AUTOMOTIVE LEAN PRODUCTION
AWARD & STUDY

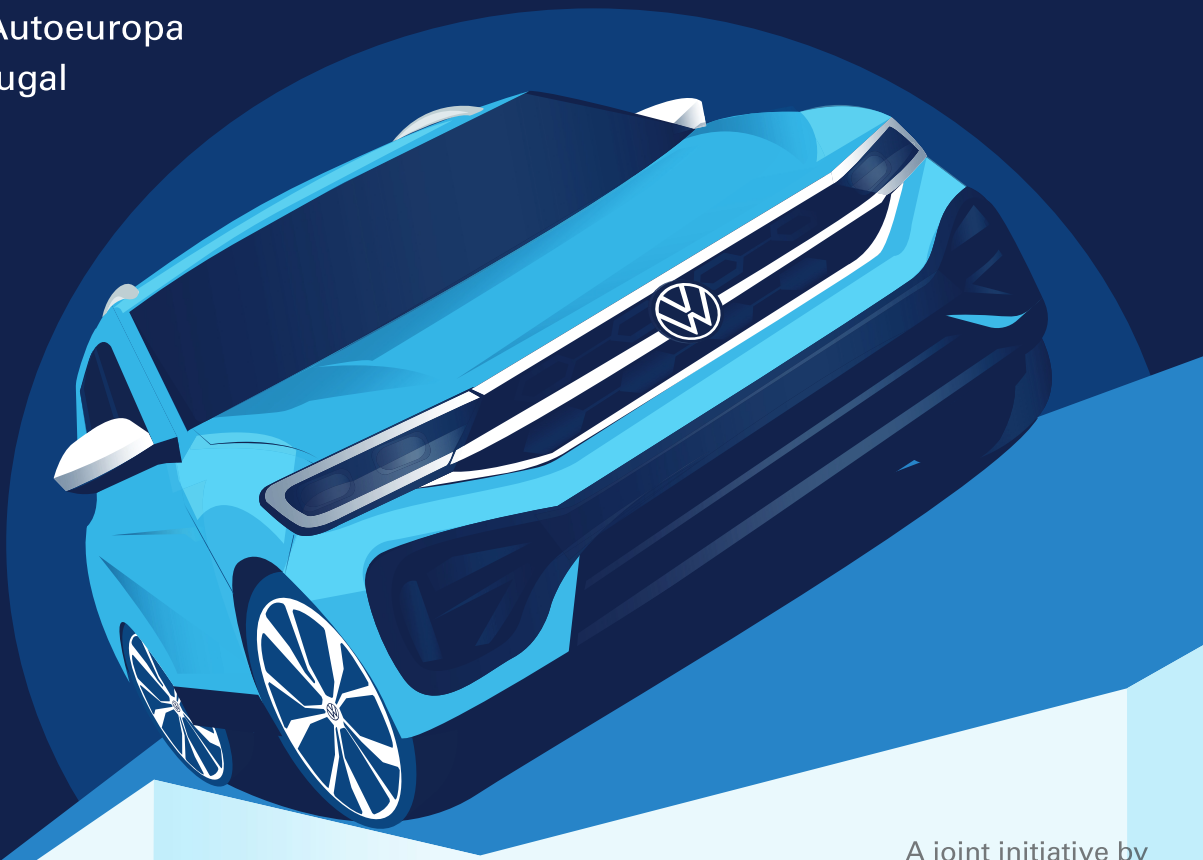
Automotive Lean Production

Award & Study Questionnaire 2024

Application until 12 Mai 2024

Award Ceremony: ALP Congress on 26-27 Nov 2024

Volkswagen Autoeuropa
Palmela, Portugal



A joint initiative by

AUTOMOBIL PRODUKTION

AGAMUS CONSULT

Automotive Lean Production Award

The 2023 winners in 5 categories

OEM
Volkswagen Autoeuropa, Palmela, Portugal

Component Supplier
BMW Group Plant Landshut, Germany

Part Supplier
Magna Otomotiv, Kocaeli, Turkey

Digital Use Case
AUDI AG Neckarsulm plant, Germany

Smart Manufacturing (Special Award)
TE Connectivity, Plant Wört/Dinkelsbühl

Award ceremony 2023 at the winner of 2022: The BMW Dingolfing plant hosted the congress at BMW Welt München for the congress (from left to right): Dirk Reusch (Automobil Produktion), Lukas Hlava (TE Connectivity), Samir Deliormanli (Magna Otomotiv), Mathias Mayer (AUDI AG), Karl Bauer (BMW Group), Fred Schulze (AUDI AG), Thomas Hegel Gunther (Volkswagen Autoeuropa), Dr. Stefan Kasperowski (BMW Group), Dr. Werner Geiger (Agamus), Marc Kräutle (Agamus)

Automotive Lean Production
Study and specialist congress

The industry magazine Automobil Produktion and Agamus Consult are conducting the **Automotive Lean Production** study for the 18th time in 2024.The comprehensive study focusses on the implementation of lean production structures in the European automotive industry:

What makes **lean** so successful in practice? Which lean components are implemented and how? Which results are achieved in terms of quality, costs and delivery performance achieved? How is lean knowledge developing knowledge develop in the personnel structure? How does the **digitalisation** of the production effect the manufacturing systems? What about the application of lean tools and **sustainability**?

The internal engagement with lean structures alone during the processing of the questionnaire is already value-adding (Lean Expertise of Agamus Consult from 18 years of ALP initiative)

Participation is **free of charge**. Just send in the attached questionnaire (German or English). The only condition: The plant must have more than 250 employees.

On request, **all participants** will receive an **individual evaluation with benchmarks** of international comparison.

The best plants are nominated for the **Automotive Lean Production Award** and additionally evaluated on site. The final evaluation is followed by the

Automotive Lean Production Congress with award ceremony on 26-27 Nov 2024 at Volkswagen Autoeuropa in Palmela.

At the high-calibre event, the winners will present their successful projects to the automotive industry. All with one goal:

To learn from the best:
Excellence in Lean & Digitalisation

Also on the programme: topical specialist presentations, roundtables, workshops- and of course the festive award ceremony in the 5 award categories.

The winners can receive an editorial profile from the industry magazine Automobil Production for positive communication in the media.

The Automotive Lean Production Initiative:
A joint initiative of Automobil Produktion and Agamus Consult.

> *Dealing with the questions posed helped to broaden our perspective on our own production processes once again.*
>
> *Accompanied by intensive exchange and in-depth, technical discussions we took the opportunity to critically scrutinise quality and processes, take a new look and ultimately improve them further.*
>
> *Winning the prize for the use of artificial intelligence (AI) in quality assurance for resistance spot welding (WPS) as part of the WPS Analytics project is an incentive for us to continue in this direction."*
>
> Fred Schulze, Plant Manager, Audi Nekarsulm

> *Learning from the other automotive players and reflecting on our achievements helped us to define the next steps on the (never-ending) way of lean & continuous improvement.*
>
> *The study is an excellent opportunity for the benchmark and for critical talks with the Agamus experts to understand our advantages and gaps to become successful in the future.*
>
> Lukas Hlava, Plant Director TE Wört/Dinkelsbühl, Germany

> *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 InTiCa Systems AG

> *We have used our participation in the Automotive Lean Production Initiative to gain a competent view from the outside on our vehicle assembly at the BMW Group plant in Dingolfing, which ultimately also provided us with valuable tips.*
>
> *Receiving the prestigious award impressively shows that we are consistently implementing the BMW iFACTORY. We always think lean and digital together."*
>
> Gunther Böhner, Director Rolls Royce Motorcars, Plant Goodwood

Download questionnaire as PDF form:
www.automotive-lean-production.de

	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 on value adding activities)	%
10	**How high is the proportion of women from the management level of team leader to top management?**	%
11	**What is the turnover rate of direct employees?** (direct employees = spend at least 80% of their time on value-adding activities)	%
12	**What is the turnover rate of indirect employees?** (Indirect employees = spend less than 80% of attendance on value-adding activities)	%
13	**How high is the absenteeism rate among direct employees?** (direct employees = spend at least 80% of their presence on value-adding activities)	%
14	**What is the absence rate for indirect employees?** (Indirect employees = spend less than 80% of attendance on value-adding activities)	%
15	**What were the sales of your plant in the last fiscal year?**	Mio. €
16	**What percentage of your turnover do you generate directly with companies from the automotive industry?**	%
17	**How do you supply your customers?** (please differentiate according to the following types in percent by value of goods)	
	Batch (lot sizes)	%
	Just in Time (JIT)	%
	Just in Sequence (JIS)	%
18	**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
19	**5S** Sort, set in order, shine, standardise, sustain					
20	**FMC – Flexible Manpower Cell** A working environment in which people and machines can quickly adapt to changing customer demands					
21	**Flexible working hours** e.g. flex time accounts					
22	**Flow production** Layout of the workstations corresponds to the material flow; synchronous and interlinked processes					
23	**Group / team work models** Multiple qualifications, partly autonomous teams					
24	**Kaizen- / CIP-Workshops** Continuous improvement workshops with the employees who take part in the process					
25	**Supplier development** Proactively develop the supplier to extensively integrate material and information flows					
26	**Cyclic material supplier in production** Milkrun, waterspider, etc.					
27	**Levelling of production** Smoothing of customer call-offs with the aim of producing constant quantities at defined intervals for a defined period					
28	**Poka Yoke** Avoidance of defects by a special design of the material or the manufacturing process; fail-safe processes, test equipment, and facilities					
29	**Q-Tools** QFD, FMEA, 6-Sigma, 8D-Reports, A3-problem-solving process, etc.					
30	**Fast response systems** Standardised event- and time-driven escalation routines that provide the necessary resources in the event of problems; e.g.rip cord					
31	**Fast setup** Fast tooling to flexibly respond to customer requirements; goal: reducing stock and increasing flexibility					
32	**Standardised workflows** Clearly visualise workflows, defined operator cycles dependent on the customer tact time; Goal: process reliability and efficient employee deployment					
33	**Standardised KPIs** Key figures, that represent the necessary efficiency ratios (OEE, workforce productivity, complaint files) at production group level and are aggregated to area codes					
34	**TPM – Total Productive Maintenance** Maintenance strategy, autonomous maintenance, management of external services, spare part management, workload planning and scheduling in maintenance					
35	**Pull production control** Pull principle driven by demand, self-regulated control loops					
36	**Visual Management** Visual marking of standards in the flow of materials and information, so that deviations become obvious and countermeasures can be taken immediately					

37	**Value stream methodology** Graphical visualisation of the material and information flow as a map and as a design, determination of the total lead time and the included non-value adding activities					
38	**Shop floor management** Leading on the spot; standardised work and control loops for employees and managers					

	D. Introduction of Lean		YES	NO
39	**Since when** (year) **have you been introducing Lean principles and tools to an appreciable extent?**		2023	
40	**Do you have a Lean roadmap?**			
	If yes: does your roadmap include digitalisation projects?			
	If yes: What planning horizon (years) does the roadmap show?			years
41	**Do you perform maturity assessments on the status 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)			%
42	**How many exempt lean experts (FTEs) who do not perform a line function do you have per 100 employees?**			
43	**What were the relative improvements in percent that you achieved as a result of your lean activities in the last two years? What will be the relative improvements you plan to achieve in the next two years?** Regarding:	**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): _____		%	%
44	**How many suggestions for improvement are submitted per employee per year?**			

	E. Digitalisation – structure and status of implementation					
	To what extent have you sustainably implemented the following digitalisation modules at your plant?	NOT IMPLEMENTED	PILOT	HALFWAY	EXTENSIVELY	COMPLETELY
45	**Culture of change** Employees have room for invention and further development: In addition to innovation workshops, employee ideas are used to generate projects that contribute to the further development of the company (Digital Factory Lab)					
46	**No-code apps & tools development** Employees can develop their own apps and workflows without programming skills, which are made available to the organisation via a library					

47	**Virtual reality for workplace design and worker training** The workplace is virtually tested after planning and freed from weaknesses. For effective training or a shortened start-up, the workers are then trained at the virtual workplace					
48	**Use of assist systems for workers** Workers use assist systems based on the networked infrastructure for various tasks in manufacturing/assembly					
49	**Use of mobile assist systems for the lower management level in production** The lower management level in production uses mobile assist systems based on the networked infrastructure for management and control tasks					
50	**Usability** Operation of complex equipment by normal operators based on auser-centred software environment and user-friendly human-machine-interfaces (semiotics).					
51	**Human-robot-collaboration** Operators share their workspace with robots without separative protection devices (maintaining same safety level). Work steps between humans and robots can be combined individually					
52	**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					
53	**Inline component manufacturing using additive processes** Use of additive processes to manufacture components in order to meet increasing individualisation of customer requirements (batch size 1, reduction of lead times, reduction of logistics costs)					
54	**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					
55	**Predictive maintenance** By determining optimal maintenance times based on real time monitoring, errors can be prevented by maintenance or early repairs					
56	**Augmented reality** Maintenance and repairs can be supported with the help of displayed virtual objects (for better explanation)					
57	**Flexible manufacturing concepts** Thanks to a modular structure, production units/lines can easily be modified or expanded. A flexible change of production technologies can proceed with a minimum effort via plug & play solutions					
58	**Digital shop floor management** Relevant shop floor data are available at multi-sites in real time (enhancing know-ledge management) and being reviewed on a virtual board by all stakeholders					
59	**Digital integration of value chain partners** All partners worldwide (suppliers, customers, service providers, etc.) are using the same up-to-date data pool					
60	**'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)					

61	**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 organisation when changes of the 'twin' occur. (Integration of industrial engineering, planning, production control and management of production and logistic into one platform)					
62	**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					
63	**Process mining** Business processes are automatically mapped and analysed (e.g. divergences from standards) based on process log data from IT systems					
64	**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	
65	**How many of your digitalisation projects are evaluated with ROI?**	%
66	**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
67	**To what extent do the following statements apply to the digitalisation projects in your plant?** (please mark each with *0: strongly disagree* to *3: strongly agree*)	0 - 3
	Our digitalisation projects are handled using agile project management methods	0
	Our digitalisation projects are implemented by a central department	0
	The product owner is always the person responsible for the process from the operations area	0
	Product ownership is usually double staffed from IT and production/logistics	0
	We work according to the MVP principle (minimum viable product) and successively expand functionalities	0

68	**To what level are goals for the following topics broken down in policy deployment (hoshin kanri)?** (please tick the appropriate box)	Top management	Middle management	Foreman/ group leader	Team leader	Operator	n.a.
	Lean						
	Digitalisation						
	Sustainability						

69	**To what extent do you agree with the following statements about changes in cooperation as a result of the digitalisation 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 the input from younger colleagues more (digital natives)	0
	Junior colleagues are taking management responsibilities more quickly	0

		TODAY	FUTURE
70	**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*)		
	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 Analytics Software for process and equipment data exploration	0	0
	Indoor tracking (part tracking) in the production (e.g. RFID, UWB, etc.)	0	0
	Software for simulating virtual commissioning	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 control 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. Sustainability

71	**How high is the share of renewable energy in total consumption?**		%
72	**How high is the share of self-generated energy in total consumption?**		%
73	**What was the relative improvement in percentage terms that you achieved through your sustainability activities in the last two years? What relative improvements do you plan to achieve in the next two years?** Regarding:	IMPROVEMENTS OVER THE PAST 2 YEARS	IMPROVEMENTS IN THE NEXT 2 YEARS
	THG emissions	%	%
	Amount of waste	%	%
	Water consumption	%	%
	Energy consumption	%	%
	Share of recycled materials	%	%
	Media consumption (compressed air, coolant, ...)	%	%
	Others (please state): _____	%	%

		YES	NO
74	**Have you defined annual target values for the sustainability indicators from question 73?**		
75	**Have you defined a target year for the plant's CO2 neutrality?**		
	If yes: By when would you like to achieve this goal?	years	
76	**What approach do you take to ensure improvements in sustainability at your plant?**	YES	NO
	Quantifiable target values (e.g. CO2 emission)		
	Environmental certification (ISO14000 ff)		
	Energy management system certification (ISO 16000ff / ISO 50000ff)		
	Corporate Social Responsibility indicator		
	Internal audit system		
	Checklist for self-assessment		
	Third party audit system (please state): _____		

	H. Value Stream Performance	
77	**What is the proportion of material cost in relation to the total turnover?** (raw materials and purchased parts)	0,00% %
78	**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)	%
79	**How many days supply** (own + consigned) **of finished goods do you maintain on average?**	
80	**How many days supply** (own + consigned) **of raw materials do you maintain on average?**	
81	**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	
82	**What is your plant's service level** (on time in full deliveries) **from your customers' perspective?** (order placement date, delivery date)	%
83	**What is your suppliers' customer service level from your plant's perspective?** (order placement date, delivery date)	%
84	**What is the average overall equipment effectiveness** (OEE) **as a percentage of total production time at bottleneck processes/machines?**	%
85	**What is your direct customer complains rate?** (product and logistics defects only)	PPM
86	**What is your first-pass yield?**	%
87	**Number of days without reportable accidents**	days
88	**Number of near-accidents per thousand hours of attendance**	

	I. Best Practice Example "Digital Use Case" (Optional)
89	**In the category "Digital Use Case", 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 digitalisation project that improved the KPIs of the value stream. Please present your project in a separate documentation, in a form of your choice. 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
	Rollout/further implementations planned

Fill in and send by e-mail to: lean.award@agamus.com

Award & Study 2024: Application and Dates

Automotive Lean Production – Award & Study is an initiative of Automobil Produktion and Agamus Consult. Data from the questionnaire is stored electronically by Agamus Consult for evaluation purposes and will not be passed on to third parties. The use of the data for statistical purposes is exclusively anonymised. Personal data will only be used for queries for the purposes of the study. Of the award winners only the company names are published.

Application deadline: 12 May 2024

More information and download questionnaire:
www.automotive-lean-production.de/en

Fill out the PDF locally on your PC, save, complete and email directly to:
lean.award@agamus.com

Agamus Consult, Manuela Hanusa
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18. Congress Automotive Lean Production 2024

Welcome to Volkswagen Autoeuropa

Palmela, Portugal 26-27 November 2024

The new host 2024: Thomas Hegel Gunther (Volkswagen Autoeuropa), between (left) Marc Kräutle and (right) Dr. Werner Geiger from Agamus Consult.

Photo: Volkswagen Autoeuropa

- Presentations of the award winners
- Gala dinner, festive presentation of the awards
- Exclusive tour of the Palmela plant

Photo: Volkswagen Autoeuropa

30 years Agamus Consult

Authenticity. Passion. Consulting.

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