European Survey on the adoption of usage-oriented Business Models: main findings

LIFECYCLE EXTENSION THROUGH PRODUCT REDESIGN AND REPAIR, RENOVATION, REUSE, RECYCLE STRATEGIES FOR USAGE&REUSAGE-ORIENTED BUSINESS MODELS

Acknowledgements

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http://t-rex-fp7.eu

FP7
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DISCLAIMER

This document reports the findings from a survey carried out in WorkPackage WP1 of the T-REX European project, and is an excerpt of the project deliverable D1.1 (restricted to the consortium) performed in the period from November 2013 to January 2014.

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Purpose of the document

The T-REX project addresses the development of usage-oriented business models in the domains of **Machinery, Automation and Transportation**.

The transition towards new business models or even the development of a wider service portfolio including advanced services such as maintenance contracts, or process-oriented consulting, is not so straightforward.

This document present the main findings from an extensive survey, that involved 95 companies across Europe.

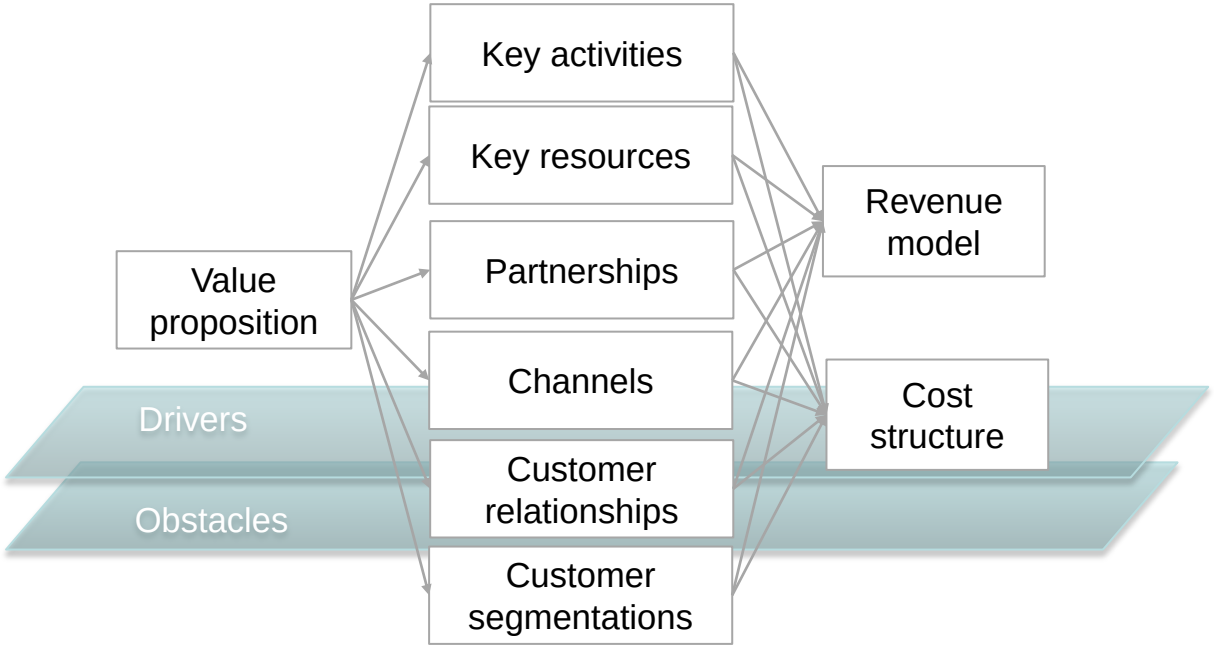
The survey investigates the diffusion of usage-oriented business models and the offering of services in the above-mentioned industries.

Main Objectives

Descriptive analyses have been performed both considering the whole set of answers and respondents segmentation (namely the industry sector and the supply chain level in which a company operates) in order to answer to these research questions:

- How business models of companies that operate in capital goods sector such as machinery (*machine tools*), automation (*robot systems*) and transportation (*forklifts trucks*) are configured?
- Which are the main drivers/obstacles toward the implementation of usage-oriented business models?

Research framework - building blocks



Based on Osterwalder & Pigneur (2010)

Relevant building blocks and variables investigated in the survey are organized into a new **Research Framework (RF):**

- RF is based on *Business Model Canvas* enriched with other additional building blocks
- RF leads research activities such as data collection, analysis and interpretation

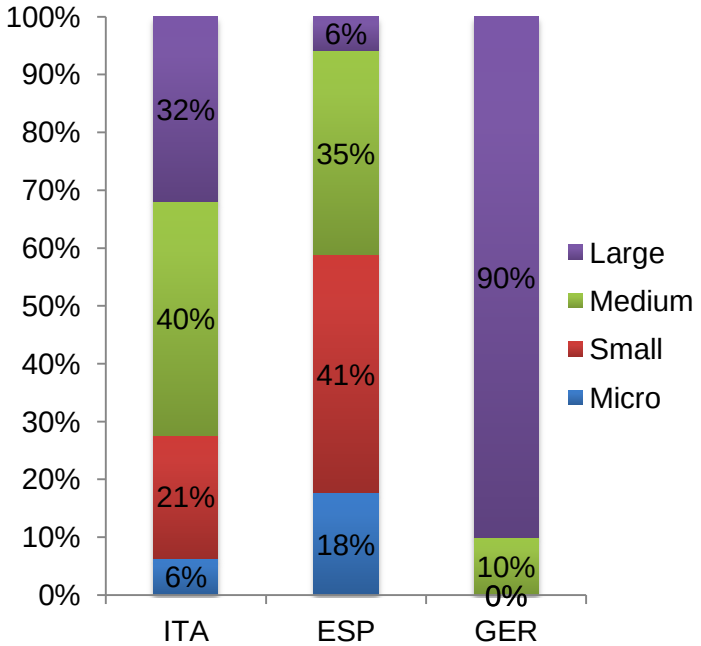
Results

- Sample description
- Business model configuration
- Main findings

Results - Sample description (95 companies)

Company Size *	No.	% of the sample	Average # of employees	Average turnover
Micro	6	6%	6	€ 562.500
Small	18	19%	33	€ 4.725.591
Medium	28	29%	117	€ 24.023.214
Large	43	45%	2.959	€ 696.712.195
Total	**95**	**100%**	**1410**	**€ 325.782.612**

Company nationality	No.	% of the sample	Average # of employees	Average turnover
Italian	47	49%	203	€ 47.482.675
Spanish	17	18%	81	€ 15.470.625
German	30	32%	4016	€ 901.005.000
Other	1	1%	15	€ 1.000.000
Total	**95**	**100%**	**1410**	**€ 325.782.612**



Sample characterised by a great presence of LARGE and ITALIAN companies. Small and micro companies are Spanish or Italian, Large are German or Italian

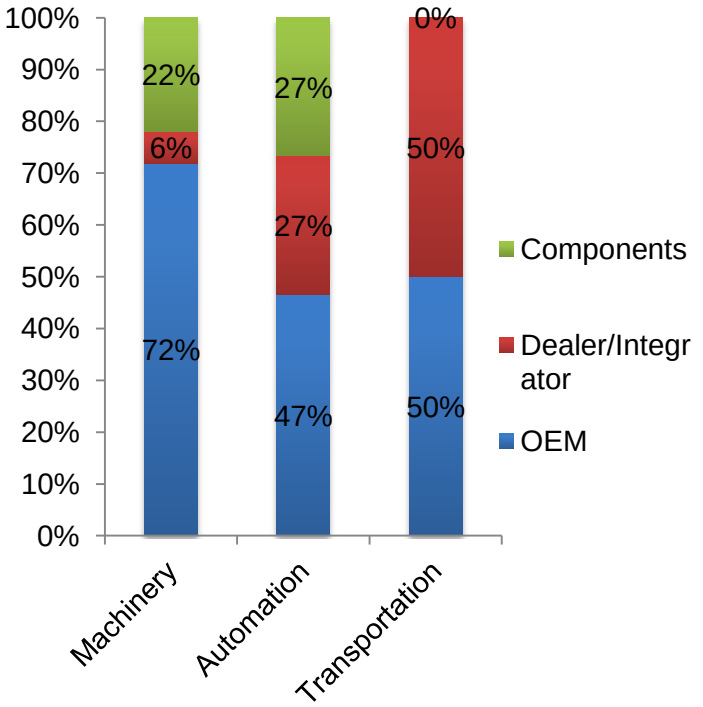
** "New SME definition" provided by the European Commission*

Results - Sample description (95 companies)

Company sector	No.	% of the sample	Average # of employees	Average turnover
Machinery	64	67%	1.188	€ 312.754.001
Automation	15	16%	3.270	€ 589.726.667
Transportation	8	8%	621	€ 168.635.000
Others	8	8%	358	€ 66.106.250
Total	**95**	**100%**	**1.410**	**€ 325.782.612**

Company supply chain position	No.	% of the sample	Average # of employees	Average turnover
OEM	62	65%	1.403	€ 353.776.402
Dealer/Integrator	15	16%	105	€ 29.832.143
Components manufacturer	18	19%	2.447	€ 465.764.097
Total	**95**	**100%**	**1.410**	**€ 325.782.612**

Machinery companies dominate the sample. Almost half respondents are machinery OEM



Results

Sample description

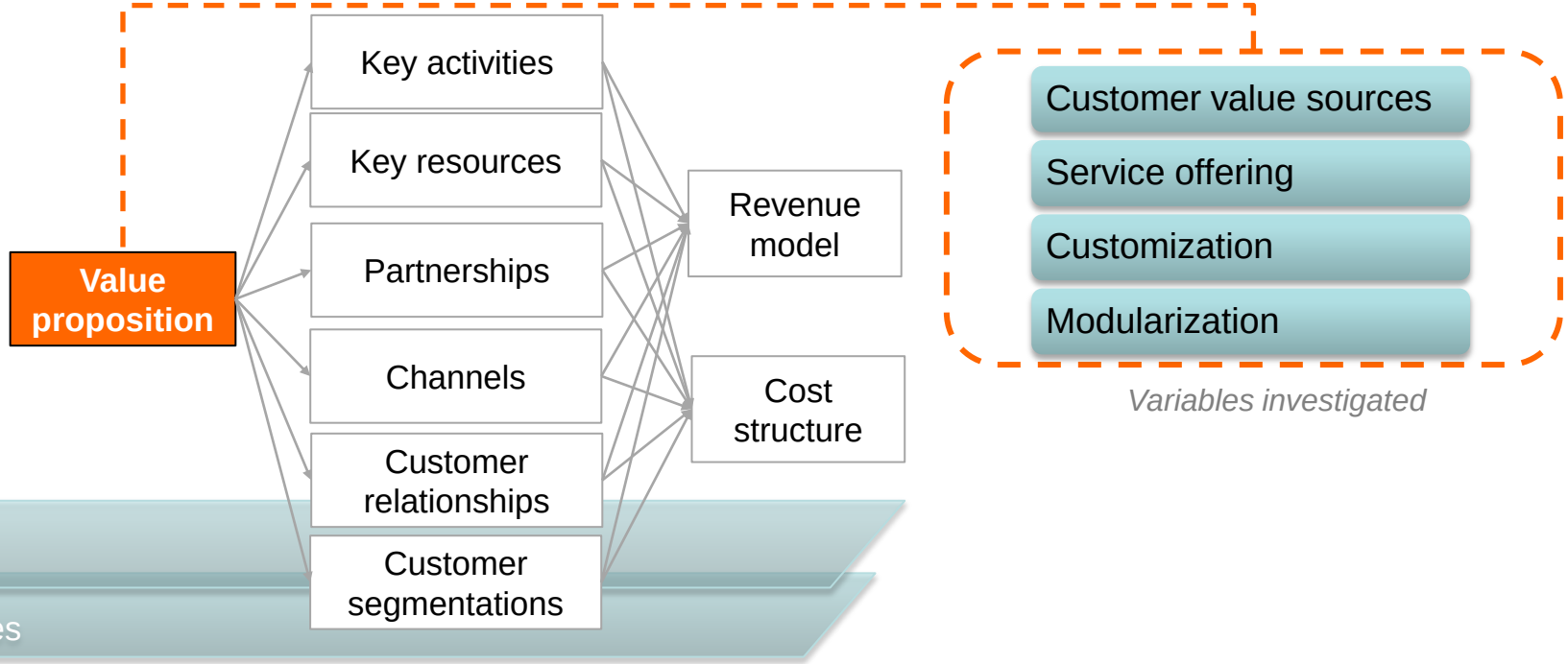
Business model configuration

Main findings

This section is structured according with the Research Framework: the aim is to provide the results of descriptive analyses for each building block and for each specific variable investigated.

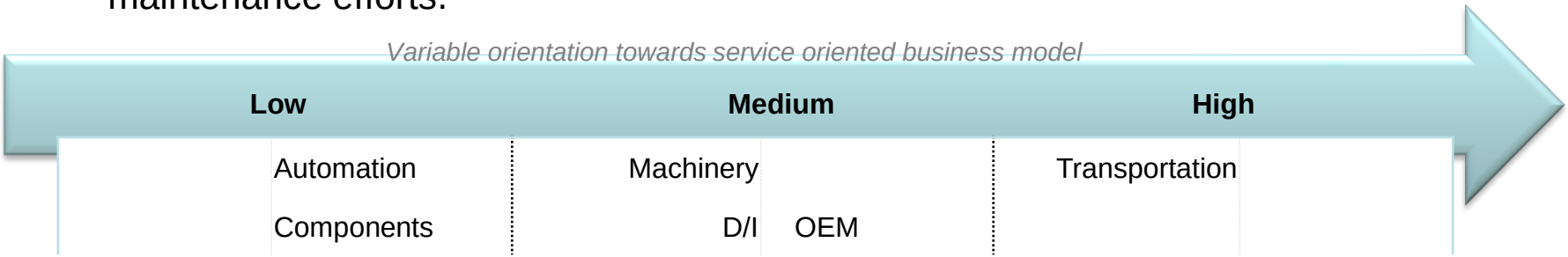
- Industrial sectors (*Domains*) and Supply Chain Levels (*SC level*) are positioned on a scale (low, medium, high) based on the organizational maturity level required by the development of usage-oriented business model.

Results - Value proposition



Customer value sources – general findings

- Main sources of value for customers are product performance, and product productivity.
- Moderately to quite important are product expected lifetime, customer image enhancement, customer minimization of operational risks, brand reliability.
- Moderate importance of value generated through minimization of customer maintenance efforts.

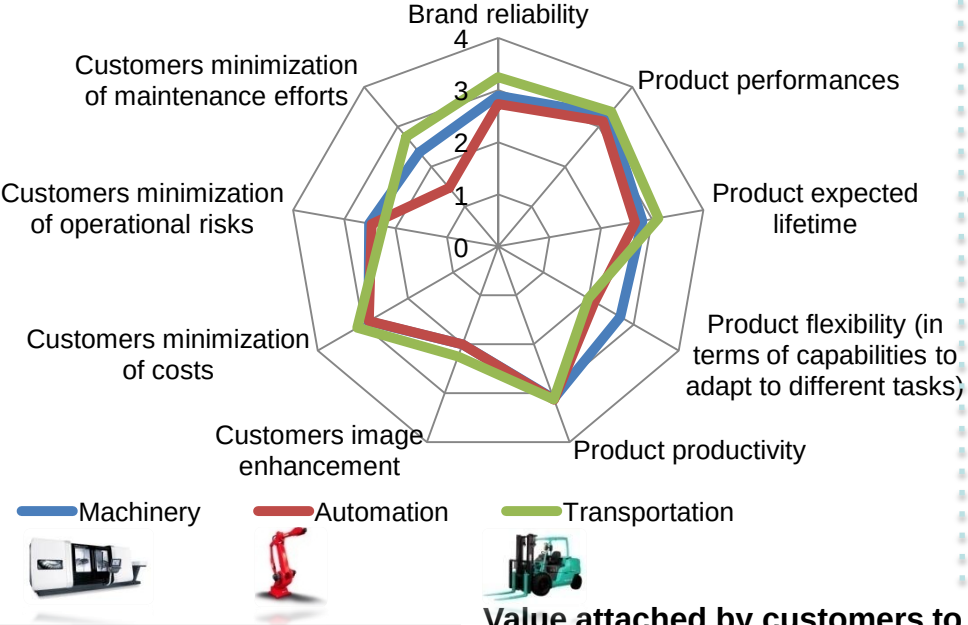


D/I: Dealer/Integrator
OEM: Original Equipment Manufacturer

Customer value sources - survey

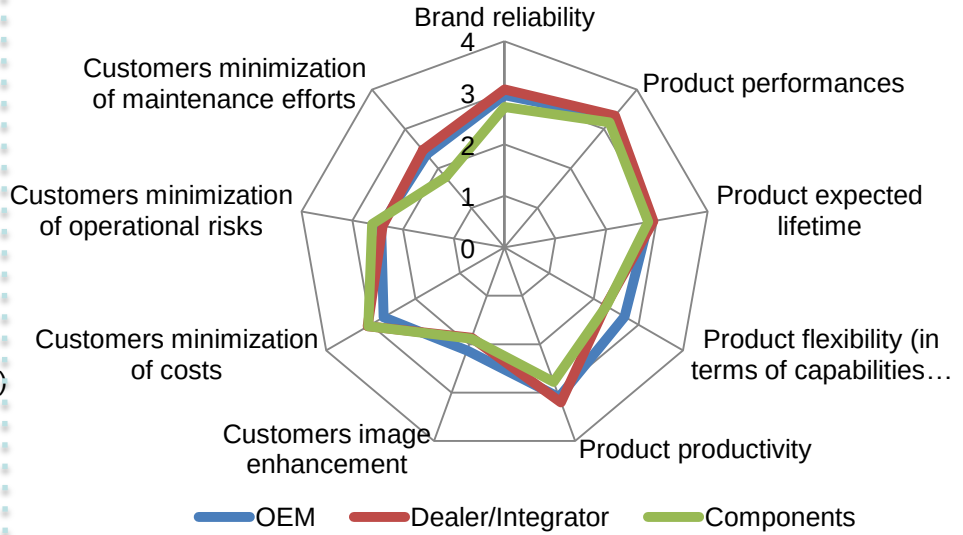
Domains

Transportation: more customer oriented.
Machinery: more focused on flexibility.
Automation: less oriented towards maintenance.



SC level

OEMs: more focused on flexibility.
Component manufacturers: less maintenance oriented.

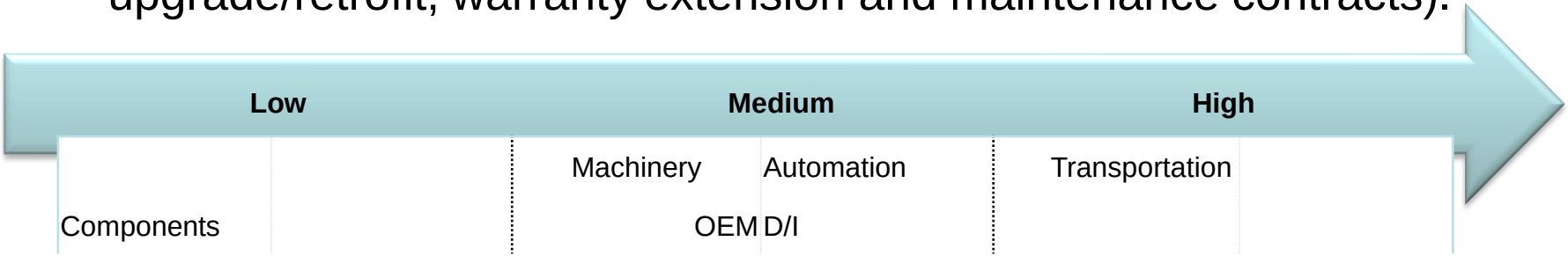


Value attached by customers to different aspects of firm's offer

(0 – Not at all, 1 – Slightly, 2 – Moderate, 3 – Quite high, 4 – Extremely high)

Service offering – general findings

- Basic services are extensively offered (documentation, repair, spare parts, basic training),
- Advanced services are sometimes offered (advanced training, remote monitoring and product remote diagnosis, product upgrade/retrofit, warranty extension and maintenance contracts).



Service offering (I)

Domains

Automation: Advanced services related to optimization of customer processes are sometimes offered.
Transportation: Some advanced services as financial services, leasing, second-hand services and rental are offered.



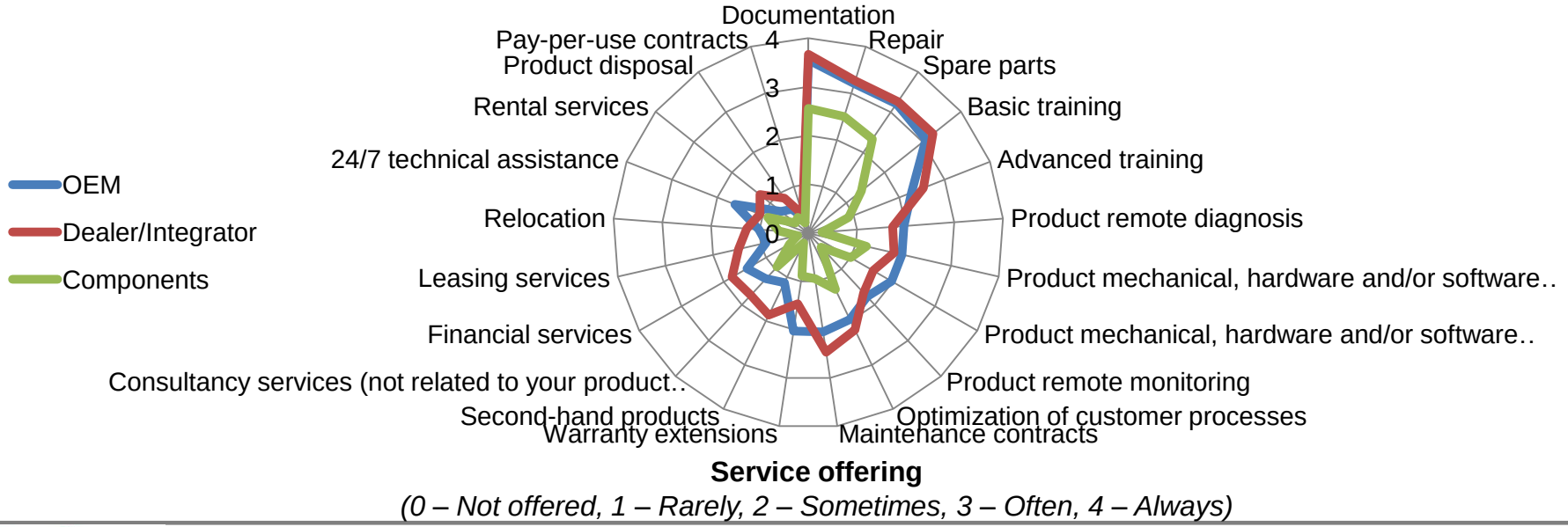
Service offering

(0 – Not offered, 1 – Rarely, 2 – Sometimes, 3 – Often, 4 – Always)

Service offering (II)

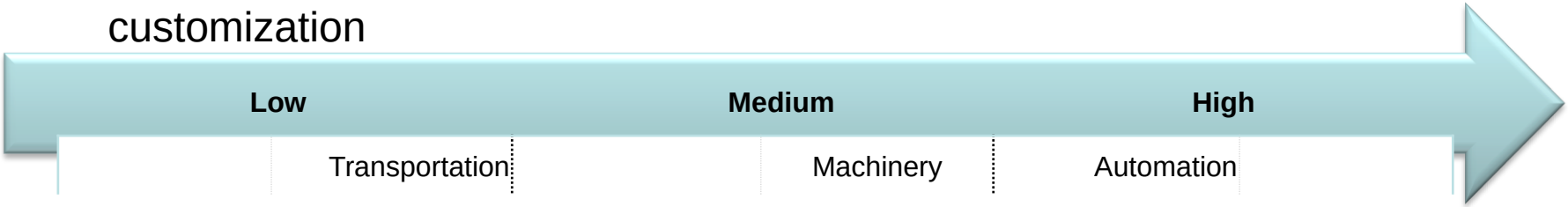
SC level

Component suppliers: basic services are only sometimes offered; advanced services are never offered.
OEMs: sometimes offer also retrofit, 24/7 technical assistance and warranty extension.
D/I: sometimes offer also second-hand product services, leasing and rental services.



Customization – general findings

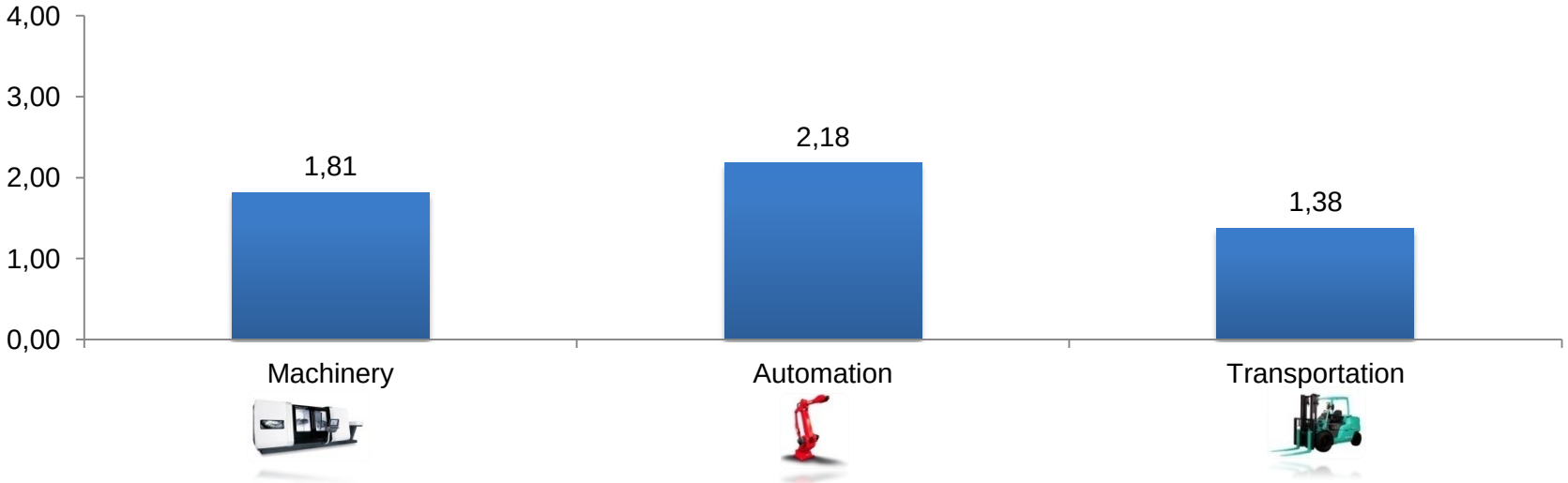
- 36% of the responding companies have a high degree of product customization
- 36% of the responding companies have a medium degree of product customization
- 27% of the responding companies have a low degree of product customization



Customization

Domains

Machinery: Average degree of customization: around 35% of typical product.
Automation: Quite high degree of customization: around 45% of typical product.
Transportation: Low degree of customization: around 25% of typical product.

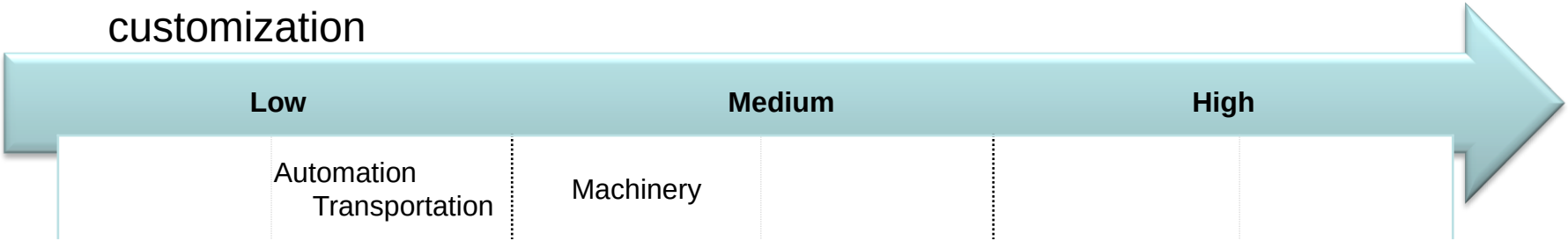


Percentage of the typical product that is customized

(0 – 0/20%, 1 – 21/40%, 2 – 41/60%, 3 – 61/80%, 4 – 81/100%)

Modularization – general findings

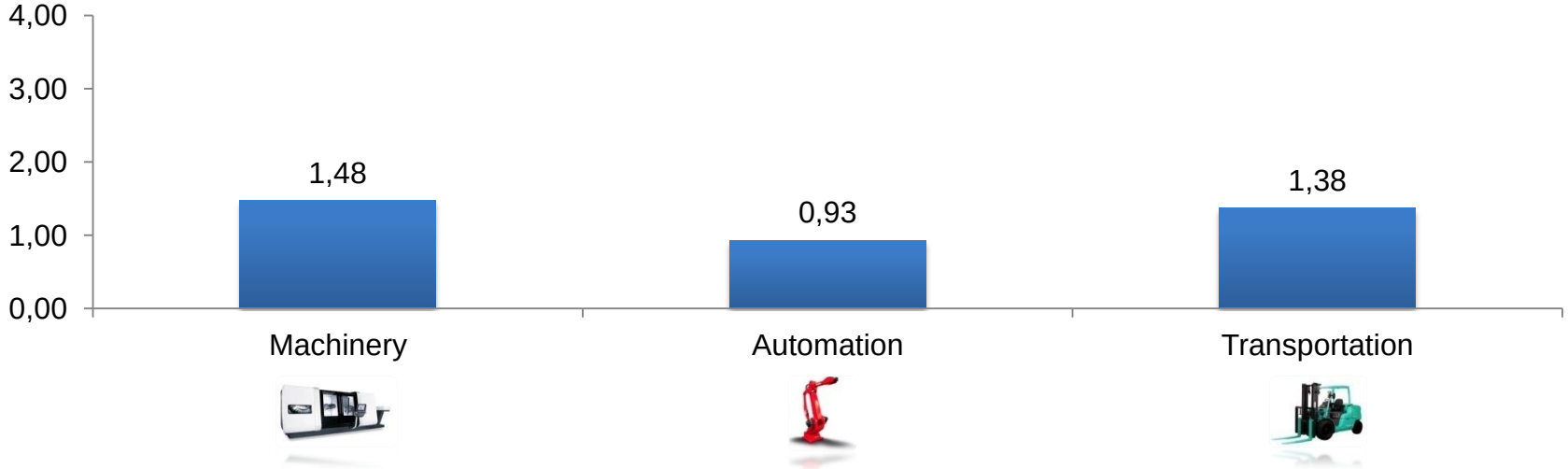
- 20% of the responding companies have a high degree of product modularization
- 53% of the responding companies have a medium degree of product customization
- 27% of the responding companies have a low degree of product customization



Modularization

Domains

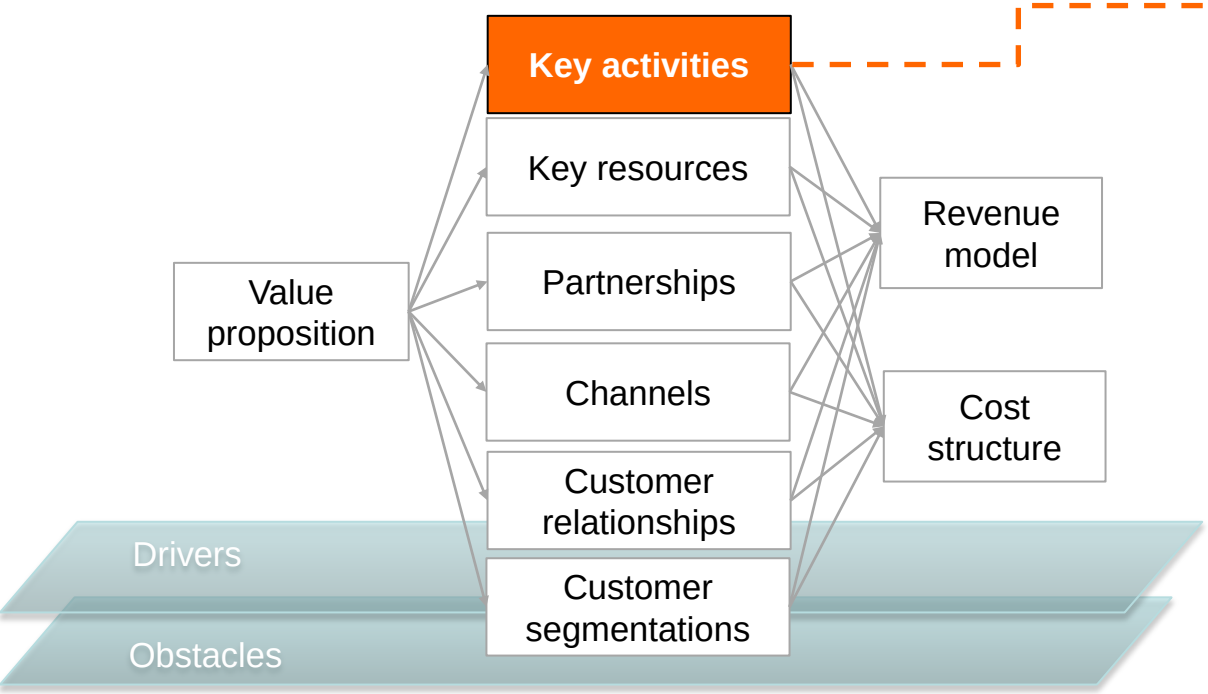
Machinery: Quite low degree of modularization: around 30% of typical product.
Automation: Low degree of modularization: around 20% of typical product.
Transportation: Low degree of modularization: around 25% of typical product.



Percentage of the typical product that is modularized

(0 – 0/20%, 1 – 21/40%, 2 – 41/60%, 3 – 61/80%, 4 – 81/100%)

Results - key activities

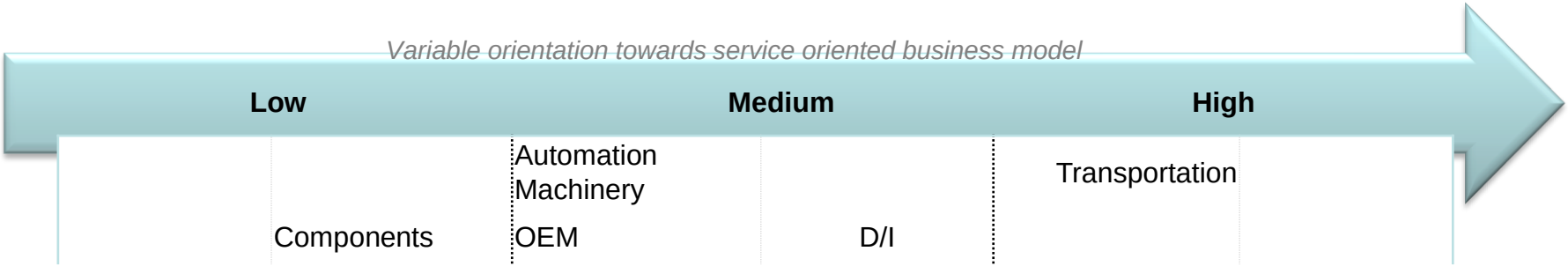


- TCO
- Service engineering
- Design for X
- Fleet operation and maintenance
- Condition monitoring

Variables investigated

Adoption level of TCO – general findings

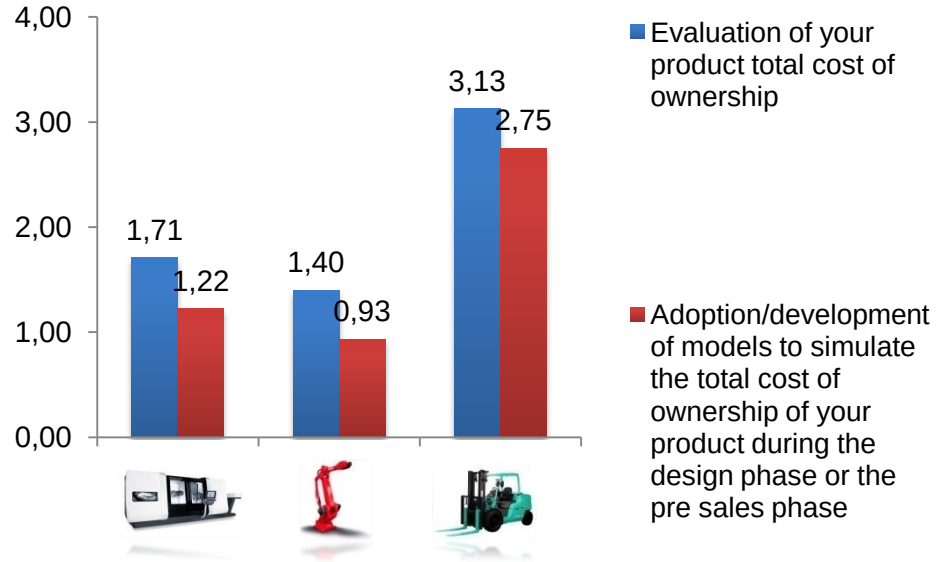
- Companies have medium experience in the evaluation of TCO.
- Companies have low experience in the adoption/development of models to simulate the TCO of their products as a service to customers.



Adoption level of TCO

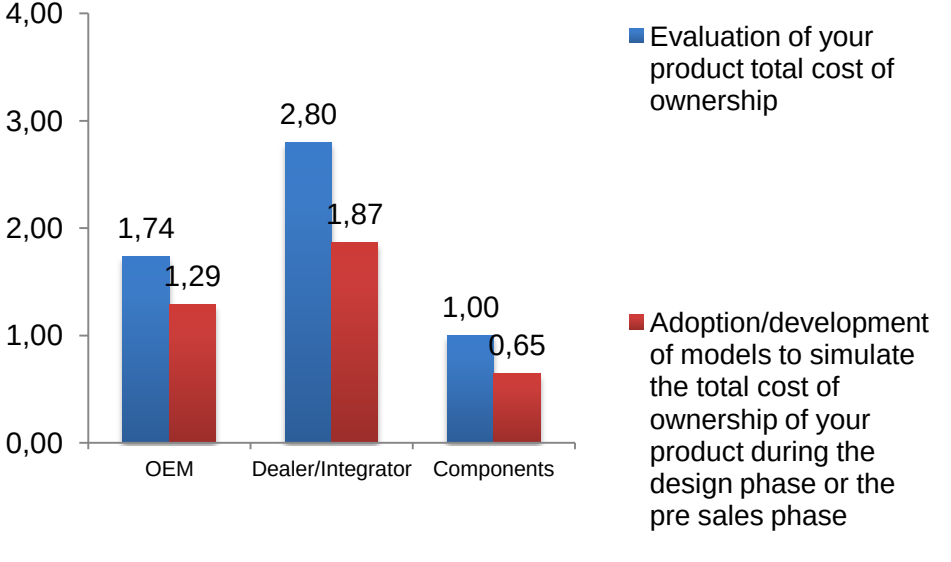
Domains

Transportation: High experience in the adoption/development of models to simulate TCO of their products and in the evaluation of TCO.



SC level

Component manufacturers: Low experience in the evaluation, very low adoption/development of TCO models.
D/I: High experience in the evaluation, medium experience in the adoption/development of TCO models

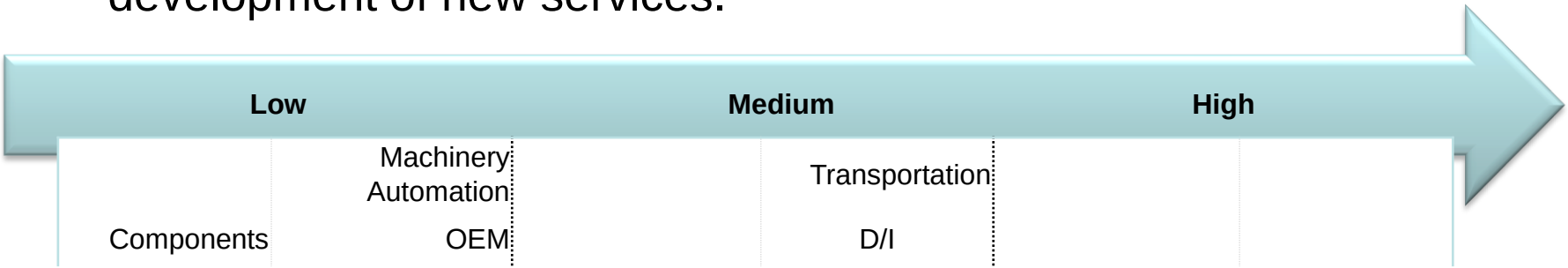


Adoption level of TCO models

(0 – Very low, 1 – Low, 2 – Medium, 3 – High, 4 – Very high)

Adoption level of Service Engineering – general findings

- Companies consider services an important part of their business and also think that their importance will increase in future.
- Most companies do not have yet defined explicit strategy, responsibilities, budget, formal processes and methods for the development of new services.

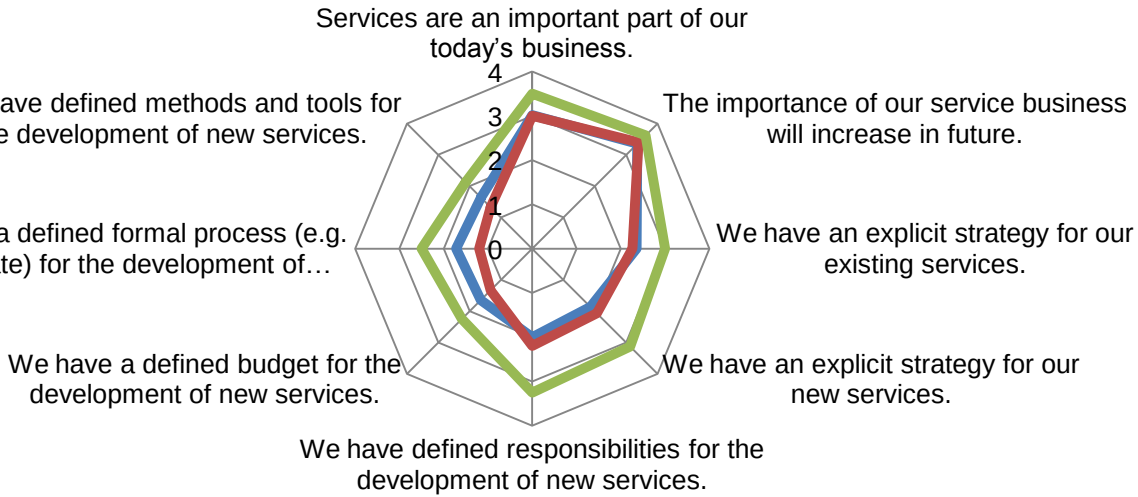


Adoption level of Service Engineering (I)

Domains

Transportation: Companies have an explicit strategy for existing and new services. Moreover they have also defined responsibilities for the development of new services.

Machinery
Automation
Transportation



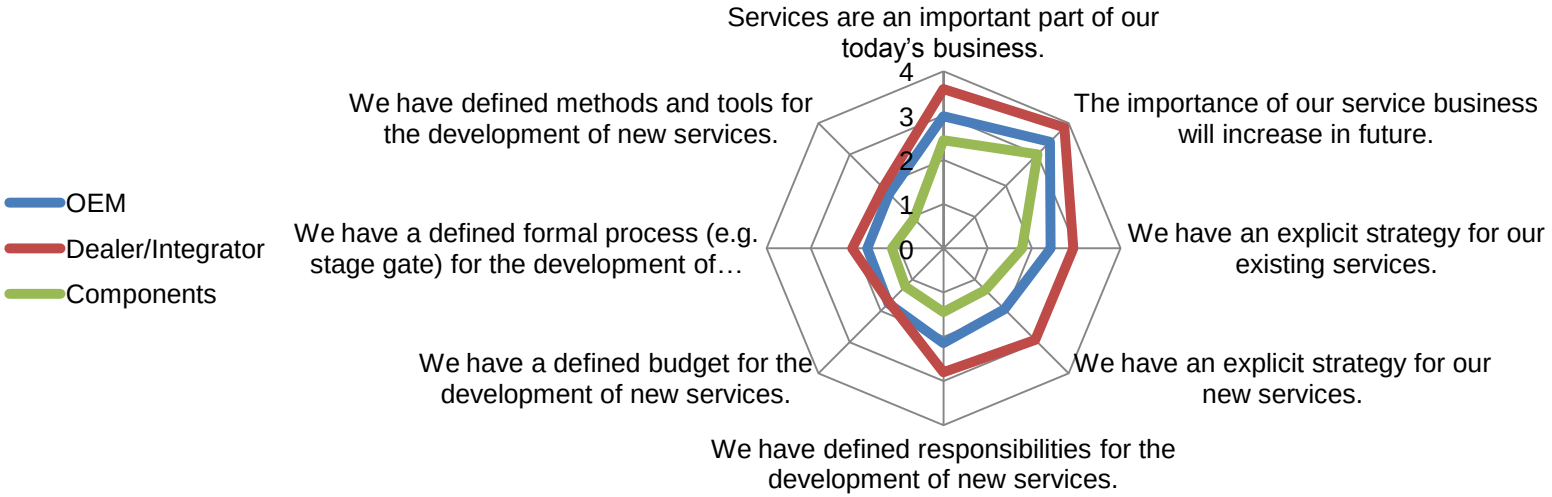
Orientation towards service engineering practices

(0 – Strongly disagree, 4 – Strongly agree)

Adoption level of Service Engineering (II)

SC level

Component manufacturers: Companies consider services not important for their current business.
D/I: Companies have defined an explicit strategy for existing and new services. Moreover they have defined responsibilities for the development of new services.

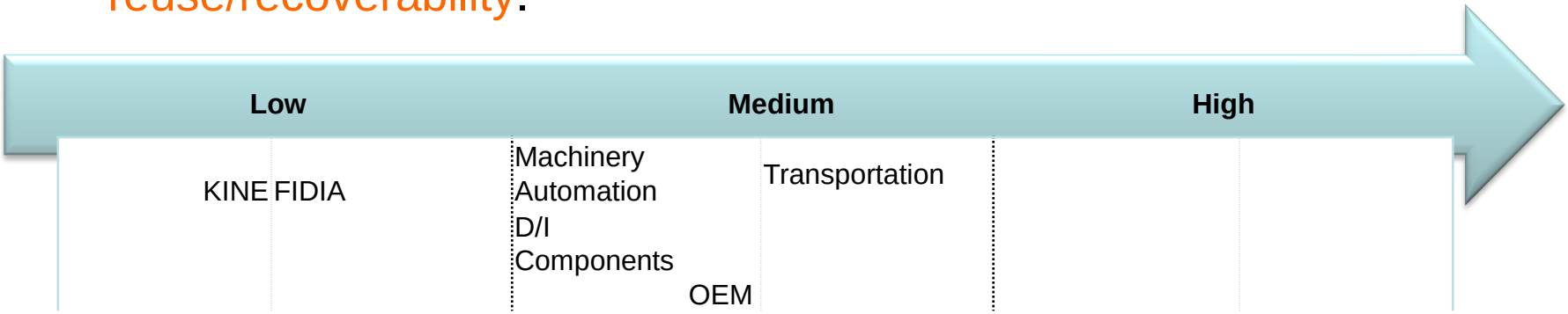


Orientation towards service engineering practices

(0 – Strongly disagree, 4 – Strongly agree)

Adoption level of Design for X - general findings

- Companies have high experience in design for reliability and medium in design for maintainability/serviceability, durability and life-cycle techniques.
- Companies have low experience in the design for reuse/recoverability.

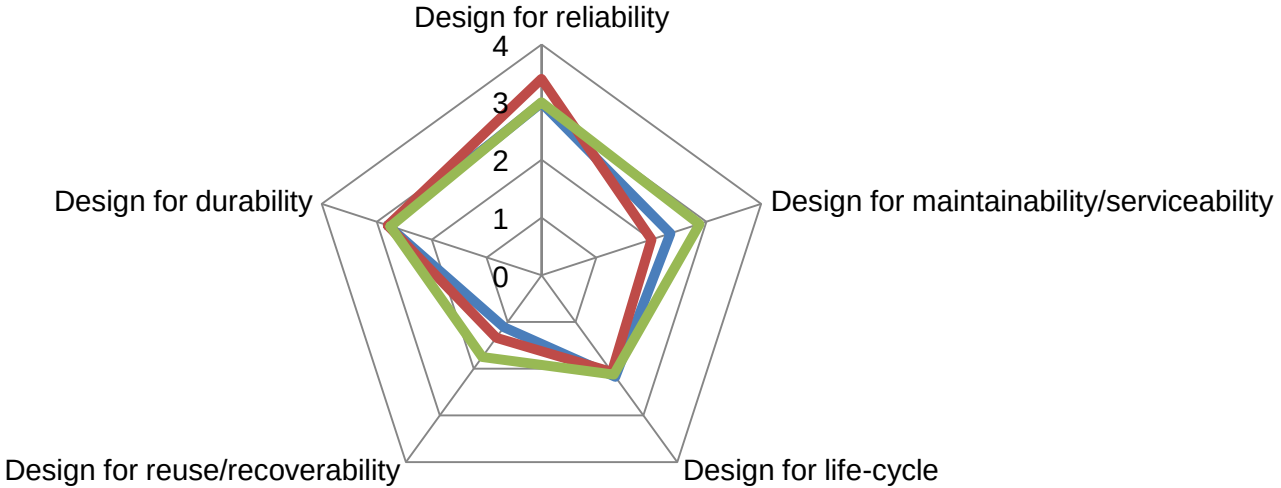


Adoption level of Design for X (I)

Domains

Transportation: High experience in the design for maintainability/serviceability and also medium experience in the design for reuse.

Machinery
Automation
Transportation



Experience on DfX practices to develop new products

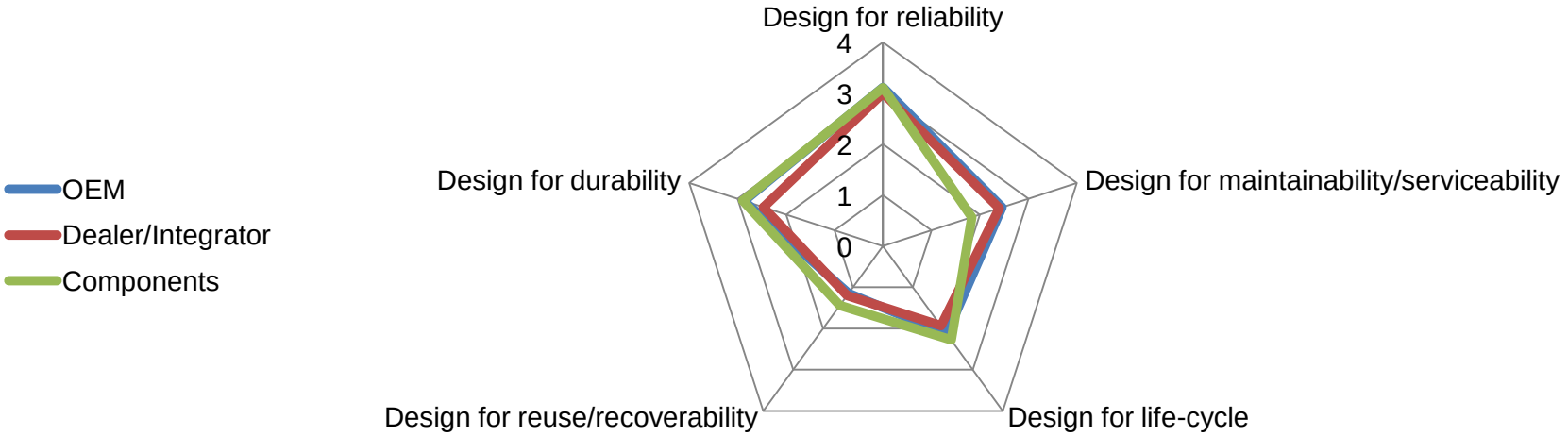
(0 – Very low, 1 – Low, 2 – Medium, 3 – High, 4 – Very high)

Adoption level of Design for X (II)

SC level

Component manufacturers: high experience in design for durability, but have a low experience in design for maintainability.

OEMs: Companies have an high experience in design for durability

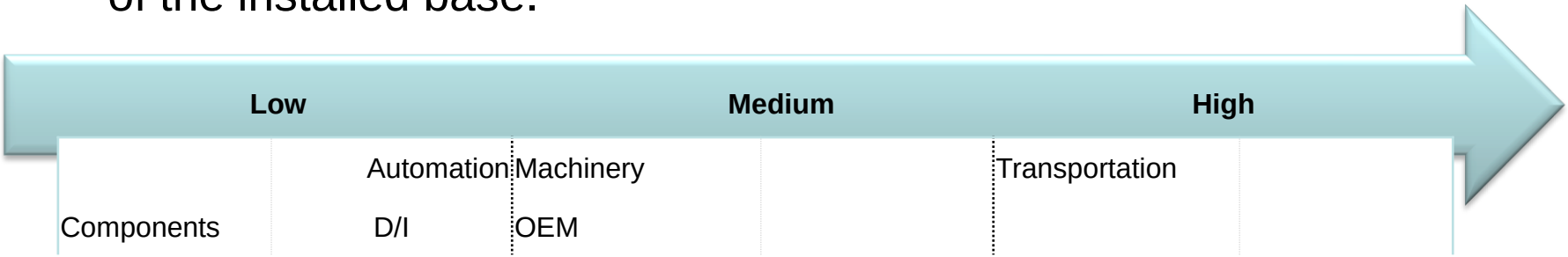


Experience on DfX practices to develop new products

(0 – Very low, 1 – Low, 2 – Medium, 3 – High, 4 – Very high)

Fleet operation and maintenance practices - general findings

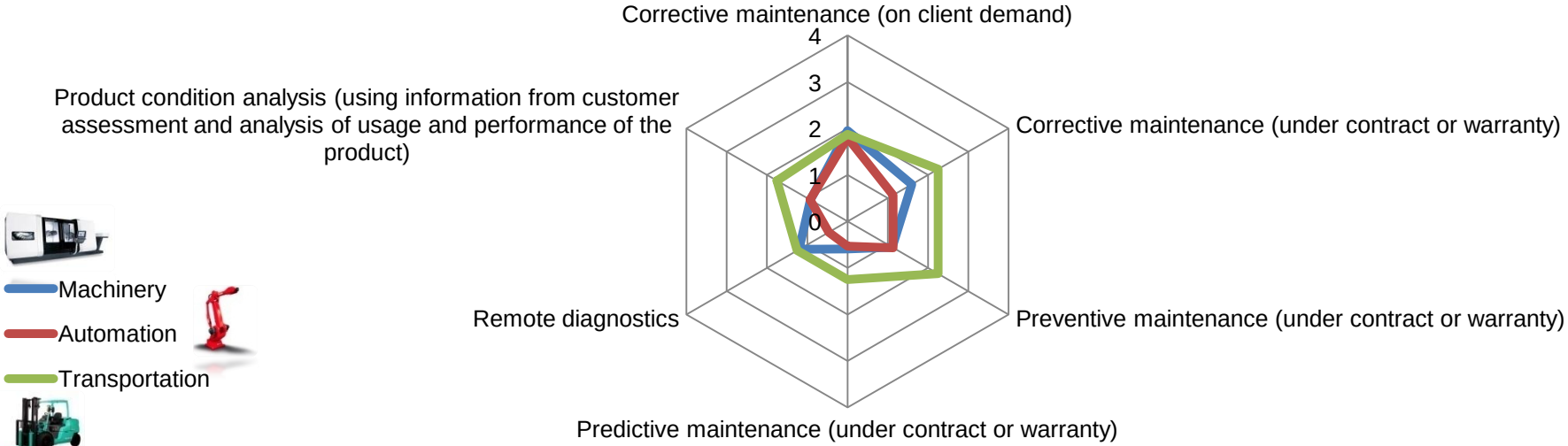
- Companies perform fleet operation and maintenance practises on less than 50% of their installed base.
- In particular remote diagnostics, product condition analysis, and preventive maintenance activities are carried out on less than 30% of the installed base.



Fleet operation and maintenance practices (I)

Domains

Machinery: companies perform predictive maintenance activities on less than 20% of their installed base.
Automation: companies perform remote diagnostics and predictive maintenance activities on less than 20% of the installed base
Transportation: companies perform preventive and corrective maintenance activities (under contracts or warranty) in average on 60% of their installed base and product condition analysis on 50% of their product.

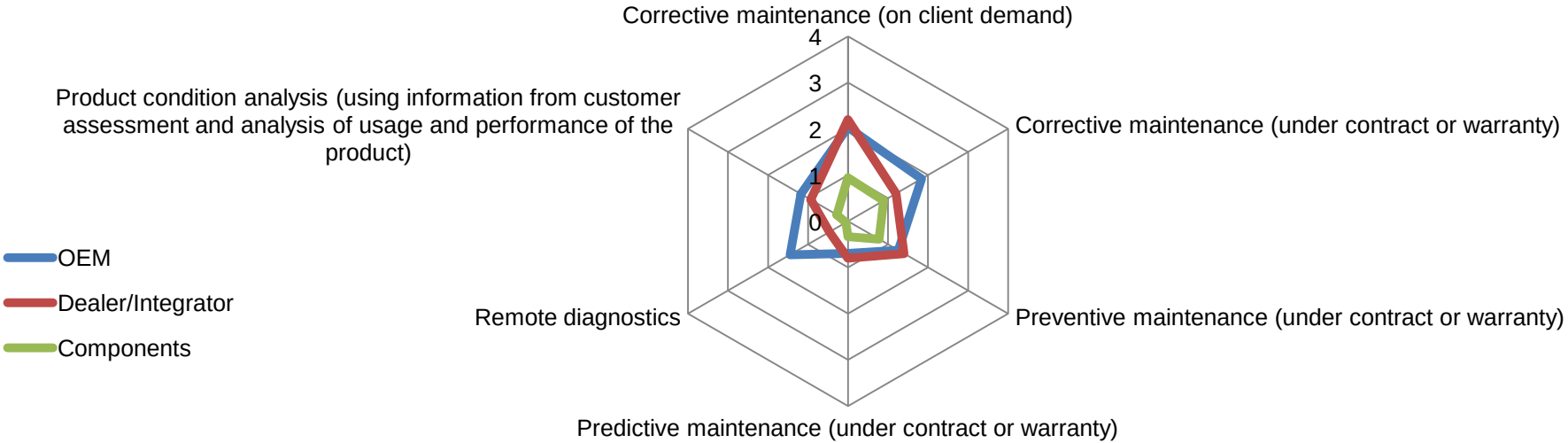


Diffusion of fleet operation and maintenance practices on installed base
(0 – 0/20%, 1 – 21/40%, 2 – 41/60%, 3 – 61/80%, 4 – 81/100%)

Fleet operation and maintenance practice (II)

SC level

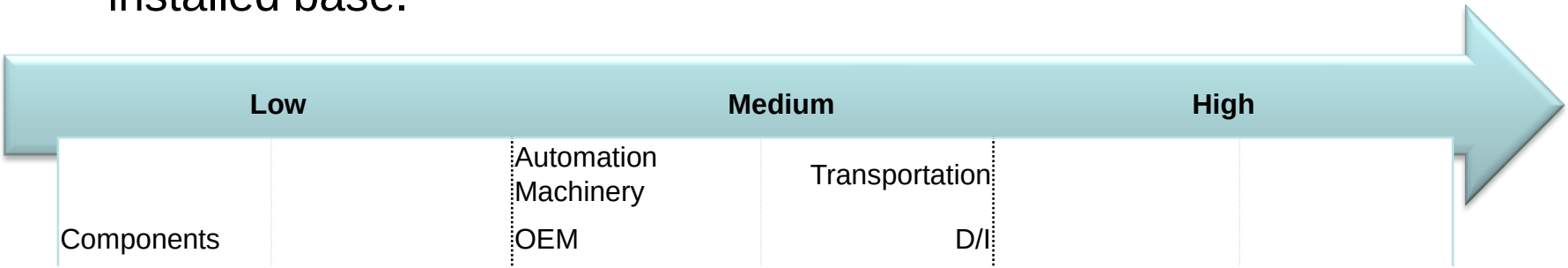
Component manufacturers: perform fleet operation and maintenance practices on less than 20% of their installed base.
OEMs: perform remote corrective maintenance (both on client demand and under contract) in average on 50% of their installed base.
D/I: perform corrective maintenance (on client demand) on average on 50% of their installed base.



Diffusion of fleet operation and maintenance practices on installed base
(0 – 0/20%, 1 – 21/40%, 2 – 41/60%, 3 – 61/80%, 4 – 81/100%)

Installed base Condition Monitoring – general findings

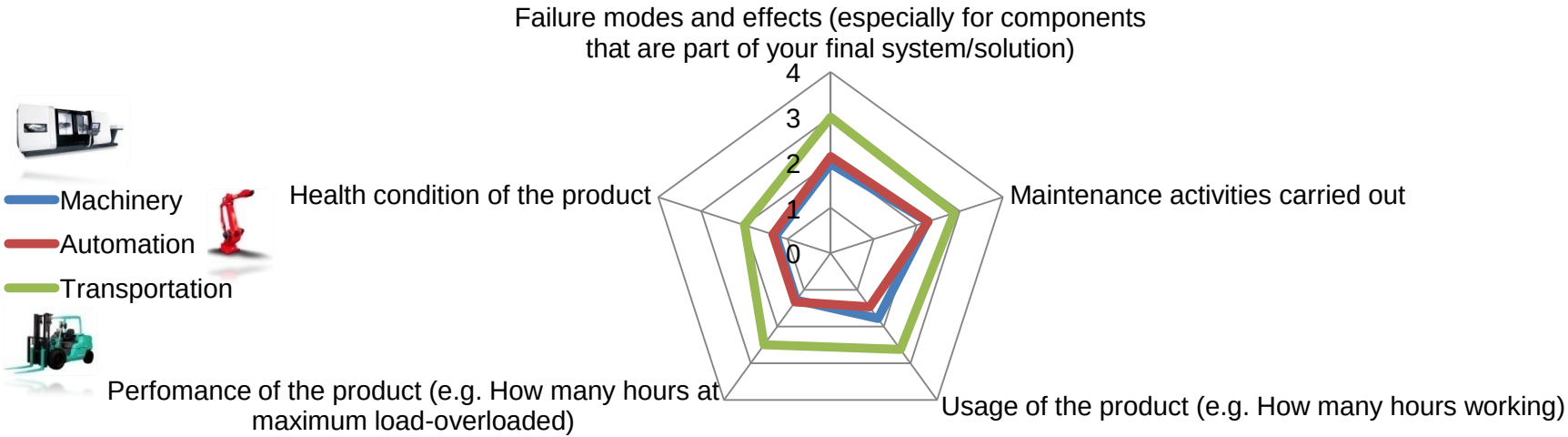
- Companies collect and manage data on health conditions and product performances on less than 30% of their installed base.
- Companies collect and manage failure modes, maintenance activities reports and product usage information on 50% of their installed base.



Installed base Condition Monitoring (I)

Domains

Transportation: collect and manage data on health condition and on product performances in average on 50% of their installed base. Failure modes, maintenance activities reports and product usage information are collected in average on 70% of the installed base.



Control over the installed base in terms of data collection

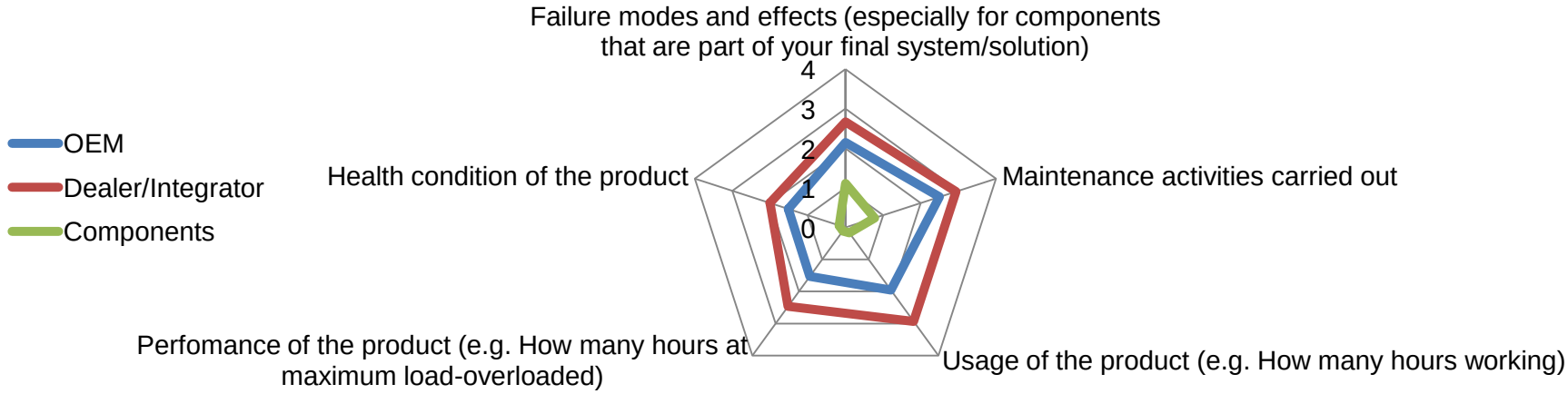
(0 – 0/20%, 1 – 21/40%, 2 – 41/60%, 3 – 61/80%, 4 – 81/100%)

Installed base Condition Monitoring (II)

SC level

Component manufacturers: collect and manage information only about failure modes and maintenance activities. This information are collected on less than 20% of the installed base

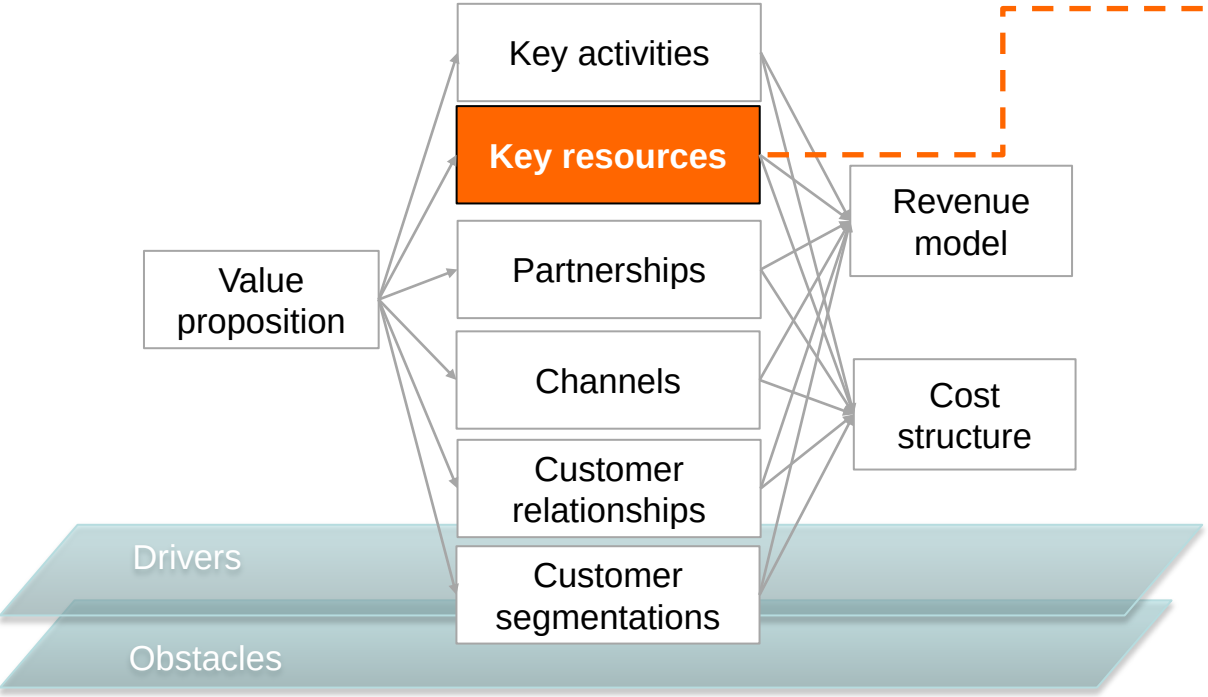
D/I: collect and manage data on health conditions and on product performances in average on 50% of their installed base. Failure modes, maintenance activities reports and product usage information are collected in average on 70% of the installed base.



Control over the installed base in terms of data collection

(0 – 0/20%, 1 – 21/40%, 2 – 41/60%, 3 – 61/80%, 4 – 81/100%)

Results - key resources



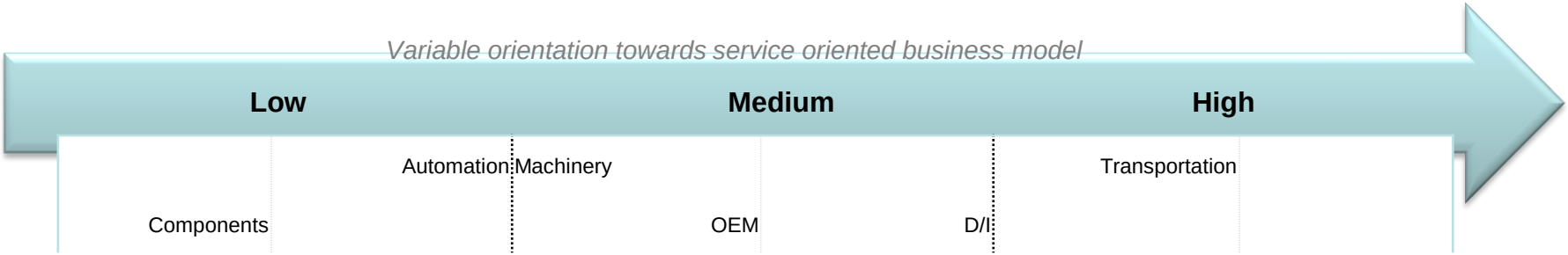
Organizational activities

Information Systems

Variables investigated

Importance of organizational activities – general findings

- Production/Assembly, product components purchasing and product design are perceived as quite important by the three industries analysed



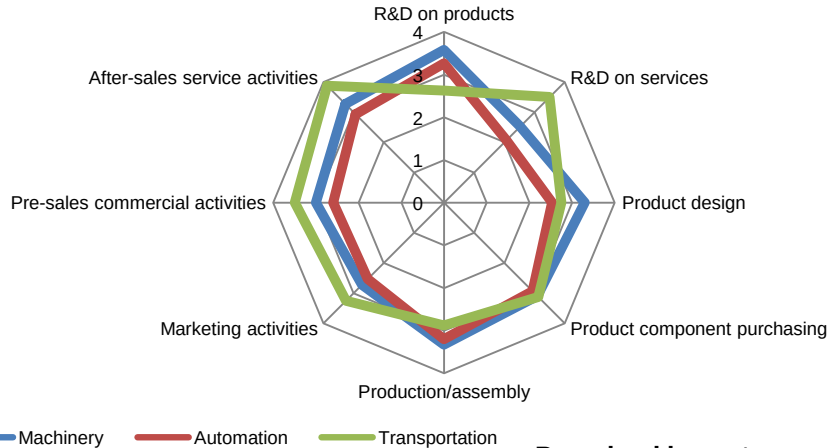
Importance of organizational activities

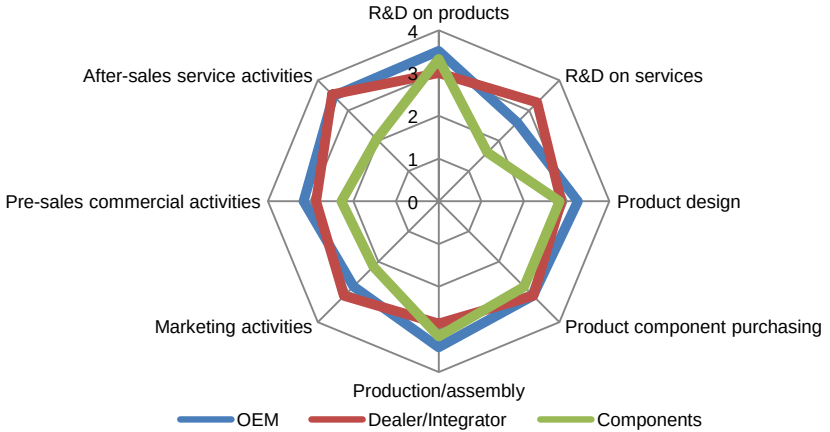
Domains

Machinery: High importance of R&D on product and product design activities and moderate importance of R&D on services
Automation: High importance of R&D on product and moderate importance of R&D on services
Transportation: High importance of R&D on services, marketing and pre-sales commercial activities; extremely importance of After-sales service activities

SC level

Component manufacturers: R&D on product is considered highly important while pre-sales, marketing, after-sales activities and R&D on services are less important for the company.
OEMs: Companies consider as highly important R&D on product, production assembly and after-sales service activities.
D/I: Companies consider as highly important R&D on services and after sales activities.



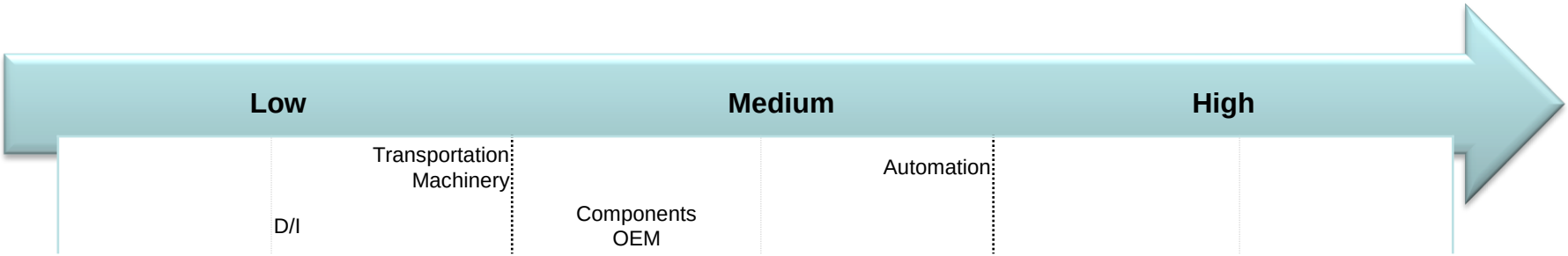


Perceived importance of different companies resources

(0 – Not at all important, 1 – Slightly important, 2 – Moderately important, 3 – Quite important, 4 – Extremely important)

Adoption level of information systems – general findings

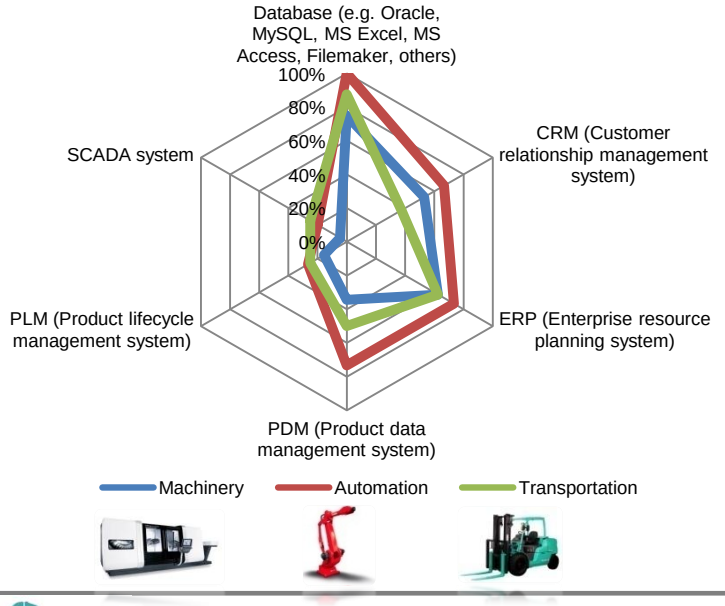
- SCADA system and PLM are poorly diffused, while ERP, PDM and CRM are quite used. Database (e.g. Oracles, MS Excel etc..) are widely implemented



Adoption level of information systems

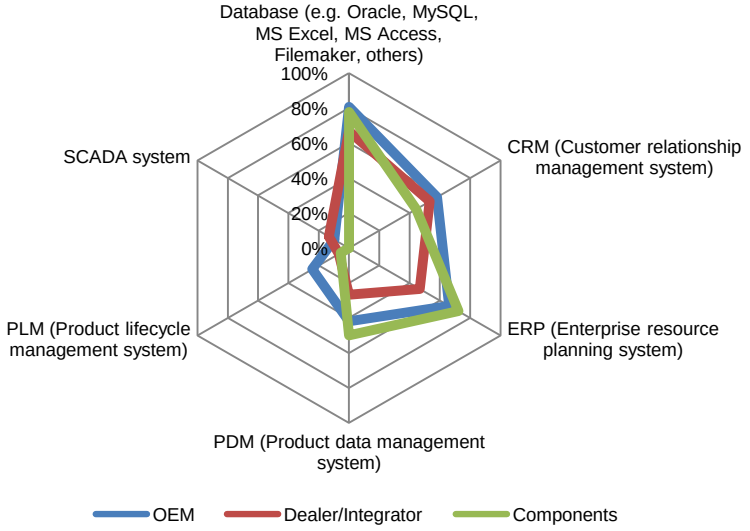
Domains

Machinery: Low diffusion of PDM systems.
Automation: High diffusion of PDM, ERP and CRM systems.
Transportation: Low diffusion of CRM systems.

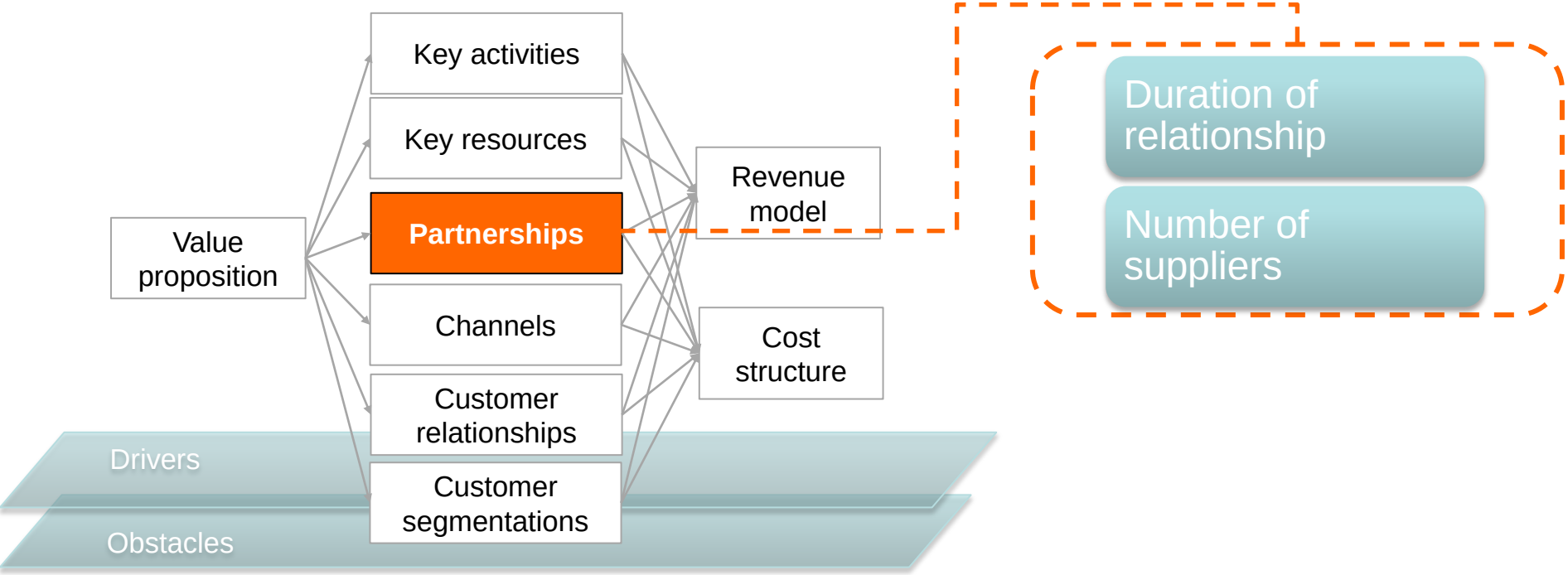


SC level

Component manufacturers: Low diffusion of CRM systems.
D/I: Low diffusion of PDM and ERP systems.

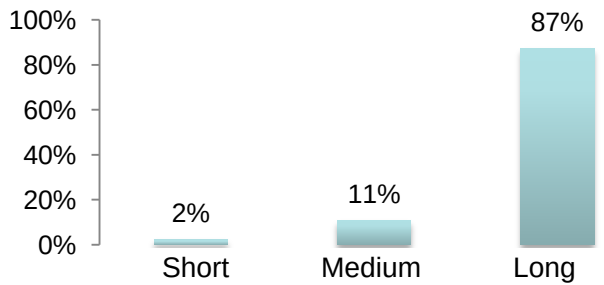


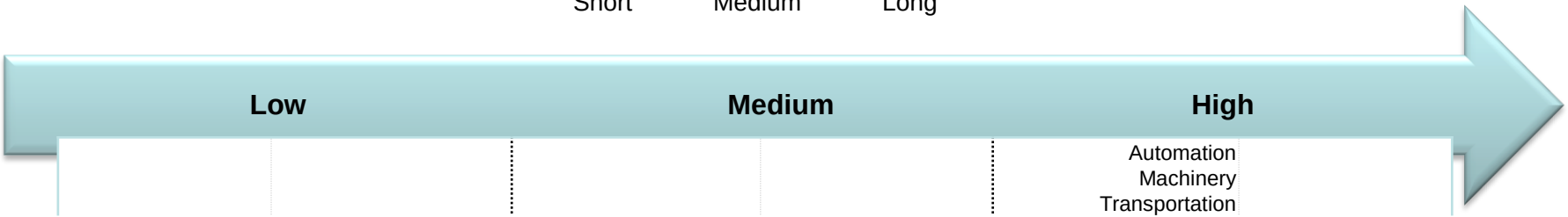
Results - partnerships



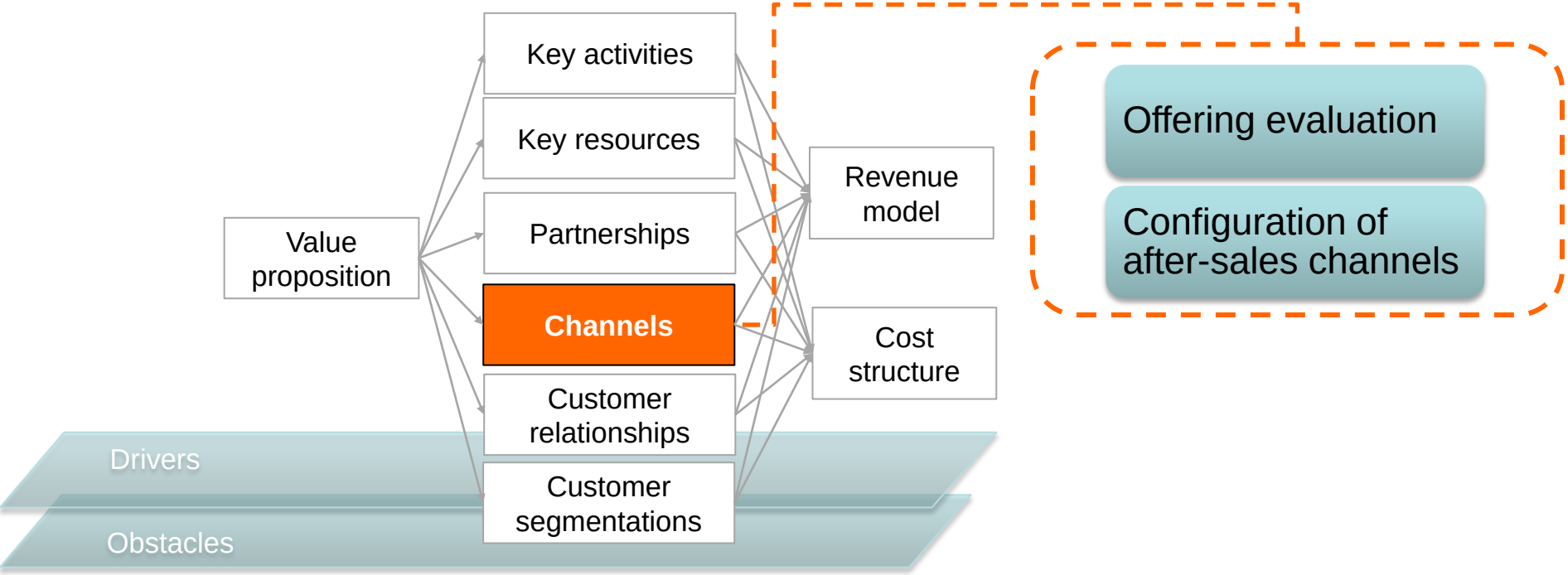
Relationships with suppliers – general findings

- Companies usually have long relationship with their supplier.



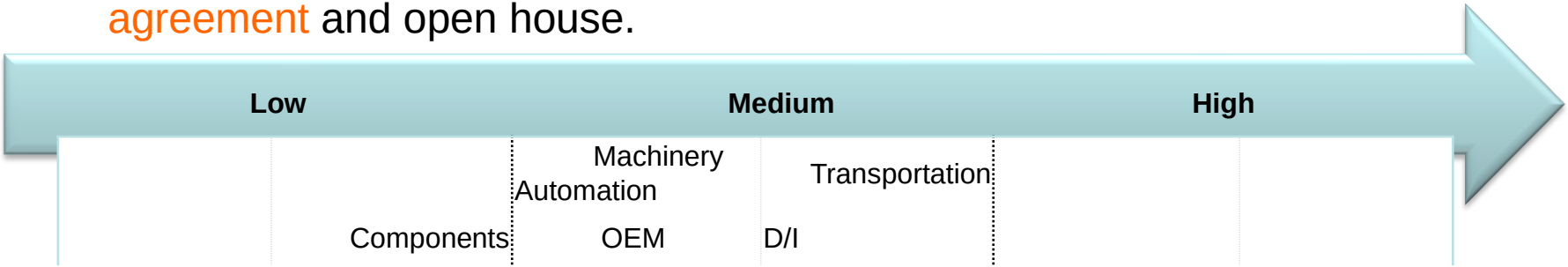


Results - Channels



Offering evaluation – general findings

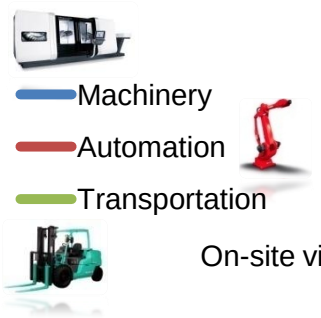
- Companies perceive as quite important use cases, reliability assessment, comparison of technical performance and on-site visit best-in-class customer.
- Companies consider moderately important for the evaluation of their offer in the pre-sale phase total cost of ownership assessment, service level agreement and open house.



Offering evaluation (I)

Domains

Transportation: Companies perceive as extremely important comparison of technical performance. Also consider as quite important service level agreements and total cost of ownership assessment.



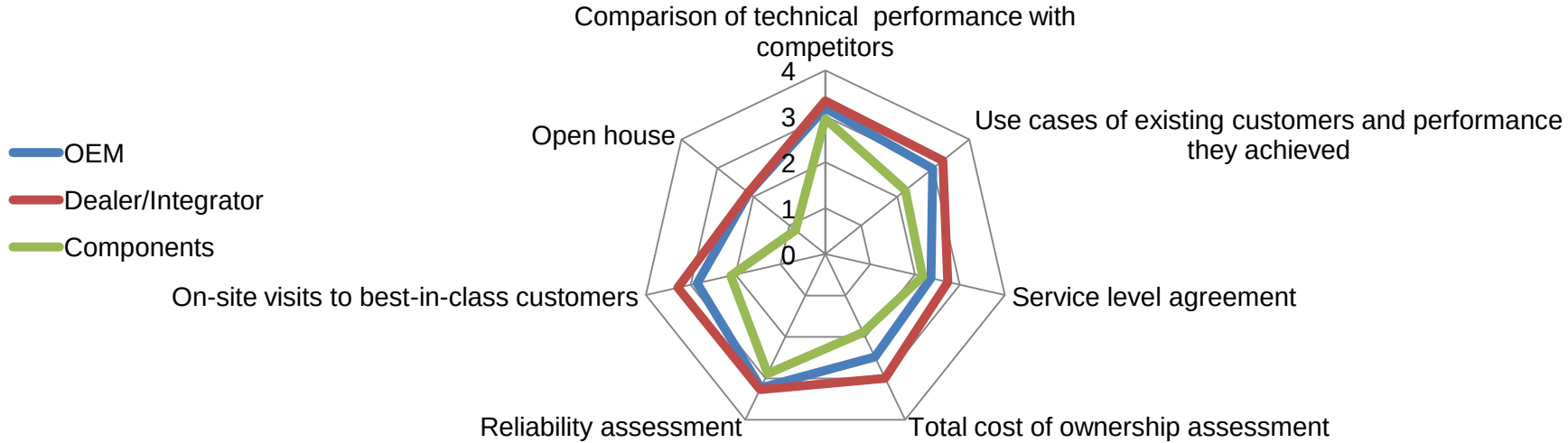
Importance of channels to support the customer evaluating the offering

(0 – Not at all important, 1 – Slightly important, 2 – Moderately important, 3 – Quite important, 4 – Extremely important)

Offering evaluation (II)

SC level

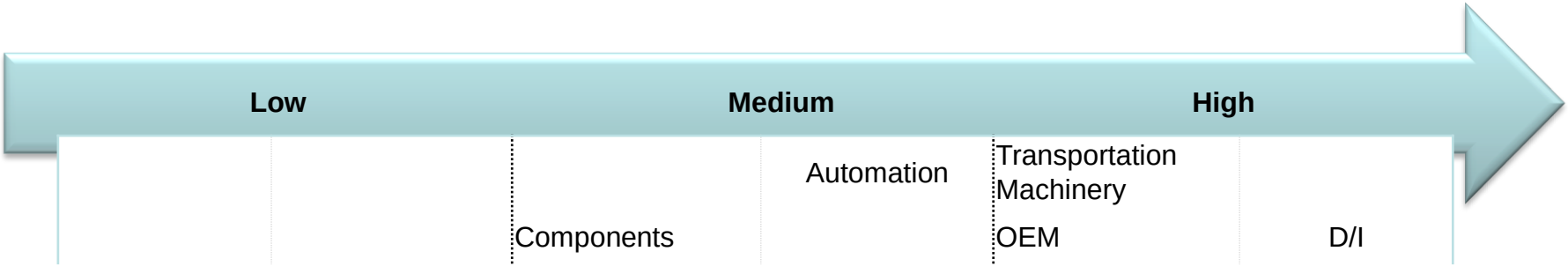
Component manufacturers: consider slightly important on-site visit and use cases.
D/I: Companies perceive as quite important service level agreement and total cost of ownership assessment.



Importance of channels to support the customer evaluating the offering
(0 – Not at all important, 1 – Slightly important, 2 – Moderately important, 3 – Quite important, 4 – Extremely important)

Configuration of after-sales channels – general findings

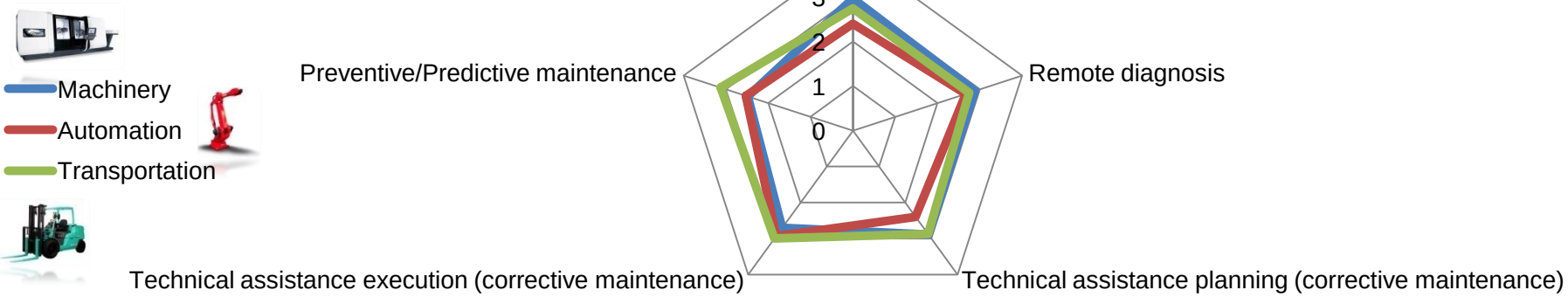
- Companies provide support after the sales mainly with internal resources.



Configuration of after-sales channels (I)

Domains

Transportation: provide preventive/predictive almost only with internal resources.
Automation: provide preventive/predictive maintenance and technical assistance planning both with internal and external resources.



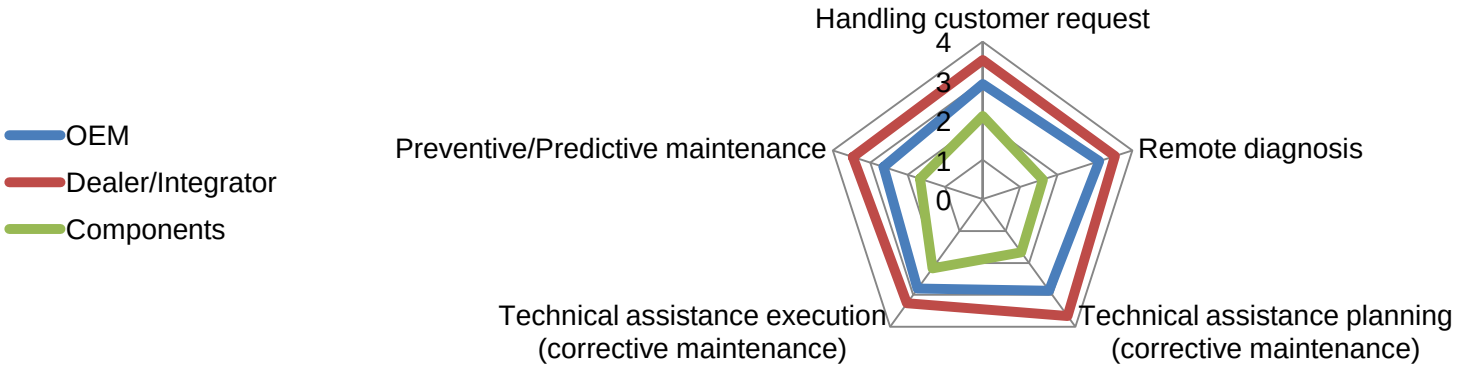
After-sales channels configuration

(0 – Completely outsourced, 1 – Mainly outsourced, 2 – 50/50, 3 – Mainly internal, 4 – Completely internal)

Configuration of after-sales channels (II)

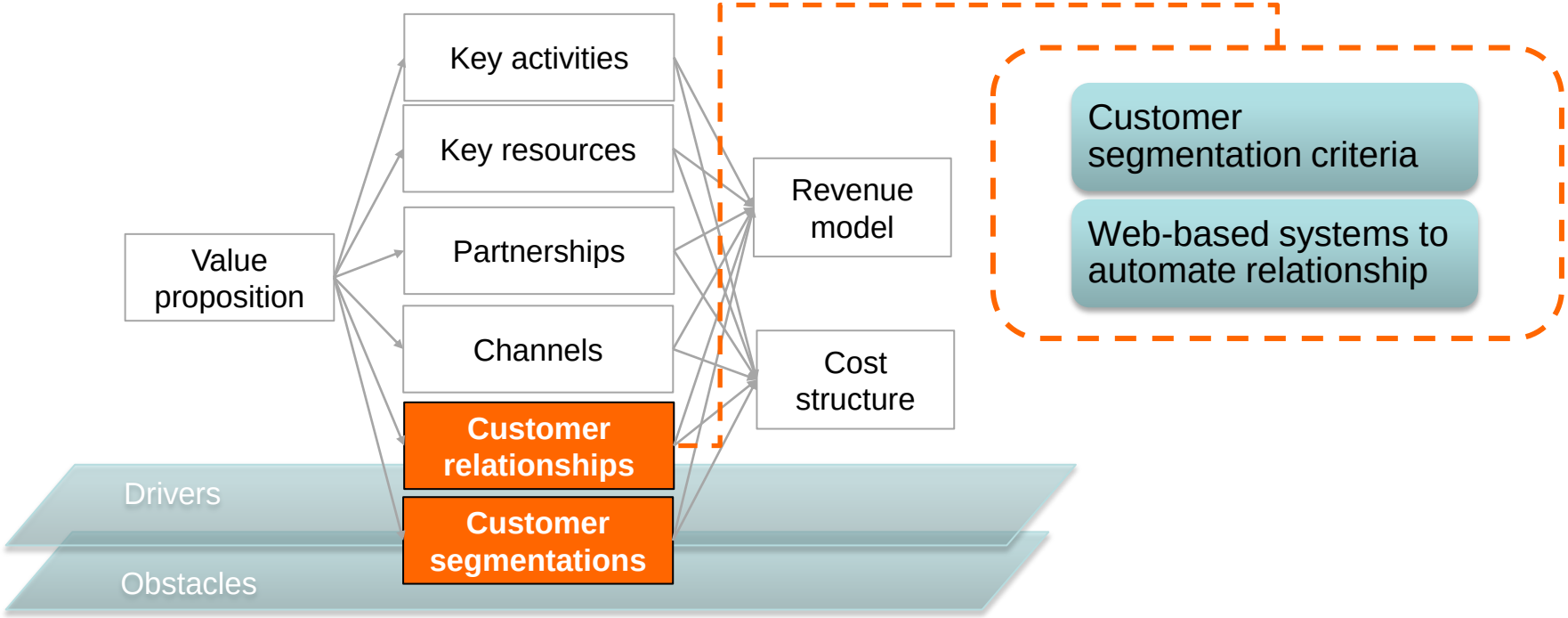
SC level

Component manufacturers: provide support after the sales both with internal and external resources.
D/I: Companies provide support after the sales almost with internal resources.



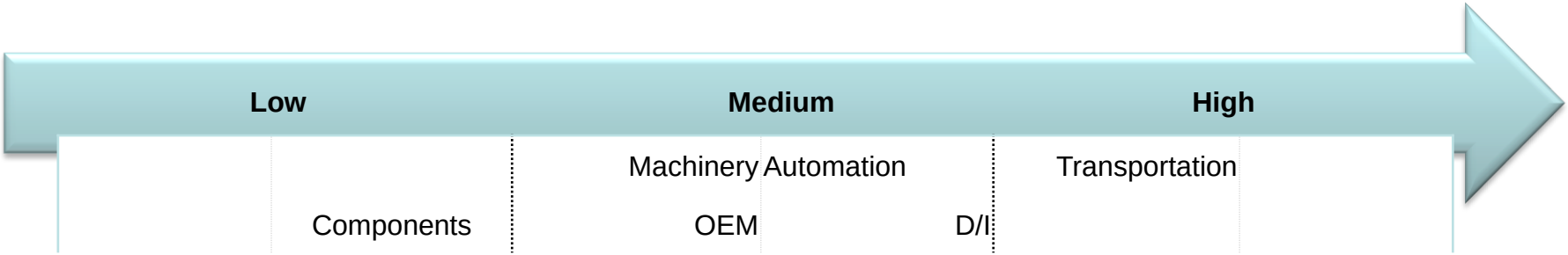
After-sales channels configuration
(0 – Completely outsourced, 1 – Mainly outsourced, 2 – 50/50, 3 – Mainly internal, 4 – Completely internal)

Results - Customer



Adoption of customer segmentation criteria

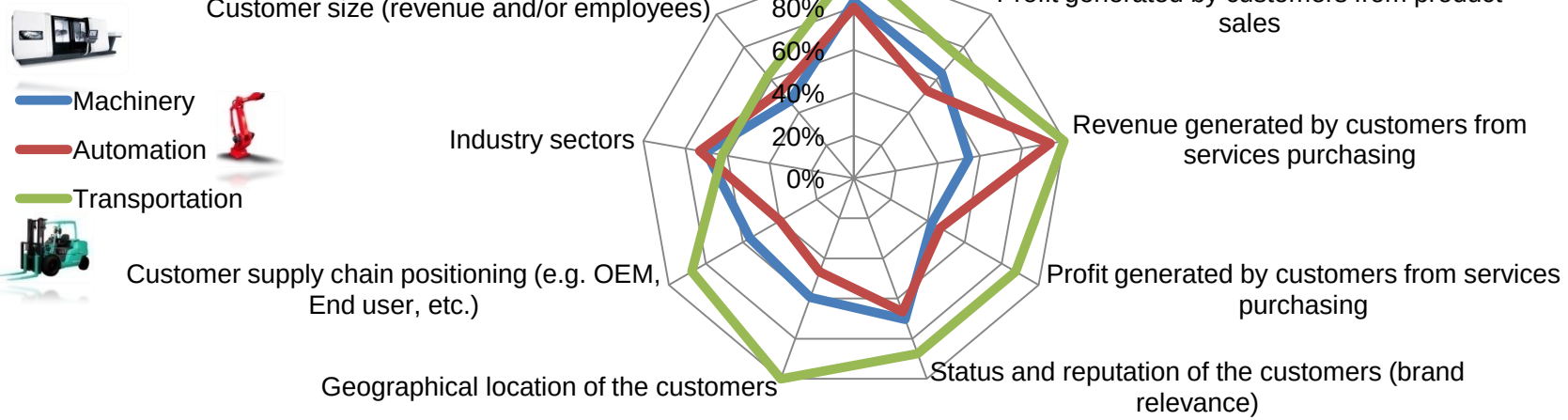
Customer segmentation criteria have an average diffusion among companies. In particular, criteria based on customers industry sector, customer status and reputation and revenue generated by customer from product sales are widely diffused.



Adoption level of customer segmentation criteria (I)

Domains

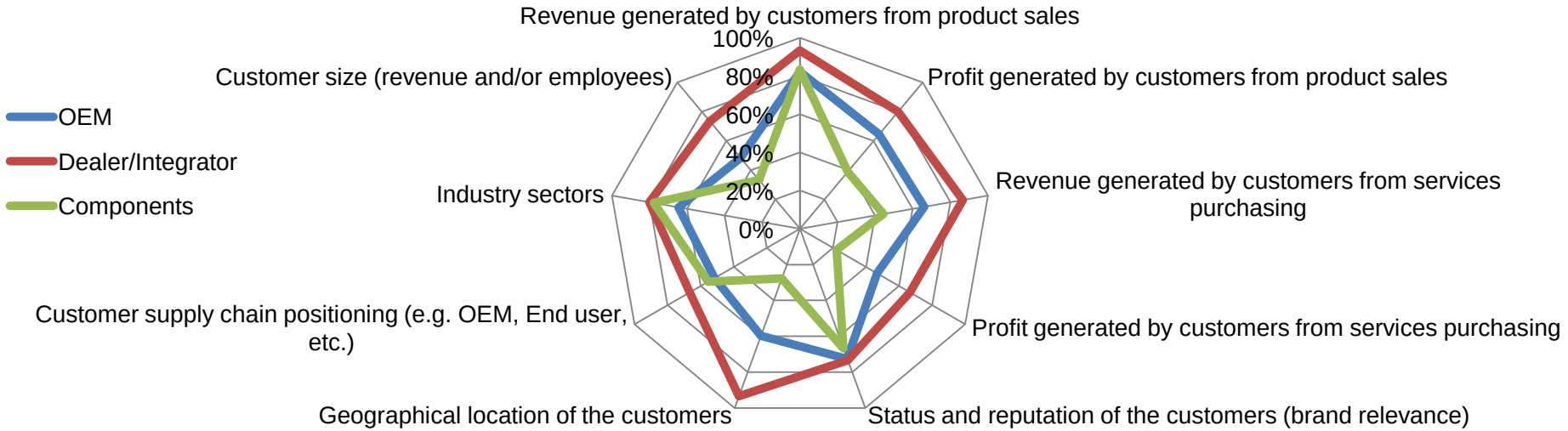
Automation: Revenue generated by customer from services purchasing is extremely diffused.
Transportation: Geographical location, revenue generated by customer both from services and product purchasing, customer status and reputation and profit generated by customer services purchasing are highly diffused.



Adoption level of customer segmentation criteria (II)

SC level

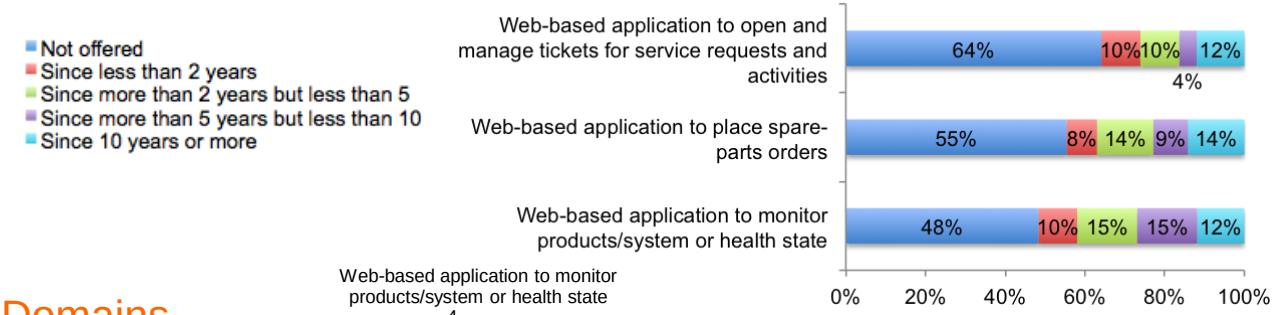
Component manufacturers: Low diffusion of criteria based on customer size, profit generated by customer from services purchasing and geographical location.
D/I: Geographical location, revenue generated by customer both from services and product purchasing are highly diffused.



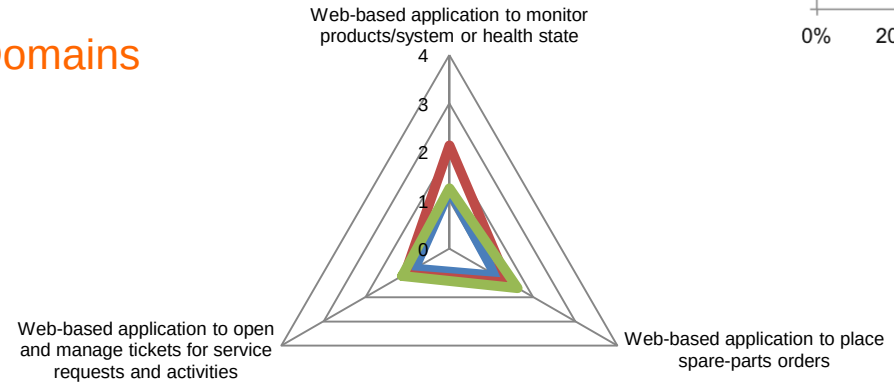
Adoption level of web-based systems to automate relationships – general findings

- Web-based application to automate customer relationships during the after-sales phase are generally not offered. Whenever offered, these tools are implemented since less than 5 years.

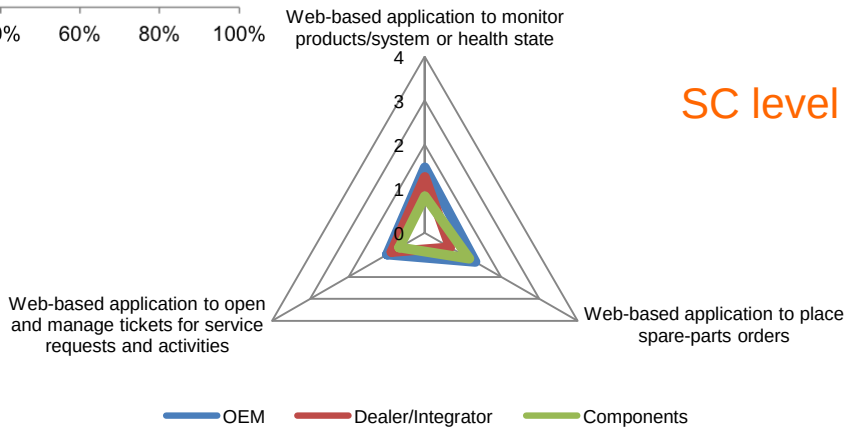
Web-based systems to automate relationships



Domains



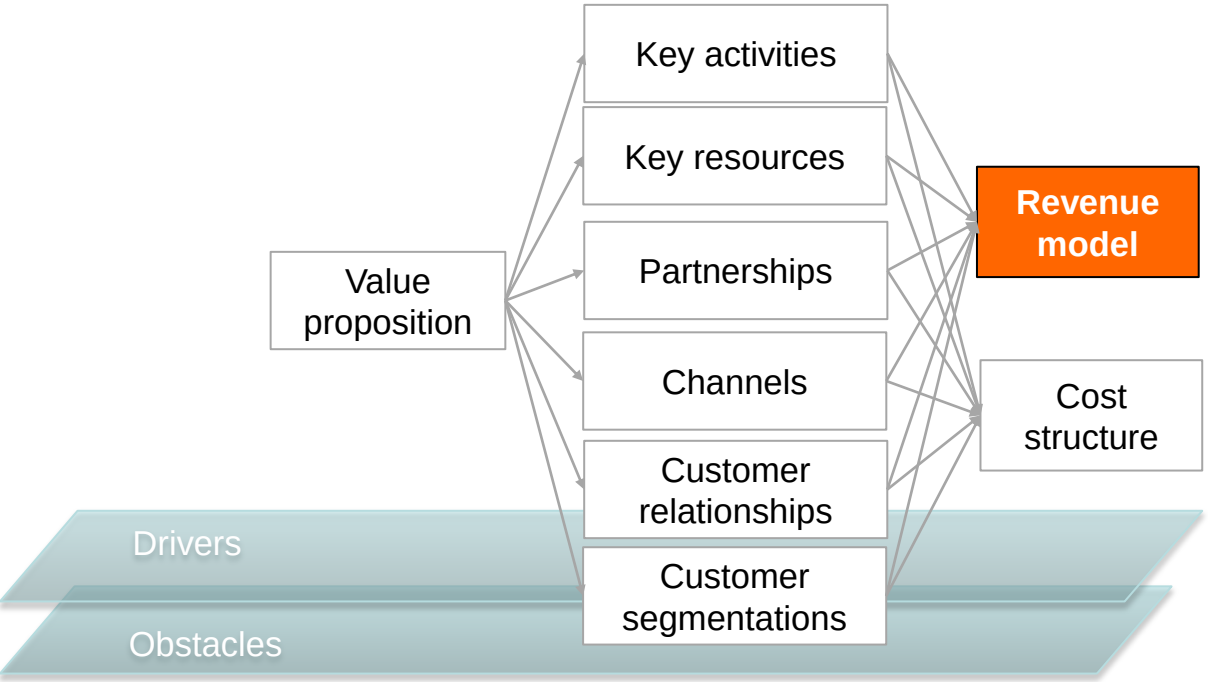
SC level



Machinery Automation Transportation

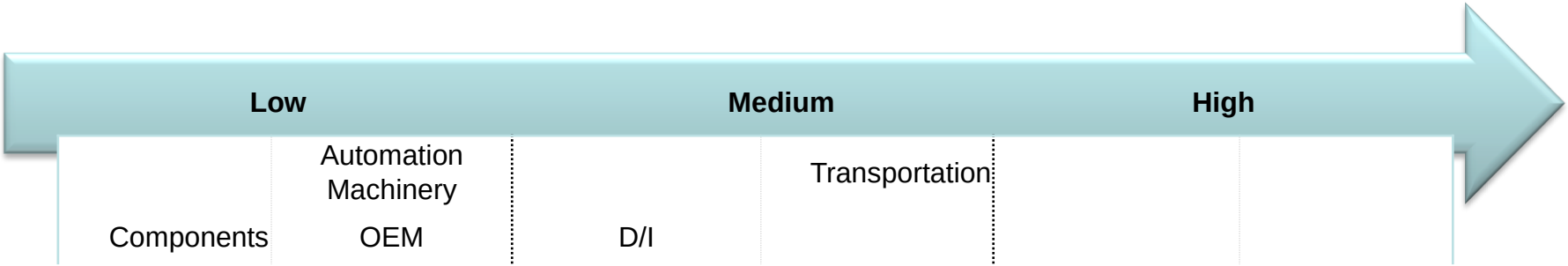
Adoption level of web-based systems
(0 – Not offered, 1 – Offered since less than 2 years, 2 – Offered since more than 2 years but less than 5, 3 - Offered since more than 5 years but less than 10, 4 – Offered since more than 10 years)

Results - Revenue model



Revenue model - general findings

- Product sales represent the main source of revenues.



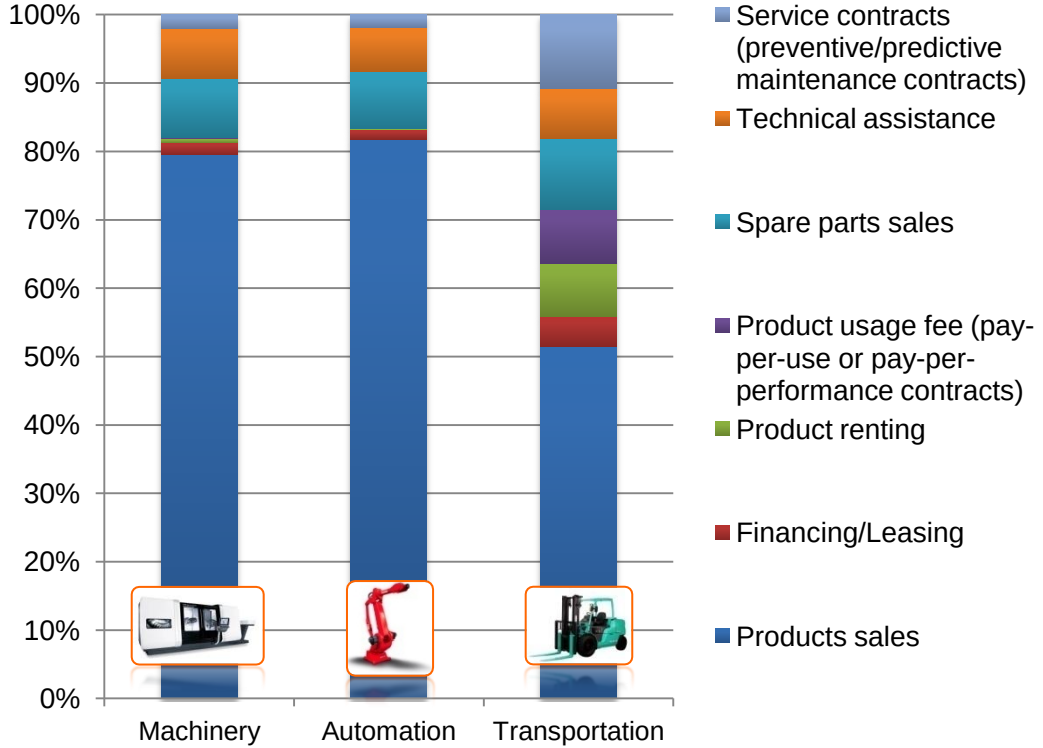
Revenue model (I)

Domains

Machinery: Services represent only 20% of companies turnover. Service contracts and financing/leasing represent less than 2% each. Renting and pay-per-x contracts don't generate revenue.

Automation: Services represent less than 20% of the companies turnover. Service contracts and financing/leasing represent less than 2% each. Renting and pay-per-x contracts don't generate revenue.

Transportation: Service represent about 50% of companies turnover. Service contracts represent the main sources of service-related revenues (about 11%). Financing/leasing contribute to the total turnover for around 5%, renting and pay-per-x contracts for around 8% each.



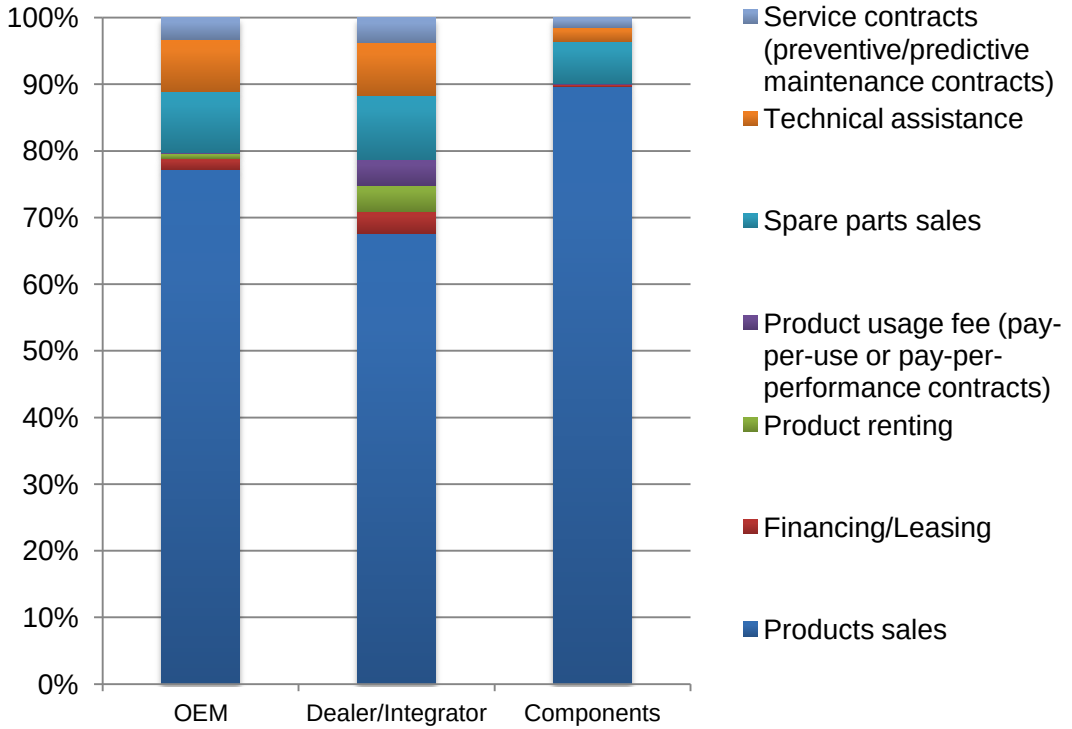
Revenue model (II)

SC level

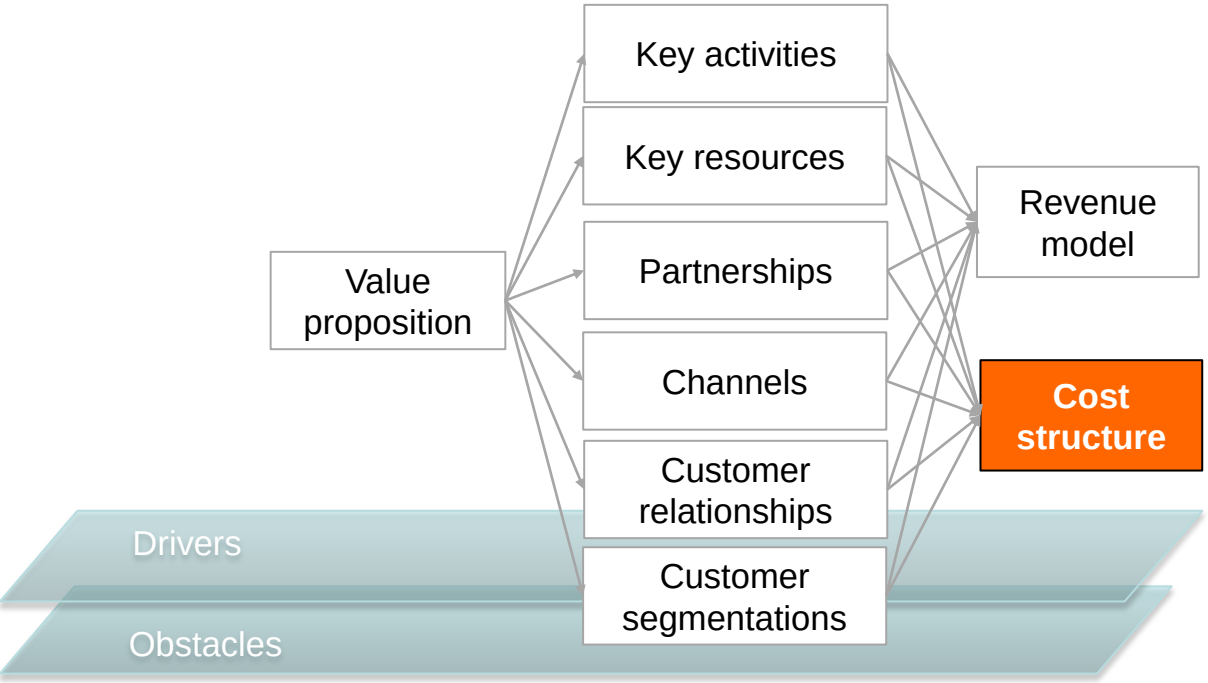
Component manufacturers: Services represent only 10% of turnover. Service contracts and financing/leasing represent less than 2% each. Renting and pay-per-x contracts don't generate revenue.

OEMs: Services represent only 20% of turnover. Service contracts represent about 3%. Renting and pay-per-x contracts don't generate revenue.

D/I: Service represent about 35% of turnover. Service contracts, renting, financing/leasing, pay-per-x contribute to the total turnover for around 4% each.



Results - Cost structure



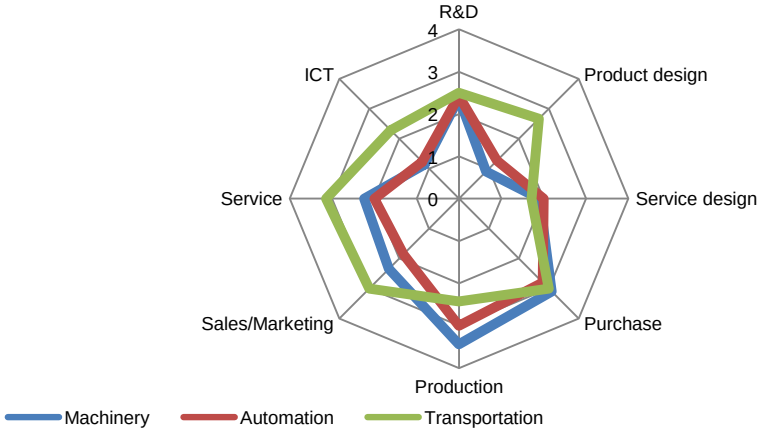
Cost structure

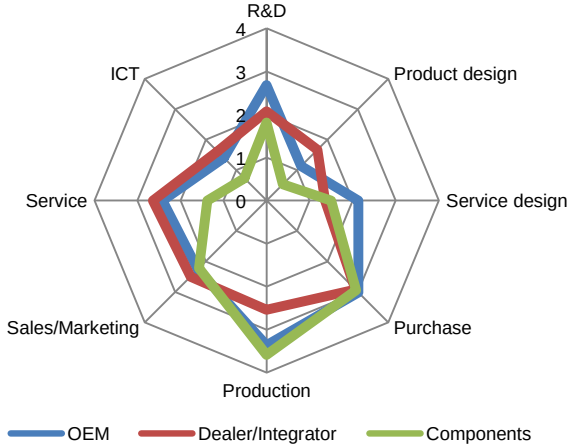
Domains

Machinery: Production and purchasing have the greater impact on costs.
Automation: Production and purchasing have the greater impact on costs.
Transportation: Service, Sales/marketing and purchasing have the greater impact on costs.

SC level

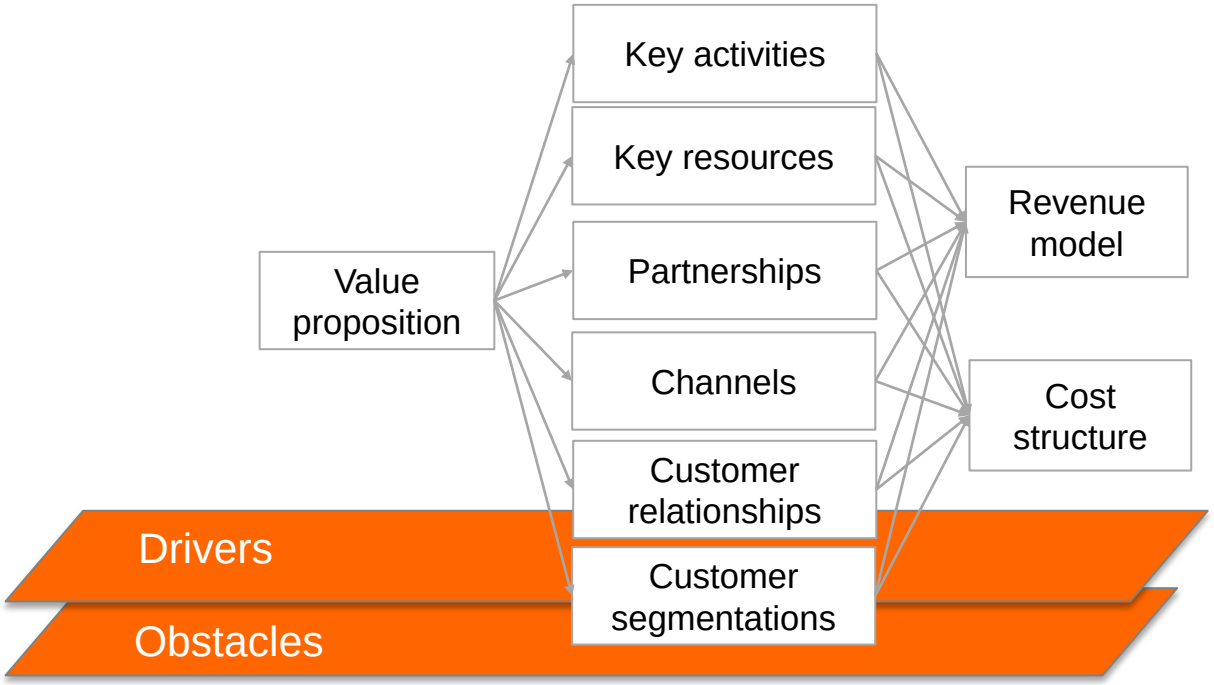
Component manufacturers: Production and purchasing have the greater impact on costs.
OEMs: Production and purchasing have the greater impact on costs, followed by R&D and service activities.
D/I: Purchasing have the greater impact on costs., followed by service and sales/marketing.





Estimated impact of organizational unit on companies cost structure
(0 – Not at all, 1 – Slightly, 2 – Moderate, 3 – Quite high, 4 – Extremely high)

Results - Obstacles and drivers



Obstacles and drivers - general findings

Drivers

The most important driver that pushes to design and offer “pay-per-x“ contracts is the possibility to strengthen relationships with customers and hence lock out competitors. The second more important driver is the possibility, through these contracts, to make product life-cycle costs tangible for the customers.

Obstacles

Companies perceive as an obstacle to develop and offer “pay-per-x“ contracts the customers’ culture. Another obstacle is represented by the difficulty to monitor the product usage conditions and related data.
Finally, transportation companies perceive as an important obstacles also the service orientation attitude of service personnel and service engineering capabilities.

Results

Sample description

Business model configuration

Main findings

Main findings (I)

Service offerings are still mainly anchored on traditional services.

In the studied companies basic services are extensively offered (documentation, repair, spare parts, basic training), while advanced services are only sometimes offered (advanced training, remote monitoring and product remote diagnosis, product upgrade/retrofit, warranty extension and maintenance contracts), and usage-oriented services (rental, “Pay-per-x” contracts) are rarely, if never, offered.

Main findings (II)

The Total Cost of Ownership (TCO) evaluation, as a way to support the shift from transactional, price-based relations with customers, to life-cycle oriented and relational ones, is gaining interest, but mainly on the provider's side.

Companies have increasing awareness about their products' TCO, but still very low adoption of models and tools to simulate the TCO, as a pre-sales activity toward potential customers, or as a through-life activity on the installed base. On the other hand, they record little or no pressures by customers on these issues.

Main findings (III)

Service is an important part of company's business and its importance will increase in future.

However, most companies have not yet formalized the ***service development activities***, with no explicit strategy, responsibilities, budget, formal processes and methods in place. No parallel can be made between R&D on products (organisation, resources, methods, and Information Systems), and the service development processes.

Main findings (IV)

Product design practices aimed at modularity and reliability are in place in a number of companies, while ***products/components reuse, recoverability and serviceability are rarely supported by formal techniques since the product design phase.***

Main findings (V)

Fleet operation and maintenance practices are carried out by companies on less than 50% of their installed base, generally through direct field engineers.

Remote diagnostics, product condition analysis, preventive and corrective maintenance activities are even less diffused, below 30% of the installed base.

Main findings (VI)

Customer relationships are still dominated by a traditional approach.

They are transaction-based, and customers' culture is perceived as an obstacle to develop and offer "Pay-per-x" contracts, since a great portion of customers still judge and decide based on the expected performance and purchasing price, rather than the services and the life-cycle costs.

Main findings (VII)

Information systems and automation have a great unexploited potential.

Two areas can be pointed out: the internal management of product and customer information (such as Product Data Management or Customer Relationship Management systems) and the interface with product/customers, i.e. data collection from the field (characterized by low automation), or automation of service offerings (e.g. web-based systems to place spare parts orders or to monitor the health state of the product).

Main findings (VIII)

The transportation industry is a step ahead the machine tool and robotics one in the journey towards new business models.

Favoured by greater product standardisation and installed base sizes, diffusion of advanced services and rental-based business models is quite high. Also the service business awareness and service development practices are more advanced. Customers are more interested in topics such as the TCO or the minimization of their maintenance costs or operational risks.

Main findings (IX)

The direct contact with the customers and the role in the supply chain matter.

Component manufacturers have a less developed service offering and lower attention to service related topics. This increases with OEMs and Dealers/System Integrators. OEMs include in their offering retrofit, 24/7 technical assistance and warranty extensions. Services represent about 20% of their turnover. Dealers/Integrators offer more frequently second-hand products, leasing and rental services, and are more experienced in TCO evaluation and models usage in the pre-sales phase. They also have explicit strategies for existing and new services and responsibilities for the development of new services. Services represent about 35% of their turnover.

Main findings (X)

Best-in-class companies are increasing their service business and are on the way towards usage-oriented business models, and support this shift with operational levers.

Indeed the contribution of service to their revenues is greater and they have a consolidated offer of advanced services, and are sometimes experimenting new business models. They couple this strategic orientation and value proposition with actions at three levels:

- Product “Design-For-X” techniques with a greater orientation to product serviceability and upgradability, reuse and lifecycle aspects;
- The formalisation of service development processes, structure and responsibilities;
- The adoption of condition monitoring, remote diagnostics and data collection over a significant share of their installed base or fleet.

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