LEARNING FROM THE BEST: EXCELLENCE IN LEAN

AUTOMOTIVE LEAN PRODUCTION
AWARD & STUDY
AUTOMOBIL PRODUKTION
agamus CONSULT

Photo: IVECO

Automotive Lean Production – Award & Study Questionnaire 2020

// Application deadline: May 15th, 2020

A cooperation between

AUTOMOBIL PRODUKTION
agamus CONSULT

automobil-produktion.de // agamus.com

Award & Study 2020: Application & dates

Application deadline for the Automotive Lean Production Study is **May 15th, 2020.**

You can find the electronic version of the questionnaire on our website **automotive-lean-production.de.**

Please return the completed questionnaire via email to **lean.award@agamus.com.**

For the purpose of evaluation your business data will be saved electronically and kept strictly confidential. Your personal data will be used in case of queries. All personal data will be deleted irrevocably after the Automobile Lean Production Congress. No data will be forwarded to third parties.

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Automotive Lean Production – Award & Study is a cooperation between the magazine AUTOMOBIL PRODUKTION and Agamus Consult GmbH. Agamus Consult has served automotive enterprises as an implementation consultant for more than 20 years.

Photo: IVECO

15th Congress Automotive Lean Production November 5th/ 6th 2020, IVECO Vallodolid Plant

On November 5th/6th 2020 the best-performers of the study will receive the Automotive Lean Production Awards. Host of this years's edition will be IVECO at their production location in Valladolid, Spain.

The IVECO plant Valladolid, 2019 award-winner in the category »OEM«, invites the participants on November 5th to an exclusive visit to its production followed by a Get-Together in the plant.

For further information about the congress, please visit: **automotive-lean-production.de**

The IVECO team from Valladolid during the Automotive Lean Production Award ceremony 2019

Photo: Matthias Leitzke for VW

Automotive Lean Production – Award & Study

Objective of the initiative
AUTOMOBIL PRODUKTION and Agamus Consult are carrying out the Automotive Lean Production study for the 15th time. The Europe-wide initiative that dedicates itself to Lean manufacturing focusses on the following questions:

- What are the success factors of Lean Production?
- Who applies lean methods and strategies and what are the results in terms of quality, cost and delivery performance?
- How does the increasing digitalization of the production affect the existing production systems?

The best performers of the study are awarded with the Automotive Lean Production Award in different categories. Eligible are plants and business units which employ more than 250 employees.

Application procedure
After analysis of the questionnaires, the top performers – candidates for the 2020 Automotive Lean Production Award – are visited for further analysis and on-site validation of the results. In a personal feedback session you discuss your strengths and potential for improvement with the experts.
The leanest and most efficient enterprises are awarded on the Congress Automotive Lean Production on November 3th/4th, 2020 and present their prize-winning projects and strategies.

Results
All participants receive – upon request – their individual analysis with benchmark comparison.

Participation is free.

Benefit for Participants
- **Benchmarking**

On base of the individual evaluation every participating plant can draw its own benchmark regarding application of lean methods and achieved results.

- **Comprehensive self-reflexion**

Beyond benchmarking the questionnaire focusses on a variety of success factors (e.g. communication and change management, trainings, planning of resources, Lean Roadmap, …), which were developed based on the experience of more than 14 years Automotive Lean Production – Award & Study by Agamus Consult. The critical analysis helps to identify blind spots at the approach in every stage of Lean implementation.

- **External Feedback on request**

For all participants, which do not belong to the group of finalists, Agamus Consult offers an evaluation visit which is independent from the award on request. Incurred travel expenses have to be beard.

Comments from former participants

»While engaging ourselves with the questions, we were able to reflect on our achievements once again as well as bringing into focus the challenges of the steps that lie ahead of us.«

Peter Lion
Head of Department HoP1/BPS – Bosch Production System, Robert Bosch GmbH, Plant Homburg

»The participation in the Automotive Lean Production evaluation after an intensive lean-transformation process has given us an honest, unadorned and profound reflection of our current situation and progress. It was and is exciting to find out where we stand as a company compared to other global players and especially medium-sized companies. In the end, it is extremely motivating to see what we have achieved – winning an award, really tops it all.«

Dr. Gregor Wasle
CEO at InTiCa Systems AG

»By LEAN/KAIZEN we understand the cultural change as the basis for improvements and economic success. The evaluation of our locations offers us both an internal and external benchmark, intensive professional discussions with Agamus and thus new impulses for our ambitious goals.«

Dr. Ronald Märtins
CEO at MöllerTech International GmbH

	A. Contact data		
1	**Name and job title of respondent:**		
2	**Company and address:**		
3	**Phone number:**		
4	**E-mail:**		
5	**What is the exact name of your unit (e.g. local subsidiary/company name, exact plant name) you are participating with in the study? Hereafter always named as plant:**		
6	**State your plant's two most important products:**		
		YES	**NO**
7	**Do you wish to apply for one of the Awards for your plant?** (upon request you will receive the results of the study even if you do not apply for the Award.)		

	B. Structural data	
8	**How many employees work at your plant?**	
9	**What is the ratio of direct employees in relation to the entire workforce?** (direct employees = spend at least 80% of their attendance with value adding activities)	%
10	**What was your plant's revenue in the last business year?** (in millions of €)	Mio. €
11	**What percentage of your revenue stems directly from enterprises in the automotive industry?**	%
12	**How do you supply your customers in regards of delivery system?** (percentage by value of goods)	
	Batch (lot sizes)	%
	Just in Time (JIT)	%
	Just in Sequence (JIS)	%
13	**What are the main production technologies at your plant?** (please rate the distribution of your direct production employees)	
	Assembly	%
	Robot welding (e.g. body shop)	%
	Casting (metal)	%
	Pressing, punching, forging ... (metal)	%
	Machining (shape-cutting)	%
	Painting, powder coating, heat treatment, electroplating…	%
	Plastics processing (e.g. injection moulding, thermoforming, RIM-process)	%
	Manufacturing of electronic parts (e.g. SMD assembly)	%
	Other (please specify): _____	%

	C. Production system - structure and implementation level					
	To what extent have you sustainably implemented the following Lean production practices at your plant?	NOT IMPLEMENTED	PILOT	HALFWAY	EXTENSIVELY	COMPLETELY
14	**5S** Sort, set in order, shine, standardize, sustain					
15	**FMC - Flexible Manpower Cell** A working environment in which people and machines can quickly adapt to changing customer demands					
16	**Flexible working hours** e.g. flex time accounts					
17	**Flow production** Work cells sequenced to match the flow of materials, optimized paths, synchronized and concatenated processes					
18	**Group / team work models** Multiple qualifications, partly autonomous teams					
19	**Kaizen- / CIP-Workshops** Continuous improvement workshops with the employees who take part in the process					
20	**Supplier development** Proactively develop the supplier to extensively integrate material and information flows					
21	**Cyclical materials supply in production** Milkrun, Waterspider, etc.					
22	**Level production** Levelled job orders in order to produce for a defined period a constant number of products in defined intervals					
23	**Poka Yoke** Employ a specially designed material or manufacturing process to prevent errors; failure-safe processes, test mediums and equipment					
24	**Q-Tools** QFD, FMEA, 6-Sigma, 8D-Reports, A3-problem-solving process, etc.					
25	**Fast-response systems** Standardized event- and time-driven escalation routines that provide the necessary resources in the event of problems; e.g. pull cord					
26	**Fast setup** Fast tooling to flexibly respond to customer requirements; goal: reducing stock and increasing flexibility					
27	**Standardised workflows** Clearly visualise workflows, defined operator cycles dependent on the customer tact time; Goal: process reliability and efficient employee deployment					
28	**Standardised KPI's** Key figures, that represent the necessary efficiency ratios (OEE, workforce productivity, complaint files) at production group level and are aggregated to area codes					

29	**TPM - Total Productive Maintenance** Maintenance strategy, autonomous maintenance, management of external services, spare-part-management, workload planning and scheduling in maintenance					
30	**Pull production control** Pull principle driven by demand, self-regulated control loops					
31	**Visual management** Visual indications of standards to ensure deviations are monitored and readily identified					
32	**Value stream methodology** Graphic account of material and information flow as map and design; to determine total lead time and identify non value-adding activities within the process					
33	**Shop floor management** Management on the shop floor, standardised routines applicable to operators and management					

	D. Introduction of Lean		**YES**	**NO**
34	**Since when** (year) **have you been introducing Lean principles and tools to an appreciable extent?**			
35	**Do you have a Lean Roadmap?**			
	If yes: Since when?		years	
	If yes: What planning horizon (years) does the Roadmap show?		years	
36	**Do you measure the maturity level of your production system?**			
	If yes: Which maturity level shows your plant? (rate positive 0-100%; if you use a stage model, please refer to the highest stage)		%	
37	**How many Lean experts that are released from other duties (FTE) do you have per 100 employees?**			
38	**What relative percentage of improvement did you achieve by your Lean activities in the last two years respectively what do you plan to achieve in the next two years?** **In terms of:**	**IMPROVEMENT OVER THE LAST 2 YEARS**	**IMPROVEMENT IN THE NEXT 2 YEARS**	
	Productivity	%	%	
	Cost reduction	%	%	
	Internal PPM	%	%	
	Supplier's PPM	%	%	
	PPM to customers	%	%	
	Lead time	%	%	
	Inventory	%	%	
	OEE	%	%	
	Reaction speed	%	%	
	Flexibility	%	%	
	Ergonomics	%	%	
	Other (please specify): _____	%	%	
39	**How many suggestions for improvement are submitted per employee per year?**			

	E. Digitization - structure and status of implementation					
	To what extent did you sustainably implement the following components of digitization at your plant?	NOT IMPLEMENTED	PILOT	HALFWAY	EXTENSIVELY	COMPLETELY
40	**Culture of change** Employee is given space for inventions and new development: among innovation workshops, ideas of employees become new projects which contribute to the further development of the company (Digital Factory Lab).					
41	**Training programms for employees** Employees are prepared for upcoming changes of digitization in the working environment by completing special training programms.					
42	**Virtual reality for designing workplaces and training of operators** After planning, the workplace is tested virtually and weak spots are being eliminated. For an effective training and a more effective ramp-up, operators are trained at their virtual workplace.					
43	**The use of supporting systems for operators** Operators use supporting systems for their different tasks on the assembly line / in manufacturing based on a networked infrastructure.					
44	**The use of mobile supporting systems for the first line management on the shop floor** The first line management on the shop floor uses mobile assistance systems based on the networked infrastructure.					
45	**Usability** Operation of complex equipment by normal operators based on a user-centered software environment and user-friendly human-machine-interfaces (semiotics).					
46	**Human-robot-collaboration** Operators share their workspace with robots without separative protection devices (maintening same safety level). Work steps between humans and robots can be combined individually.					
47	**Intuitive methods of robot-programming** Robots are no longer plain-text programmed, but are now installed by teach-by-demonstration (human demonstrates assembly operations), by app or speech-based-solution.					
48	**Inline component parts production by additive manufacturing** Use of additive manufacturing to produce component parts to meet increasing customer's wish of individualization (lot size 1, lead time reduction, logistics costs reduction).					
49	**Integrated quality assurance system** In the event of quality issues, the system intervenes in the control loops in real time and initiates processes to solve the problem.					
50	**Predictive Maintenance** Analysis of real time equipment data to determine when maintenance should be performed and avoid maintenance errors or premature repairs.					
51	**Augmented Reality** Maintenance and repairs are supported by information objects superimposed on the user's view of the equipment.					

52	**Flexible manufacturing concepts** Thanks to a modular structure, production units / lines can easily be modified or expanded. A flexible change of production technologies can be proceed with a minimum effort via plug&play solutions.					
53	**Digital shop floor management** Shop floor data are available remotely in different locations in real time (enhancing knowledge management) and can be used on virtual board by all stakeholders.					
54	**Digital integration of value chain partners** All partners worldwide (suppliers, customers, service providers, etc.) are using the same up-to-date data pool.					
55	**'Digital twin' of the real production** All equipment, products, plants as well as their conditions are clearly monitored, mapped and interconnected into a virtual representation (digital world).					
56	**Digital platform controls the real production** A manufacturing-process-platform based on the 'digital twin' controls the production and logistics in real time by autonomously adjusting the work organization when changes of the 'twin' occur. (Integration of industrial engineering, planning, production control and management of production and logistic into one platform).					
57	**Digital integration of manufacturing and logistics** Changes in the manufacturing process (e.g. product is manufactured at a different working station) update automatically related logistics processes and the simulation- and production-planning-tool of the digital world.					
58	**Process Mining** Business processes are automatically mapped and analyzed (e.g. divergences from standards) based on process log data from IT-systems.					
59	**Deep Learning / Machine Learning** Digital systems are capable of processing large data volumes of different formats and identifying recurring patterns and cause-effect correlations. In this way, trends and anomalies can be detected – in real time and within the running system.					

	F. Lean and Industry 4.0 - prerequisites, culture change, future trends	**YES**	**NO**
60	**Are you already working on digitization and Industry 4.0?**		
	If yes: Since when?	years	
61	**How many of your digitization projects are evaluated with ROI?**	%	
62	**What slows down digitization at your plant?** (please rate 0: *not* to 3: *very strong*)	**0 - 3**	
	Incorrect introduction strategy	0	
	Missing budget / investment	0	
	Missing or inadequate know-how	0	
	Rigid structures	0	
	Employee acceptance / works council acceptance	0	
	Lack of error culture, willingness to take risks	0	
	IT topics (IT security, IT strategy, ...)	0	
63	**To what extent do you agree with the following statements regarding the interaction of Lean and Industry 4.0?** (please rate with *0: don't agree* to *3: fully agree*)	**0 - 3**	
	Lean is the prerequisite for a successful implementation of Industry 4.0.	0	
	Industry 4.0 will replace our previous Lean activities.	0	

64	**Do you agree with the following statements about the digital transformation at your plant?**	**YES**	**NO**
	Digitization has changed the cooperation between management / workers.		
	Digitization has changed the cooperation between the people on the shop floor.		
	Digitization overwhelms a significant part of the workforce.		
	There are special (training) programs to help older employees get started with digitization.		
	A significant part of your workforce sees the digital transformation as a threat to the workplace.		
	Digitization will significantly change our work / corporate culture over the next few years.		

65	**Please rate these questions about the digital culture in the company:** (rate 0: *not* to 3: *very strong*)	**0 - 3**
	How intensively is your plant currently working on introducing a digital culture?	0
	How intensively is the workforce involved in the development of the digital culture?	0
	How strong is the willingness of the employees to actively shape the digital transformation?	0
66	**To what extent do you agree with the following statements about changes in cooperation as a result of the digitization at your plant?** (please rate with 0: *don't agree* to 3: *fully agree*)	**0 - 3**
	Management decisions have become more transparent for employees	0
	Decisions are now made quicker and more targeted	0
	Leaders are delegating more often their tasks	0
	Decisions are now made more often within a team	0
	The quality of regular meetings improved	0
	Working is less hierarchical	0
	The spirit of innovation is now higher	0
	'Pockets of knowledge' are decreasing	0
	Experienced employees respect more the input from younger colleagues (digital natives)	0
	Junior colleagues are taking management responsibilites more quickly	0
67	**Who is promoting / pushing digitization at your plant?** (please rate 0: *not* to 3: *very strong*)	**0 - 3**
	Customer	0
	IT-Department	0
	Other departments (e.g. production, logistics, quality, maintenance)	0
	Corporate headquarters (e.g. assigned CDO or digital project manager)	0
	Lean department	0
	Plant manager	0

68	**What benefits do you already receive today or expect to receive in the next 2 years from the following smart applications / developments?** (please give your assessment as follows: 0: *no use* ; 1: *low benefit* ; 2: *average benefit* ; 3: *high benefit* ; 9: *no statement possible*)	**TODAY**	**FUTURE**
	Sensitive collaborative lightweight robots	0	0
	Additive manufacturing for the production of spare parts (machines, tools) and helping devices (e.g. poka yoke or assembly devices)	0	0
	Usage of smart glasses (e.g. picking/logistics or remote instructions)	0	0
	Industrial Internet of Things (IIoT) platform (to link all IIoT-systems)	0	0
	In-Memory Data Analytic Software for process- und equipment data exploration	0	0
	Indoor-tracking (part-tracking) in the production (e.g. RFID, UWB, etc.)	0	0
	Software for simulating virtual commisioning	0	0
	Software for modelling and simulating the manufacturing process as-is	0	0
	Condition monitoring systems for equipments	0	0
	Predictive maintenance software	0	0
	Digital assembly instructions at the work station (via mobile devices)	0	0
	Cloud platform with suppliers to control (critical) components	0	0
	Automated in-house logistics (combining AGVs with controll software)	0	0
	Pick-by-x (pick-by-light, -voice, -vision, etc.)	0	0
	Exoskeleton as ergonomic support for factory workers	0	0
	MES (Manufacturing Execution System)	0	0
	Online (white) boards for cooperating in real time across different locations (digital visual management)	0	0
	Software for holistic energy management	0	0

	G. Value Stream Performance	
69	**What is the proportion of material cost in relation to the total turnover?** (raw materials and purchased parts)	%
70	**In what kind of delivery are these materials been supplied?** (please specify each as a percentage by value of goods)	
	Batch (lot sizes)	%
	Just-In-Time (JIT)	%
	Just-In-Sequence (JIS)	%
71	**How many days supply** (own + consigned) **of finished goods do you maintain on average?**	
72	**How many days supply** (own + consigned) **of raw materials do you maintain on average?**	
73	**What is the frequency of production of A-products?** (one answer only please)	
	Several times a day	
	Every day	
	Every third day	
	Every week	
	At intervals longer than weekly or irregularly	
	Unknown / not analysed	
74	**What is your plant's service level** (on time in full deliveries) **from your customers' perspective?** (order placement date, delivery date)	%
75	**What is your suppliers' customer service level from your plant's perspective?** (order placement date, delivery date)	%
76	**What is the average overall equipment effectiveness** (OEE) **as a percentage of total production time at bottleneck processes/machines?**	%
77	**What is your direct customer complains rate?** (product and logistics defects only)	PPM

	H. Maintenance and Industry 4.0	
78	**What are the repair costs** (planned and unplanned repair) **in relation to total maintenance cost?**	%
79	**What is the cost of planned repair, inspection and maintenance in relation to total maintenance effort?**	%
80	**What is the cost of preventive maintenance** (inspection, maintenance and technical optimization) **in relation to the overall maintenance effort?**	%
81	**Which duration of downtimes at bottleneck processes/machines is the usual threshold for them to be discussed in shop floor management?** (in minutes)	
82	**For which part of the total disturbances in critical systems will the causes be automatically recorded and coded?**	%
83	**To what extent are the machine-recorded and coded data used for the systematic derivation of maintenance measures?**	%
84	**What is the response time of maintenance in the event of faults in critical systems** (time between the occurrence of the fault and maintenace staff on-site/starting the system diagnostics)**?** (in minutes)	
85	**What proportion of the inspection and maintenance work is being executed by the production staff** (autonomous maintenance)**?** (please indicate the proportion regarding time)	%
86	**For which proportion of your systems/ system components exists a dedicated maintenance strategy?**	%
87	**For which proportion of your systems/ system components do you use condition based maintenance?**	%
88	**For which proportion of your systems/ system components do you use predictive maintenance?**	%

Send

The winners of the Automotive Lean Production Awards 2019

OEM
Iveco, Valladolid Plant, Spain

Supplier
SAS Automotive, Bratislava Plant, Slovakia

Special Award – Lean Transformation
Magna Auteca, Klagenfurt Plant, Austria

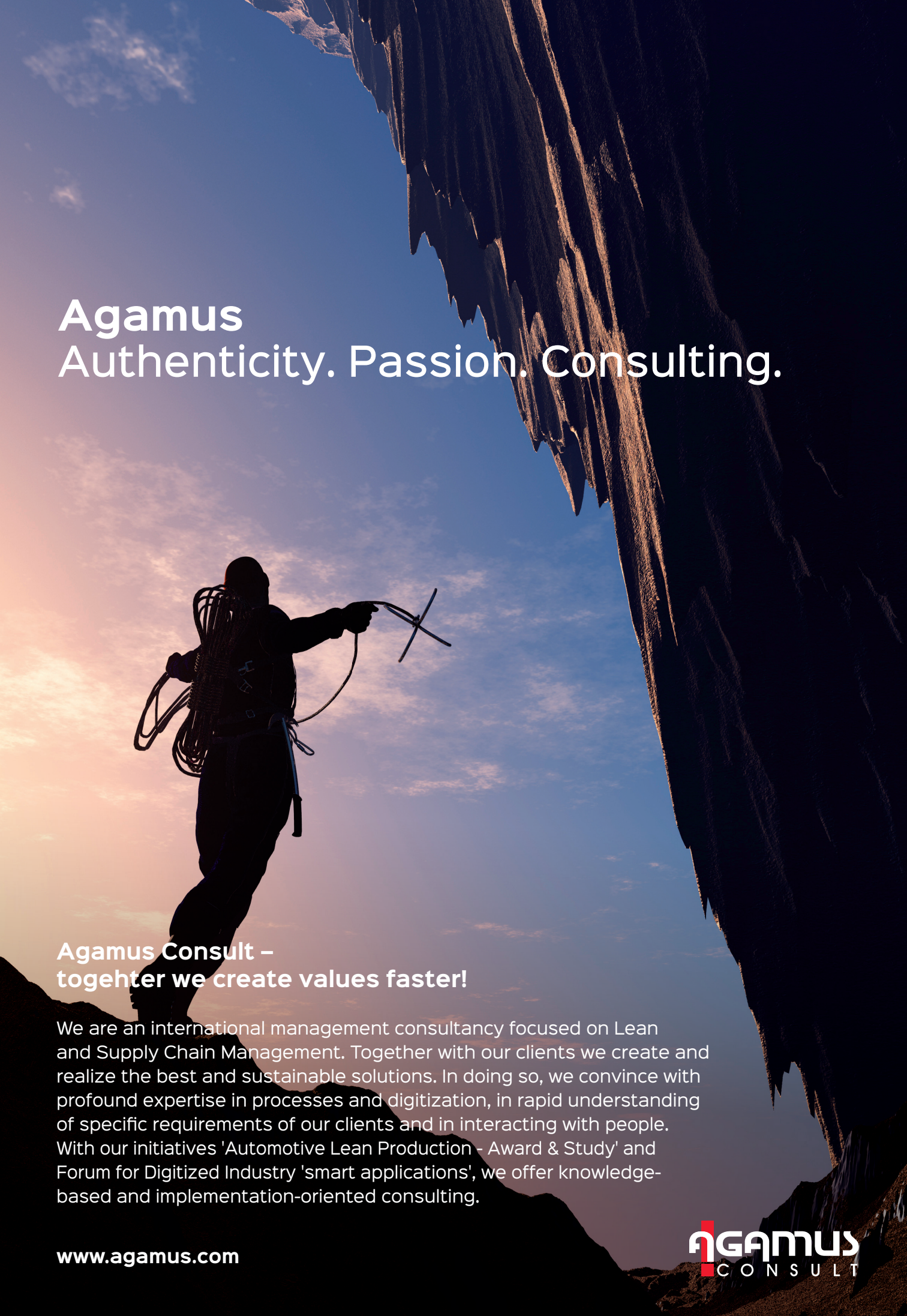
Special Award: Smart Digital Application
Skoda, Kvasiny Plant, Czech Republic

Photo: Matthias Leitzke for VW

The winners of the benchmark study Automotive Lean Production 2019

first row, FLTR:
Marek Jancák / Škoda Auto, Günther Zehenthofer / Magna Auteca, Ondrej Fukna / SAS Automotive, José Manuel Jaquotot / IVECO

second row, FLTR:
Guest of Honour: Prof. Dr. Carl Horst Hahn / former CEO of Volkswagen Group, Dr. Werner Geiger / Agamus Consult, Marc Kräutle / Agamus Consult, Dirk Reusch / Media-Manufaktur



Agamus
Authenticity. Passion. Consulting.

Agamus Consult –
togehter we create values faster!

We are an international management consultancy focused on Lean and Supply Chain Management. Together with our clients we create and realize the best and sustainable solutions. In doing so, we convince with profound expertise in processes and digitization, in rapid understanding of specific requirements of our clients and in interacting with people. With our initiatives 'Automotive Lean Production - Award & Study' and Forum for Digitized Industry 'smart applications', we offer knowledge-based and implementation-oriented consulting.

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