

***Competence Development Measures  
Employee Development in Times of Demographic Change***

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**Abstract**

Demographic change forces companies to develop concepts for lifelong learning that focus on involving older and younger employees. Nevertheless, demographic change offers a great opportunity because older employees often have distinctive age-related competences. These are particularly relevant for failure management, where older employees, due to their knowledge gained through experience, positively influence the efficiency of work processes. One approach to use the competences of older as well as younger employees more effectively is an age-appropriate design of existing competence development measures.

In an online study, competence development measures used by companies to increase their employees' professional, methodological, social, and self-competence were examined. In addition, a literature search was conducted. The measures used in practice were then analyzed according to specific criteria concerning their age-appropriate suitability. Furthermore, recommendations for the adjustment of competence development measures were derived.

As a result of this research, an enhanced age-appropriate design of competence development measures was determined. The results of the study show that e.g. 25% of the participating companies utilize mentoring to improve professional competence. But in the light of demographic change an increased use of mentoring is to be recommended. Older employees possess knowledge gained through experience as well as distinctive social competence. Therefore, they have a great potential to participate in mentoring.

Combining the competences of older and younger employees offers the opportunity for companies to improve their failure management by developing their employee's competences. Thus, they can strengthen their competitive position.

Keywords: competence development, age-related competences, lifelong learning, demographic change

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## Introduction

Companies in Germany as well as in many other industrialized nations are facing the challenge of demographic change (Prezewowsky, 2007). The low birth rate of recent decades (Heinze & Naegele, 2008; Simon et al., 2012) and too little immigration (Sachverständigenrat zur Begutachtung der Gesamtwirtschaftlichen Entwicklung, 2011) imply various consequences for companies: an increase in the average age of employees (Veen & Backes-Gellner, 2009), an increasing age heterogeneity (Ries et al., 2010) and a shortage of manpower, especially of skilled workers (McKinsey Germany, 2011). This trend will accelerate in the upcoming years.

The demographic development runs parallel to rising skill requirements (Lindh et al., 2010), which imply that the demand for professionals in the company increases while the demand for low-skilled workers decreases (Chiswick, 2011; Hardeye, 2008; Blanchard, 2005). Specialized professionals are urgently needed to tackle the central topics of the future such as dealing with complexity, innovation and flexibility (Spath et al., 2013). The increase in complexity refers to products on the one hand and on the other hand to the production process (Westkämper & Zahn, 2009). The increase in complexity implies inter alia a higher probability of the occurrence of failures (Meyer et al., 2014). To resolve failures sustainably and to implement preventive measures, qualified employees are needed (Meyer et al., 2013). Employees are thus long-term guarantee of success, especially in high-wage countries such as Germany (Hüsken & Hildebrand, 1991; Bullinger, 2012). In this context, employees' competences and their development are increasingly focused upon (Jochmann & Gechter, 2007). The management of these employee competences thus gains in importance for companies (Krause et al., 2006) and the demographic change reinforces this trend.

Several competence development measures are available to enhance employee competences (Kauffeld, 2010). However, the demographic change forces companies to develop new competence development concepts which focus more and more on the simultaneous involvement of older and younger employees (Ilmarinen, 2005; Adenauer, 2014). Thereby, the demographic change presents a great opportunity as older workers often have age-specific competences (Ilmarinen, 2005). These are especially important for failure management whose efficiency is particularly influenced by the experiential knowledge that older workers often possess (Buck et al., 2002; Olesch, 2007). One approach to tackle these challenges is to re-design existing competence development measures to make them more age-appropriate. This way, competences of both older and younger workers can be used effectively.

For this purpose, a study within the research project "Sustainable failure management in manufacturing SMEs" investigated which employee competence development measures are used by companies to train their employees' competences. The applied measures were then analyzed for their age-appropriateness. This paper describes the results of the study and concludes with recommendations for companies.

## Importance of Competences in Times of the Demographic Change

### Impact of the demographic change

The demographic development in Germany induces changes in various sectors of our society. This includes in particular the working environment (see Hamm et al, 2008; Weber, 2010). Scientists predict a rapid decline in population size for the upcoming decades. As part of this, the age structure of the German society will change. The Federal Statistical Office of Germany expects a decline in population size from approximately 82 million people in 2008 to nearly 65 million (lower limit of the "medium" population) in the year 2060. Mainly, this decline is caused by a sizable difference between the birth rate and the mortality, as the latter of which increases despite higher life expectancy (Statistisches Bundesamt, 2009). This in turn leads to a change in the labor force (see Fig. 1).

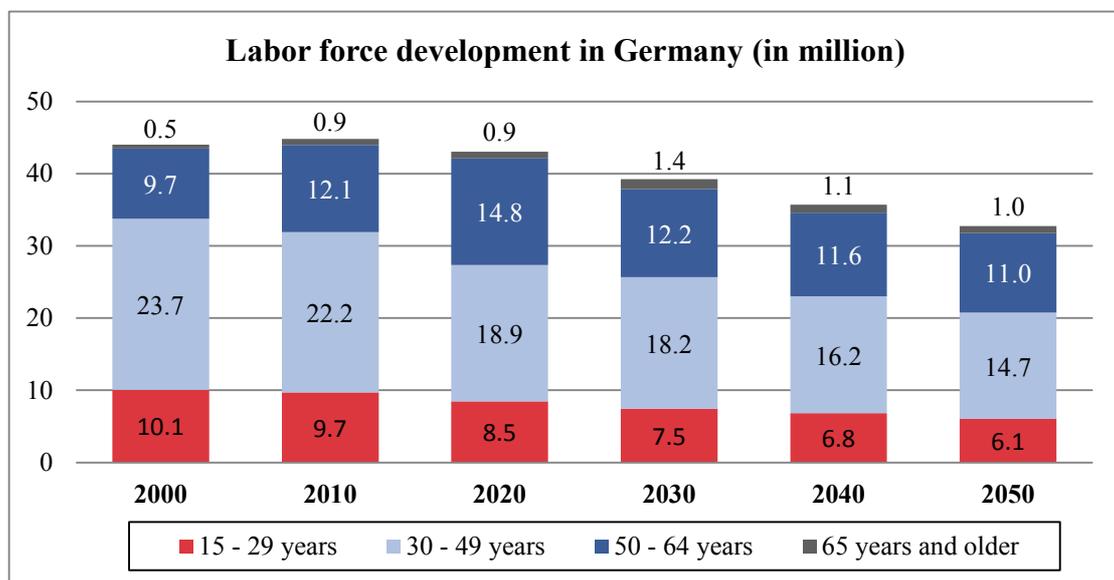


Figure 1: Labor force development in Germany (in millions) by age group (assumptions: net migration + 100,000 p.a., rising employment rates) for the years 2000-2050 (Fuchs et al, 2011.).

Figure 1 depicts the labor force development in Germany for the years 2000 to 2050. Especially striking is that the total number of workers will decrease continuously. While this figure stood at 44.03 million in 2000, it will fall to 32.73 million in 2050. This represents a decrease of over 25%. Furthermore, it becomes clear when looking at the age structure that the majority of the labor force today and in the future is between 30-49 years old. The second largest group will be the ones aged 50-64. In contrast, the group of 15-29 year olds will drop by 30% from 10.1 million in 2000 to 6.1 million in 2050 (see Fig. 1).

The consequence of the outlined development is a rise in the average age of workers in many manufacturing companies (Veen & Backes-Gellner, 2009). In addition, the age range between younger and older employees is increasing (Ries et al., 2010). Companies, such as BASF, BMW and Daimler, have recognized this development and created relevant programs that take into account the impact of the demographic

change and prepare the company for any resulting problems in the future (Econsense, 2006; Krause, 2007).

### Competence development

The concept of ‘competence’ is discussed differently in different countries (e.g. Cheng et al., 2003; Heinen, 2011; Bohlinger & Münk, 2008). As the online study described here took place among German companies, a German competence definition is applied. This makes sense because manufacturing companies located on German ground are familiar with the German understanding of ‘competence’. According to Erpenbeck (2003, p. 365) competences are: “Dispositions for self-organization of human activities”. He considers competences to include creative thinking and, in contrast to other constructs such as skills, knowledge or abilities, to be expressible in form of self-organization capabilities of the specific individual. In consequence, competences are directly testable and can only be realized if dispositions are present. When assessing competences, Erpenbeck (2003) concludes that one has to look at the latest action and performance of an employee.

Generally, the four competence facets professional, methodological, social, and self-competence can be distinguished (Kauffeld, 2006; Meyer & Nyhuis, 2012; Heinen, 2011; Witzgall, 2009). Professional competence addresses the skills and knowledge that an employee needs to work in his or her occupation as well as the ability to identify potentials for improvement within the company and to develop relevant technical solutions (Kauffeld, 2006; Rauner et al., 2013; Heinen, 2011). Methodological competence is the cognitive ability of an employee to gain new expertise as well as to learn new working methods independently of others (Erpenbeck & Michel, 2006). Thereby, skills should be used across various settings and be applied in different situations (Heinen, 2011; Kauffeld, 2006). Social competence refers to the experience, knowledge, and skill to cope with diverse social encounters (Frey & Ruppert, 2013; Kauffeld, 2006). Finally, self-competence addresses the ability for self-assessment and for the independent shaping of conditions in which an employee as well as his or her values and attitudes towards the own work are developed (Frey & Ruppert, 2013; Kauffeld, 2006).

In the study “Continuing Vocational Training Survey” (CVTS) the importance of each competence facet was examined at the European level. The results show that professional competence is assessed by 77% of the companies as particularly relevant. Followed by social competence (30%), self-competence (20%) and methodological competence (13%). Prospectively, the importance of professional competence will decrease slightly (75%) and the other competence facets will gain in importance (social skills: 40%, self-competence: 26%, methodological competence: 19%) (Moraal et al., 2009).

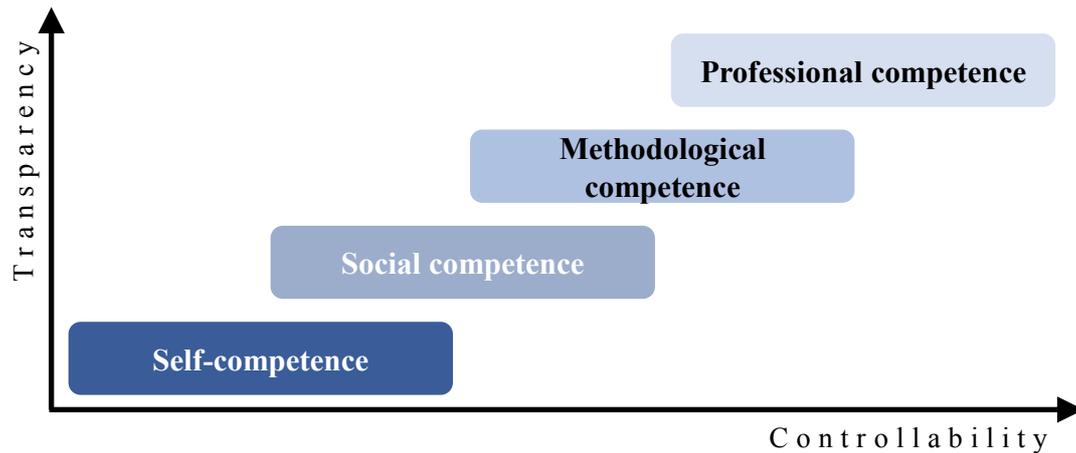


Figure 2: Transparency and controllability of the four competence facets (based on Aigner & Bauer, 2008; Bernien, 1997).

Figure 2 illustrates the transparency and controllability of the four competence facets. According to Bernien (1997), professional competence is transparent, whereas self-competence is rather not transparent. Likewise, the latter is less controllable, while the former is most susceptible (Aigner & Bauer, 2008) and hence easiest to improve.

The consideration of the competence facets and individual competences takes place within the human resource planning. The operational competence management combines traditional education and training with learning, self-organization, competence application and marketing. According to North et al. (2013, p. 23) competence management fulfills four tasks:

- Acquisition of employee competences through competence assessment (including quantitative measurements, qualitative characterizations, observations) and creation of a structured overview (e.g. competence wheel) of existing competences. The basis for the acquisition of competences is a competence catalog, which lists the competencies to be acquired;
- Detection of existing competence gaps and opportunities by comparing actual with desired competences (gap analysis);
- Distribution and dissemination of competences in the company;
- Closure of the revealed competence gaps through targeted competence development measures.

These gaps are usually closed with help the of competence development measures that take place within the working environment. Dehnbostel (2001) distinguishes three models of work-based learning:

- Work related learning (e.g. learning-on-the-job) takes place within the workplace. Learning and work are identical as the employee gains new skills while conducting his or her tasks.
- Work connected learning (e.g. learning factories) does not take place at the workplace, but is closely linked to it.

- Work-based learning (e.g. business games) implies that learning and work are not only spatially separated. Work-based learning mostly takes place outside the company and the learning process is well organized and structured. However, the reality of everyday working life always guides this form of learning.

The majority of competence development measures originate in the field of education (Kauffeld, 2010). A transfer to the business environment asks for appropriate adjustments as the learning process of adults entails other characteristics. "Adults approach the learning experience with a rather problem-centered perspective" (Kauffeld, 2010, p. 69). From adults' point of view, learning takes place through experience and should be as self-directed as possible. Generally, a trend towards individualization of competence development can be observed. Learning projects are increasingly achieved autonomously and self-organized (Kauffeld, 2010).

### Age-specific competences

During the working career, performance requirements of a job vary only minimally. They can therefore be assumed to be almost constant. However, the psychological and physiological human performance is subject to changes during the working life. It rises at the beginning of working life, reaches a maximum in the midlife and falls in the high-age for some employees. Also, the inter-individual differences in performance, meaning the differences between different individuals, increase significantly with age (Buck, 2002; Langhoff, 2009; Adenauer & Stowasser, 2009; Landau et al., 2011). These developments imply that older people can no longer meet the performance requirements in some cases (see Fig. 3).

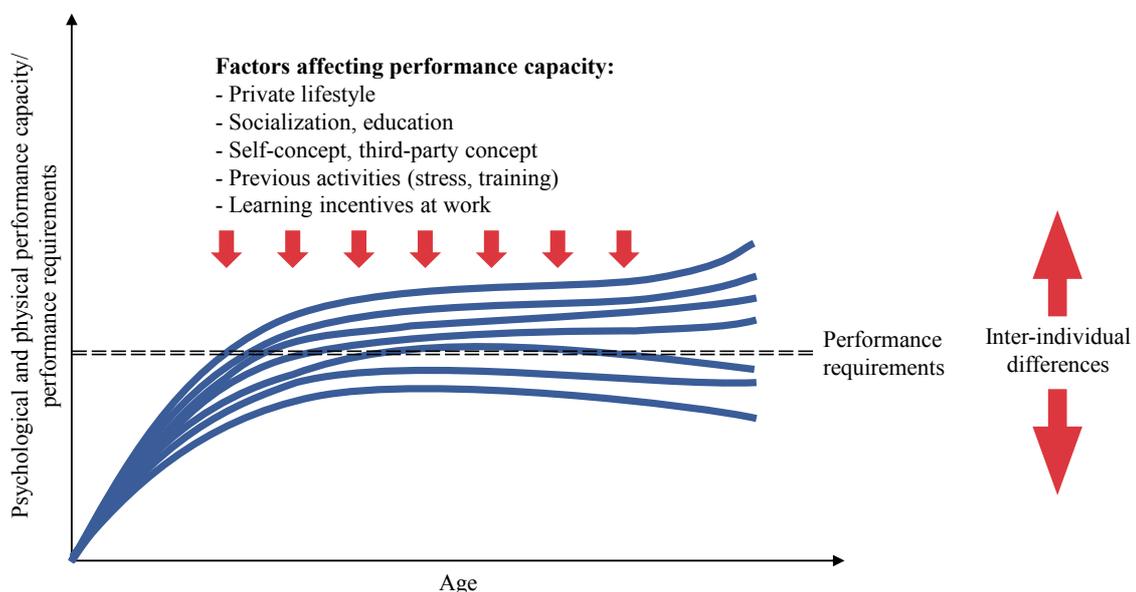


Figure 3: Changes in performance requirements and capacity over time (Buck, 2002).

Older workers are not less productive than younger employees, but abilities change once one gets older. While some particular physical abilities decline (e.g. physical

capacity), other competences (e.g. teamwork) remain constant and still others (e.g. experience) rise (Bullinger, 2002; Buck et al., 2002; Olesch, 2007).

## Method

To develop age-appropriate competence development measures, an online survey investigated which measures are used in practice to enhance competences.

With the help of publicly available company databases, companies with an own production located in Germany were identified. As “own production” was the only selection criterion, the participating companies varied in terms of size and focus of production. All companies were first contacted by phone and asked about their willingness to participate in the study. Those companies, who expressed an interest in the study, received an e-mail with the link to the online survey, including detailed instructions regarding the study and the procedure. The whole study was conducted anonymously.

The final sample consisted of  $N = 51$  experts, most of which are working within the production management or human resource department of manufacturing companies. Figure 4 shows the number of experts interviewed by company size.

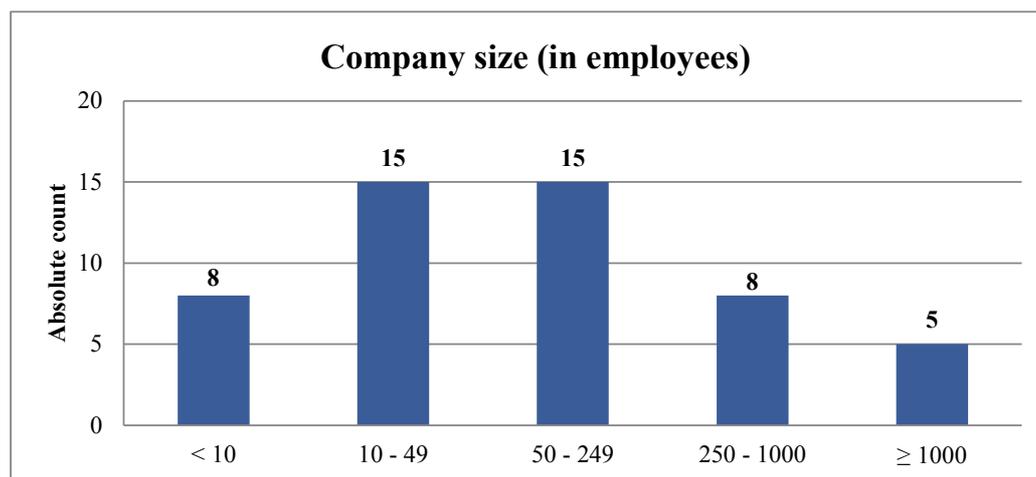


Figure 4: Respondents by company size.

In the online survey, respondents were asked:

*Which of the following methods does your company use to enhance professional, methodological, social and self-competence?*

To this end, a pre-selection of competence development measures that are used in practice was carried out through a literature review. This pre-selection included the competence development measures business game, seminar, learning factory, mentoring and learning-on-the-job.

- "A business game is a tool to reproduce complex situations such that these can be experienced playfully and thereby be better understood and evaluated" (Schneider et al., 2012, p. 68).

- "A seminar is one of many training methods in which a lecturer presents the relevant learning content through language and audio-visual tools to a group of learners" (Kauffeld, 2010, p. 3).
- "A learning factory offers the possibility of a realistic representation of products, processes and resources in an experiential and participatory digital real learning environment" (Müller et al., 2012, p. 8). Compared to the business game, a learning factory takes place in the real production plant.
- Mentoring refers to the accompaniment of an employee by an experienced person for professional and personal development (Ryschka & Tietze, 2011).
- Learning-on-the-job designates workplace learning, for instance through diversification of tasks or sharing with colleagues (Duden, 2014).

Subsequent to the survey, an analysis of the age-specific fitness of the competence development measures was carried out. For this purpose, competences were initially selected that are pronounced differently across age groups. It was then assessed to what extent the use of a particular competence development measure makes sense in terms of minimizing deficits as well as for strengthening the potential of each age class.

### Results of the Online Survey

The majority of companies surveyed use seminars and learning-on-the-job to develop their employees' competences. Professional competence is the focus in this context. The results of the study are shown in Figure 5.

Competence facet	Business game	Seminar	Learning factory	Mentoring	Learning-on-the-job	Respondents (total)	Frequency mention
Professional competence	4%	80%	2%	25%	78%	51	97
	2	41	1	13	40		
Methodological competence	10%	53%	4%	20%	78%	49	81
	5	26	2	10	38		
Social competence	0%	28%	0%	19%	83%	47	61
	0	13	0	9	39		
Self-competence	4%	37%	0%	20%	85%	46	67
	2	17	0	9	39		

Figure 5: Applied measures to increase professional, methodological, social and self-competence.

The results show that the respondents primarily utilize competence development measures to improve professional competence (97 mentions), whereby seminars and learning-on-the-job prevail. Of the 51 companies surveyed, N = 41 apply seminars (80%) and N = 40 learning-on-the-job (78%), whereas only N = 13 use mentoring (25%). The competence development measures business game (N = 2, 4%) and learning factory (N = 1, 2%) play no major role in improving professional competence.

The increase in methodological competence occupies the second rank with N = 81 nominations. Roughly 4 out of 5 companies (N = 38, 78%) use learning-on-the-job to extend this competence facet, almost every second company (N = 26) uses seminars and 20% (N = 10) mentoring. Business games are utilized by N = 5 companies (10%). Also, the results demonstrate that when business games are used, they are employed

to increase the methodological competence. The same applies to the competence development measure learning factory, which is only used by N = 2 companies (4%). Only three competence development measures are applied to increase social competence. Mainly, companies make use of learning-on-the-job (N = 39, 83%) as well as seminars (N = 13, 28%) and mentoring (N = 9, 19%). Business games and learning factories on the other hand do not matter.

To improve self-competence, 85% of companies (N = 39) use the competence development measure learning-on-the-job. 37% of companies use seminars (N = 17) and 20% of companies (N = 9) mentoring. Business games are utilized by N = 2 companies (4%) to enhance self-competence. Though, learning factories are neglected in this context.

In summary, one can notice the primary use of learning-on-the-job, followed by the competence development measures seminar and mentoring. However, learning factories and business games play a subordinate role in improving competences.

## Discussion

The competence development measures from the survey were subsequently examined with regard to their age-specific suitability and instructions for the adjustment of these competence development measures were derived (see Fig. 6).

Performance potential	Younger employees	Older employees	Competence development measure					Analysis
			Business game	Seminar	Learning factory	Mentoring	Learning-on-the-job	
Experience		●	-	(X)	(X)	X	-	Mentoring is suitable to transfer experience from older to younger employees and thereby reduces the potential danger of losing knowledge within the company.
Creativity	●		X	-	(X)	X	-	Older people can improve their creativity in simulations or take over creative thinking from younger cohorts.
Willingness to learn	●		(X)	(X)	(X)	(X)	(X)	All competence development measures further the willingness to learn to a certain extent.
Learning ability	●		(X)	(X)	(X)	-	-	The learning ability of older employees can be improved through simulations, seminars and learning factories.
Work ethic/discipline		●	-	(X)	(X)	X	-	Especially with mentoring younger people can benefit from the work ethic of older cohorts.
Attitude toward quality		●	-	(X)	(X)	X	-	Mentoring is suitable to transfer the sense of quality from older to younger employees.
Reliability		●	-	(X)	(X)	X	-	Reliability can be learned particularly well by younger employees through mentoring by older co-workers.
Loyalty		●	-	-	-	X	-	Within mentoring, older employees can inspire younger co-workers to stay in the company and thereby increase their loyalty.
Flexibility	●		X	-	(X)	X	-	Older people can enhance their flexibility within simulations or learn from younger people through mentoring.
Physical capacity	●		-	-	-	-	-	None of these competence development measures is suitable to enhance physical capacity. Rather, it is advised to implement a health management system.

● Advantages of this age group

X = strong potential influence

(X) = weak potential influence

- = no influence

Figure 6: Age-specific suitability of competence development measures (cf. among others Bullinger, 2002; Buck et al, 2002; Olesch, 2007; Kauffeld, 2010; Müller et al., 2012; Ryschka & Tietze, 2011; Schneider et al., 2012).

The results show that the competence development measure mentoring is particularly suited to respond to the demographic change. Furthermore, the use of learning factories offers advantages in the light of the demographic change. Seminars on the other hand serve this purpose only to a limited extent. The application of the measures learning-on-the-job and business games is not recommended in this context.

The results point to a current problem. Companies primarily use learning-on-the-job, although the utilization of this measure in the context of the demographic change is not advantageous. In view of the demographic development, it is advisable to increase the number of mentoring models and to use learning-on-the-job rather in combination with other measures. Seminars are currently used by many companies, but provide rudimentary means to minimize age-related deficits. The same applies to learning factories. As the survey results show, there is still much to be done, because this measure is currently hardly taken into account.

In summary, when selecting competence development measures companies must try to take more account of their potential to reduce age-related deficits and of their potential for the effective use of age-specific strengths. Above all a greater use of mentoring is recommended, followed by learning factories and seminars, while the last measure is already used frequently today.

## **Conclusion**

Companies in Germany are confronted with challenges due to demographic change. The low birth rate and a low immigration lead to, among other things, a shortage of skilled workers. In this context, the development of employee competences becomes even more important. To this end, companies can choose among various competence development measures. However, these are often used without taking the age-specific suitability into account. It requires an age-friendly design of existing competence development measures to take advantage of the skills of older as well as younger workers.

For this purpose, we first investigated in an online study which competence development measures companies use to improve competences. The applied measures were then analyzed for their age-appropriate suitability to derive conclusions.

The results of the study show that in practice, primarily the competence development measure learning-on-the-job is used, followed by the measures seminars and mentoring. The business games and learning factories play a subordinate role for the development of employee competences.

However, a further analysis of the competence development measures shows that especially mentoring is suited to meet the challenges imposed by demographic change. Furthermore, the use of the measure learning factory is advantageous to deal with current demographic challenges. Seminars, serve this purpose only to a limited extent. The application of the measures learning-on-the-job and business games are not advantageous in this context.

In summary, companies must try to take more account of their ability to reduce age-related deficits and their potential for the effective use of age-specific strengths when

selecting competence development measures. First, a greater use of mentoring is recommended. Second, an enhanced application of learning factories and seminars is recommended.

The findings are used within the research project "Sustainable failure management in manufacturing SMEs" to identify measures for closing competence gaps and to account for the age-specific suitability of these measures.

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