

**Research Review**  
**Management of Innovation**  
**and Entrepreneurship:**  
**A Network Perspective**  
**2008-2014**

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# Report on the evaluation of research in Management of Innovation and Entrepreneurship at the University of Twente

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## Preface by the committee chair

The Management of Innovation and Entrepreneurship is a burgeoning field of enquiry, receiving intense academic and practitioner attention. It is at the heart of current economic and innovation policy. It is at the heart of the way we underpin public and private investments in development and growth. The University of Twente has a long-standing involvement in this area and can show a rich portfolio of accomplishments. As a consequence, the members of the committee were enthusiastic to participate in this assessment and thus contribute to the further development of the MIEn programme.

The focus of our assessment was the research in Management of Innovation and Entrepreneurship (MIEn) at the Institute for Innovation and Governance Studies (IGS) of the University of Twente (UT). It covers the research conducted in the period 2008-2014.

In accordance with the Standard Evaluation Protocol 2015-2021 for Research Assessment in the Netherlands (SEP), the committee's tasks were to assess the quality of the research unit on the basis of information provided by the unit and interviews with the management and the research leaders, and to advise on how it might be improved.

In order to fulfil its task, the committee was able to rely upon a well-prepared and coherent self-assessment report. The committee appreciated the meticulous organisation of the visit. Interviews with a rich and diverse plethora of faculty, scientific staff, support staff and students enabled us to obtain a detailed, well-founded insight into the functioning, the organisation and the results of the MIEn programme.

The members of the committee are grateful to Rainer Harms and the MIEn colleagues and PhD candidates who participated and contributed to our understanding of the MIEn ecosystem. We also want to thank Dr. Floor Meijer and Dr. Fiona Schouten from QANU for guiding and assisting us through the SEP process. Finally, I want to thank all committee colleagues for the stimulating analyses, discussions and contributions.

Koenraad Debackere  
Chair of the Committee



# 1. The review committee and the review procedures

## Scope of the review

The committee was asked to perform a review of the research in Management of Innovation and Entrepreneurship (MIEn) at the Institute for Innovation and Governance Studies (IGS) of the University of Twente (UT). This review covers the research of this unit conducted in the period 2008-2014.

In accordance with the Standard Evaluation Protocol 2015-2021 for Research Assessment in the Netherlands (SEP), the committee's tasks were to assess the quality of the research unit on the basis of information provided by the unit and interviews with the management and the research leaders, and to advise on how it might be improved.

## Composition of the committee

The committee consisted of the following five members:

- Prof. Koenraad Debackere (chair), professor at the Faculty of Economics and Business at KU Leuven, Belgium;
- Prof. Alain Fayolle, professor of entrepreneurship and director of the entrepreneurship research centre, EMLYON Business School, France;
- Prof. Thomas E. Johnsen, professor of purchasing & supply management, ESC-Rennes School of Business, France;
- Prof. Klaus Nathusius, managing director and general partner at GENES GmbH Venture Services, Germany;
- Prof. Vlad Vaiman, associate dean and professor of international management at California Lutheran University, USA.

Short curricula vitae of the committee members are included in Appendix 1.

Dr. Floor Meijer of QANU (Quality Assurance Netherlands Universities) was appointed project manager and secretary to the committee. Dr. Fiona Schouten of QANU was also present during the site visit.

## Independence

All members of the committee signed a statement of independence, affirming that they would assess the quality of the research unit under review in an unbiased and independent way. Any existing personal or professional relationships between committee members and the research unit were reported and discussed in the committee meeting. The committee concluded that there were no relations or dependencies that could jeopardise the impartiality of its judgement and that there was no specific risk in terms of bias or undue influence.

## Data provided to the committee

The committee received the self-evaluation report of the units under review, including all the information required by the Standard Evaluation Protocol (SEP), with appendices.

The committee also received the following documents:

- Standard Evaluation Protocol 2015-2021;
- Copies of key publications;

- Copies of key societal output;
- Benchmarking report Management of Innovation and Entrepreneurship (MIEn) TUHH, Strathclyde, Imperial College.

### **Procedures followed by the committee**

In accordance with the SEP 2015-2021 the committee assessed the academic quality, relevance to society and viability of the research unit, as well as the training programme provided to PhD candidates and the research integrity policy that is in place. The meaning of the scores on the SEP criteria is explained in Appendix 2.

The site visit took place on 3-4 February 2016 at the University of Twente. At the start of the site visit the committee was briefed by QANU about research reviews according to SEP. It also agreed upon procedural matters and aspects of the review, and discussed its preliminary findings based on the self-evaluation report and key publications.

Subsequently, the committee conducted interviews with representatives of the Institute for Innovation and Governance Studies (IGS), the Faculty of Behavioral, Management and Social Sciences (BMS) and the research unit under review. The committee also spoke with a selection of PhD candidates and representatives of Twente Graduate School (TGS), which is responsible for PhD training and supervision. The schedule for the site visit is included in Appendix 3.

After the interviews the committee discussed its findings and reached an agreement on its assessment of the SEP criteria. Based on the verbal and written input of the committee members, the secretary drafted a report. This was returned to the committee for final approval and consequently presented to the Institute for Innovation and Governance Studies for factual corrections and comments.

The final report was sent to the University Board and published on the website of the University of Twente and the QANU website.



## 2. Management of Innovation and Entrepreneurship: A Network Perspective

The committee's report on 'Management of Innovation and Entrepreneurship: A Network Perspective' consists of four parts. First, the committee provides a description of the unit, which mostly focuses on its organisation, leadership, strategies and resources. Second, it assesses the three main SEP criteria – quality, relevance to society, viability – and the additional criteria of PhD training and research integrity policy. Third, the committee provides recommendations, which may further improve the unit's performance in the upcoming review period. Finally, the committee submits its scores for the SEP criteria.

### 2.1 Description of the research unit

#### Organisation, leadership, mission and strategy

The research programme 'Management of Innovation and Entrepreneurship: A Network Perspective' (MIEn) consists of a group of approximately 65 academic staff members (25.4 research fte in 2014), whose research themes include innovation, entrepreneurship, innovative management of technology, purchasing and supply management, HRM, organisational behaviour and corporate finance. Their combined research into technology -based business and its potential to solve 21<sup>st</sup> century global challenges is closely linked to the University of Twente's distinctive combination of technological and societal perspectives. The university's motto, *High Tech – Human Touch*, highlights the interdisciplinary nature of research and teaching at UT.

As of the early 2000s, the University of Twente has been structured as a matrix organisation, with (6) separate faculties (or 'schools') on the one hand and (5) research institutes on the other. Research takes place both in the research departments and chair groups at the faculty level and at the level of the research institutes. In some instances several departments contribute to a single research programme, as is the case for the research programme Management of Innovation and Entrepreneurship.

MIEn is the joint research programme of five departments of the Faculty of Behavioral, Management and Social Sciences (BMS). This Faculty was created in 2014 following a merger between the former faculties of Management & Governance and Behavioral Sciences. The five departments/chair groups that contribute to MIEn are:

- Centre for Entrepreneurship, Strategy, International Business and Marketing (NIKOS);
- Human Resource Management (HRM);
- Change Management and Organisational Behaviour (CMOB);
- Technology Management and Supply (TM/S);
- Finance & Accounting (F&A).

During the site visit it was mentioned that three chairs outside of the Faculty of BMS also contribute to MIEn but have not been included in the review.

MIEn is subdivided into two 'pillars': 1) creation orientation (NIKOS, HRM), which focuses on the emergence of new ventures and innovations, and 2) management orientation (CMOB,

TM/S, F&A), which focuses on the management of entrepreneurship and innovation in networks. During the site visit, it was stressed that this focus is not restrictive; not all research conducted within the chair groups that together form MIEn takes an entrepreneurial perspective. In a similar sense, the network perspective is not necessarily explicit in all of MIEn's research.

As a consequence of the matrix structure MIEn is not only connected to the BMS Faculty, but also to the research institute for Innovation and Governance Studies (IGS), which is one of five research institutes at UT. The research institute for Innovation and Governance Studies (IGS) was created in 2002 as the university spearhead for the social and behavioural sciences. Its research addresses issues of coordination, steering, and the operation of (networks of) actors and institutions in both public and private sectors from a multilevel, multi-actor system perspective. The 400+ members of IGS are employed at 14 departments spread out over three faculties. IGS has pinpointed eight spearheads of research, which receive strategic funding. The institute spearhead 'Management and Entrepreneurship', which is one of the first created, coincides with a major MIEn research field. Together, the coordinators of the eight spearheads form a 'programme council'.

MIEn's mission is to develop actionable knowledge on technology-based innovation, management and entrepreneurship in networks through engaged scholarship; together with its stakeholders, it aims to translate theoretical and empirical findings into instruments (consulting, interventions and tools) that companies can use to address MIEn-issues. Engaged scholarship and the network perspective are central to MIEn's strategies.

The self-evaluation report describes three main strategies for the review period, which will be continued in the coming period. First, the group has adopted a two-pronged publication strategy, which aims to increase the output both in scientific outlets and in practitioner journals. Since the last review, the group has improved the share of ISI-rated publications and average impact factor of ISI-rated journals and it hopes to continue on this path. The second strategy is to continue to sharpen the thematic profile by exploring new research foci that meet the needs of stakeholders (i.e. research into internal and external networks), and by crossing boundaries into the technology faculties at UT, which is thought crucial for tackling complex societal challenges. Third, the group aims to explore different forms of research governance that will help to organise research across disciplinary groups. Potential instruments include joint projects, informal research meetings, semi-structured key research areas and invited lectures on MIEn themes.

In the self-evaluation report and the interviews it was pointed out that coordination within MIEn is mostly informal: the unit is a loose collaboration between several self-contained, financially independent departments/chair groups, rather than a close-knitted research group with a formal leadership. MIEn researchers from time to time co-supervise PhD students, co-publish articles and meet during monthly brown-bag meetings in which research is presented, but formal policy-making and coordination take place elsewhere. Recruitment and HR policies are set at the Faculty of BMS, which employs (most) MIEn researchers, while the department heads are responsible for day-to-day leadership and annual staff appraisals. IGS is in charge of research coordination and the enhancement of research results by setting criteria for publication performance (e.g. an average of four ISI publications per year per research fte).

Research plans are developed at the level of the chair groups rather than at the level of the thematic pillars or MIEn as a whole. To the extent that there is such a thing as a common

MIEn strategy, it is outlined by the IGS programme council, in cooperation with IGS's scientific director and the leaders of the five chair groups. During the interviews it was also mentioned that the two pillars do not constitute a strong divide between the different chair groups; they are mainly considered a practical solution to create manageable groups in terms of size. Collaboration is considered strongest on issues of teaching in the Business Administration master's programme and the International Business Administration bachelor's programme, whose content reflects the research interests of MIEn.

## **Resources**

During the first half of the period the academic staff of MIEn has increased from a total of 19,3 fte (*full time equivalent*) in 2008 to 29,7 fte in 2011 (cf. table A, Appendix 4). The growing number of staff between 2008 and 2010 was made possible by increasing income (cf. Appendix 4, table C: 'Funding'). This period of growth was followed by a hiring freeze (2011-2013), which affected all levels of staff except PhD candidates. After the hiring freeze became effective and staff numbers declined, expenditures dropped. Chairs in the fields of international business, business ethics and strategic management who retired were not replaced and plans for development stopped. After the hiring freeze was lifted, staff numbers began to recover. Especially the growth in PhD numbers, from 6,6 fte in 2008 to 15,1 fte in 2014 is notable and can be attributed to four large publicly funded and firm-based research projects that were initiated during the review period and the influx of foreign scholarship PhDs. During the site visit the committee was informed that further growth in the upcoming review period is unlikely, as the Faculty is still plagued by financial difficulties.

Direct government funding and contract funding are the most important sources of income for MIEn. For much of the review period, direct funding paid for two-thirds of the research fte. In the matrix structure of UT, both the BMS Faculty and IGS play a role in the distribution of direct funding. The faculty allocates (the lion's share of the) research money to the departments/chair groups on the basis of teaching credits and completed PhDs. Significantly, at UT the full PhD premium is funnelled to the department that was responsible for the graduation. In addition, IGS has its own funding mechanism. Annually it can spend up to €900.000 on strategic research priorities. Part of this money goes to the departments that are represented in the institute spearhead 'Management and Entrepreneurship'. The remaining one-third of MIEn's research fte is funded by research contracts with private or public organisations. This, according to the self-evaluation report, reflects MIEn's commitment to 'actionable theory'. Income from research grants is negligible. Although in the past the unit had little success in obtaining competitive funding from research councils such as NWO and ERC, recently funding from NWO was received for projects.

## **2.2 Assessment of SEP criteria**

### **Research quality**

The committee has established that, in terms of volume, MIEn's output is highly respectable. Good progress has been made with regard to the number of peer reviewed papers, but also with respect to book chapters and contributions to proceedings and conferences. The number of refereed journal articles has doubled since the last evaluation period and productivity averages around 3.8 refereed papers per year per research fte (excluding PhD candidates), which is very good. Although book chapters are an important output category (2.1 book chapters per research fte per year), relatively few books (both edited and non-edited but especially the latter) were published, particularly when the PhD theses that are listed as books are disregarded. The committee is well aware that the current system of measuring

research performance tends to favour journal articles over books but even so it believes that it is worth ensuring a balance, so that books are not ignored. Productivity in terms of PhDs increased after the first years of the period. The annual average over the period was 0.5 PhD completions per tenured fte. General productivity was at its peak in 2012 but declined in the following years. The recent character of the decrease does not allow statistically valid conclusions as to the nature of this evolution, but the hiring freeze and departure of key staff members may have played a role. Since it's not likely that growth will be realised in the coming years, MIEn will have to find a way to do 'more with less', i.e. be leaner.

The impressive volume leads to a significant, tangible impact and contributions to the fields of innovation, entrepreneurship, HRM, organisation & leadership, finance and purchasing and supply management. As a whole, the quality of the output is very good, with pockets of excellence. The research questions are relevant and are being tackled in an adequate manner, both from a novelty and a methodological perspective. The unit's focus on 'engaged scholarship' is appropriate and timely. It supports the unit's deep interaction with theory and practice, and offers a unique way to define and develop the research portfolio. While it is always going to be very difficult to achieve methodological consistency in a group that is relatively diverse, this particular focus could be an important factor in differentiating MIEn's research.

The self-evaluation report identifies an increase in the scientific quality of publications, which includes both an increase in ISI-rated publications and highly ranked journals including, for example, *Academy of Management Journal* and *Journal of Management*, as well as more subject-specific top journals such as the *Journal of Product Innovation Management*. In comparison to the 2002-2007 period, the number of ISI-listed publications increased from 79 to 136 and the average ISI score of the journals grew from 1.41 to 1.64, which is reported as 'close to a top-20 position in our field'. Nonetheless, true top tier publications are not numerous. As to future research impact and its improvement, the unit could aim to be more present in the top-tier journals and, hence, the top competitive arena in its fields of relevance. The unit recognises this opportunity. At the same time, the pursuit of top publications should be kept in balance with the requirement of engaged scholarship, which focuses not only on global but also on national/regional impact of the research lines of the unit. In this respect the committee advocates that the unit develop a better view on the journal outlets it finds worthwhile to pursue. At present the unit has no systematic approach with a preferred journal list and ambitions to further improve its impact are modest (during the interviews representatives of pillar 1 mentioned a target of improving the ISI-rate by 10% in the upcoming period). The choice of publication outlets is implicit at the level of the five departments, but it would be worthwhile to make it more explicit at the level of MIEn. There still is room to get the research output of the group published in outlets that have more visibility and prestige, and therefore it would be advisable to clearly articulate preferred research outlets, not just in terms of journals but also in terms of books and publishers.

In its assessment of the research quality, the committee has not limited itself to journal impact. There are other aspects to take into account. First, MIEn has made promising steps in terms of internationalisation, notably via the PhD community (60% non-Dutch PhD candidates) and visitor's programme. There is a good culture with regards to the number and quality of visiting researchers at MIEn and MIEn researchers visiting international institutions, many of which are high-profile universities. The committee emphasises the importance of selecting the right partner institutions, also in view of MIEn's intentions to establish double degree programmes, as the quality of an institution is often judged by the quality of its partners. Second, MIEn researchers are very active in attending conferences

outside of the Netherlands and organising/hosting conferences and events themselves. During the site visit it became clear that the latter is the result of a strategy to get research published, which, in the case of niche research, is not always a straightforward process. Organising events is a good way to break into the scientific publishing community, and the committee applauds MIEn's efforts. Nevertheless, it feels that the moment has now come to move away from pure 'tactics' and move on to content-related choices. Third, there is a very good infrastructure to support research and teaching. Perhaps most notable is the new Ravelijn building that was put into use at the end of 2010, but the digital IGS DataLab is also worth mentioning.

In terms of obstacles that MIEn will have to overcome to further improve its research quality, the most obvious one is the lack of structure, coherence, and strategy at the unit level. As a research programme that connects five departments/chair groups, MIEn's most important contribution could be to increase coherence, synergies and hybridising, notably through internal cooperation, but also by stimulating collaboration with other disciplines within the Faculty of Behavioral, Management and Social Sciences and the other, technical Faculties. At the moment, MIEn does not fulfil this role, which hampers the unit's viability (see below, 'Viability').

### **Relevance to society**

The University of Twente was recently voted most entrepreneurial university in the Netherlands, which reflects the university's ability to create economic and social value from scientific knowledge. The committee notes that MIEn's research focus puts it in an ideal place to support the University of Twente in sustaining and developing its ambitions as a dynamic, entrepreneurial high-tech university. The focus on engaged scholarship, which lies at the core of MIEn's mission and strategies, offers an opportunity to connect the unit's scientific ambitions with societal relevance. Interacting with stakeholders is a particular strength of MIEn, as is demonstrated by the good industry collaboration in, for example, healthcare. Commonly, these projects include co-funded PhD projects, which is in line with the university-wide policy of actively shaping university-industry interaction by appointing one hundred co-funded PhD candidates ('100 aio-plan', 2014).

The committee established that MIEn is generally recognised as an important and relevant player in the Dutch high-tech and academic start-up 'ecosystem'. In particular, its researchers are very involved in the ecosystem around Twente in terms of entrepreneurship. The unit does a very good to outstanding job in generating projects, activities and outputs that are relevant to the entrepreneurial and innovation community. Its presence in the various fields of practice to which it contributes is diverse and rich. The unit has attained an activity profile that allows it to contribute at a level that is both relevant and visible.

A good example of MIEn's contribution to the economic development of the Twente region is VentureLab Twente (VLT), which was started by NIKOS in 2009 as a support system for the development of business start-ups and a growth accelerator for established companies. So far several hundreds of start-ups and established businesses have benefited from VLT's annual business development programme. In 2013, VentureLab Twente developed into VentureLab International, with offices in Groningen and Apeldoorn. Also worth mentioning are the partnership with Volkswagen, the 'Competency for Innovation' project with local SMEs, NIKOS's part in the acquisition of the Twitter Data Grant (IGS) and various projects within the public sector, e.g. the NWO project on Employee-Driven innovation.

MIEn's strategy for disseminating its research results mainly relies on publications in practitioner-oriented journals. In the review period it published 59 reports and professional

journal articles, which averages 0.7 practitioner publications per research fte per year. Furthermore, there is an impressive amount of practitioner-oriented lectures, workshops and seminars and MIEn members are active in a large number (36) of management boards, including boards of social organisations. Outreach to the general public in terms of media presence is not as high on the agenda. The committee notes that the benchmark with Imperial College London that was conducted as part of this research review may prove a very good way to gain new insights and inspiration, as it reveals the width of the range of media used by Imperial College such as podcasts, videos etc.

Finally, the committee notes that the focus on engaged scholarship increases the unit's fundraising potential. In the review period up to 10.7 research fte were financed by research contracts for specific research projects obtained from external organisations (third stream funding). The impressive track record of relevant engagements also offers opportunities with regard to second stream funding, as research councils such as NWO specifically consider the societal relevance of project proposals. This means that there is opportunity to grow and to further diversify the unit's activity portfolio.

### **Viability**

It took the committee some time to gain an understanding of the rather complex organisational structure of the University of Twente in general and of MIEn in particular. MIEn is a rather virtual organisation, as it is situated in between five strategically and financially self-contained departments, as one of the eight spearheads of IGS. A tell-tale sign of this 'mosaic'-like construction is that MIEn does not show up in organisational charts, nor does it have its own website. Cross-unit collaboration (in the form of joint publications or co-supervised PhD candidates) is supposedly what makes the unit greater than the sum of its parts, but otherwise there is really not much in common among the departments. During the discussions and interviews it became clear that there is no official leadership structure; coordination is rather informal and specific. The relative lack of coherence was a key theme during the interviews, and it appeared that many staff members did not fully understand themselves, for example, whether MIEn is a group or a programme, and the significance of this distinction. This situation signals an opportunity for better, more clearly articulated leadership and structuring.

While the interview with the dean and the IGS leadership made it clear to the committee that the faculty and research institute recognise the importance of the topic of innovation and entrepreneurship in a network perspective, it is not apparent that MIEn's current organisational structure adds to the academic quality or societal relevance of the research. In order to sustain and improve the viability and the vitality of the unit, a better articulation of the unit's structure is a first requirement. One option to better position and manage the unit at faculty level would be to reconfigure, align and possibly better integrate the institute spearheads and the department structures. Another is to introduce more independent, visible and transparent leadership of the spearheads. This would enhance the clarity of the unit's governance, the transparency of the resource allocation processes and internal funding mechanisms, and the creation of (minimal) research strategy development and planning processes that are lacking at present. Such a restructuring should also serve the purpose of better connecting entrepreneurship and innovation researchers to other researchers in sociology, psychology, education, arts, engineering and economics in order to truly address the multidisciplinary dimension of MIEn's research topics.

Strategic planning is another aspect that might be improved, as the strategies mentioned in the self-evaluation report seem quite generic and unambitious. Dedicated research and

resource planning does not take place at the level of MIEn, and a strong vision and shared strategy for the unit as a whole are currently missing. The committee believes that MIEn has a real potential to evolve towards excellent, world-class research, but this requires a thorough (re)consideration of the current and intended position within Europe and globally in the various MIEn research fields explicitly taking into account a network perspective.

The development of a clear organisational structure and coherent strategy is all the more pressing because of the (financial) difficulties that the faculty faced in the past years and will continue to face over the coming period. The number of support staff has been reduced, thereby increasing the administrative burden on researchers. At the same time, high profile academic staff have been lost and not replaced because of the hiring freeze. The committee notes that attracting new talent will be critically important to ensure future viability. It agrees with the observation in the SWOT-analysis that, when it comes to talent recruitment and retention, geographical position is a challenge for a relatively small institution that is not located in a major city. But, this problem is not unique to Twente and promising steps towards the internationalisation of the research staff have already been taken, as is evident from the recruitment of some talented young researchers from outside the Netherlands. The growing number of (non-Dutch) PhD candidates and the professionalization of the PhD programme are also very important factors, which to some extent help to alleviate a reduction in staff but – more importantly – are critical to maintaining research productivity and culture. Finally, the committee notes that the University of Twente is not alone in its reliance on dwindling government funding; many universities in other European countries face a very similar problem. The shift towards bringing in funding from external sources is sensible and indeed necessary, but may change the nature of the research that can be conducted.

### **PhD programme**

MIEn hosts standard PhD candidates who are employed by the university as well as contract PhDs who are externally or internally funded but not employed, usually these are foreign scholarship PhDs or PhDs who are employed elsewhere. Standard PhD candidates work on predefined projects, while contract PhDs typically choose a research subject of their own interest. Standard PhDs are usually graduates of the one-year master's programme in Business Administration at UT (as there is no two-year research master's programme) and are appointed for a period of four years. Female PhD candidates are a minority (22%).

Over the review period the total number of PhD candidates (standard plus contract) has almost tripled, from 12 in 2008 to 32 in 2014, which is an impressive accomplishment. A total of 29 PhD theses were completed. Out of the 23 standard PhD candidates who started their projects between 2006 and 2010, 17% graduated within four years. After seven years, 52% of the PhD candidates had completed their projects, while 26% was not yet finished and 22% had dropped out. Lead times for MIEn's standard PhDs are longer than the Dutch national average (5,0 years) and the average for UT as a whole (4,8 years) in 2010. The completion rate (78%) was slightly better than the Dutch average (75%).

In the previous review period, MIEn set the goal of professionalising its PhD education. In this respect major progress has been made, particularly through the establishment of the Twente Graduate School (TGS) in 2009 and the introduction of a university-wide PhD policy in 2014. TGS is formally in charge of registering and monitoring of PhD candidates via the digital ProDoc system, and forms the umbrella structure for 19 PhD programmes at UT. One of these programmes is the four-year PhD programme in Innovation and Entrepreneurship (I&E), which is linked to MIEn. The newly introduced selection and supervision procedures are expected to improve lead times and completion rates.

The committee found that PhD education is well organised and support of the students is exemplary. Within three months after the start of each PhD project, a training and supervision plan (TSP) is drawn up and entered in ProDoc. This document contains details regarding the supervision and training of the PhD candidate. Supervision takes place in teams consisting of (at least) the main supervisor (a full professor, 'promoter') and a second ('daily') supervisor. Six to nine months after the start of the project, a 'qualifier'-exam takes place. During a public scientific meeting a committee consisting of the promoter, daily supervisor(s) and an external professor assesses the progress of the PhD candidate. Following this qualifier a first appraisal interview takes place in which the promoter makes a formal go/no-go decision, with the possibility of a three-month improvement period. Two negative qualifiers/appraisals lead to termination of the project. After a go-decision, appraisal interviews take place annually for the remainder of the appointment. PhD candidates have to complete a tailor-made 30 EC course load consisting of generic skills courses ( $\pm 15$  EC) and subject specific courses ( $\pm 15$  EC). Courses can be taken at TGS (MIEn offers one particular course within TGS) or elsewhere, which means that PhD candidates learn across departmental and even university boundaries. Standard PhD candidates usually have teaching duties, which amount to a maximum of 10% of their appointed time. The committee was pleased to learn that PhD candidates are given the opportunity to obtain a teaching certificate ('BKO') as part of their PhD appointment.

During the site visit the committee was informed that article-based dissertations are the norm (although monographs are still allowed). These consist of at least four articles that are either in the review process by the time of the defence, or already published in good journals. The PhD candidates that the committee spoke with confirmed that they are encouraged to 'aim high' with regard to journals. Commonly, the supervision team and PhD candidate discuss which journals and conferences to target at the beginning of the year. PhD candidates have ample opportunity to participate in international workshops and conferences: usually, the budget of the chair groups/departments allows them to attend (at least) two conferences per year.

The self-evaluation report not only stresses the academic value of the PhD population, but also the societal relevance of PhD projects, many of which are funded by external parties. PhD candidates engage in 'science-driven consulting, compile company reports and benchmarks, and often initiate improvement processes at their target organisations'. The committee applauds that PhD projects are an integral part of engaged scholarship at MIEn and found that the PhD candidates it spoke to were very enthusiastic about this part of their work. The students are clearly engaged and share insight and experience across the boundaries of their respective disciplines. A recent PhD networking initiative was partly dedicated to ways of 'valorising' research results. When asked what aspect of the PhD experience at MIEn could further improve, PhDs replied that they would like to extend such networking activities, possibly beyond IGS and even the University of Twente.

A little over one-third (35%) of the PhD candidates who graduated between 2006 and 2010 found employment in academia (mostly at the University of Twente). This percentage is more or less in line with the national average (30%). Half of the graduates go into industry, typically into consulting. Preparation for the labour market partly takes place in two TGS courses, during summer school panel discussions (TM/S department), and in (voluntary) courses on career development offered by the UT Center for Training and Development (CTD). Many of the PhD candidates the committee spoke with expressed the desire to remain at the University of Twente after graduation, which can be taken as an indication of their high appreciation of the research atmosphere. However, the common practice to hire one's own



PhD graduates could induce a certain amount of endogeneity, which may be harmful in a globalising world. In sum, the committee concludes that the PhD programme is a solid and well-developed operation, which encourages PhDs to learn across departments, both in informal ways and via more formal mechanisms.

### **Research integrity policy**

Like the other Dutch universities, the University of Twente adheres to the Netherlands Code of Conduct for Academic Practice (VSNU 2012), which provides guidelines on ethical attitude and behaviour for academic staff, and on the proper handling and storage of information and data. With regard to proper citation UT follows the advice of the Royal Netherlands Academy of Arts and Sciences.

The self-evaluation report stresses the importance of an open research culture, in which research integrity is given due attention and research results are frequently discussed amongst colleagues. Proper academic behaviour is reportedly stressed in all of UT's curricula, from the undergraduate to the PhD level. At the start of their projects, PhD candidates attend a mandatory workshop, in which the vice-dean of the BMS Faculty familiarises them with the VSNU Code of Conduct and challenges them with regard to the 'grey area' of academic research. The interview with the PhD candidates highlighted their familiarity with the integrity policy and the inclusion of its principles in their training and education.

University-wide measures to promote research integrity include the Committee for Scientific Integrity, which was established by the University Board to advise on integrity issues, and the implementation of a Scientific Integrity Complaints Procedure (2013). Two Confidential Advisers on behaviour and ethics function as low-threshold contact points for questions and complaints about (possible) violations. The BMS Faculty is the only faculty with a separate adviser for PhD candidates. As research at the BMS Faculty frequently deals with human subjects, there is also a faculty-wide Ethics Committee, which is involved in the design of research projects. The committee established that there were no ethical complaints concerning MIEn researchers during the review period.

Data storage and management is becoming increasingly important in the social sciences and is therefore a focal point within IGS. In anticipation of a university-wide policy, IGS has started DataLab, a support service for all UT researchers, which provides the infrastructure as well as consulting on how to store raw and processed data in ethically sound and safe ways. Courses on data management are available to PhD candidates.

### **2.3 Conclusion and recommendations**

MIEn has in many respects improved upon the results of the previous review. The volume of the output has increased significantly over the past six years, as did the scientific impact of the publications. The unit is more international than it was before, and the PhD programme has flourished as a result of growing PhD numbers and a new university-wide policy to improve PhD training and supervision. The focus on 'engaged scholarship' has produced very tangible results in terms of the societal relevance of the research. MIEn's research staff is sufficient in quality and entrepreneurial dynamism to make and sustain an impact on the local, regional and national entrepreneurial community, while its expertise also puts the unit in an ideal position to support the entrepreneurial ambitions of the University of Twente.

Yet, the unit has also experienced setbacks during the review period, especially as a result of the loss of key staff members and the hiring freeze of 2011-2013. Faced with these problems MIEn has not been able to come up with an ambitious vision or shared strategy to build towards further improvements and future growth. This is most likely a result of the rather loose, almost virtual structure of the unit. The committee believes that stronger cohesion, integration and synergy within the unit are prerequisites for further success. Increased attention to the unit's governance will enable MIEn to play a pivotal role within the faculty and the university as a whole, and sustain its viability. In short: the foundations are there, but in order to further develop the unit into an international point of reference in its various research fields and especially in the field of innovation and entrepreneurship, in a network perspective, investment in improving the unit's organisational and leadership strengths is highly advisable. This general advice can be broken down into the following recommendations:

- Show more ambition in terms of research quality. Increase the presence in top-tier journals and, hence, the top competitive arena in MIEn's research topics.
- Consider developing a journal list at the level of MIEn. Identify which journals and publishers you want to target and why, preferably choosing a wider focus than simply ISI impact. An internal journal list that synthesises ISI, ABS and other rankings may be most suitable for MIEn.
- Keep an eye on the balance between refereed journal publications and books. Journal articles are not the only output category that matters.
- More integration, coherence and synergy at the level of MIEn are necessary for growth. Come up with a realistic strategic plan in which you identify what you want to achieve as a unit and which steps are necessary.
- Identify best practices at benchmark institutes and use them to your advantage. The benchmark with Imperial College London that was conducted as part of this research review is a very good way to gain new insights and inspiration.
- A higher level of ambition requires an external orientation. Strengthen the ties with other departments and faculties within, and outside of, UT.
- The alignment between the spearheads and the departments' needs to be better articulated and the leadership of the spearheads needs more transparency and actionability.
- More and better integration of the spearheads and the departments is recommended, either by rescaling and resizing the department structures and increasing the integration of the spearheads into the departments or by more independent, visible and transparent leadership (increasing also the financial streams) of the spearheads.
- It is necessary to increase the efforts to acquire second stream funding, which is an indicator for academic quality. A good support structure at the Faculty level may prove crucial for successfully submitting proposals. Consider enlisting the services of a grant writer or professional liaison officer. Capitalise on your expertise in innovation and entrepreneurship by targeting 'top sector' funds.

## 2.4 Scores

Quality	Very good
Societal Relevance	Very good
Viability	Good

## Appendices



## Appendix 1: Curricula vitae of the committee members

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**Koenraad Debackere (chair)** is a professor of Innovation at the Faculty of Business and Economics of KU Leuven. His research has focused on the area of technology and innovation management and policy, the development of indicators for measuring the linkage between science and technology, the design and use of bibliometric indicators for science policy purposes and the role of entrepreneurial universities and academic spin-off companies in economic development. Since 1999, he is actively engaged in technology transfer activities as managing director of KU Leuven Research & Development and chairman of the Gemma Frisius Fonds (the venture fund) of the KU Leuven.

**Alain Fayolle** is a professor of entrepreneurship, the founder and director of the entrepreneurship research centre at EM Lyon Business School, France. His research interests cover a range of topics in the field of entrepreneurship. He has been (or still is) acting as an expert for different governments and international institutions (OECD, EC, UNIDO). Alain published thirty books and over one hundred and half articles in leading international and French-speaking journals. Among his editorial positions, he is notably an Associate Editor of *JSBM* and an Editor of two leading French-speaking journals. In 2013, Alain Fayolle got the 2013 European Entrepreneurship Education Award and has been elected officer of the Academy of Management Entrepreneurship Division (a five year commitment culminating with position as Chair of Division in 2016). In 2015, he has been awarded Wilford L. White Fellow by ICSB.

**Thomas E. Johnsen** is professor of Purchasing and Supply Management at ESC-Rennes School of Business, France. He joined ESC-Rennes in September 2014 from Audencia Nantes School of Management, France, where he was professor and head of the research axis 'Organisation & Value Chain Management'. He has also held academic positions at the University of Bath (UK), Jönköping International Business School (Sweden), and University of Southern Denmark. Thomas is currently associate editor of the *Journal of Purchasing & Supply Management* and associate partner of Aperitas: a Danish start-up company offering a sustainable supply chain management platform. He has been executive board member of the International Purchasing & Supply Education & Research Association (IPSERA) and was chair of the IPSERA 2013 conference at Audencia.

**Klaus Nathusius** is managing director and general partner at GENES GmbH Venture Services, the first German Equity Investment Management Company founded in 1978 by Nathusius. Nathusius is one of the pioneers of venture capital financing in Germany and in 1988-1989 he was chairman of the European Venture Capital Association EVCA (European Private Equity and Venture Capital Association) in Brussels. After receiving a PhD from the University of Cologne in 1978 he was visiting lecturer on the subject of business creation at the universities of Cologne, Dortmund and Kassel. Furthermore, he was a visiting professor for start-up financing at the Vienna University of Economics. Since 2001 he is honorary professor of Entrepreneurship at the University of Kassel. From 2002 to 2005 he was responsible for the construction of the START network for Intra- and Entrepreneurship. In addition, he was from 2003 to 2007 a lecturer (and since then honorary professor) at the University of Göttingen.

**Vlad Vaiman** is an associate dean and professor of International Management at California Lutheran University and a visiting professor at several premier universities around the world

Vaiman has published three very successful books on managing talent in organisations – *Smart Talent Management: Building Knowledge Assets for Competitive Advantage*, *Talent Management of Knowledge Workers: Embracing the Non-Traditional Workforce*, and *Talent Management of Self-initiated Expatriates: A Neglected Source of the Global Talent Flow* – as well as a number of academic and practitioner-oriented articles in the fields of talent management and international HRM. Vaiman is a founding editor of the *European Journal of International Management*, an ISI-indexed academic publication.

## Appendix 2: Explanation of the SEP scores

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The Standard Evaluation Protocol 2015-2021 asks review committees to assess three criteria:

- Research quality:
  - Level of excellence in the international field
  - Quality and Scientific relevance of research
  - Contribution to body of scientific knowledge
  - Academic reputation
  - Scale of the unit's research results (scientific publications, instruments and infrastructure developed and other contributions).
  
- Relevance to society:
  - quality, scale and relevance of contributions targeting specific economic, social or cultural target groups;
  - advisory reports for policy;
  - contributions to public debates.

The point is to assess contributions in areas that the research unit has itself designated as target areas.

- Viability:
  - the strategy that the research unit intends to pursue in the years ahead and the extent to which it is capable of meeting its targets in research and society during this period;
  - the governance and leadership skills of the research unit's management.

Category	Meaning	Research quality	Relevance to society	Viability
1	World leading/excellent	The unit has been shown to be one of the most influential research groups in the world in its particular field.	The unit makes an outstanding contribution to society	The unit is excellently equipped for the future
2	Very good	The unit conducts very good, internationally recognised research	The unit makes a very good contribution to society	The unit is very well equipped for the future
3	Good	The unit conducts good research	The unit makes a good contribution to society	The unit makes responsible strategic decisions and is therefore well equipped for the future
4	Unsatisfactory	The unit does not achieve satisfactory results in its field	The unit does not make a satisfactory contribution to society	The unit is not adequately equipped for the future





## Appendix 3: Programme of the site visit

### 3 February 2016, day 1

12:00 – 12:30 RAV 1247	Arrival	Informal, arrival of Committee members with light lunch
12:30 – 14:30 RAV 1247	Committee meeting	Committee
14:30 – 15:15 RAV 1247	Introduction to the programme	<ul style="list-style-type: none"> <li>• Prof. Peter Paul Verbeek, vice dean Faculty of BMS</li> <li>• Prof. Aard Groen, research leader IGS INN&amp;ENT</li> <li>• Dr. Rainer Harms, editor of the self-evaluation report</li> </ul>
15:15 – 16:00 RAV 1247	Pillar 1: Creation of I&E in networks	<ul style="list-style-type: none"> <li>• Prof. Aard Groen, Chair for Innovative Entrepreneurship</li> <li>• Prof. Petra de Weerd Nederhof, Chair for Organization Studies and Innovation, and Department Head of NIKOS</li> <li>• Prof. Tanya Bondarouk, Chair for Human Resource Management, dept. head Human Resource Management</li> <li>• Dr. Rainer Harms, associate professor Technology Entrepreneurship</li> <li>• Dr. Sjoerd van den Heuvel, assistant professor HRM</li> <li>• Dr. Jeroen Meijerink, assistant professor HRM</li> <li>• Dr. Isabella Hatak, associate professor Strategic Entrepreneurship</li> </ul>
<b>Short break</b>		
16:15 – 17:00 RAV 1247	Pillar 2: Management of Innovation networks	<ul style="list-style-type: none"> <li>• Prof. habil. Holger Schiele, chair for Technology Management – Innovation in Purchasing, Production and Logistics, dept. head Technology Management and Supply</li> <li>• Prof. Celeste Wilderom, chair for Change Management, dept. head Change Management and Organizational Behaviour</li> <li>• Prof. Rezaul Kabir, professor of Corporate Finance and Risk Management, dept. head Finance &amp; Accounting</li> <li>• Dr. Erwin Hofman, assistant professor Innovation</li> <li>• Dr. Xiaohong Huang, assistant professor Finance and Risk Management</li> </ul>
17: 00 – 18:30 RAV 1247	Committee meeting	Committee

### 4 February 2016, day 2

09:00 – 09:45 RAV 1247	IGS	<ul style="list-style-type: none"> <li>• Prof. dr. Kees Aarts, former scientific director IGS</li> <li>• Nienke Nijenhuis, communication advisor</li> </ul>
09:45 – 10:30 RAV 1247	TGS (Twente Graduate School)	<ul style="list-style-type: none"> <li>• Prof. Petra de Weerd-Nederhof, former head of TGS and academic advisor TGS</li> <li>• Maurice Bouwens, policy advisor UTwente</li> <li>• Dr. Paul van Dijk, head of TGS</li> </ul>
10:30 – 11:15 RAV 1247	Support staff	<ul style="list-style-type: none"> <li>• Jacqueline Weppelmann, controller</li> <li>• John Winter, HR manager BMS</li> </ul>

<b>Short break</b>		
11:30 – 12:15 RAV 1247	PhD students	<ul style="list-style-type: none"> <li>• Anna Priante</li> <li>• Raja Singaram</li> <li>• Jorrit van Mierlo</li> <li>• Milana Korotka</li> <li>• Marcella Hoogeboom</li> <li>• Maarten Renkema</li> </ul>
12:15 – 12:45 RAV 1247	Discussion with the Dean	<ul style="list-style-type: none"> <li>• Prof. Theo Toonen, dean BMS</li> </ul>
12:45 – 14:00 RAV 1247	Committee meeting	
14: 00 – 14:30 RAV 1247	Presentation of committee's preliminary impressions and lunch	Committee + chairholders + dean BMS

## Appendix 4: Quantitative data

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*Table A: Research staff (SEP D3a)*

Research staff	2008		2009		2010		2011		2012		2013		2014	
	fte	n	fte	n	fte	n	fte	n	fte	n	fte	n	fte	n
Scientific staff <sup>1</sup>	8,8	26	10,9	33	11,7	34	10,0	33	7,8	29	6,0	24	8,9	31
Postdocs <sup>2</sup>	3,9	10	3,8	10	5,2	16	5,4	16	2,6	10	1,3	4	1,4	4
PhD-candidates <sup>3</sup>	6,6	12	10,1	17	12,0	24	14,3	26	14,5	26	12,4	26	15,1	32
<b>Total research staff</b>	<b>19,3</b>	<b>48</b>	<b>24,8</b>	<b>60</b>	<b>28,9</b>	<b>74</b>	<b>29,7</b>	<b>75</b>	<b>24,8</b>	<b>65</b>	<b>19,7</b>	<b>53</b>	<b>25,4</b>	<b>67</b>

<sup>1</sup> includes full professors, associate professors, and assistant professors.

<sup>2</sup> includes researchers.

<sup>3</sup> includes standard PhDs (employed) and contract PhDs (externally or internally funded but not employed).

Table C: Funding (SEP D3c)

	2008		2009		2010		2011		2012		2013		2014	
<i>Funding:</i>	<b>fte</b>	<b>%</b>	<b>fte</b>	<b>%</b>	<b>fte</b>	<b>%</b>	<b>fte</b>	<b>%</b>	<b>fte</b>	<b>%</b>	<b>fte</b>	<b>%</b>	<b>fte</b>	<b>%</b>
Direct funding	8,1	42,9	15,8	65,3	17,36	61,6	18,72	64,7	17,31	71,9	12,35	65,2	16,6	67,4
Research grants	0	0	0	0	0	0	0	0	0	0	0	0	0,9	3,7
Contract research	10,67	56,5	8,41	34,7	10,67	37,9	10,09	34,9	6,46	26,8	6,39	33,7	7	28,4
Other	0,13	0,7	0	0	0,13	0,5	0,13	0,4	0,29	1,2	0,2	1,1	0,13	0,5
<b>Total funding</b>	<b>18,9</b>	<b>100</b>	<b>24,21</b>	<b>100</b>	<b>28,16</b>	<b>100</b>	<b>28,94</b>	<b>100</b>	<b>24,06</b>	<b>100</b>	<b>18,94</b>	<b>100</b>	<b>24,63</b>	<b>100</b>
<i>Expenditure:</i>	<b>k€</b>	<b>%</b>	<b>k€</b>	<b>%</b>	<b>k€</b>	<b>%</b>	<b>k€</b>	<b>%</b>	<b>k€</b>	<b>%</b>	<b>k€</b>	<b>%</b>	<b>k€</b>	<b>%</b>
Personnel costs	1550,0	86,2	1885,0	85,9	2187,8	85,9	2071,6	85,5	1607,1	85,1	1242,9	85,0	1644,1	85,1
Other costs	248,7	13,8	308,9	14,1	359,1	14,1	351,0	14,5	281,3	14,9	219,6	15,0	287,4	14,9
<b>Total expenditure</b>	<b>1798,7</b>	<b>100</b>	<b>2193,9</b>	<b>100</b>	<b>2546,8</b>	<b>100</b>	<b>2422,6</b>	<b>100</b>	<b>1888,4</b>	<b>100</b>	<b>1462,6</b>	<b>100</b>	<b>1931,5</b>	<b>100</b>