Strategic competence management in global service networks: An integrated approach

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Abstract

The paper is based on an industry project in the pharmaceutical industry and describes a holistic approach to integrate competence management, capacity planning and strategic forecasting in the field of service operations in a global service network. Goal of the paper is to introduce a methodology combining operations and strategic management.

Keywords: Competence Management, Service Networks, Methodology

Introduction

Companies' human capital is a key source for achieving and sustaining competiveness (Crook et al. 2011). Especially in the service industry were field service employees perform services at the customers' sites in close contacts to customers, the competences and skills of the service employees are essential for the services quality and the customers' satisfaction (Motwani et al. 2006). Main global trends like the declining demography, ongoing internationalization of the markets as well as the tendency of increasing complexity and specialization of operation tasks increase the importance and relevance of an effective as well as efficient usage and development of the human capital. Facing an upcoming lack of suitable employees in a sufficient number and qualification (Tarique and Schuler 2010), companies should try to improve the usage factor of the employees' skill and competences. Furthermore they should be able to identify gaps in the workforce' skillset and by that should be able to invest in the most necessary trainings for their workforce. The ongoing internationalization of business activities increases the necessity for companies to provide services on a global scale by simultaneously meeting the local customer requirements. To be able to do this, companies need to know which functions of employees (FoE) are needed to perform each service today and will most probably be needed in future as well as

should be able to estimate where and what kind of service will occur within their global service network.

The methodology described in the paper was developed and in parts implemented during an 18 months research project at a manufacturing company in the pharmaceutical industry from Switzerland (SwissMan). In recent years SwissMan strongly internationalized their product business. Due to the internationalization SwissMan also had to provide product-related services on a global scale without always having local employees of the right skillset local available. That causes inefficiencies due to high logistic costs and lowers the customer satisfaction. Additionally SwissMan isn't able to estimate the future advent and volume of services occurring at the installed base.

This paper describes a methodology for strategic competence management in global service networks to answer the above mentioned questions. The methodology combines a novel skill matrix-based approach for the internal mapping of competences and activities, a service life cycle view to be able to estimate the advent of specific services and the global installed base data for the quantification of the activities. The paper shows different applications for the methodology and describes how to expand the methodology in the area of capacity planning as well as strategic forecasting. SwissMan implemented the first Module of the methodology using a web-based software solution. The implementation of Module 2 & 3 is planned for the near future.

Background

Lots of research has been carried out in different fields of knowledge and competence management as well as strategic human resource management (Boselie et al. 2005; Collings and Mellahi 2009, Homer 2001, Huselid et al. 1997, Richard and Johnson 2001, Schuler 1989). The beginnings of competence management are in the 1970ties (McClelland 1973). Competence management has been shown as a critical approach for the success in many organizational functions as e.g. workforce and competence planning as well as in employee development (Draganidis and Mentzas 2006). It is also seen as a critical activity for the empowerment of the workforce in order to achieve a competitive advantage, innovation and effectiveness (Dubois 1998, Houtzagers 1999). Strategic human resource management strives to achieve the fit between the HR management and the desired strategic outcomes (Lengnick-Hall et al. 2009). Wright (1992) defines it as "the pattern of planned human resource deployments and activities intended to enable an organization to achieve its goals". Meifert et al. (2013) stated that the goal and major task of strategic human resource management lies in the management of the allocation of competences now and in the future. Thus a measurement and tracking of the available competence base of current and prospective employees is a prerequisite to make the right decisions to increase the companies' performance. Different approaches have been developed which include concepts for structuring competences, measurement of competences and methods for building up competency systems (Draganidis and Mentzas 2006). The paper describes a holistic approach which integrates strategic human resource management, product service life

cycle data and installed base data and offers an innovative methodology to manage human resources strategically in a global service network.

Methodology

The developed methodology consists of and is described in three main modules:

- Module 1: Mapping service activities and workforce skillset
- Module 2: Mapping of the service life cycles of the installed base and
- Module 3: Integration of service skill matrix, service life cycles and installed base data

After describing the methodology operational and strategic applications are shown.

Module 1: Mapping service activities and workforce skillset

Module 1 aims to analyze the service activities (service items) based on the service portfolio and the required competence portfolio of the service workforce. The information is integrated into a service skill matrix. The matrix contains the information, which Function of Employee (FoE) is necessary to perform a specific service item.

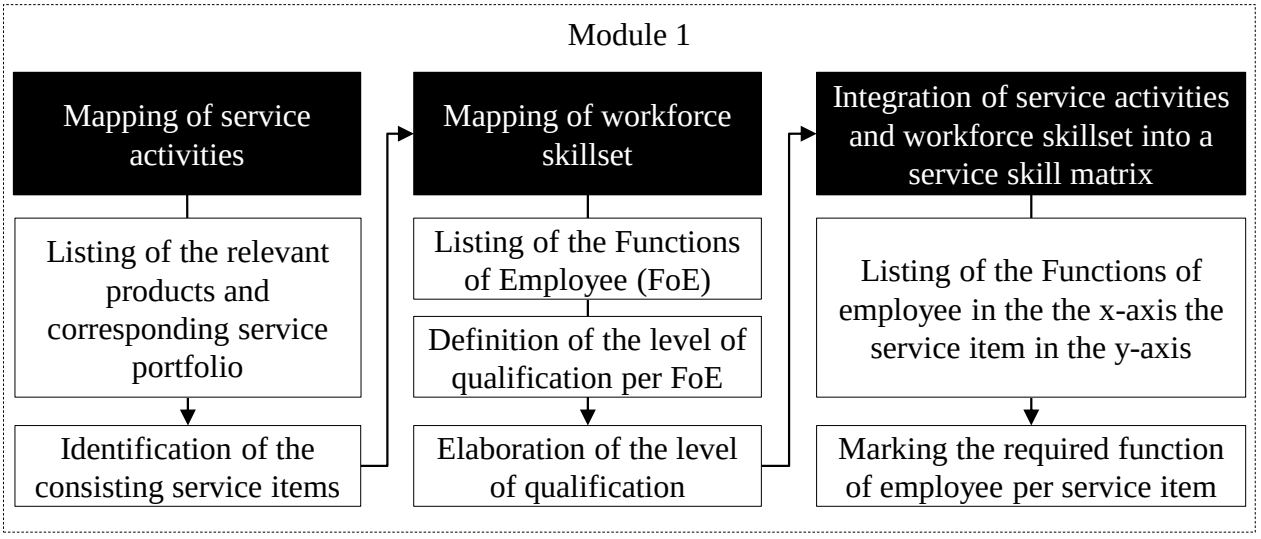

Figure 1 – Mapping of service activities and the workforce skillset

The first step of Module 1 contains the mapping of the service items which have to be performed by the company during a service event. A single service e.g. maintenance and repair normally consists of several service items of different complexity and by that different corresponding FoE are necessary to perform these items. Therefore a suitable level of analysis should be the single service item a specific service consists of. By such a differentiation it is

possible to identify the corresponding FoE which are needed to perform each service item. If a single service is offered for different products it has to be checked, whether the service differs on the service items' level. In case of that the service has to be defined specifically for each product. As a result, each service consists of a specific set of service items and by that it's possible to show in detail which FoE is required to perform each service. The first step offers a comprehensive view on the tasks and activities the company has to perform.

In step two the FoE employed in the company are analyzed. Therefore all FoE which are part of the service provision are listed. During that process it's helpful to use the list of the service portfolio and the consisting service items as a tool to support the identification of the FoE. Each FoE is differentiated in different qualification levels. During the underlying project, three level of qualification were sufficient to differentiate the specific FoE. Other numbers of competence levels can also be applied (e.g. ILOU method using 9 competence level) (Coates et al 2007). The qualification level were defined using the categories "professional prerequisites" (e.g. Master in Engineering or certificates), "experience" (e.g. working experience on machine XYZ in hours or the length of employment in a specific function) and "description" which is the formal description of the function of employee at competence level. The whole competence description is based on the concept of Draganidis and Mentzas (2006). After listing up the tasks and activities occurring in the company and after mapping all relevant FoE and their different level of qualification, both information are integrated into a service skill matrix. The FoE are listed in the x-axis the service items are listed in the y-axis. In the case that the service portfolio differs along different products, a separate matrix has to be defined for each product.

		Function of Employee								
		A1	A2	A3	B1	B2	B3	C1	C2	…
Service Items	**SA∑**	**X**	**X**	**X**		**X**	**X**		**X**	
	SA1	X				X			X	
	SA2		X				X			
	SA3		X	X						
	SB∑	**X**		**X**	**X**	**X**		**X**		
	SB1			X	X			X		
	SB2	X		X		X				
	…									

Figure 2 - Skill Service Matrix

By listing the single service items and not only the services in total, the size of the matrix easily expands to several dozens of rows. To provide the usability, additional to the service items, the services itself are listed in a separate row and are highlighted (e.g. different color and bold).

By that, it's easier for the users to identify all relevant FoE which are necessary to perform a service.

Module 2: Calculation the service advent in the installed base

After analyzing the service portfolio, the corresponding service items as well as the workforce' skillset in Module 1, the goal of Module 2 is to identify relevant product groups and corresponding customer usage types and based on that to develop the specific service life cycles.

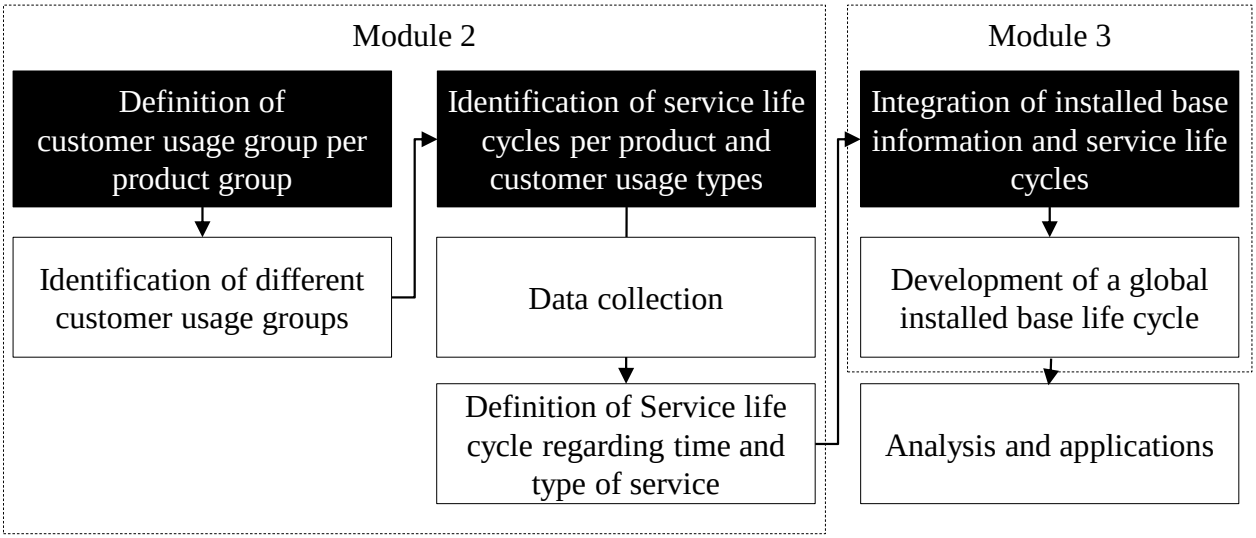

Figure 3 - Calculation of the service advent in the installed base

The first step in Module 2 is to define the customer usage types per product group. The relevant product groups were already identified in Module 1 and should be used in Module 2. The different customer usage types influence the characteristics of the service life cycle. For example a customer which uses the products at the maximum load causes different service intervals than customers which use the product below the average usage level. Customers with high application know-how probably will perform specific services by their own, where on the other hand customers with very low application know-how tend to outsource the services to the OEM. For the sake of brevity the different methods for customer segmentation will not be described in detail. It is recommended to limit the number of different customer usage levels by 3-5 per product group. Otherwise the effort for defining and handling the different customer usage types is complex and costly. After defining the customer usage type the next step is the definition of the service life cycle. The service life cycle means the advent and composition of services which have to be performed during the product life cycle. The typical service life cycle starts with presale services like planning followed by the installation, recurring maintenance and repair services, retrofits and ends probably with the disposal of the product.

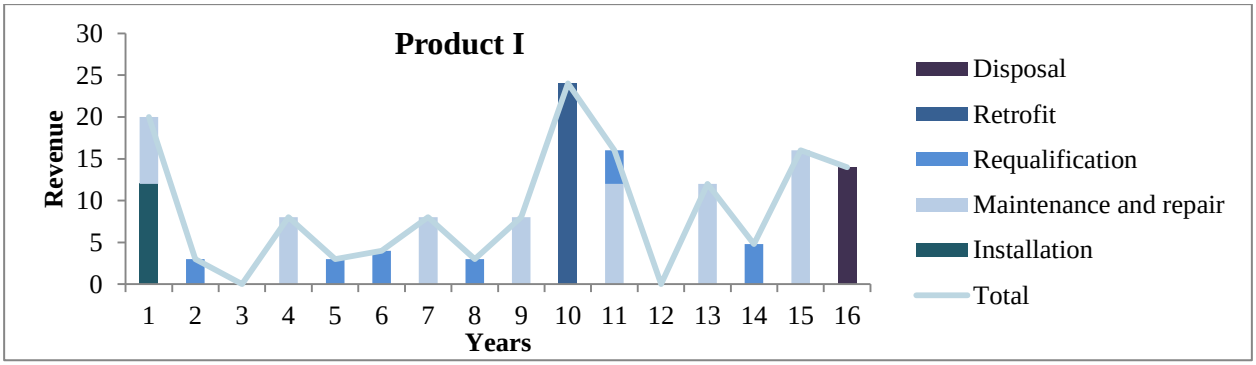

Figure 4 - Service Life Cycle (illustrative)

The service life cycle per product and customer usage type used for the described methodology includes the length of the service provision, the year the service is normally executed in, the type of service and the revenue charged for executing the service and is shown in the Figure 4. To collect the needed data two different approaches are suitable. In a company were the information is regularly provided and available by the IT-system e.g. the ERP-System, the data should be used from this source. In some cases the required data will not be available on a regular base and has to be developed manually. In that case the development of the life cycle data should take place in meetings with experts of the service department of the company. To ensure the accuracy and relevance of the data, experts of different functions (e.g. finance, controlling, field service, R&D) should take part in the meetings.

Module 3: Integration of service skill matrix, service life cycles and installed base data

In Module 3 the integration of the service life cycles and the installed base information is described. Olivia and Kallenberg (2003) defined the installed base as the "(…) is the total number of products currently under use". The required data of the installed base needed for the described methodology includes the year of product installation, the types of the installed products, a corresponding classification regarding the customer usage types and the location of the installed products. An illustrative example of such an installed based dataset is shown in Table 1.

Table 1- Installed base information

Location	Product type	Customer usage type	No. of installed products	Year																												
				1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
USA	1	1	25	1			1	1	1			1	1		1	1	3	2	1			1	1	3	2	3	1		1
USA	1	2	13								1		1				1	1	2	1	1	2	1	1				1	1
USA	2	1	23	1	1	1			1	2	1	2	1			2	1	2				2		1	2		1	2	1
USA	2	3	16			1			1			1			1			2		1		1	2		1		2	3	3
USA	2	4	13		1				1	2		1			3			1			2			1				1	
USA	3	1	19			2		1		2	1			1		2	1		2		1			1	2	1	2		1
EU	1	1	15					1		2	1			2		1	2			2	1	2	1						2
EU	1	2	24		2		2			1	2		1		1	2			1	2	1			1	2	3	1	2	1
EU	2	1	9											1		1			1	2				2		2			
EU	2	3	4							1																1		2	1
SEA	2	4	9								1							1		1			2		2	2			2
SEA	3	1	7													1				1	1			1			1	1	
...	...	...	...																										

No. of installed products per year

The connection of this dataset and the service life cycles is illustrated in Figure 5 below. The abstraction of the companies' installed base and the service life cycles of each product are shown.

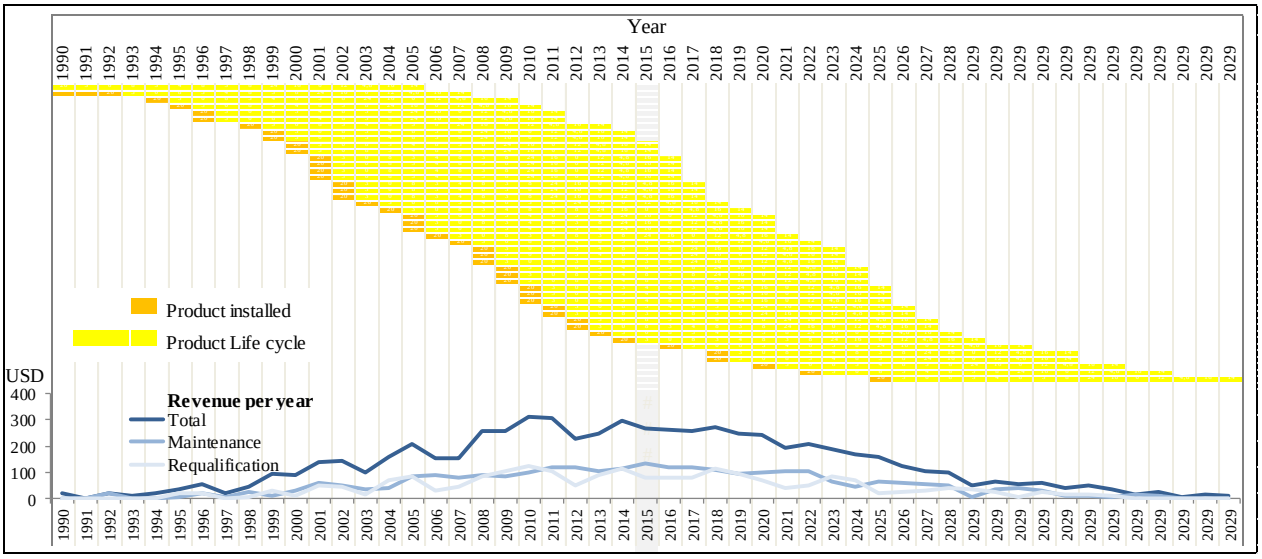

Figure 5 – Cumulative service life cycles of the installed base

For the sake of simplicity in Figure 5 each service life cycle (yellow blocks) starts with the product installation (orange block) presale services are not taken into account. In Figure 5 no differentiation between different product types and customer usage types are shown. In the figure each row represents one year and each row one sold product. Each orange and yellow block contains the information regarding the service revenue of one product per year. By adding up each column it's possible to calculate the service revenue of the installed base per year. Additional the revenues which are generated by single services can also be calculated by this

methodology. As an illustrative example this is shown within the figure by the line graph, which includes the service revenue in total per year and exemplary of two services (e.g. maintenance, requalification). By adding up each row the expected total service revenue can be calculated.

Operational and strategic applications

Module 1 aims to analyze the service items based on the service portfolio and the required competence portfolio of the service workforce and integrates the information into a service skill matrix. The goal of Module 2 is to identify the relevant product groups, corresponding customer usage types and to develop the corresponding service life cycles based on the available data. By integrating the installed base data it's possible to estimate the expected service advent in the service network. In Module 3 the goal is to integrate the skill service matrix, the installed base information and the service life cycle information

In the following paragraph the five most relevant applications of the methodology are described. Possible applications of the presented methodology are manifold. The application "employee assessment", "training management" and "mission planning" are already implemented by SwissMan. The applications "capacity planning" and "strategic forecasting" are planned to be implemented in the near future.

Employee assessment: Based on the developed skill matrix, it's possible to assess the employee capability to perform the specific service items during recurring target agreement meetings. Foundation for this application is the integration of the personal data of the employees. This assessment can be done by the direct supervisor or by the employee himself and offers a possibility to assess the employee against the concrete tasks (service items) they have to perform during their daily work. By using the unit "service item" instead of whole services which can be heterogeneous itself or abstract terms like "leadership", "communication skills", "social competences", etc., it's likely that the supervisor as well as the employee can evaluate one's ability to perform the service item.

Training management: Based on the employee assessment it's possible to identify gaps in the skill portfolio of each employee. By comparing the actual skillset of an employee based on the results of the assessment and the formal competence requirements necessary trainings are easily to identify. Furthermore by comparing the results of the employee assessment with the list of existing functions of employee within the company, it's possible to identify alternative development paths for each individual.

Mission planning: The skill service matrix can be used as a decision support during the mission planning. The goal of mission planning is to quickly identify employees which are most suitable in terms of their competence profile and close to the location where the service has to be performed. In that context, most suitable means, that the identified employee has all required competences, but is not overqualified.

Capacity planning: The presented methodology is based on a systematic analysis of the service portfolio of a company. By using the unit "service item" it is possible to assign the service item to specific FoE. Additionally by integrating the service life cycle it can be estimated which service item will be performed during the service life cycle of an installed product and which FoE is needed to perform it. By assigning the installed base information, the service life cycle and the date of installation as well as the location data, it is possible to calculate which service will likely occur at a certain time at a certain place and which FoE will be needed to perform the service.

Strategic Forecasting: The strength of the presented methodology is that a company is able to predict the service revenues as well as the needed FoE for the near future based on the product life cycles and the product sales till now. By predicting the product sales of the near future it would be possible to increase the strategic planning period. This could be done e.g. by integrating the local sales employees in the strategic planning process, asking them what sales numbers they expect in their region per product. To ask for specific products in a limited local area is expected to increase the accuracy of the estimation done by the local employees. In Figure 5 this is indicated by the orange block beyond the year 2015.

Concluding remarks and further research

Manufacturing companies which offer services worldwide are facing increasing competition and pressure to fulfill the local customer requirements. It is more and more necessary to provide services worldwide within short time at competitive prices while meeting the local customer requirements regarding quality by simultaneously efficient use of the resources, especially human resources. The presented methodology can be used as a decision support to answer questions on an operational level like employee assessment or mission planning as well and to answer questions of strategic matter like strategic competence development of the forecasting of needed competences in future. Additional application could be the competence assessment of whole sites or regions, as well as the controlling and monitoring of service revenues and other financial performance indicators. As a next step the implementation of the latter two Modules of the methodology by SwissMan will provide further insights and will most probably offer further applications.

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