

## PROGRAM

Time	Sunday, 17 Sep	Monday 18 Sep	Tuesday 19 Sep	Wednesday 20 Sep	Thursday 21 Sep
08:00	Registration	Registration	Registration	Registration	Industrial Tours Company allocation with departure and arrival times announced separately
08:20					
08:40	Doctoral Workshop (8:30 - 14:45)	Opening Ceremony	Parallell Session 5 & Meet the Editors (2)	Parallell Session 9	
09:00		Keynote Address 1			
09:20					
09:40		Break	Break		
10:00		Parallell Session 1 & Meet the Editors (1)	Parallell Session 6	Break	
10:20				Keynote Address 6 & 7	
10:40			Break	Parallell Session 10	
11:00					
11:20		Break	Keynote Address 3		
11:40		Parallell Session 2	Keynote Address 4		
12:00					
12:20					
12:40					
13:00	Lunch	Lunch	Lunch	Lunch	
13:20					
13:40					
14:00	Doctoral Workshop, cont.	Keynote Address 2	Parallell Session 7	Parallell Session 11	
14:20		Break			
14:40	PPC Editorial Board Meeting (14:45-16:00)	Parallell Session 3		Break	Closing Ceremony
15:00					
15:20	IFIP WG 5.7 Meeting (16:00-18:30)	Parallell Session 4 & Workshop; APMS Talks	Keynote Address 5		
15:40			Break		
16:00			Break		
16:20		Parallell Session 8			
16:40					
17:00					
17:20					
17:40					
18:00					
19:00	Welcome Reception				
19:30	19:00, Rockheim	Organ Concert 19:30, Nidaros Cathedral	Gala Dinner 19:30, Clarion Hotel		

Monday 18 September, before lunch

Time	Room	Cosmos 1&2			Cosmos 3A		Cosmos 3B		Cosmos 3C		Cosmos 3D		Sirius						
	Session name	Advances in Dynamic Scheduling Technologies for Smart Manufacturing (1)			Circular Manufacturing and Industrial Eco-efficiency (1)		Next Generation Human-centered Manufacturing and Logistics Systems for the Operator 5.0 (1)		Workforce Evolutionary Pathways in Smart Manufacturing Systems		Meet the Editors (1); Production Research & Management		Experiential Learning in Engineering Education (1)						
	Session chair		Magnus Wiktorsson	Sang Do Noh		Federica Acerbi	Mélanie Despeisse		David Romero	Johan Stahre		Chiara Cimini	Tamás Ruppert		Gregor von Cleminski		Jannicke Baalsrud Hauge	Giovanni Romagnoli	
10:20	Parallel session 1	SS-21	Scheduling Algorithm using Path Relinking in Different Search Paths for Production Process with Crane Interference	Takashi Tanizaki, Shonosuke Fujiwara, Hideki Katagiri, and Takayuki Katoka	SS-10	Developing Data Models for Smart Environmental Performance Management in Production	Mélanie Despeisse, Qi Fang, Ebru Turanoglu Bekar, Nils Ólafur Egilsson, Karolina Kazmierczak, Lena Moestam, Helena Söderberg, Dennis Andersson, Jenny Hörnlund, and Björn Molin	SS-8	The Role of Human Factors in Zero Defect Manufacturing: A Study of Training and Workplace Culture	Folvos Psarommatis, Gökan May, and Victor Azamfirei	SS-7	A Reflective Framework for Understanding Workforce Evolutionary Pathways in Industry 5.0	Alexandra Lagorio, Chiara Cimini, and David Romero		Participating editors:  Bjørn Andersen, Production Planning and Control: The Management of Operations  Alexandre Dolgui, International Journal of Production Research  Dmitry Ivanov, IISE Transactions, Omega and International Journal of Integrated Supply Management	SS-4	Industrial Engineering Education for Industry 4.0	Giovanni Mummolo, Jim Browne, and Asbjørn Rolstadås	
10:40	Parallel session 1	SS-21	Buffer Sizing and Route Scheduling for Reliable Autonomous Vehicle Operations in a Dynamic Environment	Inkyung Sung, and Peter Nielsen	SS-10	Analyzing Emerging Circular Economy Business Models in the E-waste Sector through the Business Model Canvas	Tirufat Dejene Woldeyes, Muffatto Moreno, and Francesco Ferrati	SS-8	Modeling Human Problem-Solving Behavior in Complex Production Systems	Susanne Franke, and Ralph Riedel	SS-7	Managing Change towards the Future of Work - Clustering Key Perspectives	Katrin Singer-Coudoux, Greta Braun, and Johan Stahre			SS-4	Challenges for Smart Manufacturing and Industry 4.0 Research in Academia: A Case Study	Matthew McCormick, and Thorsten Wuest	
11:00	Parallel session 1	SS-21	Beyond the Lab: Exploring the Socio-Technical Implications of Machine Learning in Biopharmaceutical Manufacturing	Erik Flores-García, So Hyun Nam, Yongkuk Jeong, Magnus Wiktorsson, and Yong Hun Woo	SS-10	How can Digitalisation Support the Circular Economy? An Empirical Analysis from the Manufacturing Industry	Beatrice Colombo, Albachia Boffelli, Jacopo Colombo, Alice Madonna, and Simone Villa	SS-8	Human-centric Industrial Augmented Reality: Requirements and Design Guidelines for Usability	Tiberiu Florescu, Sabine Waschull, and Christos Emmanouilidis	SS-7	Development of a Task Model for Artificial Intelligence-based Applications for Small and Medium-sized Enterprises	Florian Clemens, Fabian Willemsen, Susanne Mütze-Niewöhner, and Günther Schuh			SS-4	Innovation & Entrepreneurship in Engineering Curricula: Evidences from an International Summer School	Jovista Qosaj, Donatella Corti, and Sergio Terzi	
11:20	Parallel session 1	SS-21	A Constraint Programming Model for a Reconfigurable Job Shop Scheduling Problem with Machine Availability	Zahra Mehdizadeh-Somarin, Reza Tavakkoli-Moghaddam, Mohammad Rohani Nezhad, Zdenek Hanzalek, and Behdin Vahedi-Nouri	SS-10	Stakeholder Management in Circular Economy Product Development in the Mining Industry – A Case Study	Juhoantti Viktor Köpman, Vesa-Matti Leiviskä, Harri Haapasalo, Petteri Annunen, and Jukka Majava				SS-7	Indoor Positioning-based Occupational Exposures Mapping and Operator Well-being Assessment in Manufacturing Environment	Gergely Halász, Tibor Medveggy, János Abonyi, and Tamás Ruppert						
	Session name	Advances in Dynamic Scheduling Technologies for Smart Manufacturing (2)			Circular Manufacturing and Industrial Eco-efficiency (2)		Next Generation Human-centered Manufacturing and Logistics Systems for the Operator 5.0 (2)		Battery Production Development and Management		Food and Bio-manufacturing		Experiential Learning in Engineering Education (2)						
	Session chair		Sang Do Noh	Magnus Wiktorsson		Beatrice Colombo	David Romero		Fabio Sgarbassa	Thorsten Wuest		Mélanie Despeisse	Carla Susana Agudelo Assuad		Hans Henrik Hvalby	Boonserm Kulvatunyou		Matthias Kalverkamp	Jannicke Baalsrud Hauge
12:00	Parallel session 2	SS-21	Prediction of Residual Dye using Machine Learning Algorithms for an Eco-friendly Dyeing Process	Whan Lee, Hye Kyung Choi, seyed mohammad mehdi Sajadieh, Sang Do Noh, and Hyun Sik Son	SS-10	Optimization of Distribution Center and Supply Chain Management with Mixable Products: A Case Study of Recycling Mixable Metal Waste in South Korea	Sewon Oh, Kim Junseok, Kim Juyoun , Alex Yoosuk, and Ilkyeong Moon	SS-8	Towards Industry 5.0: Empowering SMEs with Blockchain-based Supplier Collaboration Network	Prince Waqas Kan, Imene Bareche, and Thorsten Wuest	SS-11	Battery Production Systems: State of the Art and Future Developments	Mélanie Despeisse, Björn Johansson, Jon Bokrantz, Greta Braun, Arpita Chari, Xiaoxia Chen, Qi Fang, Clarissa A. González Chávez, Anders Skoogh, Johan Stahre, Ninan Theradapuzha Mathew, Ebru Turanoglu Bekar, Hao Wang, and Roland Örtengren	RS-6	Towards More Sustainable Food Processing: A Structured Tool for the Integration and Analysis of Sustainability Aspects of Processing Equipment	Sara Esmaellian, Anita Romsdal, Eirin Skjøndal Bar, Bjørn Tore Rotabakk, Jørgen Lerfall, and Anna Olsen	SS-4	Milky Chain Game: A Pedagogical Game for Food Supply Chain Management	Mizuho Sato, Tomoya Manago, and Hajime Mizuyama
12:20	Parallel session 2	SS-21	Applying Multi-agent Reinforcement Learning and Graph Neural Networks to Flexible Job Shop Scheduling Problem	Seung Heon Oh, Young In Cho, and Jong Hun Woo	SS-10	A Stochastic Frontier Analysis (SFA)-based Method for Detecting Changes in Manufacturing Energy Efficiency by Sector and Time	Ga Hyun Lee, and Hyun Woo Jeon	SS-8	Toward a Framework for Human-Technology Cooperation in Manufacturing	Jannick Fiedler, Omid Maghazel, Arne Seelinger, and Torbjørn Netland	SS-11	Assessment of the Main Criticalities in the Automotive Battery Supply Chain: A Professionals’ Perspective	Valérie Botta-Genoulaz, and Giulio Mangano	RS-6	Transforming Food Production: Smart Containers for Sustainable and Transparent Food Supply Chains	Peter Burggräf, Tobias Adlon, Fabian Steinberg, Jan Salzwedel, Philipp Nettesheim, and Tschauder Henning	SS-4	Introducing Active Learning and Serious Game in Engineering Education: “Experience from Lean Manufacturing Course”	Gianpiero Mattel, Paolo Pedrazzoli, Giuseppe Landolfi, Fabio Daniele, and Elias Montini
12:40	Parallel session 2	SS-21	Enhancing Operations Planning and Scheduling in Dynamic Production Systems by Using CLIP	Julia Markert, Matthias Kerzel, Michael Variola, Dominik Saubke, Stephanie von Riegen, Lothar Hotz, and Pascal Krenz	SS-10	Gap Analysis for CO2 Accounting Tool by Integrating Enterprise Resource Planning System Information	Martin Perau, Dogukan Seker, Tobias Schroer, and Guenther Schuh	SS-8	Investigating Human Factors Integration into DT-based Joint Production and Maintenance Scheduling	Chiara Franciosi, Salvatore Miranda, Ciele Resende Veneroso, and Stefano Riemma	SS-11	Integration of Hydropower and Battery Energy Storage Systems into Manufacturing Systems - A Discrete-Event Simulation	Carla Susana Agudelo Assuad, Lennart Deike, Zhicheng Liao, and Ali Akram	RS-6	Produce it Sustainably: Life Cycle Assessment of a Biomanufacturing Process through the Ontology Lens	Ana Nikolov, Milos Drobnjakovic, and Boonserm Kulvatunyou	SS-4	Crafting a Memorable Learning Experience: Reflections on the Aalto Manufacturing Game	Mikael Öhman, Müge Tetik, Risto Rajala, and Jan Holmström

**Monday 18 September, after lunch**

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Tuesday 19 September, before lunch

Time	Room	Cosmos 1&2			Cosmos 3A		Cosmos 3B		Cosmos 3C		Cosmos 3D			Online					
	Session name	Modelling Supply Chain and Production Systems (1)			Transforming Engineer-to-Order Projects, Supply Chains, and Ecosystems (1)			Exploring Digital Servitization in Manufacturing (1)		Additive Manufacturing in Operations and Supply Chain Management (1)		Meet the Editors (2); Production Systems and their Methods, Tools, and Technologies		Digital Track (1)					
	Session chair		Hermann Lööding	Fabio Sgarbossa		Jonathan Gosling	Joakim Wikner		Giuditta Pezzotta	Clarissa A. González Chávez		Trond Halvorsen	Marco Semini		David Romero		Federica Acerbi	Bella Nujen	
08:40	Parallel session 5	RS-1	Cost Evaluation of a (Q, r, K) Inventory Model with Two Demand Classes of Lost Sales and Backorders	Zengxu Guo, and Haoxun Chen	SS-1	Challenges and Opportunities of Software-based Production Planning and Control for Engineer-to-Order Manufacturing	Patrick Bründl, Micha Stoidner, Huang Giang Nguyen, Andreas Baechler, and Jörg Franke	SS-5	The Digital Servitization of Manufacturing Sector: Evidence from a Worldwide Digital Servitization Survey	Giuditta Pezzotta, Veronic Arioli, Federico Adrodegari, Mario Rapaccini, Nicola Saccani, Slavko Rakic, Ugljesa Marjanovic, Shaun West, Oliver Stoll, Stefan A. Wiesner, Marco Bertoni, David Romero, Fabiana Pirola, Roberto Sala, and Paolo Gaiardelli	SS-16	What to Share? A Preliminary Investigation into the Impact of Information Sharing on Distributed Decentralised Agent-Based Additive Manufacturing networks	Owen Rahmat Peckham, James Gopsill, Chris Snider, and Mark Goudswaard		Participating editors:  Ugljesa Marjanović, International Journal of Industrial Engineering and Management  Thorsten Wuest, Smart and Sustainable Manufacturing Systems and Robotics and Computer-Integrated Manufacturing  Nick Szirbik, Computers in Industry	DT-1	Comparative Analysis of Sustainability and Resilience in Operations and Supply Chain Management: Exploring Similarities and Differences	Piotr Warmbier	
09:00	Parallel session 5	RS-1	Optimal Class-based Storage System with Diagonal Movements	Kasuni Vimasha Weerasinghe, Fabio Sgarbossa, and Giulia Fede	SS-1	Has the Pendulum Swinged Too Much from JIT o JIC in the Aftermaths of Covid-19?	Jenny Bäckstrand, and Andréas Malmstedt	SS-5	Maximizing Customer Satisfaction in Sheet Metal Processing: A Strategic Application of the Customer Health Score	Greta Tjaden, Annika Baier, Maureen Strache, Cornelia Regelmann, and Anne Meyer	SS-16	The Potential of Additive Manufacturing Networks in Crisis Scenarios	Yen Mai Thi, Xiaoli Chen, and Ralph Riedel			DT-1	Understanding Sustainability: Cases from the Norwegian Maritime Industry	Olena Klymenko, and Lise Lillebryggfeld Halse	
09:20	Parallel session 5	RS-1	Algorithms and Models for Automated Replenishment of Store Shelves – Exploratory Research	Abhinav Majumder, Shiyu Sun, and Vittaldas Prabhu	SS-1	Underlying Mechanisms for Planning Engineering Capacity and Load in an Engineer-to-Order Context	Nils-Erik Ohlson	SS-5	An Investigation into Technological Potentials of Library Intralogistics Operations	Niloofar Jafari, Fabio Sgarbossa, Bjørn Tore Nyland, and Arild Sorheim	SS-16	An Environmental Decision Support System for Determining On-site or Off-site Additive Manufacturing Production of Spare Parts	Enes Demiralay, Seyed Mohammad Javad Razavi, Ibrahim Kucukcoc, and Mirco Peron			DT-1	A Proposed Assessment Framework for Circular Supply Chains Management towards Net Zero Targets in The Netherlands	Verena Zielke, and Adriana Saraceni	
09:40	Parallel session 5				SS-1	Performance Management Collaboration between Companies Involved in the Industrialised Housebuilding Order Fulfilment Process	Wolfgang Grenzfurtnr, and Martin Rudberg									DT-1	A Simulation Optimization Approach to Inventory Optimization in Supply Chain Networks	Farzaneh Mahmoudi, Alireza Eshghi, Mohadesse Basirati, and Erfan Hassannayebi	
	Session name	Modelling Supply Chain and Production Systems (2)			Transforming Engineer-to-Order Projects, Supply Chains, and Ecosystems (2)			Exploring Digital Servitization in Manufacturing (2)		Additive Manufacturing in Operations and Supply Chain Management (2)		Lean in Healthcare			Digital Track (2)				
	Session chair		Ralph Riedel	Vittal Prabhu		Martin Rudberg	Margherita Pero		Giuditta Pezzotta	Ugljesa Marjanovic		Trond Halvorsen	Lise Lillebryggfeld Halse		Christiane Lima Barbosa	Flávia de Souza		Gregor van Cieminski	Bella Nujen
10:20	Parallel session 6	RS-1	A Location-Routing Problem: Last-Mile Delivery with Drop-off Facilities for Return	Sungbae Jo, and Ilkyeong Moon	SS-1	Capability Building Blocks for Digital Twin Development	Sonika Gogineni, Cansu Tanrikulu, Jörg Brünnhäuser, Kai Lindow, and Heiko Witte	SS-5	Coalescing Circular and Digital Servitization Transitions of Manufacturing Companies: The Circular Economy Digital Innovation Hub	Claudio Sassanelli, Saman Sarbatzvatn, Giorgos Demetriou, Lucie Greyl, Giorgio Mossa, and Sergio Terzi	SS-16	Latest Technological Advances and Key Trends in Powder Bed Fusion: A Patent-based Analysis	Antonio Pedro DiasAlves de Campos, and Marco Leite	SS-14	Role Of Manufacturing Industry for Minimizing the Barriers to Circular Transition in the Health Sector: A Framework	Kartika Nur Alfina, and R.M. Chandima Ratnayake	DT-1	Pricing Strategy of Apparel Supply Chain Considering Traceability Awareness of Consumers Driven by Blockchain	Wenjie Wang, Jinxia Zheng, Yazhou Liu, and Lei Xie
10:40	Parallel session 6	RS-1	Business Models for Electric Vehicle Fixed Charging Station Infrastructure with Commercial & Non-Commercial Uses	Hakan Erdes, and Saadettin Erhan Kesen	SS-1	Towards the Digital Factory Twin in Engineer-to-Order Industries: A Focus on Control Cabinet Manufacturing	Micha Stoidner, Patrick Bründl, Huang Giang Nguyen, Andreas Baechler, and Jörg Franke	SS-5	Servitization and Industry 5.0: The Future Trends of Manufacturing Transformation	Dragana Slavic, Ugljesa Marjanovic, Giuditta Pezzotta, Ioan Turcin, and Slavko Rakic	SS-16	Integration of Additive Manufacturing in an Industrial Setting: The Impact on Operational Capabilities	Christopher Gustafsson, Anna Sannö, Koteswar Chirumalla, and Jessica Bruch	SS-14	Managing Performance in Technology-enabled Elderly Care Services: The Role of Service Level Agreements in Modular Smart Service Ecosystems	Godfrey Mugurusi, Anne Grethe Syversen, Inge Hermanrud, Martina Ortova, Pankaj Khatiwada, and Stian Underbekken	DT-1	The Role of Organizational Culture in the Transformation to Industry 4.0	Rogério Queiroz Camargo, Marcia Terra Silva, Ana Lucia Figueiredo Facin, and Rodrigo Franco Gonçalves
11:00	Parallel session 6	RS-1	Investigating the Sustainable Development of Charging Stations for Plug-in electric vehicles: A System Dynamics Approach	Mohammad Pourmatin, Amir Fayaz-Heidari, Moein Moeini-Aghtaie, Erfan Hassannayebi, and Mohadesse Basirati	SS-1	Industry 4.0 Application in ETO Companies: An Empirical Comparison	Felix Schulze, and Patrick Dallasega	SS-5	Sustainability-as-a-Service: Requirements based on Lessons Learned from Empirical Studies	Clarissa A. González Chávez, Mélanie Despeisse, Björn Johansson, David Romero, and Johan Stahre	SS-16	Additive Manufacturing: A Case Study of Introducing Additive Manufacturing of Spare Parts	Bjørn Jæger, Fredrik Wiklund, and Lise Lillebryggfeld Halse	SS-14	Effect of Machine Sharing in Medical Laboratories	Aili Biriita Bertnum, Roy Kenneth Berg, Stian Bergstøl, Jan Ola Strandhagen, and Marco Semini	DT-1	Requirements Planning in the New Normal: Comparison between Reorder Point Method and DDMRP	Beatrice Marchi, Ivan Ferretti, and Simone Zanoni

**Tuesday 19 September, after lunch**

Time	Room	Cosmos 1&2			Cosmos 3A			Cosmos 3B			Cosmos 3C		Cosmos 3D		Online				
	Session name	Modelling Supply Chain and Production Systems (3)			Transforming Engineer-to-Order Projects, Supply Chains, and Ecosystems (3)			Digitally enabled and Sustainable Service and Operations Management in PSS Lifecycle (1)			Lean Management in the Industry 4.0 Era (2)		Digital Twin Concepts in Production and Services		Digital Track (3)				
	Session chair		Matthias Thurer	Fabio Sgarbossa		Mohamed Naim	Patrick Dallasega		Roberto Sala	Fabiana Pirola		Daryl Powell	Matteo Ferrazzi		Boonserm Kulvatunyou	Hans-Henrik Hvalby		Gregor von Cieminski	Bella Nujen
14:00	Parallel session 7	RS-1	Implementation of a Quality Cost Management Model: Case Study from the Textile Industry Sector	Bruno Barros, Cristina Rodrigues, Sérgio Sousa, and Eusébio Nunes	SS-1	Integrating Lean, Agile, Resilient and Green Supply Chain Management in Engineer-to-Order Contexts: Insights from Expert Interviews	Antonio Masi, and Margherita Pero	SS-6	Source-Target-Link-Matrix: A Conceptual Approach for the Systematic Design of Data-Driven Product Service Systems	Oliver Stoll, Simon Züst, Eugen Rodel, and Shaun West	SS-2	Enablers Identification to Support the Combined Implementation of Lean and Industry 4.0	Ilse Urquía, Anne Zouggar, and Bruno Vallespir	RS-3	The Digital Thread Concept for Integrating the Development Disciplines for Mechatronic Products	Sylwester Oleszek, and Erik Rieger	DT-1	Systems Thinking Approach for Production Process Optimization based on KPI Interdependencies	Heiner Winkler, Susanne Franke, Felix Franke, Iren Jabs, Daniel Fischer, and Matthias Thürer
14:20	Parallel session 7	RS-1	Optimal Production Planning of Ice-food Under Production, Backordering and Renewal Conditions	Syrine Guinoubi, Yasmina Hani, Marwa Hasni, and Abderrahmane Elmhamed	SS-1	Investigating On-Site Production in Construction Using Decoupling Thinking	Petter Haglund, Joakim Wikner, and Martin Rudberg	SS-6	It is Not About Technology – Stupid! Lessons from a Start-up Developing a Digitally-enabled Product Service System to Grow Plants	Marco Kunz, Shaun West, Oliver Stoll, and Michael Blickenstorfer	SS-2	Lean and Digitalization Status in Norwegian Manufacturing Companies	Natalia Iakymenko, Daryl Powell, Eivind Reke, Marte Daae-Qvale Holmemo, Eirik Bådsvik Hamre Korsen, Signe Sagli, Sigrid Sand, and Sunniva Økland	RS-3	A Digital Reverse Logistics Twin for Improving Sustainability in Industry 5.0	Xu Sun, Hao Yu, and Wei Deng Solvang	DT-1	Human in Command in Manufacturing	Doris Aschenbrenner, and Cecilia Colioseus
14:40	Parallel session 7	RS-1	Automating Loading and Unloading for Autonomous Transport: Identifying Challenges and Requirements with a Systems Approach	Tarun Kumar Agrawal, Robin Hanson, Farook Abdullah Sultan, Mats I. Johansson, Dan Andersson, Gunnar Stefansson, Konstantina Katsela, and Michael Browne	SS-1	Clarifying the Interface between Construction Supply Chain and Site - A Key to Improved Delivery Efficiency	Farah Naz, and Anna Fredriksson	SS-6	Smart Product-Service System Definitions and Elements – Relationship to Sustainability	Stefan Wiesner, Jannicke Baalsrud Hauge, and Klaus-Dieter Thoben	SS-2	Effects of Lean and Industry 4.0 Technologies on Job Satisfaction: A Case-based Analysis	Matteo Zanchi, Andrea Lorenzi, Matteo Prezioso, Daryl Powell, and Paolo Gaiardelli	RS-3	Model Simplification: Addressing Digital Twin Challenges and Requirements in Manufacturing	Adria Sánchez de Ocaña, Jessica Bruch, and Ioanna Aslanidou	DT-1	Optimized Task Planning of Transfer Robots using Reinforcement Learning	Jiwhan Park, and Sang Do Noh
15:00	Parallel session 7	RS-1	Design of Reconfigurable Cellular Manufacturing Systems with Alternative Routing	Mehmet Uzunosmanoglu, Veronique Limère, and Birger Raa	SS-1	Exploring Challenges in a Low-Volume Product Industrialization Process - A Railway Case Study	Vésteinn Sigurjónsson, Jessica Bruch, and Anna Granlund	SS-6	Service Lifecycle Management in Complex Product-Service Systems	Peter Dober, Shaun West, Stefan Wiesner, and Martin Ebel	SS-2	Lean Supply Chain and Industry 4.0: A Study of the Interaction between Practices and Technologies	Matteo Rossini, Stefano Freccassetti, and Alberto Portioli-Staudacher	RS-3	Digital Service Twin - Design Criteria, Requirements and Scope for Service Management	Alicia Schultheiss, Edgar Polovoj, Stefan Dolanovic, and Katja Gutsche			
15:20	Parallel session 7	RS-1	Development of Predictive Maintenance Models for a Packaging Robot Based on Machine Learning	Ayoub Chakroun, Yasmina Hani, Sadok Turki, Nidhal Rezg, and Abderrhmane Elmhamed	SS-1	The Resilience of an ETO Archetype to Demand Shocks	Yuxuan Zhou, Jonathan Gosling, Mohamed Naim, and Xun Wang	SS-6	Lifecycle Management of Digitally-enabled Product-Service Systems Offerings: The Next Challenge for Manufactures	Oliver Stoll, Shaun West, Fabiana Pirola, and Roberto Sala	SS-2	The Productivity Leap: Effects of an Industry Program in Norway	Eivind Reke, Natalia Iakymenko, and Mette Holmriis Brøgger	RS-3	Towards Ontologizing a Digital Twin Framework for Manufacturing	Milos Drobnjakovic, Guodong Shao, Ana Nikolov, Boonserm Kulvatunyou, Simon Frechette, and Vijay Srinivasan			
	Session name				Towards Next-Generation Production and SCM in Yard and Construction Industries			Operations and SCM in Energy-Intensive Production for a Sustainable Future (1)			Applications of Artificial Intelligence in Manufacturing		SME 5.0: Exploring Pathways to the Next Level of Intelligent, Sustainable, and Human-Centred SMEs						
	Session chair																		
17:00	Parallel session 8				SS-15	Towards a Concept for Digitalized Yard Logistics—Outlining the Next-Generation Features	Jo Wessel Strandhagen, Marco Semini, and Erlend Alfnes	SS-17	A Digital Twin–based Approach to Reinforce Supply Chain Resilience: Simulation of Semiconductor Shortages	Phu Nguyen, Dmitry Ivanov, and Fabio Sgarbossa	RS-4	Examining Heterogeneous Patterns of AI Capabilities in Manufacturing Value Chain	Djerdj Horvat, Marco Baumgarten, Steffen Kinkel, and Patrick Mikalef	SS-20	From Surviving to Thriving: Industry 5.0 at SMEs Enhancing Production Flexibility	Zuhara Zemke Chavez, Ala Arvidsson, Jannicke Baalsrud Hauge, Monica Bellgran, Seyoum Eshetu Birkie, Patrik Johnson, and Martin Kurdve			
17:20	Parallel session 8				SS-15	Requirement Analysis and Concept Design of a Smart Mobile Factory for Infrastructure Projects	Patrick Dallasega, Andrea Revolti, Felix Schulze, Lorenzo Benedetti, and Doré de Morsier	SS-17	Integrating Closed-loop Supply Chain Design-Planning into Product Development: A Systematic Literature Review	Sobhan Mostafayi Darmian, Fabio Sgarbossa, and Torgeir Welo	RS-4	Enabling an AI-based Defect Detection Approach to Facilitate Zero Defect Manufacturing	Nicolas Leberrier, Jessica Bruch, Mats Ahlskog, and Sara Afshar	SS-20	Challenges in Designing and Implementing Augmented Reality-based Decision Support Systems for Intralogistics: A Multiple Case Study	Moritz Quandt, Hendrik Stern, Markus Kreutz, and Michael Freitag			
17:40	Parallel session 8				SS-15	Management and Emerging Technology in Maritime Logistics: A Lewin Force Field Analysis	Atle Martin Christiansen, and Kenneth Vidskjold	SS-17	Life Cycle Assessment of Red Mud-based Geopolymer Production at Industrial Scale	Luca Adelfio, Fabio Sgarbossa, Rosanna Leone, and Giada La Scalia	RS-4	A Conceptual Framework for applying Artificial Intelligence to Manufacturing Projects	Aymane Sahli, Euijin Pei, and Richard Evans	SS-20	Data at the Heart of the Industry of the Future: New Information Issues from an Information and Communication Sciences Perspective	Nathalie Pinède, and Bruno Vallespir			
18:00	Parallel session 8				SS-15	Streamlining the Execution of Maritime Commissioning with a Digital Assistance System	Tim Maximilian Jansen, Oliver Karl, Ahmed Elzabalany, and Hermann Lödding	SS-17	Product Recovery Options in Closed Loop Supply Chain Networks: A Literature Review	Hiran Harshana Prathapage, Dmitry Ivanov, and Fabio Sgarbossa	RS-4	Influence of Artificial Intelligence on Natural Resource Consumption	Naiara Uriarte-Gallastegi, Beñat Landeta Manzano, Germán Arana-Landín, and Iker Laskurain-Iturbe						

Wednesday 20 September, before lunch

Time		Room		Cosmos 1&2		Cosmos 3A		Cosmos 3B		Cosmos 3C			
	Session name	Smart Production Planning and Control (1)		Crossroads and Paradoxes in the Digital Lean Manufacturing World (1)		Digital Transformation Approaches in Production Management (1)		Smart Manufacturing to Support Circular Economy					
	Session chair		Jan Ola Strandhagen	Anita Romsdal		David Romero	Paolo Gaiardelli		Selver Softic	Ugljesa Marjanovic		Rossella Pozzi	Nicolò Saporiti
08:40	Parallel session 9	SS-19	Modeling of a Matrix Production System for Simulation to Predict Material Demand	Daniel Ranke	SS-9	Tying Digitalization to the Lean Mindset: A Strategic Digitalization Perspective	Victor Eriksson, Sourav Sengupta, Ann-Charlott Pedersen, Elsebeth Holmen, Heidi Carin Dreyer, Marte Daae-Qvale Holmemo, Signe Sagli, Sigrid Sand, Sunniva Økland, Daryl Powell, Natalia Iakymenko, Serkan Eren, and Eirin Lodgaard	SS-12	Digital Transformation towards Industry 5.0: A Systematic Literature Review	Jelena Crnobrnja, Darko Stefanovic, David Romero, Selver Softic, and Ugljesa Marjanovic	SS-18	Assessing the Interplay between Circular Economy, Industry 4.0 and Lean Production: A Bibliometric Review	Violetta Giada Cannas, Riccardo Fabris, Rossella Pozzi, Matteo Ridella, Nicolò Saporiti, and Andrea Urbinati
09:00	Parallel session 9	SS-19	Data-driven Production Logistics: Future Scenario in Two Swedish Companies based on Discrete Event Simulation	Masoud Zafarzadeh, Magnus Wiktorsson, and Jannicke Baalsrud Hauge	SS-9	Synergies between Industry 4.0 and Lean on Triple Bottom Line Performance	Thomas Bortolotti, Stefania Boscarì, Willem Grob, and Daryl Powell	SS-12	Industry 5.0 and Manufacturing Paradigms: Craft manufacturing - A Case from Boat Manufacturing	Bjørnar Henriksen, and Maria Kollberg Thomassen	SS-18	Adopting Circular Economy Paradigm to Waste Prevention: Investigating Waste Drivers in Vegetable Supply Chains	Madushan Madhava Jayalath, R.M. Chandima Ratnayake, H. Niles Perera, and Amila Thibbotuwawa
09:20	Parallel session 9	SS-19	Artificial Intelligence of Things (AIoT) Strategies for a Smart Sustainable-Resilient Supply Chain	Hamed Nozari, Reza Tavakkoli-Moghaddam, Mohammad Rohani Nezhad, and Zdenek Hanzalek	SS-9	Design and Application of a Development Map for Aligning Strategy and Automation Decisions in Manufacturing SMEs	Malin Löfving, Peter Almström, Caroline Jarebrant, and Magnus Widfeldt	SS-12	Industry 4.0 Readiness Assessment of Enterprises in Kazakhstan	Dinara Dikhanbayeva, Malika Aitzhanova, Yevgeniy Lukhmanov, Ali Turkyilmaz, Essam Shehab, and Idriss El-Thalji	SS-18	Towards a Circular Manufacturing Competency Model: Analysis of the State of the Art and Development of a Model	Marta Pinzone, and Marco Taisch
09:40	Parallel session 9	SS-19	PPC-Layout and Order Net – Visualization for a rapid PPC Analysis and Design	Hans-Hermann Wiendahl	SS-9	Using the Lean Approach for Improving Eco-efficiency Performance: A Case Study for Plastic Reduction	Matteo Ferrazzi, and Alberto Portioli-Staudacher	SS-12	Critical Factors for Selecting and Integrating Digital Technologies to enable Smart Production: A Data Value Chain Perspective	Natalie Agerskans, Mohammad Ashjaei, Jessica Bruch, and Koteshwar Chirumalla	SS-18	Implications of Improving Resource Efficiency when Utilizing Residual Raw Material on Trawlers Producing Head and Gutted Fish	Per Solibakke
10:00	Parallel session 9	SS-19	Does Regulating Work-In-Process Increase Throughput and Reduce Cycle Times? An Assessment by Lab Scale System Models	Matthias Thürer, Shan Shan Li, Can Yang, Ting Qu, and George Q. Huang	SS-9	Work Pattern Analysis with and without Site-specific Information in a Manufacturing Line	Takeshi Kurata, Rei Watanabe, Satoki Ogiso, Ikue Mori, Takahiro Miura, Karimu Kato, Yasunori Haga, Shintaro Hatakeyama, Atsushi Kimura, and Katsuko Nakahira	SS-12	Business Process Reengineering in Agile Manufacturing – A Mixed Method Research	Khadija Lahlou, Khaled Medini, Thorsten Wuest, and Qussay Jarrar	SS-18	Driving Sustainability through a VSM-Indicator-based Framework: A Case in Pharma SME	Zuhara Zemke Chavez, Mayari Perez Tay, Mohammad Hasibul Islam, and Monica Bellgran
	Session name	Smart Production Planning and Control (2)		Crossroads and Paradoxes in the Digital Lean Manufacturing World (2)		Digital Transformation Approaches in Production Management (2)		Operations and SCM in Energy-Intensive Production for a Sustainable Future (2)					
	Session chair		Julia Pahl	Jannicke Baalsrud Hauge		Daryl Powell	David Romero		Selver Softic	Ugljesa Marjanovic		Giuseppe Fragapane	Fabio Sgarbossa
11:40	Parallel session 10	SS-19	Setup Time Prediction using Machine Learning Algorithms: A Real-world Case Study	Alberto Locatelli, Manuel Iori, Marco Lippi, and Marco Locatelli	SS-9	A Systematic Literature Review on Combinations of Industry 4.0 and Lean Production	Kristian Johan Ingvar Ericsson, and Antonio Maffei	SS-12	Service-Oriented Architecture for Driving Digital Transformation: Insights from a Case Study	Omid Maghazei, Marco Messerli, Thomas Gittler, and Torbjørn Netland	SS-17	Digital Twin enabling Manufacturing and Energy Flexibility and Optimizing Industrial Demand Response Services	Paul Kengfai Wan, Matteo Ranaboldo, Alessandro Burgio, Chiara Caccamo, and Giuseppe Fragapane
12:00	Parallel session 10	SS-19	Simple Analysis of Planning Quality in Production Logistics	Tobias Hiller, Lena Osterkamp, Lea Vinke, Patrick Holtsch, Alexander Mütze, and Peter Nyhuis	SS-9	Lean and Digital Strategy Role in Achieving a Successful Digital Transformation	Stefano Frecassetti, Anna Presciuttini, Matteo Rossini, and Alberto Portioli-Staudacher	SS-12	Consumer Engagement in the Design of PLM Systems: A Review of Best Practices	Uchechukwu Nwogu, and Richard Evans	SS-17	Discrete Event Simulation for Improving the Performance of Manufacturing Systems: A Case Study for Renewable Energy Sources Production	Panagiotis Mavrothalassitis, Nikolaos Nikolakis, and Kosmas Alexopoulos
12:20	Parallel session 10	SS-19	Planning and Control of Maritime Commissioning - Planning Concept	Nina Maria Köster, Christopher Mundt, and Hermann Lödding	SS-9	Characterization of Digitally-Advanced Methods in Lean Production Systems 4.0	Simon Schumacher, Roland Hall, Michael Hautzinger, Jan Schöllmann, and Thomas Bauernhansl	SS-12	A Distributed Ledger Technology Solution For Connecting E-Mobility Partners	Radu Ungureanu, Selver Softic, Emil Stefan Chifu, and Ioan Turcin	SS-17	Analysing Barriers to Achieving SDG 7. Managing Green Product Development in the Wind Energy Sector	Rakel Garcia, Beñat Landeta, German Arana, and Ruben Jimenez
12:40	Parallel session 10	SS-19	Production Scheduling using Production Feedback Data; An Illustrative Case Study	Mina Rahmani, Anita Romsdal, Øyvind A.M. Syversen, Fabio Sgarbossa, and Jan Ola Strandhagen							SS-17	Challenges and Opportunities for Adopting Green Technologies in Maritime Transportation Planning	Mohamed Ben Ahmed, Even Molland, and Tore Tomasgard

Wednesday 20 September, after lunch

Time		Room		Cosmos 1&2			Cosmos 3A			Cosmos 3B			Cosmos 3C				
	Session name		Smart Production Planning and Control (3)		Product Information Management and Extended Producer Responsibility			Managing Digitalization of Production Systems (2)			Resilience Management in Supply Chains						
	Session chair			Jo Wessel Strandhagen	Sven-Vegard Buer			Lise Lillebrygfeld Halse	Bjørn Jæger			Umit Bititci	Heidi Dreyer		Dmitry Ivanov	Boonserm Kulvatunyou	
14:00	Parallel session 11		SS-19	Towards Smart Maintenance and Integrated Production Planning	Julia Pahl, Harald Rødseth, and Jan Ola Strandhagen		SS-23	Opportunities and Challenges of Applying Internet of Things for Improving Supply Chain Visibility of Incoming Goods: Results from a Pilot Study	Ravi Kalaiahasan, Malin Ducloux, Tarun Kumar Agrawal, Jannicke Baalsrud Huage, and Magnus Wiktorsson		RS-2	A New Generation? A Discussion on Deep Generative Models in Supply Chains	Eduardo e Oliveira, and Mª Teresa Pereira		RS-5	Derivation of the Data Attributes for Identification of Incorrect Events in Supply Chain Event Management	Jokim Janßen, Tobias Schröer, and Günther Schuh
14:20	Parallel session 11		SS-19	Smart Production Planning and Control; Concept for Improving Planning Quality with Production Feedback Data	Mina Rahmani, Øyvind A.M. Syversen, Anita Romsdal, Fabio Sgarbossa, and Jan Ola Strandhagen		SS-23	A Review on Design for Repair Practices and Product Information Management	Nataliia Roskladka, Gianmarco Bressanelli, Giovanni Miragliotta, and Nicola Saccani		RS-2	Business Context-based Approach for Managing the Digitalization of Biopharmaceutical Supply Chain Operational Requirements	Elena Jelusic, Milos Drobnjakovic, Boonserm Kulvatunyou, Nenad Ivezic, and Hakju Oh		RS-5	Resilience Configurator for Procurement	Maria Spiß, Tobias Schröer, and Günther Schuh
14:40	Parallel session 11		SS-19	Spare Parts Demand Prediction by using a Random Forest approach	Joakim Andersson, and Evangelos Siminos		SS-23	Approach on How to Handle Digital Thread Information in Manufacturing with a Human-Centric Perspective Taking into Account a Didactic Factory	Kay Burow, Patrick Klein, Karl Hribernik, and Klaus-Dieter Thoben		RS-2	Volunteering Service Engineering in Non-Profit Organizations	Mike Freitag, and Oliver Hämmerle		RS-5	A Proposal of Resilient Supply Chain Network Planning Method with Supplier Selection and Inventory Levels Determination using Two-stage Stochastic Programming	Hibiki Kobayashi, Toshiya Kaihara, Daisuke Kokuryo, Rina Tanaka, Masashi Hara, Yuto Miyachi, and Puchit Sariddichainunta
15:00	Parallel session 11		SS-19	Interfaces between the Factory Planning Process and the Quality Management for an Optimized Planning Outcome	Tanya Jahangirkhani, Ninja vom Stein, Peter Nyhuis, and Manuel Löwer		SS-23	Textile Industry Circular Supply Chains and Digital Product Passports. Two Case Studies	Bjørn Jæger, and Sivert Myrøld						RS-5	Function-based Approach for Disaster Relief Logistics	Theresa-Franziska Hinrichsen, Eduardo Colangelo, Merlit Kirchhoefer, and Tobias Spanke