

Newsletter SFI Norman

RESEARCH AREA 2, Quarter 4, 2012

In the final quarterly newsletter of 2012, we mark the end of a very successful year for SFI NORMAN and Research Area 2 with a number of success stories and report our achievements both in industry and in academia.

Industrial achievements

Throughout 2012, research area 2 has worked closely with industry in order to develop new theories, methods, models, and management tools that will enable Norwegian manufacturers to thrive in global competition. Such achievements include:

- Together with Volvo Aero Norge, we have developed a five-stage capability maturity model for MES support for lean production. The findings were presented at the APMS conference in Rhodes, 22-26 September 2012.
- Working with Volvo Aero Norge, we have also developed a concept for a system called real time event supervisor which aims for an efficient production control in a dynamic manufacturing environment. These findings will be presented at the IEEM conference, 11-13 December, Hong Kong.
- We have developed an action research methodology for mapping and comparing different forms of team organization. Participating companies were Teeness and Benteler. A presentation of the methodology and fieldwork was published in *Team performance management* (Rolfesen, M. et al. 2012).
- With Volvo, we are developing a framework called "the industrial worker of the

future". A set of interviews have been carried out. A workshop at Volvo on "the industrial worker of the future" is in planning.

- Based on the activity in TINE we have developed a framework for selection of differentiated planning and control approaches in food production.
- Working with NOCA in Trondheim as a case company, we have developed a methodology for ERP-based lean implementations which can be used by practitioners to realise synergies between the application of ERP systems and the deployment of Lean practices.
- A concept for manufacturing planning and control in project manufacturing environment/ one of a kind production has also been developed. The findings were presented at the International Working Seminar on Production Economics, 20-24 February, 2012, Innsbruck, Austria. A collaborability meter to measure socio.technical fit in organizations (Teeness & Benteler)

PhD Candidate Daryl Powell successfully defends his thesis "Investigating ERP support for lean production"

Text by T. Netland, SINTEF Technology and society

On September 5th 2012, Daryl Powell successfully defended his PhD thesis titled "Investigating ERP Support for Lean Production" at the Department of Production and Quality Engineering at NTNU, Trondheim, Norway. Over the last three years,

Powell's research has received much interest from the international Operations Management research community and from industrial companies struggling with the mismatch between lean production and ERP utilization. Powell – a Brit with experience as a Continuous Improvement Champion in the Schäffler Group in the UK – has since 2009 conducted qualitative research in Norwegian and Dutch industry as part of the SFI Norman research project. His in-depth case studies of four Dutch SMEs have analysed how to make the most out of recent technological developments and functionality of contemporary ERP systems in order to support card-based pull production systems (such as Kanban and POLCA). He has also conducted a three-year action research project at the Trondheim-based company Noca. The thesis is now available online at: <http://tinyurl.com/ERP-Lean-2012>.

NordForsk supports research in sustainable transport and logistics

Over the past couple of decades there has been a significant increase in the awareness of logistics management and sustainability. Today, research and education relevant to these topics is carried out in more than ten universities in



the Nordic countries, including NTNU, Alto, Aalborg, Chalmers, Lund, Bergen, and Århus. In order to encourage greater collaboration between these institutions, NordForsk has allocated 800 000 NOK to support a Nordic researcher training program in sustainable logistics research activities. The program will start in January 2013.

International Journal Publications

The end of 2012 saw a rise in the number of journal publications for research area 2. Some examples include:

- Netland, T. H. (2012) Managing strategic improvement programs: the XPS program management framework. *Journal of Project, Program and Portfolio Management*, 3, 31 – 44.
- Ingvaldsen, J. & Rolfsen, M. (2012). "Autonomous work groups and the challenge of inter-group coordination". *Human Relations*, 65 (861)
- Powell, D. & Skjelstad, L. (2012). "RFID for the extended lean enterprise", *International Journal of Lean Six Sigma*, 3 (3) pp.172-186.
- Rolfsen, M., J. Ingvaldsen and M. Hatling (2012). "Graphical profiling of team working through participatory research". *Team Performance Management*, 18 (1/2) pp.27-40.

The scientific publication activities within research area 2 have resulted in a number of publication points for both NTNU and SINTEF. YTD: 17

points (before calculation of cooperation value and author share). Note that proceedings from some conferences will be published in approved channels on a later stage.



Prof. Ingvold Strømmen gives the opening address at IWAMA 2012

APMS International Conference, 2012

The Advances in Production Management Systems (APMS) conference, arranged by the IFIP Working Group 5.7 was this year held in Rhodes, Greece and attracted more than 250 delegates from 31 different countries across the globe. The conference took place on September 24th-26th 2012 and offered 36 sessions in 4 parallel streams. With papers presented in several of these sessions as well as participation in the doctoral workshop, SFI NORMAN was well represented in Rhodes. Some examples of the NORMAN work presented on the largest and most beautiful of the Dodecanese islands includes:

- *MES Support for Lean Production.* Powell, Arica and Binder conceptualise potential lean support functionality of-

fered by MES systems, and use Volvo Aero Norway as an illustrative case.

- *Intelligent Manufacturing Systems: Controlling Elastic Springback in Bending.* Welø presents results from NORMAN research area 1.

- *The Insignificant Role of National Culture in Global Lean Programmes.* Netland challenges researchers to focus their attention on more interesting factors than the role of national culture in global lean programs, and shows that national culture has an insignificant role in such programs.
- *Underlying Factors for Practicality of the Production Control Systems.* Arica, Strandhagen, and Hvolby out-lines the important factors affect the practicality of the production control systems.
- *Tactical and Operational Issues in a Hybrid MTO-MTS Production Environment; the Case of Food Production.* Romsdal, Arica, Strandhagen, and Dreyer investigates the production planning and control process for tactical and operational levels in hybrid manufacturing environments.

Along with EurOMA, which was in 2012 held in Amsterdam and which will be co-hosted by Trinity College Dublin and the University College Dublin in Ireland in June 2013; APMS continues to be one of the priori-

tized conferences for WP4. In 2012, Erlend Alfnes was accepted in to the IFIP 5.7 working group, which means together with Heidi Dreyer and Jan Ola Strandhagen, SFI NORMAN is now well represented in the IFIP and APMS communities for the years to come. The next APMS conference will be hosted by Penn State University in the USA in August 2013.

International collaboration

Research collaboration, cooperation, and co-publishing in an international context have always been important aspects of research area 2. Examples of our international collaboration partners and cooperative ventures include:

- Catholic University of Leuven, Belgium: *Lean production and de-layered management structure: an odd couple?*
- Georgetown University, Washington DC, USA: *Research project on Volvo production System.*
- University of Groningen, Netherlands: *Capability model*
- *for ERP support for pull production.*
- Newcastle University Business School, UK: *Framework for the integration of MRP and Lean Production.*
- University of Aalborg, Denmark: *Concept for the role of WorkFlow in Lean ERP; and a diagnostic information model for supply chain execution.*

Several initiatives contribute to a very satisfying improvement in international collaboration and mobili-

ty. For example, it is satisfying to report that we hosted the SMARTLOG seminar "Modern trends in production control: Lean and ICT" in March, where professor Rik van Landeghem was key note speaker and presented his experiences and research results with the use of manufacturing execution systems (MES) to support lean production. Fruitful discussions between the industry and the academics took place. Additionally, one of the researchers is spending one year at Georgetown University, McDonough School of Business, Washington D.C., USA, which have established a strong scientific relationship. We have also employed Professor Hans-Henrik Hvolby from Aalborg University as a Professor II at IPK, NTNU. IPK attended a research trip to Bergamo, Italy, June 13-15th, where we had a number of scientific seminars and meetings with the University of Bergamo as well as a factory visit to the Brembo plant, where "Brembo Production System" was presented to us.

We have also recently worked closely with Shanghai University to organize and prepare the International Workshop of Advanced MANufacturing (IWAMA), which was hosted in Trondheim 22-24nd June 2012.

In September 2012, NTNU hosted the 16th International Workshop on Team working (IWOT 16). IWOT is an annual multidisciplinary conference about teams and team based work systems. 30 participants from 9 different countries submitted papers for the conference. Monica Rolfsen and Jonas Ingvaldsen of WP5 were in charge of the conference.

We strongly motivate and emphasize for these kinds of international collaboration in RA2.

In 2013, we plan to continue our cooperative work with these universities, as well as increase our international presence by collaborating with other institutions, such as:

- Stockholm School of Economics, Sweden: *Lean and Information Technology.*
- Cardiff University, Wales: *Engineer-to-order Supply Chains.*

Forthcoming Workshop: Hansen Protection

2012 saw a number of successful SFI NORMAN industrial workshops, including those that were held at Benteler, Raufoss in Q2 and Pipelife, Surnadal in Q3. Following on from these, on January 8th 2013, Hansen Protection will host the next workshop at its plant in Moss. The theme for the workshop will be the development of new business models. More information about the workshop will be distributed soon.

Lean Forum Midt-Norge

A start up meeting for the Lean Forum in central Norway, the 8th network to be established within the Lean Forum Norway initiative, was held on August 28th 2012. There was a record interest in starting a Lean Forum in Central Norway and 85 participants gathered at *Statens Hus* in Trondheim to establish the network. Initiators of the forum include a number of key players, such as NTNU, SINTEF, Nidar, Rema 1000 distribution, DNB Liv, Kåntega, Ernst & Young and PWC. A number of representatives from SFI NORMAN

research area 2 are currently involved in establishing Lean Forum Midt-Norge, with Jan Ola Strandhagen, Monica Rolfsen and Daryl Powell all acting members of the interim steering committee.

Best Master Project

At the Transport and Logistics Conference in Oslo, October 2012, Sindre Grindheim was awarded the prize for best Masters Project for his project "*Dynamic and distributed production control*". His Master project was carried out in collaboration with the industrial partner Volvo Aero Norway (now GKN). The project thesis was written in Engineering and ICT at the Department of Production and Quality Engineering, NTNU in Trondheim.

A total of 11 students were working on Master projects connected to SFI NORMAN research area 2 in 2012, and 10 more have already begun working with projects this autumn.

New Project Initiatives

Researchers from WP4 and WP5 have been involved in a number of initiatives to address various calls for research projects this autumn, including the Research Council of Norway's program "MAROFF" and the EU Program "Factories of the Future". Some examples of projects that we are applying for European funding for are:

- *EXIGO* – A project to develop advanced technology-based business models for

realizing new product-services (FoF call 9).

- *IPROSERVE* – A project to enable the integrated design of personalized product-service systems (FoF call 5).

handle real time production planning and control.

Work Plan for 2013

In 2013 the main activities in research area 2 are as follows:

- Increased visibility in SFI NORMAN network
 - More applied research together with industrial partners.
- Increased visibility in International research arena
 - Greater level of international collaboration.
 - Greater focus on publication in International journals.

New PhD Student: SFI NORMAN warmly welcomes Taravatsadat Nehzati!

Taravat joined SFI NORMAN as a PhD student in August 2012. Her main interest is in production planning and control. Previously, she graduated from Mazandaran University of Science and Technology (MUST) in September 2008, with degree of Industrial Engineering and pursued her master studies in University Putra Malaysia (UPM). She is interested in application of computational intelligence in operation management problems. The objective of her work with the NORMAN industry partners is to develop a new intelligent adaptive model to



Best Master Student! (from left: Eiril Bø, Sindre Grindheim, Heidi Dreyer)

Latest News! IEEM 2012, Hong Kong

The IEEE's Industrial Engineering and Engineering Management (IEEM) conference was held at the International Convention and Exhibition Centre in Hong Kong, 10th-13th December 2012. The conference was as well attended as ever, with over 500 participants from 50 countries. Both PhD student Emrah Arica and Post-doc Daryl Powell (Arica, pictured right) Participated at this conference, which was an excellent chance for the researchers from IPK to demonstrate their ability in carrying out and presenting state-of-the-art research, and to extend their network into Asia:

- Powell & Strandhagen (2012) *21st Century Operational Excellence: Addressing the Similarities and Differences between Lean Production, Agility and QRM*
- Hofmann & Powell (2012) *The Combination of Lean Thinking and Systems Thinking in the Design of Manufacturing Systems*
- Arica, Strandhagen & Hvolby (2012) *A Review of Key Research Streams for Managing Uncertainties in Production Planning and Control*
- Arica, Grindheim & Roulet-Dubonnet (2012) *A Real Time Event Supervisor System for Efficient Production Control*

Finally, we would like to wish you all a very merry Christmas and a prosperous new year!

