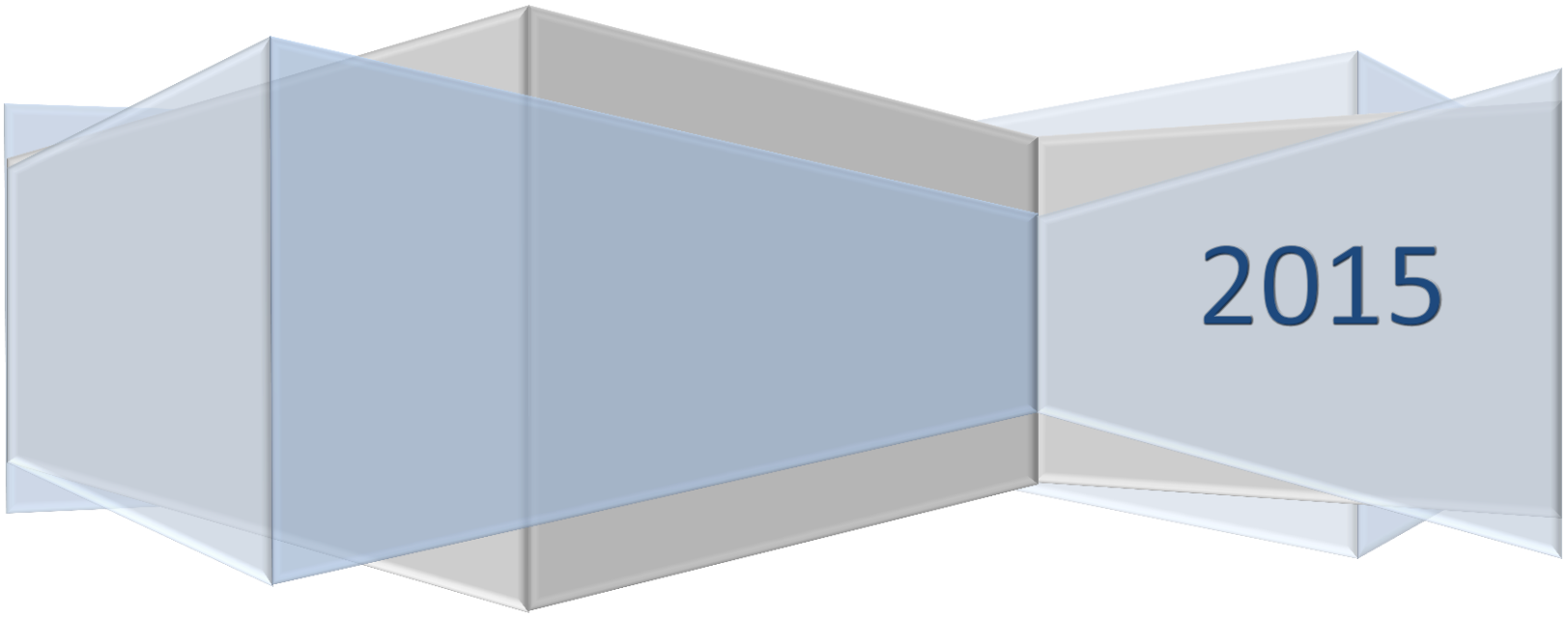


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1 Introduction

1.1 The process for annual reporting

The annual report from the PhD candidates and supervisors is intended to bring forward the status of our research education. The main purpose is to provide a picture of the reality as seen by the primary stakeholders in order to promote improvements to the individual, research groups and to learn from each other's experiences. Discrepancies in the form of lack of progress, challenges related to guidance, academic and social integration, or ethical issues are handled to provide a basis for improvement.

The annual report provides a basis for performance reviews. The Department is responsible for following up the individual employee at the individual level, and implementation of improvement measures. Each Department has received a report for their PhD programme and individual reports from both their PhD candidates and supervisors.

1.2 The handling of annual reports

The annual report provides a basis for performance review. The Head of the Department is responsible for handling all reports confidentially, and if necessary implements improvements measures.

The Research Committee chaired by the Vice Dean for Research evaluate and discuss the result findings based on the aggregated report, and if necessary implement improvements measures.

1.3 Feedback

The data for this report is based on 309 reports from the PhD candidates and 332 reports from the main supervisors. The data are compared with data from joint student data system (FS) at 25 March 2015. The reporting started in April 2015, however all reporting until 12. August is analysed and in this dataset. It has been issued 3 reminders.

The annual reporting includes PhD candidates that have not applied for prolongation of their study period beyond 2014.

The number of registered PhD candidates registered in FS was 347. A few candidates were early on reported to have ended their studies, and administrative procedures were already started, but not finalised. All registered candidates are accounted for in this year's reporting, including candidates on leave, candidates in the phase of completing their studies, supervisors on leave or on sabbatical year.

- Total number of PhD candidates is 347.
- The response rate for the Ph.D. candidates is 89% and 96% for supervisors.

One of the main challenges is to distinguish between those who work actively with their research education, those who have temporary residence in their studies (with or without leave) and those who actually have ended their studies without graduating. The Faculty administration and the departments are working continuously on these matters.

In the annual reporting 6 PhD candidates were reported to have ended their studies without graduating. In addition, the supervisors have questioned the progress for their candidates. By the end of the year 2015 a total of 60 candidates were enrolled in 2009 or earlier, these represents approximately 1 out of 6 of the total existing PhD community by the end of the year 2015.

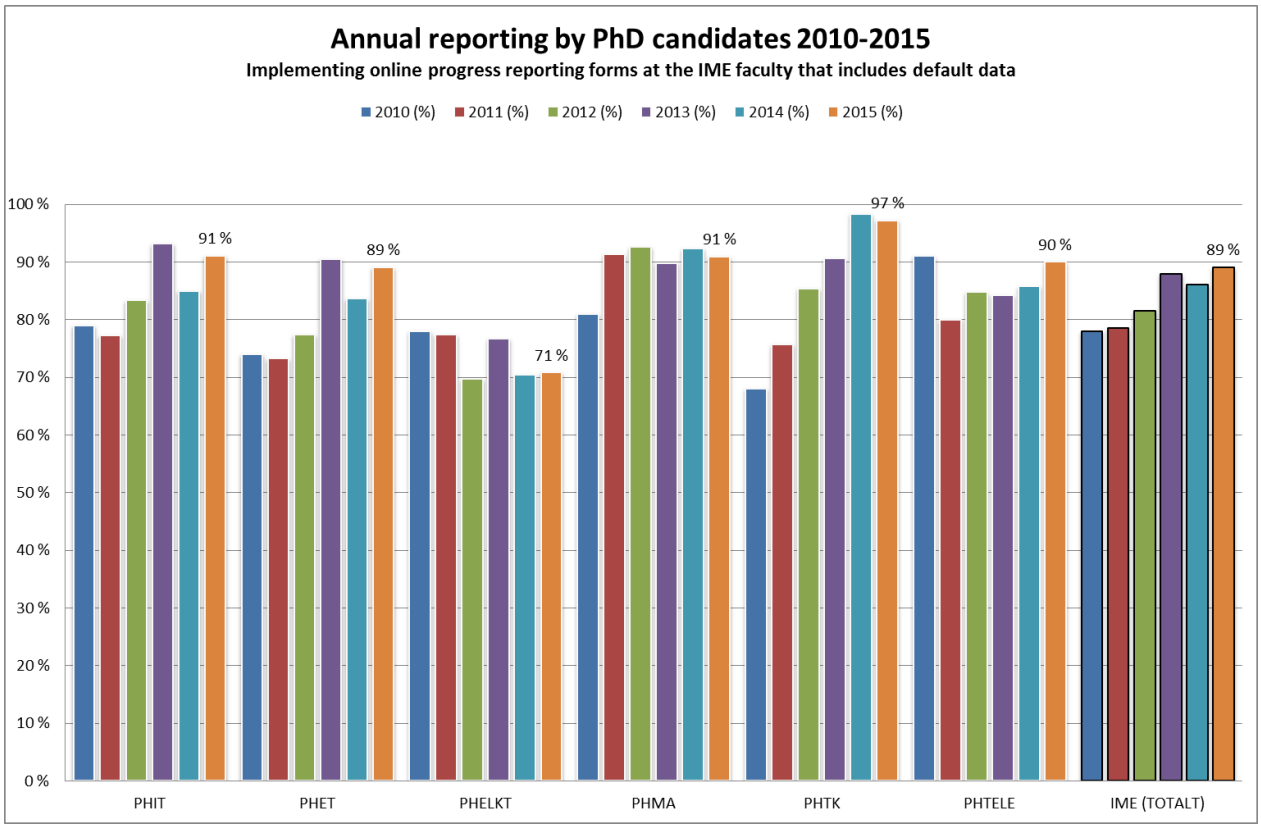


Figure 1: Annual reporting for 2010-2015 by Department, PhD candidates reporting in percent

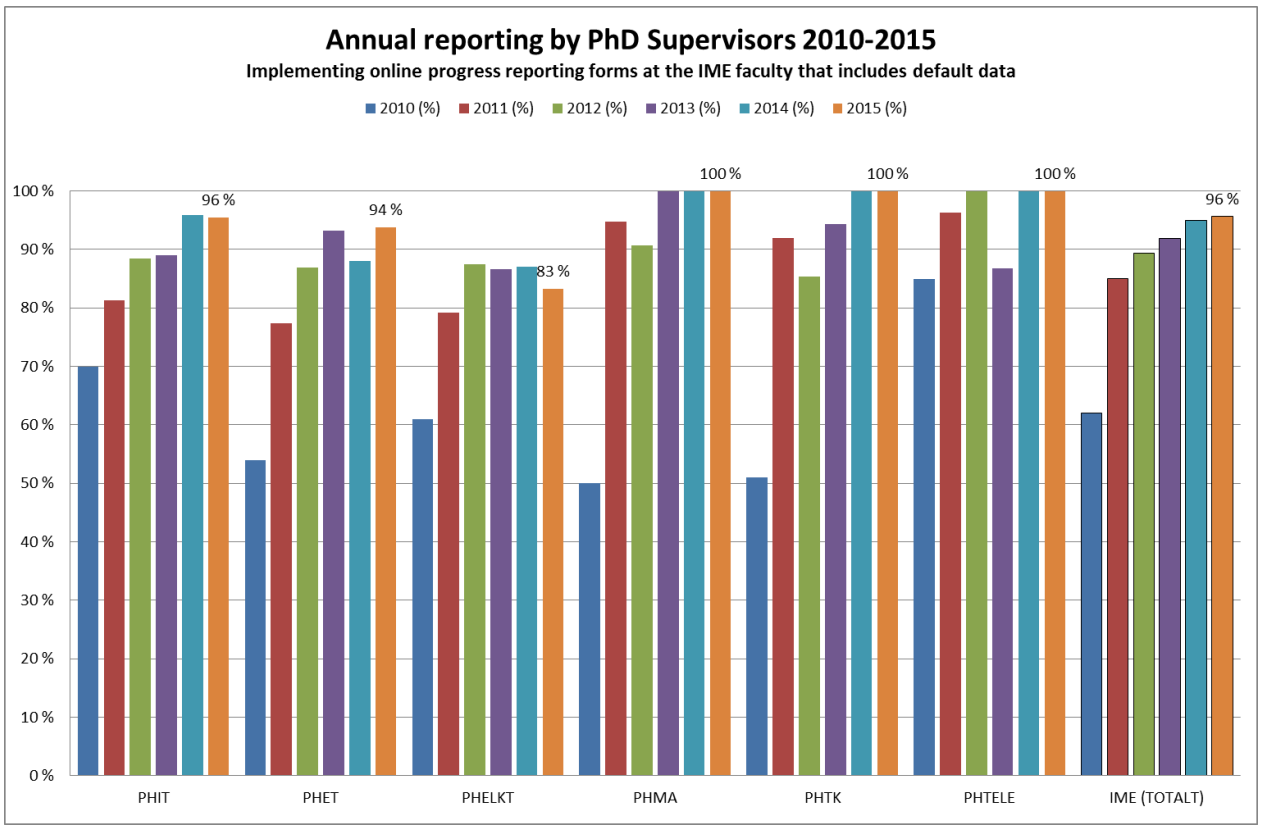


Figure 2: Annual reporting for 2010-2015 by Department, Supervisors reporting in percent

1.4 The PhD Community

In **Figure 3** the number of current active doctoral candidates at the Department is given in the bar graph by the year they started their studies. The lines given indicate respectively the number of admissions, completions and terminations of doctorate candidates per year. An overview for the Faculty and each PhD programme (Department) is given in Appendix A.

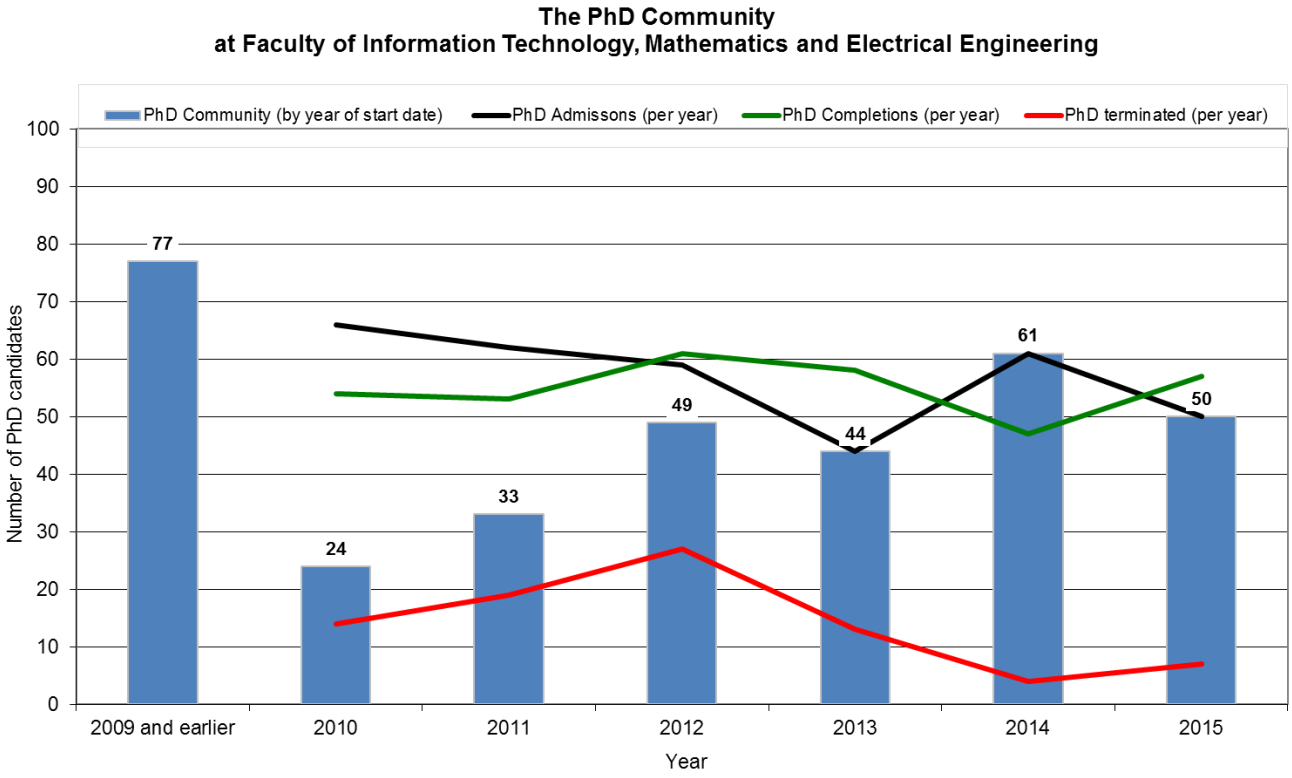


Figure 3: The PhD Community at the Faculty

2 Results - Annual reporting 2014

The results in this report are based on reports from doctoral candidates and reports from supervisors.

2.1 Starting the studies

Doctoral candidates are an important source of recruitment of scientific staff and a large proportion of the research activities of faculty. Experience suggests that there are challenges in start-up, including preparing the research plan, and uncertainty regarding the conduct of the study. To improve this the faculty has taken measures in the form of a 2-days introductory seminar for all PhD candidates.

Furthermore, the faculty has this year implemented new start-up procedures in order to ensure a research plan delivery within 6 months after employment or admission for PhD (whichever comes first). A research plan is to be drafted in the process of recruitment. The faculty has also provided discussion materials to be discussed in early phase of the PhD education ensuring a common understanding of expectations and roles between the PhD candidate and their supervisor(s).

2.1.1 PhD Introduction seminar and research plan

The faculty has incorporated an introduction seminar that is to be arranged each semester. The seminar addresses several issues that the candidates point to as important for their initiation and progression.

The seminar focuses on: the institution (and candidate) expectations and obligations; publication in the early research phase, including to be integrated and take part in a professional network, but also for social gatherings; research and ethical integrity.

- 91% of the current candidates (i.e. admitted January 2008 – May 2014, actual numbers is 223 out of 244) have participated in the faculty's PhD introduction seminar.

The faculty encourage all PhD candidates and supervisor(s) to have a guidance meeting related to the research plan that includes expectations, responsibility and likely form for guidance.

2.1.2 Guidance

There are different practices with respect to the number of supervisors at the departments. In the new PhD regulation, in force from 1st August 2012, it is stated that all PhD candidates must have a minimum of 2 supervisors. 3 of 4 of the 52 PhD stating they have one supervisor and were admitted after the new regulation entered into force had de facto more than one supervisor. The one PhD candidate with only one appointed supervisor has been followed-up by the faculty.

- At the Faculty 83% of doctoral candidates reports to have two or more supervisors.
  The share per PhD programme:

PHIT	PHMA	PHELKT	PHTK	PHTELE	PHET
97%	69%	88%	90%	74%	77%

It is a good match at Faculty level between the candidates and the supervisors' perception of the frequency of guidance / academic discussions.

- Approximately 45% of the graduate candidates have supervision weekly.
- Approximately 30% of the graduate candidates have supervision monthly.

The result is in line with earlier findings the results have shown 45-50% of weekly guidance and 25-30% of monthly guidance.

The variation between the PhD programmes and perception by the supervisors and PhD candidates is presented in

Count of How often do you have academic discussions with your supervisor-							
	PHIT	**PHMA**	**PHELKT**	**PHTK**	**PHTELE**	**PHET**	**IME total**
Weekly	48 %	68 %	32 %	30 %	63 %	42 %	46 %
Monthly	20 %	25 %	29 %	43 %	22 %	26 %	29 %
Regularly, but less than every month	12 %	3 %	29 %	20 %	15 %	16 %	15 %
Rarely, but every semester	13 %	3 %	9 %	6 %	0 %	9 %	7 %
Have not had any contact in the past semester	7 %	0 %	0 %	0 %	0 %	7 %	3 %
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Figure 4 and Figure 5.

Count of How often do you have academic discussions with your supervisor-							
	PHIT	**PHMA**	**PHELKT**	**PHTK**	**PHTELE**	**PHET**	**IME total**
Weekly	48 %	68 %	32 %	30 %	63 %	42 %	46 %
Monthly	20 %	25 %	29 %	43 %	22 %	26 %	29 %
Regularly, but less than every month	12 %	3 %	29 %	20 %	15 %	16 %	15 %
Rarely, but every semester	13 %	3 %	9 %	6 %	0 %	9 %	7 %
Have not had any contact in the past semester	7 %	0 %	0 %	0 %	0 %	7 %	3 %
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Figure 4: PhD candidates' perception of frequency of academic discussion with supervisor(s)

Count of How often do you have academic discussions with the PhD candidate-							
	PHIT	**PHMA**	**PHELKT**	**PHTK**	**PHTELE**	**PHET**	**IME Total**
Weekly	49 %	67 %	31 %	28 %	48 %	37 %	44 %
Monthly	15 %	17 %	49 %	58 %	11 %	36 %	32 %
Regularly, but less than every month	11 %	3 %	11 %	10 %	30 %	10 %	11 %
Rarely, but every semester	18 %	6 %	9 %	4 %	11 %	12 %	10 %
We have not had any contact in the past semester	7 %	6 %	0 %	0 %	0 %	5 %	3 %
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Figure 5: Supervisors' perception of The PhD Community at the Faculty

- 11 Supervisors' report that they have not had any contact with their candidate in the past semester.
- 8 PhD candidates report that they have not had any contact with their supervisor(s) in the past semester.

In general the candidates expressed positive experiences with their supervisors, especially regarding the good scientific feedback, access to supervisors, writing of articles, and regularity of meetings and discussions. However, a few candidates and supervisors give input for further improvements. Most challenges are related to PhD candidates that run out of funding and have other work, or related to periods the supervisor is on sabbatical.

- 18 PhD candidates (6%) responded that the supervision do not work satisfactory.
- 43 Supervisors (13%) responded that the supervision with the candidate do not work satisfactory.

The result is 2-3 percentage points above the findings in the previous annual reporting at the Faculty.

2.1.3 Ethical issues related to the research

It is important that candidates who are or think they will come up in an ethical dilemma regarding their research as soon as possible. The candidates are strongly advised to consult their supervisor, department or faculty on these matters.

- 5 candidates reports that they have or believe it is likely that in the coming year their research may raise some form of ethical dilemma. 3 cases were by the faculty regarded as non-ethical issues. All cases have been handled by the Faculty.

2.1.4 Mid-term evaluation

Mid-term evaluation has been introduced to all Departments in the academic year 2012/13. In general will granted leaves cause a postponed date for the mid-term evaluation.

Mid-term evaluation was introduced in 2005 at the Department of Computer and Information Science (PHIT).

- 89% of PhD candidates at the department with a starting date between January 2006 and July 2013 - likely to have been completed - have reported that they have completed their mid-term evaluation.

Mid-term evaluation was in 2007 at the Department of Telematics (PHTELE).

- 82% of PhD candidates at the department with a starting date between January 2008 and July 2013 - likely to have been completed - have reported that they have completed their mid-term evaluation.

Mid-term evaluation was more recently introduced to the other 4 Departments. The period that may have been completed regarding mid-term evaluation is set to January 2012 to July 2013:

- 62% of the reporting PhD candidates have reported that they have completed their mid-term evaluation at the Department of Electronics and Telecommunication (PHET).
- 61% of the reporting PhD candidates have reported that they have completed their mid-term evaluation at the Department of Engineering Cybernetics (PHTK).
- 29% of the reporting PhD candidates have reported that they have completed their mid-term evaluation at the Mathematical Sciences (PHMA).
- 25% of the reporting PhD candidates have reported that they have completed their mid-term evaluation at the Department of Electric Power Engineering (PHELKT).

2.2 Leaves

14% of the candidates reports that they have had formal leaves in the past calendar year. Percentage on leave varies between the Departments, from the minimum of 6% to a maximum of 27%.

Count of Have you had any formal leave of absence in the past calendar year							
	PHELKT	PHIT	PHET	PHMA	PHTELE	PHTK	IME
No	94 %	73 %	82 %	92 %	85 %	91 %	86 %
Yes	6 %	27 %	18 %	8 %	15 %	9 %	14 %
Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %

Figure 6: Formal leave of absence

2.3 Academic training and Research plan

- 72% of the candidates respond that they have passed all courses in the academic training.

PHIT	PHMA	PHELKT	PHTK	PHTELE	PHET	IME
80%	75%	79%	59%	81%	65%	72%

- 42% of the candidates have revised their research plan within the last 12 months.

PHIT	PHMA	PHELKT	PHTK	PHTELE	PHET	IME
48%	34%	36%	44%	60%	35%	42%

The supervisors rate their candidates high with respect to learning objectives defined as knowledge, skill and competence. In most cases this year's result is an improvement from 2014 (indicated by coloured arrows).

How would you evaluate the candidate's progression - taken into account the candidate's phase in their research education - with respect to to the learning objectives of the Quality Framework (i.e. Knowledge, Skills, and Competence) on a scale from 1 (poor) to 5 (excellent).	Knowledge (e.g. knowledge of systems, theory and methods)	Change from 2014	Skills (e.g. develop hypotheses, plan and perform research)	Change from 2014	Competence (e.g. participation in research networks, publish)	Change from 2014
PHIT	4,1	⇔	3,8	⇔	3,6	⇩
PHMA	4,0	⇧	4,1	⇧	3,9	⇧
PHELKT	4,1	⇧	3,9	⇧	3,8	⇔
PHTK	4,0	⇔	4,0	⇧	3,9	⇔
PHTELE	4,1	⇔	4,1	⇧	4,0	⇔
PHET	3,9	⇧	3,6	⇔	3,5	⇧
IME (Total)	**4,0**	⇔	**3,9**	⇧	**3,8**	⇔

Figure 7: PhD supervisor's evaluation of the learning objectives according to the Quality Framework

For the 2014 figures, see Appendix A.9.

2.3.1 PhD candidates evaluation of the academic training

In general, doctoral candidates consider that the academic training provides breadth in their professional competence, that it is relevant to the dissertation, and that the quality of the educational component is high.

Our candidates' assessment is positive, cf. Figure **8**, e.g. compared to results from previous surveys by IME, and survey for NTNU conducted by the Nordic Institute for Studies in Innovation, Research and Education (NIFU Report 38/2009).

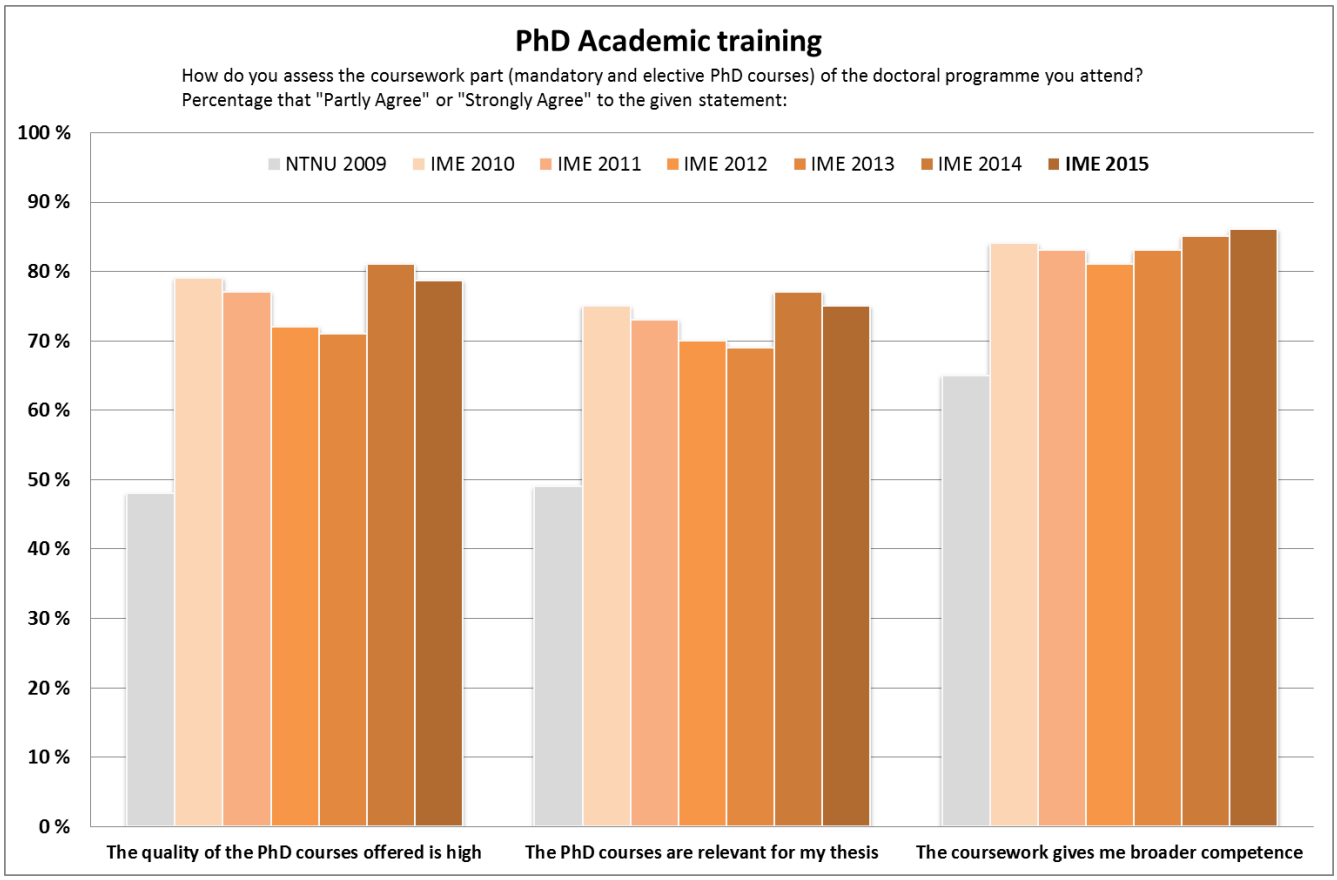


Figure 8: PhD candidate's evaluation of the academic training in the 6 PhD programs offered by the IME-Faculty

- 79% of the candidates fully or partly agreed that the quality of the educational courses offered is high

- 1% of the candidates strongly disagree, and 6% partly disagree, to the statement on high quality in PhD courses.

- 75% of the candidates fully or partly agreed that the training program is relevant for their thesis.
  - 1% percent of the candidates strongly disagree, and 12% partly disagree, to the statement on the PhD courses relevance for their thesis.

- 86% of the candidates fully or partly agreed that the coursework gives them a broader competence.
  - 1% percent of the candidates strongly disagree, and 2% partly disagree, to the statement of the coursework giving them a broader competence.

There are some variations between the PhD programmes, but clearly better result than compared to earlier studies at NTNU, programme specific results is presented in Appendix A.

2.3.2 PhD candidates evaluation of the research education

Doctoral candidates were in the annual report asked to consider statements about their research education so far. Our graduates' assessment is compared with earlier surveys conducted by the Nordic Nordic Institute for Studies in Innovation, Research and Education (NIFU, Report 38/2009) in comparable mathematical and technology environments.

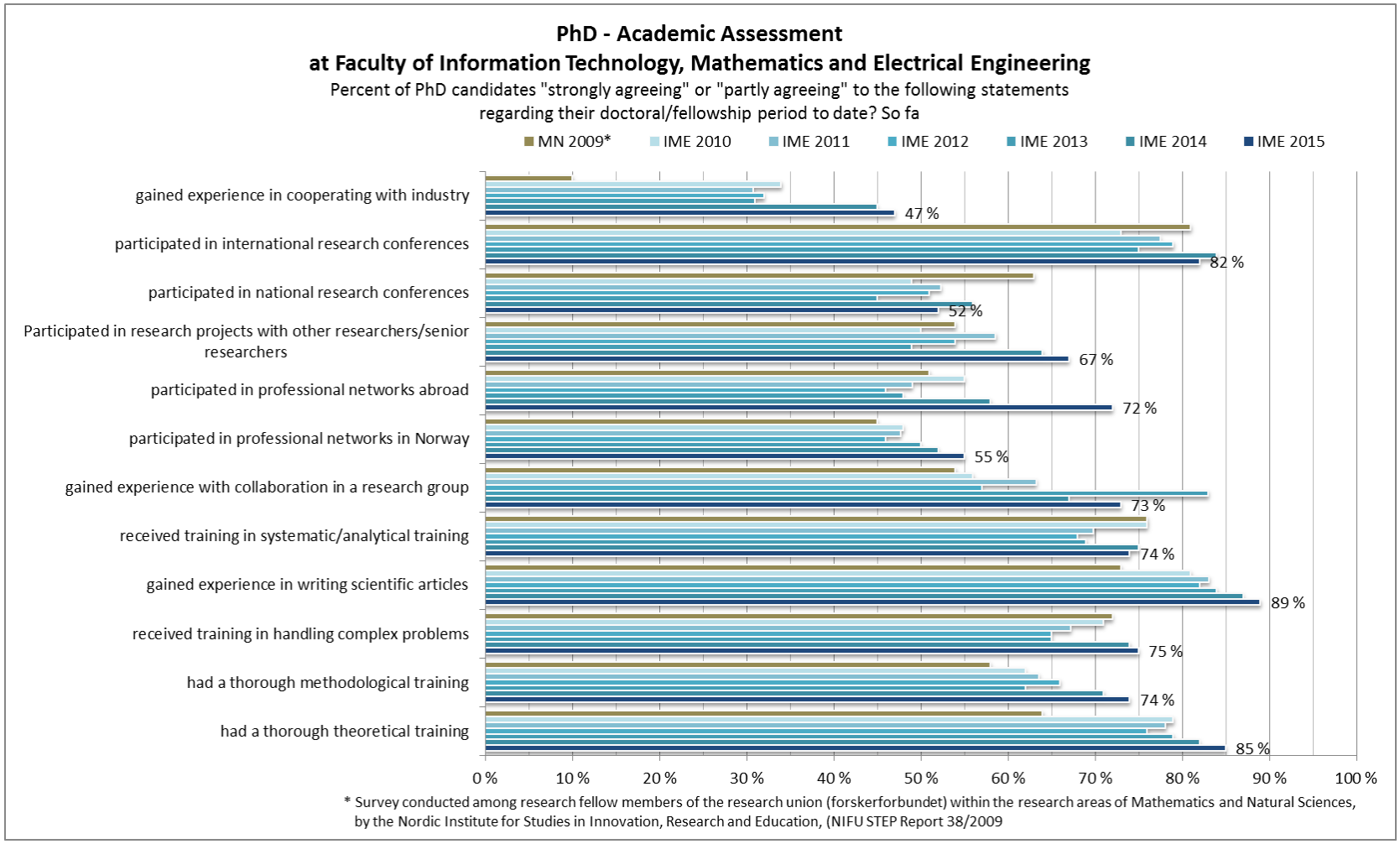


Figure 9: PhD candidate's evaluation of the doctoral /fellowship studies so far all PhD programs at IME

Please respond to the following statements regarding your doctoral/fellowship period to date? So far, I have ...							
	IME 2015	IME 2014	IME 2013	IME 2012	IME 2011	IME 2010	MN 2009*
had a thorough theoretical training	**85 %**	82 %	79 %	*76 %*	78 %	79 %	64 %
had a thorough methodological training	**74 %**	71 %	62 %	*66 %*	64 %	62 %	58 %
received training in handling complex problems	**75 %**	74 %	65 %	*65 %*	67 %	71 %	72 %
gained experience in writing scientific articles	**89 %**	87 %	84 %	*82 %*	83 %	81 %	73 %
received training in systematic/analytical training	**74 %**	75 %	69 %	*68 %*	70 %	76 %	76 %
gained experience with collaboration in a research group	**73 %**	67 %	83 %	*57 %*	63 %	56 %	54 %
participated in professional networks in Norway	**55 %**	52 %	50 %	*46 %*	48 %	48 %	45 %
participated in professional networks abroad	**72 %**	58 %	48 %	*46 %*	49 %	55 %	51 %
Participated in research projects with other researchers/senior researchers	**67 %**	64 %	49 %	*54 %*	59 %	50 %	54 %
participated in national research conferences	**52 %**	56 %	45 %	*51 %*	52 %	49 %	63 %
participated in international research conferences	**82 %**	84 %	75 %	*79 %*	77 %	73 %	81 %
gained experience in cooperating with industry	**47 %**	45 %	31 %	*32 %*	31 %	34 %	10 %

Figure 10: Table of PhD candidate's evaluation of the doctoral /fellowship studies so far all PhD programs at IME

In general there has been a positive development towards gained experience in cooperating with industry, participation in professional networks abroad, and gained experience with collaboration in a research group. Our PhD candidates regard themselves to have a high degree of participation in international research conferences, experience in writing scientific articles, and a thorough theoretical training. The findings are summarised in Figure 9. The result for the individual PhD programs is presented in **Error! Reference source not found.**.

PhD programme specific results are presented in Appendix A.

2.4 Academic assessment

The following paragraphs deals with aspects of guidance. The results from the PhD candidates are given in with blue cells and supervisors results are given in figures with red frames, arranged by topic. The results, Figure 11, are based on identical questions for PhD candidates and supervisors and expressed by the following scale: (1) Not discussed/Not touched – (2) – (3) – (4) - (5) Very thorough.

In general differences between the programmes may be explained by the nature of the field of research, but also related to the PhD candidates and supervisors finding the question "not relevant" or grading the importance differently in different phases pf the candidates research education, e.g. at start-up of the studies, leaves, or having run out of funding, or about to complete their studies. Furthermore a few questions may be related to the share of international PhD candidates at each programme.

It is never the less important that the PhD candidate and supervisor(s) are aware of the differences in perception of guidance given in their studies. This is indicated by some samples of red and green cells. Red cells indicate that the supervisors' perception of to what extent the guidance has been in one topic is stronger than the receiver (PhD candidate). Vice versa for green cells were PhD candidates' perception of to what extent the guidance has been in one topic is stronger than the supervisors'. Both cases may indicate that a misperception may occur between the supervisor and the PhD candidate.

The faculty has, as already mentioned, provided discussion materials to be discussed in early phase of the PhD education ensuring a common understanding of expectations and roles between the PhD candidate and their supervisor(s).

Complete results and results by PhD programme are given in appendix A.

Faculty / PhD programs | PhD candidates | Supervisors | Likert scale: (1) Not discussed/Not touched – (2) – (3) – (4) - (5) Very thorough.	IME		PHELKT	PHIT	PHET	PHMA	PHTELE	PHET
"In the guidance received in the past year, to what extent have you been discussing..." in percentage	(3)–(5)	*(5) very thorough*	(3)-(5)	(3)-(5)	(3)-(5)	(3)-(5)	(3)-(5)	(3)-(5)
Direction and content of the research work	89 %	*38 %*	91 %	78 %	82 %	95 %	93 %	96 %
	87 %	*34 %*	94 %	84 %	76 %	92 %	78 %	94 %
Promotion of early and frequent (if relevant) publication and participation in conferences	75 %	*23 %*	68 %	73 %	70 %	80 %	74 %	78 %
	75 %	*22 %*	80 %	66 %	59 %	84 %	56 %	93 %
Introduction to international research partners	62 %	*17 %*	56 %	48 %	61 %	66 %	56 %	77 %
	61 %	*21 %*	74 %	48 %	41 %	71 %	48 %	78 %
Discussions of choice of method and approach	78 %	*24 %*	71 %	77 %	74 %	80 %	74 %	88 %
	83 %	*24 %*	94 %	75 %	69 %	89 %	81 %	92 %
Reviewing industrial and social implications of the research work	55 %	*10%*	53 %	48 %	63 %	31 %	70 %	70 %
	44 %	*5 %*	57 %	41 %	46 %	22 %	41 %	60 %
Exercising research with professional and ethical integrity	61 %	*20 %*	61 %	58 %	67 %	46 %	74 %	65 %
	62 %	*20 %*	66 %	61 %	58 %	57 %	63 %	67 %

Figure 11: Academic assessment by PhD candidates and supervisors

Some findings (to be discussed at Department/research group level):

- **Direction and content of the research work**
  - Overall a very high score, it is positive that in most cases PhD candidates' perception is that the theme has been more thoroughly covered than what has been expressed by the supervisors.
  - Direction and content of the research work is the one topic that is given the most thorough attention.
- **Promotion of early and frequent (if relevant) publication and participation in conferences**
  - Overall a high score, however some variations in perception of how thoroughly the topic has been covered. *May be a focus point for further improvement?*
- **Introduction to international research partners**
  - Overall a low score, likely too low. *Are supervisors awareness on this sufficiently high? Are measures needed too improve?*
- **Discussions of choice of method and approach**
  - Overall a high score, but be aware of the general gap between the supervisors' and PhD candidates' perception of guidance on the topic.
- **Reviewing industrial and social implications of the research work**
  - Overall a low score, and not guided "very thorough", some variations across the disciplines. *Is the attention to this issue appropriate for the study programme and the individual candidates?*

- **Exercising research with professional and ethical integrity**
  - Overall a low score. *Are supervisors and candidate awareness on this sufficiently high (area and topic taken into account? Is an overall increased emphasis on this issue needed in our PhD studies?*

2.4.1 PhD's activity in their academic environment

In the following the self-evaluation of the PhD candidates regarding their activity in the academic environment are presented in the table rows with red shadow. The statements by supervisors are given in blue rows.

- 20% of the PhD candidates evaluate themselves to have a low or no activity when it comes to *participating in the internal academic environment*. The supervisors have indicated that 16% have no or low activity.

No or low activity	PHIT	PHELKT	PHET	PHMA	PHTK	PHTELE
PhD candidates	30%	24%	20%	19%	17%	4%
Supervisors	18%	20%	20%	10%	12%	22%

- 39% of the PhD candidates evaluate themselves to have a low or no activity when it comes to *participation in colloquia and discussion forums* (typically every second week). 21% have been identified by the supervisors to be on the lower scale of this activity.

No or low activity	PHIT	PHELKT	PHET	PHMA	PHTK	PHTELE
PhD candidates	62%	27%	30%	29%	51%	19%
Supervisors	23%	22%	36%	11%	12%	34%

- 36% evaluate themselves to have a low or no activity when it comes to activities such *as presenting their work, rounds for questions and critical discussions* (each semester). The supervisors have indicated that 18% have no or low activity.

No or low activity	PHIT	PHELKT	PHET	PHMA	PHTK	PHTELE
PhD candidates	52%	30%	23%	38%	42%	19%
Supervisors	19%	20%	20%	14%	11%	34%

2.4.2 Internationalisation and dissemination

- 28% of the PhDs have during their study stayed at a university abroad.

PHELKT	PHIT	PHET	PHMA	PHTELE	PHTK	Grand Total
21 %	22 %	26 %	34 %	26 %	35 %	28 %

  - Most commonly a stay lasts for 4 to 6 months.
  - Individual cases show a range from 1 month to 30 months!
- 44% of the supervisors find it not relevant for their candidate to stay at a university abroad.
- 54% of the PhD community at the Faculty is foreign PhD candidates.

Nationality of the PhD Community AND Percent of supervisors that do not find it relevant to include a stay abroad for their candidate							
	PHELKT	PHET	PHIT	PHMA	PHTELE	PHTK	Grand Total
Norwegian	44 %	43 %	43 %	63 %	16 %	50 %	46 %
Foreign	56 %	57 %	57 %	38 %	84 %	50 %	54 %
"Stay abroad not relevant"	63 %	49 %	54 %	25 %	59 %	32 %	44%

- 63% of the PhD candidates have written a scientific paper for publishing in 2014.

PHELKT	PHIT	PHET	PHMA	PHTELE	PHTK	Grand Total
71 %	70 %	60 %	50 %	70 %	64 %	63 %

- 81% states that their complete list of scientific publications is listed in Cristin (Current Research Information SysTem In Norway). All scientific publications are to be registered in Cristin, delay may be expected based on the process of peer reviewed, acceptance of paper and actually in print.

Count of Is your registration in Cristin a complete list of your scientific publications							
	PHELKT	PHIT	PHET	PHMA	PHTELE	PHTK	Grand Total
No	18 %	17 %	18 %	17 %	19 %	26 %	19 %
Yes	82 %	83 %	82 %	83 %	81 %	74 %	81 %
Grand Total	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**

2.5 Completing and funding

71% of the candidates reports that they work full-time with their PhD-study. 75% of the candidates believe they will be able to complete the doctoral degree in accordance to the original financing plan.

Count of Do you work full-time with your PhD							
	ELKRAFT	IDI	IET	IMF	ITEM	ITK	Grand Total
No	29 %	45 %	39 %	10 %	37 %	17 %	29 %
Yes	71 %	55 %	61 %	90 %	63 %	83 %	71 %
Grand Total	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**

Count of Do you assume that you will be able to complete the doctoral degree with the original financing plan							
	ELKRAFT	IDI	IET	IMF	ITEM	ITK	Grand Total
No	29 %	28 %	33 %	12 %	37 %	19 %	25 %
Yes	71 %	72 %	67 %	88 %	63 %	81 %	75 %
Grand Total	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**

47 candidates states that they do not have funding for completing their studies.

Count of Do you have funding for the completion of the doctoral degree							
	ELKRAFT	IDI	IET	IMF	ITEM	ITK	Grand Total
No	6	14	15	1	6	5	47
Yes	4	3	4	6	4	8	29
Grand Total	**10**	**17**	**19**	**7**	**10**	**13**	**76**

2.5.1 Individual meetings

The Faculty administration has initiated 13 meeting on request from the candidates (7) and supervisors (6).

2.6 Evaluation of PhD theses

In 2015 57 theses were submitted for review. None were rejected, and no rework was imposed on the candidates before the committee took its decision. All 57 theses were found worthy of defense.

The quality of the PhD theses in the PhD programmes are by the international members of the assessment committees commonly regarded to be on level with the theses at their home institution, i.e. within the mid-quarters. The share of excellent theses is significantly higher than the share belonging to the lower quartile.

See Appendix A for PhD programme specific results.

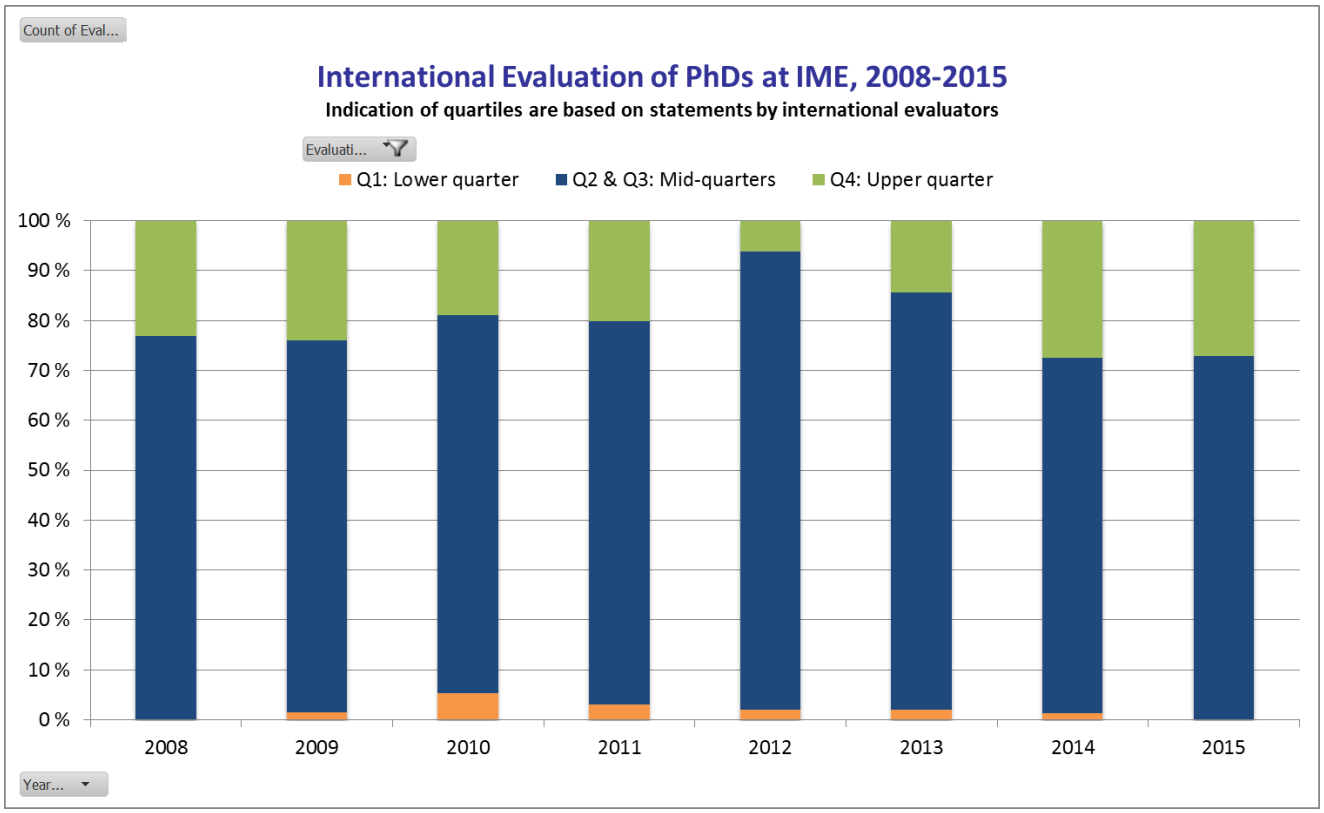


Figure 12: International Evaluation of PhD theses at IME, 2008-2015

3 Concluding remarks

In general there has been a positive development towards gained experience in cooperating with industry, participation in professional networks abroad, and gained experience with collaboration in a research group. Our PhD candidates regard themselves to have a high degree of participation in international research conferences, experience in writing scientific articles, and a thorough theoretical training. The PhD theses are commonly rated to be on average or excellent compared to the international members of the assessment committees home institutions.

All Departments are encouraged to revise their programme specific annual report for own purposes. It is suggested that the Department discuss the findings and add give input to the Faculty for the annual Quality Report for the Rector (due 15th February 2016).

This year's report will also be part of the information provided for the assessment committee in the upcoming evaluation of all PhD programmes at the Faculty in 2016.

Suggestions for follow-up activities (individual listing provided for the departments):

- Candidates and/or supervisors that have indicated that the supervision do not work satisfactory
- Make sure to replace supervisors when needed, e.g. retirement, undefined period of sick leave, in order to offer the candidates best possible follow-up. (Do also remember that all main supervisors shall appoint a “replacement supervisor” for all candidates located in Trondheim in case of sabbatical).
- See list of discussion items at the end of Section 2.4 Academic assessment.

3.1 Main activites 2015

- Introduced new start-up procedures, ensuring excellent recruitment and plan for an early and good start is implemented.
- Focus on the organization of professional discussions- and interaction arenas (for PhD candidates) at the Departments.
- The recruitment process is satisfactory, many applicants, but within some programmes it is regarded as advantageous/necessary with more Norwegian / Nordic applicants.
- Reducing dropout and increased throughput is highly prioritized tasks.
- The PhD supervisor seminar at the Faculty is well-founded with contributions from internal and external resources. An ongoing assessment of the seminar arranged by the Faculty related to the new initiative taken by the central administration at the NTNU is in process.
- Regarding internationalisation the Faculty has signed Cotutelle agreements (double degree) with the following universities in 2014/2015: Technical University of Denmark (DTU); University of NIŠ; KU Leuven; École supérieure d'électricité (SUPÉLEC); Queensland University of Technology; Turku University; University of Pavia.

3.2 Main activities foreseen in 2016

- Collaborate with the new NTNU milieus (previously at university colleges in Gjøvik, Trondheim and Ålesund; The organization for 2017 is not yet decided), especially related to PhD education, i.e. “Information Security” and “Computer Science”.
- Review, exchange and establish best practice related to the selection of candidates for PhD study.
- Arrange and follow-up the evaluation of the PhD programmes.
- Start the of work on reviewing and revising the faculties PhD programmes. The following will be in the input to this process: Results of the PhD programme evaluation; "Innovative Doctoral Training" (e.g. CESEAR); conditions given by PhD educational cooperation within the EU, e.g. MSCA ITN, and the initiative for PhD education within the the European Research Consortium for Informatics and Mathematics (ERCIM).
- Establish a recruitment arena for “own” students, including focus on recruiting women in PhD positions.
- Initiate contacts with recipients of PhD candidates. This work will extend beyond 2016.