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Service-based business models in the machine tool building industry

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European machine tool builders are facing competition from emerging countries in a situation shaped by the economic crisis. New business models with a stronger service orientation are seen as an instrument to react to the upcoming competition and future challenges. Therefore, three concepts of particularly promising new service-based business models in the machine tool building industry were empirically tested in an online survey. Data was collected in the second half of 2012 among the members of the European machine tool association (CECIMO). Results which can help to support machine tool building firms in the face of competition are presented in the following.

For more information on the DEMAT Project please visit the homepage: <http://www.dematproject.eu>

Survey Setting

In Europe, the European machine tool association (CECIMO) represents the interests of European Machine Tool Industries. They include a total of around 1,500 companies which are organized in 15 country specific member associations. Our survey addressed the companies which are organized in the national machine tool associations of Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Italy, The Netherlands, Portugal, Spain, Sweden, Switzerland, Turkey, and the United Kingdom. These machine tool building (MTB) companies constituted the population for the online survey conducted in 2012. Taking into account the unequal dispersion of machine tool production in Europe, the attempt was made to address the top 5 countries of the European machine tool production, namely Germany, Italy, Switzerland, Austria and Spain, in their mother tongue (German, Italian, French, and Spanish). For the residual countries English as lingua franca could be used to complete the survey.

In total 110 participants took part in the DEMAT online survey

In the following the results of the online survey are presented. The data covers a wide range of MTB companies from different European countries. The link to the survey was selected at least 213 times. Of those, 110 respondents filled in the questionnaire; 24 used the English version, 11 the French, 35 the German, 27 the Italian, and 13 the Spanish version. Out of those, 19 questionnaires revealed that the firm addressed does not manufacture any machine tools at all. This result shows that addressing the population via CECIMO can be assessed as successful referring to accuracy. Due to the survey frame the data does not provide any statistically representative picture, neither the sampling frame nor the responsibility of the companies provide a common probability to participate. However, the framework of the survey provides a broad coverage of the population and therefore a basis for statements about the group of MTBs in Europe.

Results

General Information on Participating Companies

The main characteristics of the companies surveyed can be summarized as follows and are also given in Figure 1. Small and medium-sized enterprises, as well as larger companies delivering products and services to a great variety of customer sectors are included in the sample. None of the firms produces standard machines, but in contrast offers customized or predominantly custom-made machines.

Figure 1:
Overview of
participating firms
(multiple choices
available for
"Sectors delivered
to"; due to missing
values number of
samples partly
below 110)

Characteristic	N	%	
total number	110		
Company size	up to 49 employees	15	19%
	50 to 99 employees	10	13%
	100 to 249 employees	17	21%
	250 and more employees	38	48%
Sectors delivered to	Automobile industry	65	71%
	Metal working	65	71%
	Machinery and equipment	60	66%
	Space and aviation industry	53	58%
	Railway cars and shipping	45	49%
	Defence technology	28	31%
	Medical technology, precision mechanics and optics	27	30%
	Electrical engineering	19	21%
	Other branches	33	36%
Degree of customize	Predominantly standard machines	0	0%
	Customization based on standard machines	68	75%
	Predominantly custom-made machines	23	25%

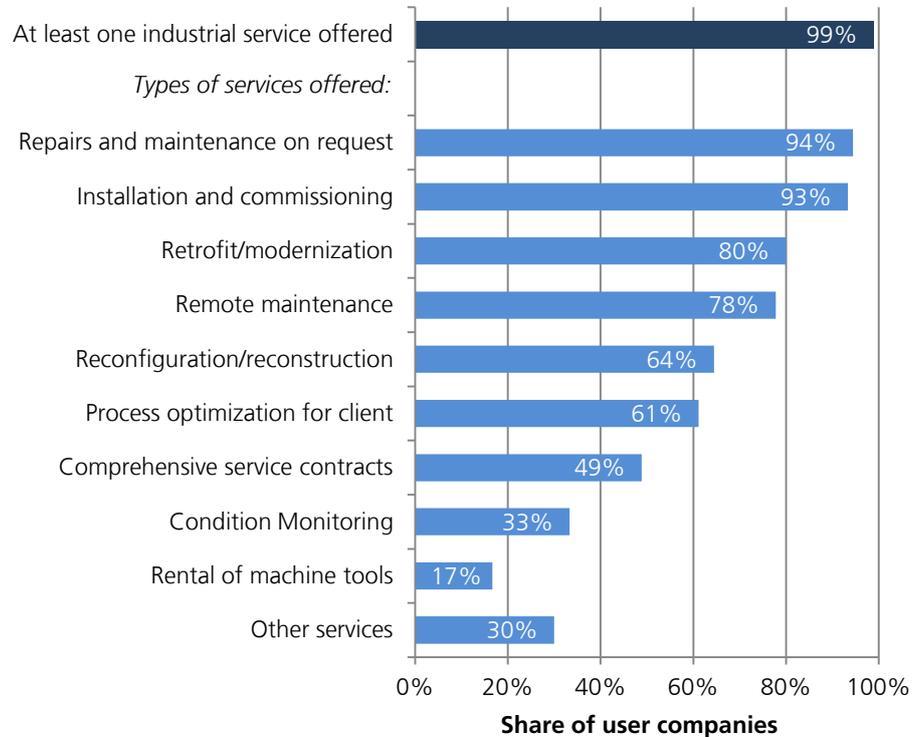
Source: DEMAT survey on machine tool industry 2012, n=110.

Offer of industrial services

By offering
standard services
an MTB cannot
differentiate itself
from competitors

In Figure 2 the industrial services offered are depicted. Nearly all of the respondents offer at least one industrial service complementing the machine tools sold. The most frequently provided services are repairs and maintenance on request (94 %), installation and commissioning (93 %), retrofit/modernization (80 %) and remote maintenance (78 %). Customers also expect most of these services. Therefore, by offering these standard services the individual MTB cannot differentiate itself from competitors. Instead, it becomes more and more important that companies offer comprehensive and holistic solutions.

Figure 2:
Offers of
industrial services



Source: DEMAT survey on machine tool industry 2012, n=90.

Service-based
business models
are far more
comprehensive
than classical
product-related
services

Offers of Industrial Business Models

In addition to selling machine tools, several manufacturers offer their clients holistic solutions by taking on additional responsibility for the operation of the machine tool or also for the achieved availability in the client's firm. These offers are far more comprehensive than classical product-related services. In Figure 3 the distributions of three service-based business models are presented. These alternative service-based business models, formed by new value propositions, revenue models and supply chain architectures can be divided into:

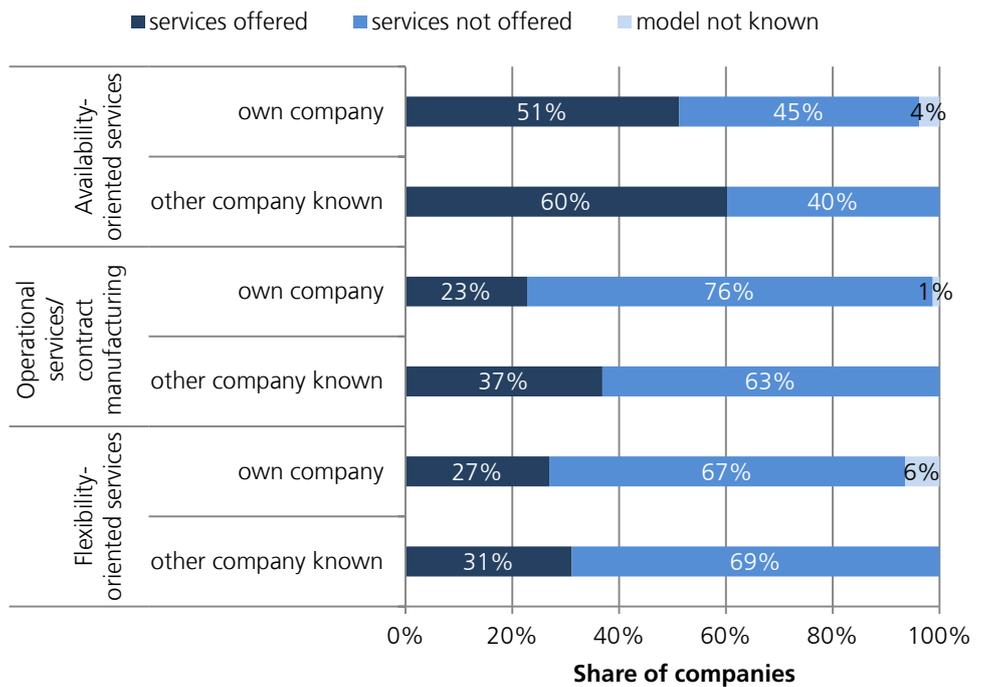
- **Availability-oriented services** which guarantee specific availability levels for the machine tools which are agreed with the client in advance and upon which the performance fee is determined;
- **Operational Services/Contract manufacturing** which include the offer to take over the production of parts for the machine tool customer; and
- **Flexibility-oriented services** which include the design, building and selling of a manufacturing system with a focus on flexibility, which means that the provider foresees and guarantees future reconfigurations of the machine and is paid a fixed price in advance.

The dissemination of the 3 observed service-based business models varies

Two different propositions can be distinguished: The respective service is offered by the company on its own, or it knows another company which successfully offers these kinds of services.

It seems remarkable, that nearly two-thirds of the companies know at least one other company which offers availability-oriented services and even about half provide it on their own. In contrast, operational services are only offered by a quarter of the respondents. Flexibility-oriented services are offered approximately by a quarter of the firms polled, which shows that there still is a huge potential for business models built on flexibility guarantees. While flexibility-oriented services are widely offered, we assume that only a certain number of those companies take full responsibility for the result in monetary terms.

Figure 3: Offering of service-based business models



Source: DEMAT survey on machine tool industry 2012, n=80.

However, it can be seen that there is an emerging demand for flexibility from the customers' side to which European MTBs have already reacted. The extent to which this is done by committing to the relationship with the customer or by expanding the service offer can be more clearly observed when taking the implications of the organizational architecture into account. However, the results in this case should be considered with caution and need to be linked to other questions.

Offer of Flexibility-Oriented Services

In Figure 4 the details of the flexibility-oriented services on offer are shown. Even if the figures are based only on responses by companies that have declared that they use these business models, a trend becomes visible. First, it seems that neither customer pressure, nor the company's own initiative is a dominant reason to offer these kinds of advanced services. Second, over one third of the respondents conducted some restructuring activities in order to be prepared to give their customers flexibility-oriented services. The most important restructuring activities are the setting up of independent service units (100 %) and the development of new internal competences (88 %) as well as stronger networking of internal teams (63 %).

*Figure 4:
Details on offered
flexibility-oriented
services*

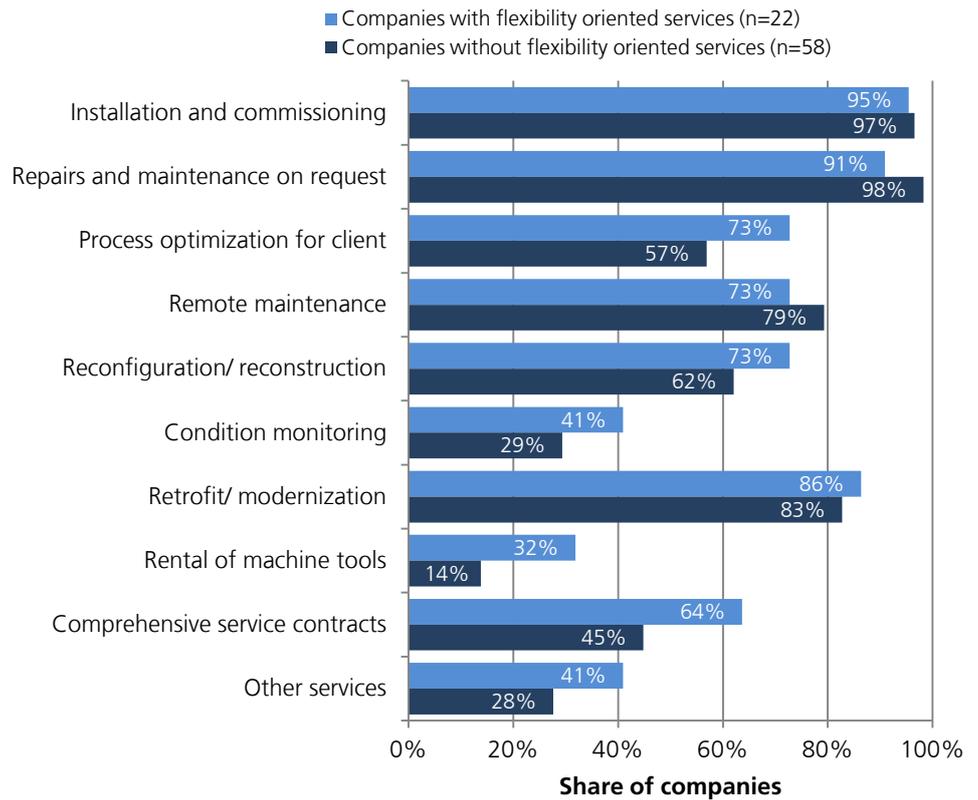
Introduction due to customer pressure		
	rather due to customer pressure	41%
	rather due to own initiative	41%
	Not known	18%
Restructuring activities when introducing		
	Yes	36%
	No	36%
	Not known	28%
Restructuring activities for flexibility-oriented services (multiple answers)		
	Setting up of independent service-unit	100%
	Development of new internal competences	88%
	Stronger networking of internal teams	63%
	Adaption of machine tool design	50%
	Application of new technologies	38%
	Cooperation with external partners	13%

Source: DEMAT survey on machine tool industry 2012, n=22.

Comprehensive services (e.g. process optimization, reconfiguration, condition monitoring) are offered to a greater extent by companies with flexibility guarantees

Other new and interesting insights can be won by combining the offered industrial services with the more comprehensive service-based business models. In Figure 5 the different industrial services offered by companies with flexibility-oriented services are shown and compared with the services offered by firms which do not provide flexibility-oriented services. Not surprisingly, most of the rather basic services, like installation and commissioning or repair and maintenance on request, are particularly offered by companies without flexibility-oriented services. On the contrary, more comprehensive services, like process optimization, reconfigurations and reconstructions, condition monitoring or comprehensive service contracts, are offered to a greater extent by companies with flexibility guarantees. These kinds of industrial services seem to play an important role and may act as a precondition for the potential offer of flexibility-oriented services, which can help to support MTB firms when facing new competition.

Figure 5: Services used by firms with flexibility-oriented services



Source: DEMAT survey on machine tool industry 2012.

Flexibility-oriented services help to guard the customer against the dynamically changing environment

While availability guarantees and operational services are already being intensively investigated, flexibility-oriented business models are quite innovative for the MTB industry. The value proposed in these flexibility-oriented business models is to guard the customer against the dynamically changing environment. Flexibility in these models requires that the MTB is able to support customers at any time to have available the right production capacity to satisfy market demand, which might change in terms of features and volumes. Also, the flexibility guarantee given by the MTB requires a more supportive network of partners than the models of availability guarantees and operational services. These partners have to follow the same business logic, which means dealing with uncertainty, keeping up the edge of technology, and the acceptance of lower and discontinuous incomes. The basis for calculating the revenue of the flexibility-oriented model is the additional value provided for customers by optimizing system flexibility design and guaranteeing the availability of manufacturing capacity accordingly.

However, there are some possible barriers preventing the implementation of the business model. For instance, in order to implement the new business models, changes are necessary to machine and system design, which are potential technology barriers. Beside these barriers others are strategy and marketing barriers, competence barriers, supply chain and networking barriers and organizational barriers. Future research will concentrate on proposals how to overcome these barriers and how to establish win-win-situations for both, the provider and the customer, in innovative service-based business models like flexibility guarantees.

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