LEARNING FROM THE BEST: EXCELLENCE IN LEAN

AUTOMOTIVE LEAN PRODUCTION
AWARD & STUDY
AUTOMOBIL PRODUKTION   AGAMUS CONSULT

Automotive Lean Production – Award & Study Questionnaire 2022

// Application deadline: May 13th, 2022

New Award
Best Digitization Project 2022

A cooperation between

AUTOMOBIL PRODUKTION   AGAMUS CONSULT

automobil-produktion.de // agamus.com

Award & Study 2022: Application & dates

Application deadline for the Automotive Lean Production Study is **May 13ᵗʰ, 2022.**

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

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 data will be deleted irrevocably after the Automobile Lean Production Congress. No data will be forwarded to third parties.

Info-Line
Susann Matzat
phone: +49 89 44 388 99 22
fax: +49 89 44 388 99 23
email: lean.award@agamus.com

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 25 years.

Photo: Volkswagen Navarra

16ᵗʰ Congress Automotive Lean Production
November 16ᵗʰ / 17ᵗʰ 2022, Volkswagen Navarra, Pamplona

On November 16ᵗʰ / 17ᵗʰ 2022 the best-performers of the study will receive the Automotive Lean Production Awards at this year's congress at the Volkswagen Navarra plant in Pamplona, Spain.

Volkswagen Navarra invites the participants to an exclusive plant tour and provides an inspiring insight into its production.

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

Photo: David Markovic

▲ The award winners from VW at the presentation of the Automotive Lean Production Awards 2021; f.r.t.l.: Markus Haupt, Dr. Christian Vollmer with Dr. Werner Geiger and Mark Kräutle (Agamus)

Automotive Lean Production – Award & Study

Objective of the initiative

Agamus Consult and AUTOMOBIL PRODUKTION are carrying out the Automotive Lean Production study for the 16th time. The Europe-wide initiative focuses on the following questions:

- What are the success factors of Lean Production?
- Which lean modules are used and to what extent?
- What results are achieved in terms of quality, costs and delivery performance?
- How does the digitization of manufacturing affect the further development of production systems?
- What successful digitization projects are existing in the automotive industry?

The best plants are honored with the renowned Automotive Lean Production Awards (including OEM, Supplier, Smart Digital Operations, Digital Use Case). With the category ‚Digital Use Case' we are honoring individual projects for the first time and not just entire plants. Every participant has the opportunity to apply for one of the coveted awards with a successful digitization project. Eligible are plants and operational units that employ more than 250 employees.

Application procedure

After evaluating the questionnaires received, an on-site evaluation is carried out at the plants that are nominated for the Automotive Lean Production Award.
The winners will be announced at the Automotive Lean Production Congress on November 16th/17th, 2022 and will 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 etc.), which were developed based on the experience of more than 16 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 designation of your unit** (company, plant, …) **you are participating with in the study? Hereafter always designated 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	NOT IMPLEMENTED	PILOT	HALFWAY	EXTENSIVELY	COMPLETELY
	To what extent did you sustainably implement the following components of digitization at your plant?					
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** Relevant shop floor data are available multi-sites in real time (enhancing knowledge management) and beeing reviewed 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 enable to process large data volumes of different formats and identify 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		
	Missing budget / investment		
	Missing or inadequate know-how		
	Rigid structures		
	Employee acceptance / works council acceptance		
	Lack of error culture, willingness to take risks		
	IT topics (IT security, IT strategy, ...)		
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.		
	Industry 4.0 will replace our previous Lean activities.		

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?		
	How intensively is the workforce involved in the development of the digital culture?		
	How strong is the willingness of the employees to actively shape the digital transformation?		
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		
	Decisions are now made quicker and more targeted		
	Leaders are delegating more often their tasks		
	Decisions are now made more often within a team		
	The quality of regular meetings improved		
	Working is less hierarchical		
	The spirit of innovation is now higher		
	'Pockets of knowledge' are decreasing		
	Experienced employees respect more the input from younger colleagues (digital natives)		
	Junior colleagues are taking management responsibilites more quickly		
67	**Who is promoting / pushing digitization at your plant?** (please rate 0: *not* to 3: *very strong*)	0 - 3	
	Customer		
	IT-Department		
	Other departments (e.g. production, logistics, quality, maintenance)		
	Corporate headquarters (e.g. assigned CDO or digital project manager)		
	Lean department		
	Plant manager		
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		
	Additive manufacturing for the production of spare parts (machines, tools) and helping devices (e.g. poka yoke or assembly devices)		
	Usage of smart glasses (e.g. picking/logistics or remote instructions)		
	Industrial Internet of Things (IIoT) platform (to link all IIoT-systems)		
	In-Memory Data Analytic Software for process- und equipment data exploration		
	Indoor-tracking (part-tracking) in the production (e.g. RFID, UWB, etc.)		
	Software for simulating virtual commisioning		
	Software for modelling and simulating the manufacturing process as-is		
	Condition monitoring systems for equipments		
	Predictive maintenance software		
	Digital assembly instructions at the work station (via mobile devices)		
	Cloud platform with suppliers to control (critical) components		
	Automated in-house logistics (combining AGVs with controll software)		
	Pick-by-x (pick-by-light, -voice, -vision, etc.)		
	Exoskeleton as ergonomic support for factory workers		
	MES (Manufacturing Execution System)		
	Online (white) boards for cooperating in real time across different locations (digital visual management)		
	Software for holistic energy management		

	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. Best Practice Example "Digital Use Case" (Optional)
78	**In the category "Digital Use Case", for the first time we are also awarding prizes for individual projects and not just entire works. Each participant has the opportunity to apply for one of the coveted awards with a successful digitization project that improved the KPIs of the value stream. Please present your project in a separate documentation, whose form we leave up to you. In particular, please address the following aspects of the project.**
	Name/Designation
	Start and End date
	Target
	Essential contents/Milestones
	Improvements attained (qualitative, key figures)
	Innovations/What distinguishes the project in particular?
	Experiences/Lessons Learned
	Roll out/Further implementations planned

The winners of the Automotive Lean Production Awards 2021

OEM
Volkswagen Navarra, Plannt Pamplona, Spain

f.l.t.r.: M.Kräutle (Agamus), Dr. C.Vollmer, K.Fandrich, J.Arreche, M.Haupt, Dr. W.Geiger (Agamus)

Special Award –
Excellent Culture of Improvement
CNH Industrial, IVECO, Plant Suzzara, Italy

f.l.t.r.: A.Carlucci, Dr. M.Romani, G.Ricci, M.Kräutle (Agamus)

Special Award -
BU-Transformation Lerning Organisation
Feintool System Parts Europa, Germany

f.l.t.r.: Dr. W.Blümel, K.Zimmer, M.Kräutle (Agamus)

Special Award –
Lean Transformation
Witzenmann USA LLC, Werk Troy (MI), USA

f.l.t.r.: R.Kahrsch, K.Shivnen, Dr. W.Geiger (Agamus)

Excellent Ramp-Up of a New Paint Shop
ŠKODA AUTO, Plant Mladá Boleslav, Czech Republic

Dr. M. Oeljeklaus

Fotos: David Markovic

New Taigo
Be unfaithful to the ordinary

Why should you do what everyone else is doing? Do the unthinkable. The unexpected. And if you have to choose, choose. But choose it all. Like an SUV as well as a coupe and a coupe as well as an SUV.

Made in Volkswagen Navarra.
Winners of the Automotive Lean Production Award 2021

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