The Panel was asked to assess research conducted at the Units of Assessment in comparison to research conducted in internationally recognized units all over the world in the field in question. The assessment period was 2005–2010. The Assessment Criteria were: Scientific Quality, Scientific Impact, Societal Impact, Research Environment, and Future Potential. The Assessment Scale was: Outstanding International Level (5), Very Good International Level (4), Good International Level (3), Fair International Level (2), and Poor International Level (1). In addition to assigning a numerical rating and preparing a written statement on each of the Assessment Criteria, the Panel was asked to provide an overview of the Unit as well as recommendations for the future.

The Panel was also invited to give more general comments on issues that it considered important. These can be found in the beginning of this Report.

The detailed guidelines for carrying out the Assessment were defined in the Terms of Reference Document, which is available on TUT’s website. The Site Visit Week took place in June 2011.
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GENERAL COMMENTS

The panel appreciates TUT’s intentions to develop a world class research university. We are impressed by the administration’s commitment to organize the extensive assessment with the aim to achieve the university’s goals.

In the departments examined, the panel finds commitment for becoming a world class research institution at all levels. The panel finds vibrant and energized leadership, collaborative groups of researchers, and research outputs with high societal impact predominantly in national industry and public sector projects. However, the panel considers that many staff have the potential to extend their reputation internationally with appropriate university support.

We also identify areas of improvement. There is variety in the clarity in the departments’ research mission statements and how they link to the university’s mission. We sense a misalignment in terms of research outcome expectations and investments in research environments. This can be addressed at least partially by developing a system of funding core leading edge research. Such a system would be expected to exist in an international research university. The system would establish an internal university fund for supporting programmatic, longer-term research activities targeted for core areas particularly for achieving higher rates of international top level publications. The system would also support a sabbatical system that would reward research active faculty. The panel also recommends expanding the university level bonus system in terms of monetary impact and increasing the points given for doctoral dissertations. In terms of external funding, the university should help develop supporting policies encouraging longer term industry and public sector projects including dedicated time for article writing. With these and other improvements, the university’s research environment would become competitive with other world class research universities and help attract and retain capable international faculty.

All areas examined by the panel have identified the importance of international networks and made progress in internationalization. However, the common weakness is that the networks have not yet resulted in productive research collaborations with international scholars (i.e., publications with international scholars in top journals). To remedy this weakness, support from the university level is needed in terms of resources, communication, and visible recognition to increase international collaboration. Targets should be set for international faculty appointments, and short- & long-term visits to TUT; and short-long-term visits to international top universities. Release time from teaching is needed to engage in inter-university collaborations.

Regarding the backgrounds of faculty members, the panel notes that many faculty members come from TUT itself. The panel feels that the practice of hiring TUT’s own graduates reduces the university’s opportunities to link itself more deeply in national and international networks. The panel senses that to recruit and retain high caliber international talent, the
university might need to institute more flexibility in salary negotiations. TUT should also consider endowments and sponsorship for establishing additional professorships.

The panel is highly encouraged by the plans to adopt tenure system university-wide. At this time, it is vital to clearly communicate the university’s expectations regarding tenure system and career paths. The panel encourages the university to develop criteria for evaluating applied research units that might be somewhat different from more basic research units. Besides the traditional metrics to assess basic research, spin-off companies and expert roles in industry should be considered.

The panel finds a need to develop a more formal annual assessment to measure research accomplishments and set target expectations including preferred target journals in different focus areas. Such an assessment will also contribute to the development of a system for recognition and appreciation for research accomplishments. Such an assessment may also help to improve the institutional level responses to research opportunities. Currently, there appears to be a lack of a system for cohesion, awareness, and responding to research opportunities across TUT.

The panel finds a strong collaborative culture at the departments of the Faculty of Business and Technology Management which inspires doctoral students. However, this is not enough. Faculty of Business and Technology Management is encouraged to create a research forum for doctoral and post-doctoral students across the research groups at the level of Faculty. There should be more resources allocated to offer common Ph.D. courses across all the faculty’s departments. The doctoral education requires specialized methodological courses that could be offered in collaboration with other faculties, as well as via collaboration with international partners. Resources are also needed to allow release time for the supervision of doctoral students. At the Faculty of Business and Technology Management, there is also a need to invest in research infrastructure such as simulation tools, statistical packages, and digital databases containing relevant research articles.

Particularly because TUT is not organized in the form of schools and therefore there is no business school as such, the panel sees a need for greater collaboration within the faculties at TUT as well as within the Faculty of Business and Technology Management. The departments under the Faculty of Business and Technology Management already collaborate on research projects and this is highly encouraged in the future. The panel is concerned with the vulnerability of Pori’s IMEU unit and encourages closer collaboration between the Pori’s IMEU unit and the Department of Industrial Management, and/or between the units in the Pori University Consortium.

In general, we are impressed by the enthusiasm, vigor, and commitment to research which is particularly exhibited by the young leadership of Department of Industrial Management and Department of Business Information Management and Logistics. However, the panel finds the departmental and research leaders to be overburdened by responsibilities. Some of the burden can be eased with the delivery of support services at the university level. We also
encourage the university to organize research development training for research leaders to generate more efficiency and effectiveness in executing research.

In the units examined, there is a great variety of research performance and potential. Below we identify areas and make suggestions that can support TUT’s ambitions to become a leading edge research university.

PS. The “Measures to Improve Performance” section is provided for each unit being assessed. We provide “Suggestions for Improvement” in each criteria section that is directly related to the criteria.
DEPARTMENT OF BUSINESS INFORMATION MANAGEMENT AND LOGISTICS

1 Overview

The TUT-Business Information Management and Logistics unit is a small department with 6 professors and 40 staff members involved in research and education. The department consists of two distinct groups: one in the area of business information management (BIM) and the other in transport systems. The domain of BIM is diverse bridging the disciplines of industrial management and computer science and focusing on themes such as service productivity, knowledge management, intellectual capital, innovation and organizational change, business intelligence, enterprise information systems, and media management. The domain of the transport systems research group includes traffic and transport planning, management, operation, and engineering and its interaction with land use and urban planning. The department is in the process of establishing two research centers: one in the area of business information management and the other in the area of logistics. The department has already collaborated with other groups at TUT and made connections with national and international scholars. The department has very strong industry and public sector contacts that have been a source of funds for research projects. Over the last years, the research expenditure is averaging just under million (avg 864,000 million) Euros per year, with the most coming from Tekes and public funding sources. The staff also conducts expert tasks in society and business.

2 Scientific Quality of the Unit’s Research

2.1 Statement on Research Quality

Research outcomes comprise primarily of conference papers, books, book chapters, reports, and public presentations. There is a great variety among the senior staff regarding research productivity. Recently, there has been a notable emphasis on refereed journal publications although so far the success has been varied and somewhat low overall in the department. The BIM area has began to publish in international refereed journals but so far the publication count by faculty is low in high impact international journals. The citation count is low as well. The weakness in refereed journal publications is particularly great in the Transport Systems group. As opposed to main academic journals, the main channels for publications are reports and conference proceedings. The department has recognized the lack of refereed publications and efforts are taken to address this weakness. While some domestic collaboration is evident, international collaboration on actual research projects is relatively weak. There is an absence of funding from the Academy of Finland.

2.2 Rating: Good International Level (3)
2.3 Suggestions for Quality in Research

- Continue to build international networks as this would help open doors to the Academy of Finland and EU funding as well as lead to top journal publications.
- Logistics as a research area should have a higher profile as it can be a basis for quality and relevant research output in the future.
- Recruit experienced researchers (e.g., professorship) in core transport area and in emerging information logistics area with international links that broaden the research scope and methodological approaches.
- Secure a resource pool for article writing for highly ranked journals.
- Stronger methodological preparation for doctoral students in the BIM and Transport Systems groups with emphasis to develop skills in latest statistical techniques and simulation tools. Strong methodological skills is a highly valued asset particularly in competition with related groups in other technical universities and schools of economics.
- Establish a policy that externally funded projects include a minimum stay for doctoral students and post docs (from 6 months to 1 year) at leading international research universities.
- Institute a policy that thesis opponents are international scholars preferably with important editorial positions to improve the department’s and doctoral students’ international networks.

3 Scientific Impact of the Unit’s Research

3.1 Statement on Scientific Impact

The BIM group has a short history and is gradually beginning to achieve some national recognition as well as opportunities internationally for its work in issues of contemporary organizational problems particularly in service productivity and intellectual capital development and management. However, BIM’s broad and diverse research scope is making the reputation building particularly challenging. With its long history, the Transport Systems group has established itself nationally as a research environment developing and applying advanced transport planning methodology to the development of transport systems in compliance with societal goals and regulations. The two small groups operate currently as two distinct entities with their own research cultures.

BIM faculty is active in reviewing, editorial boards, conferences, and professional committees. We also find evidence of faculty serving as a keynote speaker in an international conference and serving as a chair of international conferences. We find evidence of at least one paper having received journal recognition for excellence. In the BIM group, half of the Ph.D.s are placed in educational institutions including Aalto University. However, the Transport Systems group has a low graduation rate for doctoral students.
The scientific impact of research beyond national borders appears to be low. In the public and industry sector projects, there seems to be a significant demand for national publications and reports as opposed to international academic publications. The industry sector projects are often short in duration and heavy in day to day management demands that negatively influence the time available for academic publication. The panel finds a weak international publication record especially in the Transport Systems group.

The scientific impact may also be reduced because of the lack of depth in methodologies and the low use of some methods such as simulation. Particularly in the Transport Systems group, there appears to be a demand to diversify and strengthen the methodological approaches.

The panel was encouraged by several aspects that should allow the department to increase its scientific impact. The department has set clear expectations towards high quality publication outlets. The potential scientific impact is strengthened by excellent access to research sites as it allows important and relevant research with unique access to data sources.

3.2 Rating: Fair International Level (2)

3.3 Suggestions for Scientific Impact of Research

- Recruit experienced researchers (e.g., professorship) in core transport area and in emerging information logistics area with international links to increase international visibility, increase networking opportunities, and significant international reputation gain.
- Establish a shared and specific research focus in the BIM group in order to develop international reputation.
- Steps must be taken to increase the completion rate of doctoral students in the Transport Systems group. This is likely to require more resources devoted to doctoral student supervision.
- Establish policy that doctoral dissertations should be based on or comparable to 2-3 articles in international refereed journals.
- The department overall but particularly the Transport Systems group should strengthen its international publication rate.
- Look for opportunities to publish in and or edit special issues of high quality journals targeted for contemporary topics.
- Free academic time to allow journal article preparation in high quality refereed journals.
- Strive for organizing or having a greater leadership role in the field’s major international conferences (e.g., organize a workshop in the context of a major international conference).
• Integrate the Transport Systems and BIM groups via greater shared projects to develop the field of logistics and information logistics
• Particularly the Transport Systems group should seek closer collaboration with ICT related research groups at TUT and other research institutions

4 Societal Impact of the Unit’s Research

4.1 Statement on Societal Impact

Much of the impact in BIM and Transport Systems groups come from excellent networks with industry and governmental agencies. This is manifested by high visibility and active interactions with industry and the public sector. The substantial funding demonstrates the satisfaction of Finnish industry and the public sector with research process and results.

The Transport Systems group has shaped the evolution of the transport policy and the development of transport systems at the national, regional, and local level and developed the interaction between transport and urban planning. This is manifested in numerous research projects and as the role of policy advisor. The public media profile is high particularly in the Transport Systems group. The BIM’s broad agenda of research allows impact in many different industrial and public sectors. Research activities enable timely and relevant course offerings and connect students to real world problems. Research activities at BIM and the Transport Systems groups create a dynamic learning environment for students who are then highly sought out by industry. Particularly the BIM group has a sizable group of doctoral graduates working outside the university.

4.2 Rating: Very Good International Level (4)

4.3 Suggestions for Societal Impact of Research

• Both groups should maintain their high visibility and activity level in societal relevant areas

5 Research Environment at the Unit

5.1 Statement on Research Environment

The department enjoys a young, ambitious, and energized leadership who is committed and enthusiastic about improving research and aware that change is necessary. Personal networks exist with scholars in a number of international universities, but have not yet led to collaborations resulting in refereed journal publications. The department has a collaborative research climate although close collaboration across separate BIM and Transport Systems groups is not yet evident but the panel understands such collaboration is being planned. The department is one of the smallest departments at TUT and research time is constrained by
heavy teaching demands. The department has taken some steps to rationalize teaching. Preliminary efforts are in progress to systemize the doctoral education to improve quality and improve efficiency. The research environment also appears to have some gaps in tools, software, and digital journal access.

5.2 Rating: Good International Level (3)

5.3 Suggestions for Research Environment

- Continue change in research culture. Rewards needed at the department to encourage success in high quality journal publications
- Secure digital access to international journals in areas of research groups
- Secure longer term funding that allows continuity in research focus and high quality article writing
- International visits to department at all levels (e.g., FiDiPro program, short term visits); organize and participate in Nordic networks to take advantage of high visibility scholars visiting the Nordic countries to extend their visits to TUT
- Establish a regular research seminar including presentations by international scholars
- Institute a policy that thesis opponents are international scholars preferably with important editorial positions to improve the department's and doctoral students' international networks
- Integrate resources and leverage capabilities via shared projects between the Transport Systems and BIM groups
- Continue to rationalize teaching to free time for research

6 Future Potential of the Unit

6.1 Statement on Future Potential

The department has established a strong desire to improve research output and has taken a number of steps to achieve this goal. The department recently formulated a vision to achieve national and international recognition in the two groups of BIM and Transport Systems. The department’s vision is aligned with the university’s mission and serves important sustainability needs of the society in particular the Transport Systems group in emerging climate and environmental issues as well as in service productivity (e.g., elderly services). Both groups offer considerable future potential. The panel sees much potential in the joint efforts of BIM and Transport Systems in the area of logistics. These two focus areas of the department have complementary capabilities and are encouraged to join forces to generate higher scientific and societal impact in the area of information logistics.
6.2 Rating: Good International Level (3)

6.3 Suggestions for Future Potential

- The panel highly supports the department’s intention to strengthen the Transport Systems group by recruiting experienced researchers in transport systems and information logistics.
- Extend collaboration with other departments particularly Industrial Management, and for the Transport Systems group also with the departments in the Faculty of Built Environment and with groups with expertise in data analysis and modeling capabilities.
- Acquire specific simulation and data analysis software to fully exploit the research data available in the department.
- Exploit unique data sources to company operations and performance in order to differentiate the department from competitors.
- Secure longer term funding that allows continuity and high quality article writing.
- Establish policy that doctoral dissertations should be based on or comparable to 2-3 articles in international refereed journals.
- Exploit opportunities to share capabilities across BIM and Transport Systems groups on research projects.

7 Recommendations for the Future

7.1 Main Strengths and Weaknesses of the Unit

7.1.1 Main Strengths

- Motivated, enthusiastic and collaborative research climate.
- Leadership has a clear understanding of strengths and weaknesses.
- Excellent industry and public sector access and collaboration including industry based Ph.D.s.
- Satisfied staff.
- Shared vision being developed for BIM group and Transport Systems group.
- Nationally unique Transport Systems research group with public visibility.
- BIM group has well formulated development targets and some identified measures.
- In the BIM group, leadership and participation in international conferences on key focused areas.
- BIM group exhibits variety in methodological approaches.
7.1.2 Main Weaknesses

- Unbalanced senior professor resources
- Low publication rate per faculty in international highly ranked journals
- Small department with a wide range of research interest areas
- High dependence on short term outside funding particularly in the Transport Systems group
- Long term strategy execution challenged by the need to meet the short term industry needs
- Limited participation in the major academic society level conferences
- Vulnerable Transport Systems group
- Transport Systems group lacks a record of international publications and Ph.D. graduates
- BIM as a group is new and still maturing as an entity
- Transport Systems group lacks well formulated development targets and measures
- Lack of substantial funding from the Academy of Finland and EU.
- Funding currently nonexistent for publications not driven by industry
- Lack of depth in methodologies

7.2 Opportunities and Challenges

7.2.1 Opportunities

- Continue to generate strong demand for groups’ advice and skills with industry and public sector
- Leverage unique access to industry and public sector that provides leading edge problems, unique data sets, and the ability to implement and validate research findings and recommendations
- A unique window of opportunity to establish the first internationally known research group in the transport field in Finland
- Opportunities to develop strong methodological depth in research groups
- Opportunities to develop a better balance in research groups’ portfolios between industry and public sector driven versus academic research targeted for highly ranked journals

7.2.2 Challenges

- Window of opportunity to establish an internationally known transport and logistics group highly dependent on near term recruitment of experienced researchers
- Stronger international collaboration and networks
• Secure funding for research targeted for academic publications to balance the industry driven funding
• Finding the core area of research for building world class reputation
• Hiring and retaining qualified researchers with international connections

7.3 Groups that Stand Out
A number of distinct research groups in the department; each excellent in terms of industry and societal relevance and access; each has many strengths; the Transport Systems group has many strengths but also serious weaknesses such as its vulnerability.

7.4 Research Groups that have potential to become International Flagships
Both BIM and Transport Systems groups have potential to become flagships particularly if the groups collaborate in areas of logistics and information logistics, but there are many challenges as indicated earlier.

7.5 Measures to Improve Performance
1. Recruit experienced logistics researcher (e.g., professorship) with international links (a track record of complementary research approaches from what exists today in the department)
2. The department overall but particularly the Transport Systems group should strengthen its international publication rate.
3. Secure resource pool for article writing targeted at highly ranked international journals
4. The BIM group should establish a clear research focus to enable international reputation building
5. Stronger methodological preparation for doctoral students in the BIM and Transport Systems groups particularly develop greater knowledge in latest statistical techniques and simulation tools. Strong methodological skills is a highly valued asset particularly in competition with related groups in other technical universities and schools of economics
6. Steps must be taken to increase the completion rate of doctoral students in the Transport Systems group
7. Secure digital access to international journals in the research areas of the groups
8. Strive for organizing or having a greater leadership role in the field’s major international conferences (e.g., organize a workshop in the context of a major international conference)
9. International visits to department at all levels (e.g., FiDiPro program, short term visits); organize and participate in Nordic networks to take advantage of high visibility scholars visiting the Nordic countries to extend their visits to TUT
10. Establish a regular research seminar including presentations by international scholars
11. Institute a policy that thesis opponents are international scholars preferably with important editorial positions to improve the department’s and doctoral students’ international networks

12. Integrate resource and leverage capabilities via shared projects between the Transport Systems and BIM groups

13. Particularly the Transport Systems group should seek closer collaboration with ICT related research groups at TUT and other research institutions
DEPARTMENT OF INDUSTRIAL MANAGEMENT

1 Overview

The TUT-Industrial Management (TUT-IM) department has 8 professors (at the end of 2010) with the total staff of approximately 70 including 9 post-docs. The domain of IM includes managing profit oriented, value adding processes and operations in industrial organizations. The research component is conducted in the department's three research centers: Center for Innovation and Technology Research (CITER), the Cost Management Center (CMC), and the Center for Safety Management and Engineering (CSME). The centers' research areas are as indicated by their name. They vary in their history with the CITER as the most recent (initiated in 2003) and CSME as the most dating (initiated over 30 years ago). Over the last 6 years, the research expenditure (from external sources of funding) is averaging a million Euros per year, with an average 29.7% from industry over the last 6 years (peaking to 41% in 2005 and declining to 21% in 2010). The form of the research outcome of the department includes refereed articles, patents, software, and book chapters. The department has well established links to industry, which provide funds for research projects.

2 Scientific Quality of the Unit’s Research

2.1 Statement on Research Quality

The department’s research outputs include a variety of research types including refereed journals, patents, book chapters, editorial-ship, software, and books. Many of the CMC articles are based on "Interventionist management" accounting methodology. Other research includes organizational theory and international management, innovative behavior and competitive dynamics, and performance measurement. Noted also is the contribution in safety management on occupational accidents and fatal work-related diseases and the use of research by the ILO. The work in innovation management and technology forecasting has great potential given the hunger of the world community for nurturing innovation. The majority of publications are in refereed journals with modest impact factor, albeit some are published in high impact journals. The department has received some funding from EU and the Academy of Finland.

2.2 Rating: Good International Level (3)

2.3 Suggestions for Quality in Research

• Continue on the path of quality research in "Interventionist management" accounting methodology and safety management to the point of creating a name for the TUT-IM in this area.
• All research areas within TUT-IM should strive to publish more in journals with high impact factor
• TUT-IM may consider creating a "hub" for Innovation technology in Finland and the region. An open innovation hub would allow innovators to exchange ideas and share contributions. The hub could provide unique opportunities for longitudinal research.

3 Scientific Impact of the Unit's Research

3.1 Statement on Research Impact
The department has averaged one refereed article per member per year during the evaluation period although since 2009 the productivity has increased and averages closer to 2 refereed articles per member per year. The department distinguishes itself working closely with industry. The various groups within the department have developed focus areas that have helped them begin to develop national and international reputation. Notable is the interventional research in Cost Management that has received international recognition. However, the collaborative research networks – internally, nationally, and internationally – are still modest. The department hosted a number of conferences. Research staff has received international awards and is involved in journal reviewing, cooperation with other universities, and conference participation. The department shares its research/competences through post-doctoral employment by other universities.

3.2 Rating: Good International Level (3)

3.3 Suggestions for Scientific Impact in Research
• Continue to develop clear niche area(s) for each research unit (CITER, CMC, CSME),
• The department needs to be involved in International Projects (or European) with high impact. Within TUT, there are some seed projects with the BIM group.
• It would be beneficial to have a research leadership structure for each of the research centers to enable more efficient and effective execution of research projects.
• During project negotiations with industry, the TUT-IM department should include provisions for academic publications.
• Foster international collaboration in research through visiting scholars in centers' fields of research.
4 Societal Impact of the Unit’s Research

4.1 Statement on Societal Impact

The unit maintains a number of long-term research projects and programs. Notable are contributions of CSME in Finland and for the ILO - Guide for safety Management Publication and Occupational diseases with FIOH. CITER’s contributions in Management of Technology in general and technology forecasting, strategy, adoption and diffusion in particular are noted. Efforts are underway to seek greater collaboration in EU projects. CMC produces practical outputs which are much appreciated by local industry. Research projects span private and public sectors.

4.2 Rating: Very Good International Level (4)

4.3 Suggestions for Societal Impact

- Potential development of a tool for technology strategy by companies in the form of software.
- Executive MBA can be used as a tool for more collaboration with industries.
- Spread service through distance learning and Webinars.
- Establish a mechanism for disseminating research outputs (such as “interventionist research”) to the industrial community.
- Allow consultancy opportunities for staff members within limits as a service to the community - may even generate research opportunities (Examples include prototyping and testing of innovative gadgets/ tools/ devices)

5 Research Environment at the Unit

5.1 Statement on Research Environment

The department enjoys inspiring leadership, committed to research excellence, as well as a highly collaborative culture. The department appears to face problems in recruiting highly qualified researchers nationally and internationally as appointments are often from within. The department has deep research collaborations with Industrial partners/ organizations - public and private (Metso, Nokia, Sandvik, Bosch, Rexroth, ..., Tekes, CIMA). The panel finds the department’s collaboration with industry exceptionally deep. The department has secured access to unique data sources and research tools. The department has modest collaborative research networks internally and nationally. Researchers’ network to international organizations and companies is relatively modest. There are initiatives to host regional conferences such as EuroMot.

5.2 Rating: Very Good International Level (4)
5.3 Suggestions for Research Environment:

- Devise a mechanism for rewarding Ph.D. supervision such as release time from teaching.
- Current collaboration with TUT's technical departments (Mechanical & Materials Dept. as well as Signal Processing and Automation Science) could be the seed for much stronger, highly visible projects.
- There is high potential value from further investments in research tools, techniques, and methodologies. By nature, research activities in Industrial Management may not require expensive laboratory or physical facilities; however, tools such as simulation software and others are necessary to test the viability and applicability of new developed techniques and methodologies.
- Establish a program of visiting international speakers which may lead to further collaboration including joint publications in top refereed journals.
- Develop involvement with research journals, which may include reviewing, board membership, and special issues editorialship.
- Study the possibility of establishing your own journals in your niche areas of research.

6 Future Potential of the Unit

6.1 Statement on Future Potential

The department has built a strong foundation for future success and needs to maintain the momentum. There is a need for a clear research mission/ objective for each of the research centers. The missions lack specificity (as stated in reports provided to the panel). The department reports on "promising research directions" such as Financial Engineering, project and service industry, Marketing and International business; however it is not entirely clear whether these areas were identified based on a capability assessment or need assessment. These research directions also have some overlap with those of the Department of Business Information Management and Logistics suggesting value from joint collaboration between the two departments.

The department identified the young age of its senior researchers as a weakness but the panel considered this to be a strength. Departmental targets need be specific and quantified whenever possible. The department has established clear targets and a reward system for journal publications. This is a fine example of target quantification.

The panel assesses the strength areas of the department to be the CMC based on interventionist research methodology, CSME cooperative work with the ILO, and the CITER in innovation and technology strategies. These niche areas provide excellent fit for a
research-based technological university. If nurtured properly, they can contribute positively to TUT’s ambition to be at the leading edge.

6.2 Rating: Very Good International Level (4)

6.3 Suggestions for Future Potential

• Conduct an internal SWOT analysis and proceed from there to develop a departmental mission, goals and objectives, a road map that is compatible with TUT mission and objectives.
• Outcome of applied research projects – technical reports - should be disseminated to related organizations. It provides service, growth to the researchers, funds, and facilities.
• Develop a mentoring program for novice researchers
• Seeking research funds should be through a targeted program and an action plan.
• Consideration should be given to free research leadership for conducting their leadership role. The department chair appears to be burdened with too many tasks.
• Reward active researchers with a variety of incentives (monetarily, release from teaching, support conference attendance) as a percentage from research funds.

7 Recommendations for the future

7.1 Main Strengths and Weaknesses of the Unit

7.1.1 Main Strengths

• Specialty of the research centers within the department (subunits)
• Young motivated researchers who enjoy their research
• Youthful and enthusiastic leadership team
• Research supporting administration and department management
• pleasant research environment (students and researchers are happy)
• Involvement in practical, outcome oriented projects (leads to patents and tools for industry)
• Good balance between basic and applied research, and between teaching and research.
• Well established links with industry and the research addressing problems at the leading edge
7.1.2 Weaknesses

- Isolation, insufficient cooperation with other units within TUT, outside TUT, nationally, and internationally
- Lack of International research staff
- Modest experience in seeking EU and international funding

7.2 Opportunities and Challenges

7.2.1 Opportunities

With ever growing technological breakthroughs, TUT-IM is in a unique position to contribute in its three fields of research thrust (Accounting, Industrial safety, and Technology management). Specifically:

- CMC >>>> Interventional accounting Management,
- CITER >>>> Technology and Innovation Forecasting, Technology strategy, adoption and Commercialization.
- CSME >>>>> Service management, and Industrial Safety

- There is an opportunity for CMC, CITER, and CSME to provide a research focus that can lead to international impact for the department

7.2.2 Challenges

- Balancing the growing teaching and research demands
- Devising a mechanism to assign teaching graduate courses compatible with students’ plans for graduation without infringing on faculty’s research

7.3 Groups that Stand out

- Center for Safety Management and Engineering (CSME)

  The center has produced technical articles and established cooperation with the International Labor Organization (ILO) in the area of occupational accidents and fatal work-related diseases. The IM department can capitalize on the seed work for a much more in-depth analysis. The nature of research outcome should go beyond statistical analysis to the production of guidelines for Industry for greater societal impact

- Center for Innovation and Technology Research (CITER)

  The work of the group in the development of performance measures in R&D organizations as well as technology forecasting, innovation, and technology adoption may be considered a stepping stone for a TUT research park (hub), where the center may forecast technology ventures to innovators and entrepreneurs. The TUT research park can be a flagship and can attract venture capitalists willing to venture in new technologies. It is win-win situation for TUT and its researchers as well as Finland as a nation.
Cost Management Center (CMC)

The center has the notable distinction of using an interventionist methodology to conduct research. In essence, this involves researchers participating in practical problem solving in an industrial setting. This is an approach which fits well in a technological university aiming to be “at the leading edge”. The research is applied, of contemporary significance and impacts constructively on industrial society. It provides a niche specialism with the potential to generate important international research. Several high quality research journal publications have been produced and the work of the center has been recognized through a CIMA sponsored book to be published by Routledge later this year. The center therefore insures continued close connection with industry and the research outputs can also be directly fed into teaching and instructional texts.

7.4 Research Groups that have potential to become International Flagships

Below we make the case for international flagship recognition of CMC center. Given the recommendations provided in this report, the other two centers (CSME and CITER) have the potential to become International Flagships as well. The research topics being tackled are all of contemporary importance each in its niche identified earlier.

Case for an international flagship recognition of CMC:

This center has already established an impressive track record in industrial collaboration and research output generation. It is based on the use of an interventionist research methodology in the management accounting discipline. Although the approach has a long pedigree in business research its use in accounting is more novel. This gives the center a focus and experience that is unique in the research community.

Interventionist research is an excellent fit for a technological university pursuing an ambition to be "at the leading edge." It involves research centering on problems faced by managers in the real world. The researcher participates with them in constructing a solution to the problem. The solution is also tested out. Thus, by nature, the approach is relevant to issues of contemporary significance, involves close collaboration with industrial partners (a prominent feature of TUT activity) and generates prescriptions for practice. It can be used, to test and modify technical innovations, and/or create new management accounting tools. Additionally, the researcher is well placed to relate the development to existing academic knowledge and demonstrate how it can further that knowledge. These dimensions can form the basis for contributions in high quality international research journals.

The center has staff already experienced in the method and has demonstrated its potential by generating several good publications. Recognition of this emerging position as a research leader is already evident, not only in these publications, but also in the forthcoming publication of a book on the center’s experience by Routledge. This book was sponsored by one of the world’s leading accounting Institutes (CIMA). Finally, the research of the centre is also of benefit for teaching. Findings can be directly integrated in courses as examples and...
instructional case studies can be prepared. A successful teaching text has already been prepared from the center’s research.

7.5 Measures to Improve Performance
1. Invest in active researchers (hiring package, guaranteed summer employment, seed funded research).
2. Recruit and retain capable researchers (not necessarily from within) including international researchers.
3. Request Ph.D.s to have 2-3 papers as a condition for graduation.
4. Reward active researchers with a variety of incentives (monetarily, release from teaching, support conference attendance, percentage from research funds).
5. Tighten up the tenure criteria with more emphasis on the research component (Ph.D., Refereed papers, funds).
6. Consideration should be given to possible devising of a sabbatical program for tenured faculty and post-docs.
7. Continue/ initiate periodic seminars by researchers and industry collaborators (open to all).
8. Seek and encourage funded research (EU, Tekes). Seeking research funds should be through a targeted program and an aggressive action plan.
9. Hire/ Select a member who is a “go getter” for funded research (may be the Department chair).
10. Introduce cooperative research inter and intra the unit (Potential: IMEU and BIM).
11. Encourage collaborative research with other TUT departments.
12. Provide conducive research environment (access to research database, modern facilities and research tools, continuous encouragement) – Ex: iPAD to every researcher and connection to electronic libraries of leading journals.
13. Capitalize on the opportunities – identified earlier.
14. Increase collaboration with EU countries as well as the US universities and research centers.
15. Continue the collaboration with industry at all levels with possible offering of consulting services.
16. Capitalize on the executive MBA program for recruitment and possible funded research.
17. Continue reaching for all graduates of your program (create an alumni newsletter, website, …).
18. Introduce an award system for Ph.D. supervision and release time from teaching in favor of research.
19. Benchmark periodically with the best in research (e.g., the UK, US).
20. Seek cooperation with “who is who” in the research area through programs for international speakers and international visitors programs.

21. TUT-IM may consider creating a "hub" for Innovation technology for Finland and the region. This would be an open innovation hub where innovators may exchange ideas and share contributions and could serve as a laboratory for longitudinal research.

22. To help realize the full potential of CMC consider establishing a small international panel for guidance and collaboration.
INDUSTRIAL MANAGEMENT AND ENGINEERING UNIT (IMEU) – TUT PORI CAMPUS

1 Overview

The TUT Pori Campus operates in the University Consortium of Pori together with university units of Aalto University, University of Turku, and University of Tampere. During the period 2005–2010, IMEU-Pori had one professor, two lecturers and one part-time docent as teaching staff. Research in the unit has been conducted by doctoral students, as well as by master and licentiate level students and partner universities. The IMEU-Pori offers three specialized research areas:

1. Leadership and Management object ontology research (Evolute)
2. Project management
3. Supply chain and network research

Under this umbrella many management areas are researched including strategic management, human research management, project management, knowledge management, supply chain management, and executive and decision support systems.

The main outputs of the unit’s research are based on master theses, licentiate theses and doctoral dissertations, which totaled 82 master theses, 5 licentiate theses and 7 PhD dissertations during the period 2005–2010. The nature of research is the applied side through funded projects with Tekes, ESR, and Industry. Industry has been the largest source of funds. TUT Pori Campus funding is substantial compared to other TUT units examined by Panel 3. Nevertheless, the panel was concerned about the unit’s future. The unit could be vulnerable if it continues its reliance on a single professor, without a greater focus, and without a greater integration with other TUT departments and/or units within the University Consortium of Pori. The unit recently appointed a second professor (Fall 2010).

2 Scientific Quality of the Unit’s Research

2.1 Statement on Research Quality

The IMEU’s research achievements are mainly based on funded applied research projects. Significant part of the unit’s achievements is based on Evolute Research. Other research areas include research in the project management area. The unit has published research in refereed journals with low impact factor and few citations. The majority of these research are administered/ advised by one professor.

2.2 Rating: Fair International Level (2)
2.3 Suggestions for Quality in Research

- Instill a condition for Ph.D. graduation to have 2-3 articles in refereed/archival journals.
- Small number of researchers with large number of students and possibly large teaching load is affecting the research quality. The unit needs to take remedial actions: increase research staff, reduce teaching load (release time), reward funded research and publications.
- Research leadership and guidance required for early researchers (possibly with the assistance of TUT’s department of Industrial management or other units within the university consortium of Pori)

3 Scientific Impact of the Unit’s Research

3.1 Statement on Research Impact

The unit recognizes its limitations in research impact. There is evidence of building international networks and conference participation, but this has not yet led to the recognition of the research work in the academic circles such as keynote speeches, invited papers, editorial board memberships, etc. The research work is appreciated by industry and practitioners through the continued funding by Tekes and Industry.

3.2 Numerical Rating: Fair International Level (2)

3.3 Suggestions for Increased Research Impact

- Nurture the emerging research areas of potential impact (project management, safety, and leadership)
- Potential cooperation with US institutions in this regard (e.g. Technological Leadership Institute at the University of Minnesota)
- Strive for impact driven cooperation with International research organizations
- Target high impact journals for publications

4 Societal Impact of the Unit’s Research

4.1 Statement on Societal Impact

The unit’s main research impact is through the master theses. A valuable impact of the research is that students often get their first permanent position in one of those companies they have worked with. Hence, they have a chance to apply their research outcome. The research projects at IMEU-Pori are action-oriented and diverse. The unit has developed significant collaboration with industry.
4.2 Rating: Good International Level (3)

4.3 Suggestions for Societal Impact

• Industrial contacts provide an opportunity to capitalize on for research, publications, and funding.
• Exploit research areas such as safety for possible high societal impact.
• Provide open service to the industrial society in areas of specialty.
• Disseminate graduate theses to “relevant” communities/society (website, tie-up with industry)

5 Research Environment at the Unit

5.1 Statement on Research Environment

The unit’s research environment is weakened by the small number of researchers (total of 5). The small number of researchers does not provide a critical mass to establish an international reputation. The research laboratory also appears to be inadequate to accommodate sufficient numbers of researchers. However, there appears to be good support from the technical staff of Pori TUT as well as from the Pori University Consortium library. From a global perspective, Evolute Research has created a strong and wide international research network, the Evolute Research Academy (ERA). At present, the total number of universities and university departments that have joined and are with the ERA as Evolute Research Center members (ERC) is 15, and many new universities are interested in joining. The research environment is conducive to the applied research especially in issues related to International management. However, it is not clear if the environment is primarily used for research or more for education. High teaching load may be taking a toll on the research activity within the unit.

5.2 Rating: Good International Level (3)

5.3 Suggestions for Research Environment

• Collaborate more with TUT-Department of Industrial Management (TUT-IM), especially in project management and Evolute areas of research. Alternatively, collaborate with other units in the University Consortium of Pori
• The ERC base should be utilized for generating research topics
• Capitalize on the industry relationship to generate research topics of applied nature
• For the unit’s research activity to survive, it is necessary to recruit new experienced researchers that can complement current and future activities.
• Rationalize teaching activities to free time for research.
6 Future Potential of the Unit

6.1 Statement on Future Potential
IMEU has excellent possibilities to serve society, industry, and commerce; due to the nature of its applied research especially in project management, leadership and management object ontology. The integration of IMEU in a consortium of other universities provides an excellent chance for a good practical research future. There is also potential for greater integration with TUT’s Department of Industrial Management.

6.2 Rating: Good International Level (3)

6.3 Suggestions for Future Potential
• Tie-up the education component to the research component whenever feasible
• Enlarge the research influence in the unit’s mission
• The young staff can be energized to carry useful and valuable research with appropriate mentoring and supervision.
• Recruit experienced research leaders

7 Recommendations for the Future

7.1 Main Strengths and Weaknesses of the Unit

7.1.1 Main Strengths
• Affiliation with other universities nationally and internationally
• Applied research component in cooperation with industry
• Project management as an area of research (many companies are adopting Matrix management (project oriented) as its business model,
• Evolute: Leadership and management object ontology are hot research topics.
• Evolute network, and the Evolute Research Academy
• The MS program offers good connection with industry
• The enthusiasm for research of junior researchers

7.1.2 Weaknesses
• Limited dedicated research staff (research professors)
• Potential heavy teaching load
• Lack of quality research
• International links are not exploited enough for research
• Lack of research leadership
7.2 Opportunities and Challenges

7.2.1 Opportunities
- Capitalize on the strengths, eliminate the threats, strengthen the weaknesses, and seize on the opportunities. Specifically:
  - Applied research
  - Project management
  - Evolute Network and connection to industry

7.2.2 Challenges
- The major challenge would be how the unit will fare after the retirement of its senior most professor
- Hiring and retaining researchers that may need guidance
- Balancing teaching and research in a constrained staff environment

7.3 Groups that Stand out
None

7.4 Research Groups that have potential to become International Flagships
None

7.5 Measures to Improve Performance
1. Recruit, hire, and retain capable research leaders (not necessarily from within).
2. Invest in young active researchers (hiring package, guaranteed summer employment, seed funded research).
3. Request Ph.D.s to have 2-3 papers as a condition for graduation.
4. Instill mentoring and counseling program for novice researchers. This may rely on the cooperation of Pori consortium of universities.
5. Initiate a weekly seminar by researchers and industry collaborators (open to all).
6. Engage in collaborative research with TUT's Department of Industrial Management.
7. Provide conducive research environment (Space, modern facilities and research tools, continuous encouragement).
8. Capitalize on the research opportunities identified earlier.
9. Connect more with program graduates.
10. Create an Industry and academic advisory board to take active role in shaping up the research agenda for the unit.
11. Benchmark with other units with the same research objectives worldwide.
12. Unit may merge with the Department of Industrial Management at TUT.
CONCLUDING COMMENTS

The Department of Business Information & Logistics and the Department of Industrial Management have considerable potential for achieving research standing "at the leading edge." These two departments demonstrate evidence of capabilities that form the basis for high quality research. However, this goal can be materialized only if the research environment is improved with significantly increased internal resources and other university support for focused research that results in article publication in refereed journals with high impact factor. The TUT Pori Campus Industrial Management and Engineering Unit is vulnerable without tighter integration within TUT units (e.g., Department of Industrial Management) and/or within the units of the Pori University Consortium. All three departments that Panel 3 examined fit the mission of TUT. Some units, the TUT Pori Unit and the Transport Systems group, are in critical need of strategic appointments.