



**Leopoldina**  
Nationale Akademie  
der Wissenschaften



berlin-brandenburgische  
**AKADEMIE DER WISSENSCHAFTEN**



**UNION**  
DER DEUTSCHEN AKADEMIEN  
DER WISSENSCHAFTEN

**2024**  
*Statement*

# The Future of Work



German National Academy of Sciences Leopoldina | [www.leopoldina.org](http://www.leopoldina.org)

Union of the German Academies of Sciences and Humanities | [www.akademienunion.de](http://www.akademienunion.de)

## Imprint

### Publishers

Union of the German Academies of Sciences and Humanities  
Union der deutschen Akademien der Wissenschaften e. V.  
(Lead: Berlin-Brandenburgische Akademie der Wissenschaften)  
Geschwister-Scholl-Straße 2, 55131 Mainz, Germany

German National Academy of Sciences Leopoldina  
Deutsche Akademie der Naturforscher Leopoldina e. V.  
– Nationale Akademie der Wissenschaften –  
Jägerberg 1, 06108 Halle (Saale), Germany

### Editors

Prof. Dr. h. c. Jutta Allmendinger, Ph. D.  
Dr. des. Yuca Meubrink  
Moritz Neugebauer, Ph. D.

### Translation

Marc Weingart

### Design and typesetting

eckedesign GmbH, Berlin

### Title Picture

©iStock/ma\_rish

**ISBN: 978-3-949455-33-9**

**Published under the terms of CC-BY-NC-SA 4.0**

<https://creativecommons.org/licenses/by-nc-sa/4.0/>

### Bibliographic information published by the German National Library

The German National Library lists this publication in the German National Bibliography.  
Detailed bibliographic data is available online at <http://dnb.d-nb.de>

### Recommended citation

German National Academy of Sciences Leopoldina, Union of the German Academies of Sciences and Humanities (2024): The Future of Work. Berlin.

### Editorial deadline

November 2023

First published in German by Nationale Akademie der Wissenschaften, Union der deutschen Akademien der Wissenschaften (2024): Die Zukunft der Arbeit. Berlin.





## Foreword

Since the SARS-CoV-2 pandemic at the latest, there has been a new debate about work and its role both in private as well as public life. Societal transformation, the orientation towards the common good, and the necessity to ensure prosperity for most members of the society are inconceivable without work. After all, work is supposed to increase happiness in life, not to reduce it.

With this statement, the Union of the German Academies of Sciences and Humanities and the German National Academy of Sciences Leopoldina provide stakeholders in politics and society with suggestions for orientations regarding the changes of work in the multiple crises of the present.

We would like to express our gratitude to the interdisciplinary research group and its spokesperson, Jutta Allmendinger, for investing time and energy in preparing this statement, despite all of their other obligations. Only thanks to the expertise assembled here, it was possible to provide a synthesis on the different positions of this topic, as presented in this paper.

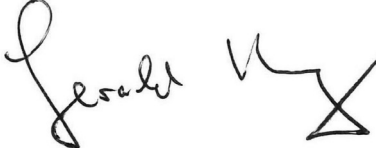
Finally, we would also like to thank the reviewers as well as the staff members in administration for their help in developing, supporting, and commenting on the position paper.

Berlin and Halle (Saale)

In November 2023



*Prof. Dr. Dr. h. c. mult.*  
*Christoph Marksches*  
President  
Union of the German Academies  
of Sciences and Humanities



*Prof. Dr. Gerald H. Haug*  
President  
German National Academy of Sciences  
Leopoldina

## Content

	Summary .....	6
1	Introduction .....	10
	1.1 From paid work to activity .....	11
	1.2 Work in the activity-oriented society .....	12
	1.3 A new consciousness for the greater picture .....	14
2	Work as a concept .....	16
	2.1 Work in pre-modern times .....	16
	2.2 Paid work and the modern work-oriented society .....	17
	2.3 Change of the work-oriented society: new negotiations, de-limitation, restructuring .....	19
	2.4 Perspectives for designing the activity-oriented society .....	22
3	Demography and life-course-oriented design of the labour market ....	24
	3.1 Introduction .....	24
	3.2 Demographic change .....	24
	3.3 New forms of shaping life-courses in older age .....	28
	3.3.1 Paid work at retirement age .....	28
	3.3.2 Health aspects .....	30
	3.3.3 The role of voluntary work .....	30
	3.4 Recommendations for action .....	31
4	Digital transformation and new forms of organization in paid work .....	33
	4.1 Introduction .....	33
	4.2 Digitalization and the change of paid work .....	34
	4.2.1 Dimensions of digitalization .....	34
	4.2.2 Digitalization in the context of further transformation processes .....	35
	4.3 Digitalization and new forms of organization of paid work .....	40
	4.3.1 Digitally assisted work .....	40
	4.3.2 Mobile working .....	44
	4.3.3 Platform work .....	47
	4.4 Recommendations for action .....	49
	4.4.1 Digitally assisted work .....	50
	4.4.2 Mobile working .....	50
	4.4.3 Platform work .....	51
5	Education and continuing education in the activity-oriented society ...	53
	5.1 Introduction .....	53
	5.2 Educational poverty and social selectivity .....	55
	5.3 Preparing for the digital world .....	60

5.4	Professional continuing education .....	64
5.5	Recommendations for action .....	68
5.5.1	Exploiting education potentials better .....	68
5.5.2	Purposefully strengthening digital education .....	69
5.5.3	Institutionally anchoring continuing education .....	70
<b>6</b>	<b>Paid work and care work in the activity-oriented society .....</b>	<b>72</b>
6.1	Introduction .....	72
6.2	On the relationship between paid and care work – current state of research .....	72
6.2.1	Large inequalities between men and women .....	72
6.2.2	Increasing demand for care work .....	75
6.2.3	Increasing use of external care services .....	78
6.3	Recommendations for action .....	79
<b>7</b>	<b>The activity-oriented society and the constructed environment .....</b>	<b>82</b>
7.1	Introduction .....	82
7.2	Building design for the office work of the future .....	83
7.2.1	Dissemination of remote work .....	83
7.2.2	Changes in the office worlds .....	85
7.2.3	The third place: co-working .....	87
7.3	Urban and residential development for the activity-oriented society .....	89
7.3.1	City and countryside .....	89
7.3.2	Residential quarters and public space .....	89
7.3.3	City of quarters: a sustainable urban life form .....	90
7.4	Multifunctional spaces and a new culture of sharing .....	92
7.5	Recommendations for action .....	92
7.5.1	Flexible solutions in construction .....	92
7.5.2	“Third places”, resp. co-working areas .....	93
7.5.3	Functionally mixed neighbourhoods .....	93
<b>8</b>	<b>Towards an activity-oriented society: five fields of action .....</b>	<b>94</b>
8.1	Adapting employment biographies to demographic change .....	95
8.2	Adapting organizational forms of paid work to digital change .....	95
8.3	Orienting education, vocational and continuing education stronger towards the grand challenges .....	96
8.4	Reducing gender-related inequalities in the distribution of paid work and care work .....	96
8.5	Adapting spatial and constructional framework conditions .....	97
	<b>Contributors .....</b>	<b>100</b>
	<b>Responsible for the chapters .....</b>	<b>101</b>
	<b>References .....</b>	<b>102</b>

## Summary

Paid work is currently changing significantly. Processes of digitalization and automation, which often allow remote working, as well as processes of defossilization, through which our economy and professional world are shifting towards ecologically sustainable energies and technologies, cannot be ignored. The same is true for the demographic change and immigration. These developments entail opportunities as well as risks. Old fields of work disappear, while new ones emerge. The latter require the acquisition of new professional competencies but also open up hitherto unknown opportunities to connect paid work with other activities. These changes, in turn, affect the spatial organization of paid work and thus the social and ecologically sustainable design of areas of work and activity. Therefore, it makes sense to take a closer look at the question of how activities can be organized in the future and how prosperity is ensured as a result.

The opportunities and risks of the current transformation do not concern all people and enterprises to the same degree. The interdisciplinary research group “The Future of Work” investigated how positive and negative effects are distributed among different societal groups, according to age, socio-economic status, gender, education, income, family care obligations or regional origin. The working group also analyzed how existing material, respectively immaterial, inequalities are reduced or strengthened. This also concerns the enterprises, which operate in different markets and are affected to different degrees by politi-

cal, technological and regulatory changes. The objective is to design a change that is considered fair by all sides and to prevent that poor working conditions or environmental burdens are outsourced to other world regions.

The interdisciplinary research group therefore proposes to observe paid work in its interaction with other forms of activities, to view the concept of work more broadly and to take a look at different forms of human activity and their interplay. Prosperity, well-being and social cohesion are essentially based on paid work as a central pillar of social order. At the same time, there are numerous other forms of activities to satisfy human needs, to develop skills and to achieve work, that is valuable to society. In the context of this broader view of work, human potentials and a newly balanced relationship between social, economic and ecological requirements move to the centre.

We propose a shift in emphasis from a work-oriented society (“Arbeitsgesellschaft”) to an activity-oriented society (“Tätigkeitsgesellschaft”)\*. The interdisciplinary research group thus demarcates itself from those who speak of an “end” of work. It points to the opportunities that open up for people, the economy and society if these activities are equally recognized.

\* Already in German, the distinction between “Arbeit” and “Tätigkeit” is not unequivocal since *Arbeit* is also a *Tätigkeit*. In English, the same applies. Here the term “labour” denotes work in the classic sense and could be used instead of “work” to sharpen the distinction.



In this position paper, the interdisciplinary research group identifies relevant developments and formulates recommendations in five fields of action which sketch out initial contours of an activity-oriented society and can support the common quest for answers in the economy, politics and society.

## **Recommendations for action**

### **Adapting employment biographies to demographic change**

Due to demographic change, the gained years of life in good health and the increase of women in the workforce, it is necessary to have a higher flexibility with regard to the relationship between paid work and other forms of activities. Potential measures for a more flexible design of work that is oriented towards the life course could include the opportunity to extend sabbatical months and years and to replace the legal age of retirement by a window of retirement in which people can freely choose when they would like to begin retirement.

A forward-looking activity-oriented design of work also includes supporting re-entry into paid work after other phases of activities. Thus, the possibility of re-entering the labour market also in higher adult age should be made easier if people desire this. In this context, a stigmatization of allegedly “unproductive” older people, who from a certain age no longer want to or no longer can be available on the labour market, needs to be avoided.

Such a design of work that is oriented towards the life course is one side of the coin, a reliable care- and nursing infrastructure is the other. Here, it is necessary to expand the day care programmes in childcare centres and schools and to

guarantee day care for children in all age groups until school entry. This could take place analogously to the right to day care for elementary school children (from 2026). This, however, also includes the expansion of out-patient and in-patient care facilities, respectively, nursing services for chronically ill or disabled people.

### **Adapting the organization of paid work to digital change**

First of all, a re-evaluation and new assessment of human work requires a change in attitude. It can only be successful if the organizational forms of paid work can be adapted to the digital change. For this purpose, regulations have to be developed in this area, for example, in dealing with opportunities and risks of digitally assisted work. It has already become clear that a human-appropriate design of digital systems of assistance and decision-making can provide opportunities of relief. However, it also entails risks with respect to data protection, for example. Using the technological progress for the benefit of the activity-oriented society also requires setting clear corporate rules for working hours, availability and performance control in remote work as well as redefining employment relationships in platform work. Finding concrete and context-sensitive solutions to these questions requires that employees have a say, both within existing structures of corporate co-determination as well as – in particular for platform work – in formats that are to be newly developed.

### **Orientate education, professional training and continuing education more strongly towards the grand challenges**

In Germany, more effort needs to be invested in all forms of education. The performance level of children is low, especially when they come from socially pre-

carious families or from families in which German is not spoken. The divergence of educational outcomes according to place of origin is significant. This has repercussions on the participation of children, economic development as well as societal cohesion. The entire education system of a society and the level of education of its population determine which forms of work prevail in the short-, medium- and long term and which results can be achieved.

Early childhood education needs to be expanded. The earlier educational measures are applied in the life course, the larger the expected yield, measured according to the level of achieved performances and the reduction of inequalities. We need more day-care centres for children, ones that involve educational opportunities at an earlier age, we need target-oriented support for our very young children, especially when they grow up in difficult circumstances. The “Startchancenprogramm” (early childhood educational opportunities programme) for pupils of elementary schools needs to be expanded and orientated to those schools and children that require help. A half-hearted programme with widespread distribution would only increase inequality and leave potentials unused.

Successfully dealing with new insecurities and uncertainties moreover requires further developing the (pre-) school curriculum. In this context, a stronger orientation to the OECD Future Skills, especially with respect to “digital literacy”, individual responsibility and value orientation, could be useful. The target are citizens who develop as a personality and who can apply their knowledge and skills for a viable and productive society in harmony with nature, both in the context of their paid work as well as in other forms of activity.

In view of the transformation of work and demographic change, continuing education needs to be moved more to the centre as well. Aside from personal adaptation this involves also adapting to technological developments, which includes opportunities of a second or third vocational education for a new job. A “period reserved for education” (Bildungszeit) could provide incentives to explore new areas of activity in adulthood, to improve one’s own employability and thus shape one’s own employment biography of activities with more self-determination. Framework conditions could be designed as an “insurance of continuing education” (Weiterbildungsversicherung). Another approach would be the expansion of the consulting services of the Federal Employment Agency and its cooperating partners, including easily accessible consulting services for supported continuing education.

#### **Reducing gender-related inequalities in the distribution of paid work and care work**

Inequalities in the distribution of paid work and care work in families should be reduced. This would increase work productivity of women and their financial independence and decrease stereotyping of roles. Here it is recommended to change the tax and transfer system so that it promotes a more balanced relationship of classic paid work and care work as an unpaid activity. There should also be incentives for a more equal distribution of paid work and care work among both parents. Many elements of the tax and transfer system benefit the unequal distribution of care work and paid work between men and women, which is why these federal instruments do not meet the standards of an activity-oriented society. Important starting points here would be to expand the so-called partner months (Partnermonate) in parental ben-

efits (Elterngeld), to reform tax splitting among married couples to a “Realsplitting” with a low amount to be transferred and to abolish so-called Mini-jobs. More financial means for the care sector should be made available, infrastructures in care and nursing should be expanded, personnel should be increased and the attractiveness of the profession should be improved. Moreover, the status of live-in care workers from abroad needs to be improved so that these already existing forms of paid care work can experience a stronger societal recognition.

Other measures that should be developed in the future include a “family working time”, benefit replacement rates for certain care and support activities and their recognition for retirement as well as flexible work models that, among other things, make it easier for older women to reconcile a longer employment with care work within the family.

Furthermore, unpaid and low-paid work in the informal area should be taken more strongly into consideration socio-politically. Here, “time accounts” for voluntary work (as part of the flexibilization of employment biographies) and an organizationally easier leave from paid work for a “voluntary work time” (in addition to “parental time” and “care time”) could be considered. Another option would be extensive tax advantages for voluntary work. Opportunities for counter-financing would result from the reform of tax splitting among married couples, the financial incentives for Mini-jobs or the cost-free co-insurance of spouses in statutory health insurance.

### **Adapting spatial and constructional conditions**

The current crises radically put into question existing solutions with regard to workplaces as well as their infrastructures and follow-up costs. Due to the permanent introduction of remote work for part of the employed population, especially in the form of working from home, new, flexible and health-promoting constructional concepts are necessary in the private and professional field of activity. This ranges from flexible layouts to labour and health protection. The office of the future needs to be designed in a socially and ecologically sustainable manner, and it also needs to involve the exteriors more strongly.

In the activity-oriented society, remote work, office and “third places” form an innovative triad for those professions whose workplace is not determined by the task as such. Here, the idea of the economy oriented towards the common good is particularly powerful: “third places” and co-working spaces should not only be operated by private enterprises but also by the municipalities and should be publicly funded wherever they have a function that benefits the community. In that case, they should be declared “tenants worth protecting”, if possible combined with public usages and developed into neighbourhood centres, and easily accessible for all interested parties. Corresponding planning and construction regulations could thus strengthen the sense of community and solidary, healthy work in an activity-oriented society. They could ease the transitions between paid work and other forms of activities significantly – even more: they become their indispensable prerequisite.

# 1 Introduction

The challenges of our time – in particular the climate crisis and necessary defossilization, dealing with migration, demographic change and digital transformation – require new considerations about what work is, what role it plays in society and what meaning it has for the individual. In addition, the Corona pandemic has moved some aspects of the world of work more into focus that call for an in-depth debate. Thus, for example, the relationship between economy, work and nature as well as the relationship between actors of the state, of market economy and civil society should be discussed and newly adjusted in the design of work. These current issues are evaluated in academia<sup>1</sup> as well as in the public discourse<sup>2</sup> and are the reason for this position paper, which deals with the world of work in Germany in the context of the change of work and society. At the core is the question in how far the current and ongoing developments can, yes must, lead to a (new) structural change of work.

The situation is unclear, the developments are in part contradictory and simple solutions are not at hand: the German economy is worried about the supply of specialist and skilled workers in order to remain competitive in the global competition and to ensure prosperity. In view of demographic developments, innovative ways are called for to maintain workers, to win new ones and to moreover increase the existing work-

force. At the same time, the socio-ecological transformation requires an extensive reorganization of the existing value chain. Both developments cannot be looked at separately. In addition, in some parts of the population, a change in mentality with regard to the status of paid work can be observed, which could even be strengthened by the current situation of the labour market. Employees increasingly and more often than before ask about the ‘why’ and ‘what for’ regarding their work and seek opportunities for the identification of their own moral concepts. This holds enormous potential for innovation for enterprises that develop new business models in the socio-ecological transformation – in the best case with positive effects for productivity, satisfaction of employees, their intrinsic motivation and not least for binding the individual employee to the enterprise. Against this background, the present position paper deals with the structural change of the world of work and provides suggestions for designing this change.

Very often, the term “work” is used synonymously with “paid work”, i. e., considered as purely market-related work through which services and goods are produced that can be utilized on markets in order to achieve income, be it in dependent or independent positions or in one of the many forms in between. In the following, we propose a broader definition of work, which also includes non-market-related activities such as citizen work, care work and political work, as well as defence and community work in addition to paid work.

<sup>1</sup> E. g., Honneth (2023); Seidl & Zahrnt (2022).

<sup>2</sup> E. g., Bücker (2022).

By shifting this boundary, we gain an extensive perspective on human activities.

The term “activity” serves as the key to the understanding of the abundance of activities through which humans change their environment and themselves. We propose a shift in emphasis from a “work-oriented society” (“Arbeitsgesellschaft”) to an “activity-oriented society” (“Tätigkeitsgesellschaft”), as was already formulated by Ralf Dahrendorf (1983)<sup>3</sup> as a vision and, for example, also repeatedly emphasized in feminist, ecological and Catholic discourses.<sup>4</sup> In doing so, we demarcate ourselves from those who speak of an “end” of work.<sup>5</sup>

For us it is about understanding “life as an activity” in all of its diversity, to overcome one-sided dependencies and to thus strengthen freedom and self-determination of the individual. This call for self-responsible design, to become active and stay active – in contrast to retreat, refusal and inactivity – aims at a broader understanding of where and how humans become active and effective. We focus on the relationship between different forms of activities – education of children, care of the elderly, phases of continuing education, engagement in voluntary work – and do so throughout the entire life course of people. In this context, we point to opportunities that open up to people, the economy and society if these activities are equally recognized, and thus emphasize the orientation towards the common good of an activity-oriented society.

## 1.1 From paid work to activity

People develop by becoming active. Being active serves to satisfy material and immaterial needs, shapes one’s personality and promotes self-realization as well as interaction of individuals. A significant part of these processes occurs via paid work, and this will – especially in view of the current and continuing lack of skilled workers – presumably remain that way.

It also has to be noted, however, that paid work is currently changing significantly. Processes of digitalization<sup>6</sup> and automation, which often allow remote work, as well as defossilization, through which our economy and world of work are reorganized towards ecologically sustainable energies and technologies, can and should not be ignored nor halted. These developments entail opportunities as well as risks. Old fields of activity disappear, while new ones emerge. The latter require the acquisition of new professional competencies but also open up hitherto unknown opportunities to connect paid work with other activities. These changes, in turn, affect the spatial organization of paid work and thus the socially and ecologically sustainable design of spaces of work and activity. Therefore, it makes sense to take a closer look at the question as to how prosperity can be ensured in the future.

The opportunities and risks of the current transformation, however, do not concern all humans and enterprises to the same degree. Thus, it needs to be investigated how positive and negative effects are distributed among different societal groups, according to age, socio-economic status and gender, education, income,

<sup>3</sup> Dahrendorf (1983); *ibid.* (2001).

<sup>4</sup> For an overview, see e.g., Haugg (2008); Littig & Spita (2011); Gerold (2022), *Katholische Arbeitnehmer-Bewegung* (2005).

<sup>5</sup> See e.g., Benanav (2020).

<sup>6</sup> Here and in the following, we understand digitalization in the sense of a comprehensive socio-technological transformation as is common in the public and political discourse. For more details, see chapter 4.2.

family care obligations or regional origin, and how they reduce or increase immaterial inequalities. This is also true for enterprises that operate in different markets and are affected by political, technological and regulatory changes to different degrees. The objective is to design a change that is considered fair by all sides and to prevent that poor working conditions or environmental burdens are outsourced to other world regions.

We therefore propose from the start to observe paid work in its interaction with other forms of being active, to view the concept of work more broadly and to take a look at different forms of human activities and their interplay. Prosperity, well-being and social cohesion are essentially based on paid work as a central pillar of social order. At the same time, there are numerous other forms of activities to satisfy human needs, to develop skills and to achieve work that is valuable to society. In the context of this broader view of work, human potentials and a newly balanced relationship between social, economic and ecological requirements move to the centre. In the results of this position paper, we will derive initial contours of such an activity-oriented society from the individual contributions.

## 1.2 Work in the activity-oriented society

In modern societies, the diversity of human activities is distinguished into market-related activities (paid work) and different forms of non-market-related activities for which mostly no wage is paid and which are not integrated into the social security system. Such non-market-related activities can be conducted publicly or in private. In the most general sense, they directly or indirectly serve the maintenance of quality of life and

happiness, and thus also productivity. In this context, it needs to be distinguished whether the corresponding standards are brought about by the social environment (family, neighbourhood, ...) or set by self-determination. The experienced degree of autonomy varies depending on individual and societal values, rules and norms.

Paid work entails an income, professional recognition and social status. In dealing with the requirements of the activity, especially competencies are achieved, which in turn can increase employability. Material and immaterial resources form the so-called instrumental goals of paid work and can contribute to the social well-being of an individual. On their part, humans need to invest time, physical and mental resources in order to carry out paid work or pursue a career.

Non-market-related activities include, among others, formal, respectively, organization-based, voluntary work, informal support services<sup>7</sup> and participation in civil society (resp. informal), for example, political activities.<sup>8</sup> Forms of civil engagement are not oriented towards material gains and are carried out voluntarily. In this context, the organization-based voluntary work is termed the “old” voluntary work, for example, engagement in an association, union or religious community. Activities that are not tied to membership in an organization, on the other hand, are called “new” or informal voluntary work, respectively, participation. This includes, for example, involvement in a citizen initiative.<sup>9</sup> Informal support services that are carried out in the private environment, such as supervising one’s own children or grandchildren

<sup>7</sup> Hank & Erlinghagen (2010).

<sup>8</sup> Burr et al. (2002); Martinson & Minkler (2006).

<sup>9</sup> Backes & Hölte (2008).



or caring for family members,<sup>10</sup> are distinguished from the forms of engagement that take place in the public space. These activities are a central part of unpaid, resp. informal care work.<sup>11</sup> However, supporting friends or neighbours outside one's own household, for instance, in grocery shopping or garden work or small repair work, are also to be understood as informal support services.<sup>12</sup>

Resources such as good health, free time available or certain skills and qualifications are preconditions for non-market-related activities. Thus, people who do take up voluntary work are mostly better educated, better paid and also healthier than people who do not participate in voluntary work.<sup>13</sup> Individual resources and institutional framework conditions are also important for care work within the family.<sup>14</sup> They are moreover an important source of social recognition and emotional affection and not least a place of cultural and political education.

In today's world, most activities are organized based on the division of labour and always refer to other actors for whom, or with whom, work is achieved. This cooperative and complementary dimension of work characterizes paid work, on the one hand. Thus, physical and mental work – traditionally often understood as hierarchical – are in this complementary relationship. On the other hand, the cooperative and complementary dimension concerns the relationship between paid work and other forms of activities, such as

unpaid care work, voluntary work activities, socio-cultural or political work. Care work and other non-market-related activities are also always the precondition so that paid work can be carried out and be productive.

By using the concept of an activity-oriented society, we aim at a more holistic perspective that makes these changing relationships visible. For this reason, it is in our opinion necessary not to reduce paid work to its economic function or to a competition of income, but to ask always about the social purpose and the contribution to the common good. If paid work is experienced as purposeful, it can contribute to a sense of belonging and a stable self-esteem. An over-identification with paid work, on the other hand, can lead to the neglect of other purposeful and, in the medium-term, important activities, up to health limitations. It is therefore decisive to find the right balance between both sides of paid work, to enable individual development and to simultaneously achieve responsible added value for others and for society.

How important this balance is for a successful life and for a viable society is shown by the negative effects of unemployment, repetitive and physically burdening activities and low wage work, where no positive relationship to one's own job can be developed since opportunities for design are lacking.<sup>15</sup> Such constellations not only affect the life of the individual but also undermine societal cohesion. "Good" work, on the other hand, fulfils a central function of socialization and integration, contributes to economic added value, and leaves each individual enough room for activities beyond paid work.

<sup>10</sup> Wija & Ferreira (2012); Caro & Bass (1995).

<sup>11</sup> Aside from the productive activities mentioned above, some approaches also look at those that create or maintain the physical and mental preconditions for this, such as, for example, physical activity or private hobbies (Caro et al., 1993; Herzog et al., 1989). Such activities will not be considered in more detail in the following.

<sup>12</sup> Künemund (2006); Hank & Erlinghagen (2008).

<sup>13</sup> Choi (2003); Wilson & Musick (1997).

<sup>14</sup> Ruckdeschel & Ette (2010); Eichler & Pfau-Effinger (2008).

<sup>15</sup> Graeber (2019); Soffia et al. (2021).

With the idea of the activity-oriented society, we generally attempt to illuminate the “nature” of work (again) more comprehensively. Historically, it connects to developments before industrial capitalism and questions current matters of course. At the same time, we react to contemporary challenges that practically require a broader understanding of purpose and meaning of human work. These cannot be overcome in the existing paradigm of the work-oriented society. In the sense of Dahrendorf, the activity-oriented society is in many areas already a reality, especially where humans can act autonomously and with self-determination. The transition from work determined by others to self-chosen activities, however, requires not only self-motivation but also self-responsibility, and this sets high standards for self-organization and personality development. The reverse case is conceivable as well, for example, that creative, productive activity is rearranged into instrumental paid work or that humans are not able to develop their personality in the process of work.

The change of what society and each individual can expect of work is decisive. In the work-oriented society, paid work forms the central point of societal integration, even more: it is the essential moment that gives each life course a structure. This logic of work is changing: the continuing scarcity of skilled workers cannot simply be solved by digitalization and automation. Only against this background are current debates about working hours, demands towards work, as well as opportunities and risks of new forms of work understandable.

The distinction between work-oriented and activity-oriented society allows us to expand the focus on the potentials and limitations of humans. In the activity-oriented society, it is not

about more or less work, higher or lower wages but about a different understanding of work itself. The associated humanizing potential forms the normative core of the activity-oriented society and can serve as an approach to the responsible design of the world of work. A broader understanding of work also takes changes in the environment caused by human work more strongly into account.

### 1.3 A new consciousness for the greater picture

It is increasingly being acknowledged that the extreme forms of socio-economic inequality, which non-regulated markets can bring about, threaten the future of democracy and political achievement of the ecological transformation and thus should be limited, as was especially emphasized by the Club of Rome in its recent report.<sup>16</sup> Human relations and co-existence, mutual dependencies and effects that the freedom to choose of one individual has for the life of another and the environment move stronger into focus. A successful socio-ecological transformation obviously changes our way of life and economy massively and is inevitably connected to social transformation processes.

It is therefore no coincidence that, since some time now, the question regarding the common good experiences a renaissance and it is newly discussed within society. As “common good” we understand those collective values and institutions that shape our co-existence, provide humans with orientation, and in the best case are a resource for a successful life. According to the study “GemeinwohlAtlas Deutschland”, four of five people surveyed are worried that not enough

<sup>16</sup> Dixon-Declève et al. (2022).



attention is paid to the common good in Germany. At the same time, nine of ten citizens claim that they can influence the common good with their own behaviour.<sup>17</sup>

The common good does not necessarily stand in contrast to individual rights and freedoms. If the numerous forms of social interaction are taken into account, the rights and freedoms of all members of a society can be better ensured, be it through markets or federal action, through engagement of citizens/civil society or through social norms. Even though some forms of individual freedom can antagonize the common good, we understand the common good as a resource of the personal and collective gain of freedom.<sup>18</sup> In the tension between subjective determination and social requirements and standards, the individuals are ideally aware of their dependencies and social roles as well as their freedoms and responsibilities.

These areas of tension need to be laid open and dealt with constructively. Thus, the search for self-realization and orientation towards the common good in paid work are contrasted by economic requirements of productivity, in particular in view of the decreasing number of people of employable age due to demographic change. With regard to work time, it can be asked for the individual and society as a whole more pointedly: should work time (per week but also in life years) be increased? Or should it be redistributed among women and men in order to leave room for other forms of activities and in order to not endanger the psychological and physical health of the work force? How can vocational and continuing education support this flexibilization? How should different forms of activity be designed so that they can be reconciled with each

other? What does this mean for the – also financial – recognition and validation of non-market-related activities? The German model of a co-determined economy in which employers together with employees search for solutions for the respective contemporary challenges is thus again the focus of an international debate,<sup>19</sup> namely as a model that does not need to be overcome but modernized and developed further.

The structural change of the world of work occurs in the interplay with other societal trends, many of which cannot be dealt with or dealt with only marginally in this position paper. We would like to briefly point out these limitations: they include questions of enterprises' capacity for innovation, socio-economic inequality, dealing with property and the effects of changing family structures and gender roles.<sup>20</sup> The further development of the German model of co-determination and the future role of unions will be mentioned briefly in connection with platform work but will not be discussed in-depth. Since the main focus of this position paper is on Germany, the design of work in other countries, for example, with respect to the responsibility within supply chains or work migration, will not be elaborated either. These topics are excluded solely due to the focus of this position paper, the future of work, but their importance is not put into question. And finally, potential financing models for the suggestions presented here – which, of course, need to be developed in the context of general considerations on tax models and federal finances – will not be discussed; we believe this is an important task for research to develop respective scenarios.

<sup>17</sup> Gemeinwohl Deutschland (2019); Meynhardt (2018).

<sup>18</sup> Meynhardt (2016).

<sup>19</sup> See e.g., Anderson (2017).

<sup>20</sup> Many of the studies cited here refer to heterosexual couples; this should not, however, be considered as a standard of value.

## 2 Work as a concept

### 2.1 Work in pre-modern times

A look at the past shows: the conceptual equivalencies of work only partly correspond to what we understand as work today. In Ancient Greece, especially crafting activities and physical efforts were considered work, from which the higher classes could abstain because it was carried out by slaves. Such work did not enjoy recognition in society but was considered as an inevitable burden of simple humans. In the Roman Empire, as in Ancient Greece, a large part of the population was active in agriculture. In addition to slaves, there were also small farmers and small tenants, whose work (just like that of free workers in the prospering municipal crafts), in contrast to Greece, enjoyed societal recognition. The unfree craftsmen, however, had a bad reputation as did the unfree slaves on the larger agricultural estates.

According to Jewish Christian views, as in the pagan environment, manual work was initially considered as hardship, and it did not exist in paradise, nor in the eschaton of the end times. Gradually, this view changed. Because the degree to which work was also viewed as imitating divine creativity and thus as a gift of God, it could also be considered an appropriate means for self-fulfilment and fulfilling one's religious obligations. The Benedictine rule *Ora et Labora*, pray and work, shows the special importance that work not only enjoyed in monasticism but in the Christian worldview and view of society as a whole. The counter concept to work

was that of rest. On Sabbath, respectively on Sunday, one was supposed to rest like God and to enjoy life as a divine service.<sup>21</sup>

In the High Middle Ages, only certain groups could rest on Sundays and on the numerous religious holidays. The agrarian societies of pre-modern times did not know of a general absence from work. Every day, animals had to be taken care of, meals had to be fixed, children had to be fed and the sick had to be treated. In the life and economic form of the "whole house" ("ganzes Haus"), which developed from the *oikos* of Antiquity and was common in agriculture, trade and craftsmanship, all these activities were spatially, socially and temporally connected. While there were hierarchies and differences in status, everybody contributed and nobody, except for those of old age and the ill, was inactive. Married couples understood themselves first and foremost as couples of work, not as couples of love.<sup>22</sup>

The upgrading of hard work as a divine service in a Europe characterized by Christianity benefitted especially those activities that had socially received little recognition in Antiquity. It was reflected in the ascent of the craft guilds of medieval and early modern municipal communities as well as in the growing importance of trade and the dissemination of merchant and financial capitalism, which was preceded by technological innovations

<sup>21</sup> On this and the following: Conze (1972); Finley (1993); Kocka (2005).

<sup>22</sup> Brunner (1956); Opitz (1994); Wunder (1992).

and increase of production.<sup>23</sup> The Evangelical reformations of the 16<sup>th</sup> century strengthened the upgrading of work as they no longer distinguished categorically between a calling into a spiritual life form and a worldly life. Instead, they developed the uniform concept of a “profession” to which individuals are “called” by God independent of their specific professionalism. Whoever rejected this call and tried to avoid work, was subject to criticism. It is no coincidence that the first workhouses and houses of correction emerged in Calvinistic countries in which the Protestant work ethic was pronounced most radically.

Also, worldly authorities supported this teaching because they expected to gain from it hard-working, productive subjects and an increase in overall prosperity. Since the 18<sup>th</sup> century, there were more and more indications that work was not only a service to and for God but that it also served the state or the “common good”. This was accompanied by another upgrading: work was no longer embedded in a concept of religious obligation but also in a secular, political system of reference along with an emphatic celebration of work as a source of respectability and human self-fulfilment as it can be found in the texts of the Enlightenment.

Thus, a general concept of work emerged at the threshold to modernity which had been lacking in ancient language use and cannot be found in all languages. Work possessed a purpose beyond itself, which consisted in creating, achieving something. It served a task set by others or by oneself, had a connotation of duty and necessity. Work was always also strenuous, had to overcome obstacles, required effort and a minimum of perse-

verance. Play, leisure, and inactivity were counter concepts.<sup>24</sup>

## 2.2 Paid work and the modern work-oriented society

In the course of the 19<sup>th</sup> century, this broad, comprehensive concept of work was narrowed with a tendency towards paid work. This meaning was increasingly found in dictionaries, public statistics and in common language. Paid work meant work with which services are provided and goods are produced in order to trade these on the market. Through this work, one received an income, one lived off of it, whether in a dependent or independent position or in one of the many steps in-between.<sup>25</sup>

This conceptual narrowing took place in parallel to two historical developments: capitalism, through which work increasingly became a commodity, prevailed as did industrialization, through which paid work was largely centralized in workshops, factories, administration etc.<sup>26</sup> Thus began what Karl Polanyi termed dis-embeddedness: work was disembedded from its comprehensive social connection in which cultural, religious, political and in a narrow sense economic aspects were interwoven.<sup>27</sup> Together with the ascent of economics as a science of market-related economic activity, this activity was freed from other purposes. This strengthened the tendency to demoralize and marketize work. For many, work lost its meaning as a religious obligation and virtue as well as its connotation of punishment and coercion. On the other hand, work gained

<sup>24</sup> Thomas (1999), p. xiv.

<sup>25</sup> Kocka (2015), pp. 315 – 21.

<sup>26</sup> The meaning of work at home during the early industrialization should not be neglected here; see Bettger (1985).

<sup>27</sup> Polanyi (1978), pp. 88 – 9.

<sup>23</sup> Kocka (2016), pp. 25 – 65.

a significant societal value as a condition for the “wealth of nations” as Adam Smith wrote in 1776. The reference to the common good emerged in particular through economic growth and general prosperity.

On the level of experience, there was then a spatial, temporal and factual division between family/household and paid work. This led to the development of the understanding of family as a private and, if possible, protected life-sphere that was very distinct from paid work and the public sphere. This understanding became the ideal, first among the bourgeoisie, from which it spread outward. Paid work from then on took place separately from other aspects of life: with a logic of its own, roughly measurable and correspondingly compensated with money. Soon many useful activities and those oriented towards the common good were no longer considered work in the truest sense of the word: unpaid work in the household and in the family, which primarily was carried out by women as a labour of love, but also the unpaid engagement for philanthropist, social and cultural purposes or general issues, which later was in part subsumed under the concept of “voluntary work”.

This development had a significant effect on the assessment of work as it increased the discrepancy between theory and practical experience. Not only in the works of Diderot, Kant and Hegel but also in those of Marx and the spokesperson of the emerging labour movement it becomes apparent that they considered work as a human right and the core of humanity and socialization. This was countered by the increasingly capitalist-oriented, specialized, mostly dependent, often also monotonous, strenuous and miserable reality of (paid) work, which became the subject of fundamental criticism of alienation and society. This contradiction between aspiration and reality fed the influential

protest movements of the 19<sup>th</sup> and 20<sup>th</sup> centuries.<sup>28</sup>

Especially since the late 19<sup>th</sup> century, work – as paid work – gained social, cultural as well as political significance. Thus, the labour movement as the largest protest and emancipation movement with its different characterizations and orientations based on dependent work. At the same time, it reflected the socializing power of paid work, which connects humans with each other and can serve as a basis for standards and cultural recognition, social participation and political influence. In this sense, the first women’s movement fought for new ways of earning money and connected these with the demand for female emancipation and equality. The discursive as well as practical upgrading of paid work also occurred in colonial contexts: here, different understanding and practices of work defined the asymmetrical field between colonial power and the colonized, in which disciplining and resistance, indoctrination, exploitation and subordination, sometimes also learning and liberation, took place.

Paid work and the state moved close together from the late 19<sup>th</sup> century. On the one hand, federal politics intervened strongly in working relationships due to legal and administrative regulations: by developing norms, shortening working hours, limiting the power of the market, and thus strengthening the definition of work as paid work. From this, the modern distinction between (paid) work and unemployment emerged. On the other hand, paid work formed the basis for the modern welfare state. Those who worked, not the poor, were the addressees of federal social security, initiated by Bismarck. The premiums of the employed and

<sup>28</sup> Kocka & Offe (2000), pp. 476 – 92.

employers, not taxes or savings, financed the system, which was further expanded in the 20<sup>th</sup> century.

At the same time, taxes and other obligations towards the general population as well as socio-political rights towards the state were tied to the status of gainful employment. Other support and transfer systems remained lower ranked for the time being. Especially since the 1950s, paid work ensured by work contract and the welfare state moved to the centre, and with it the ideal of the male full-time worker who was to be the bread winner of a family. Married women were not excluded from paid work but mostly restricted to the role of secondary wage earner. The differences in income and in career opportunities between men and women as well as in taking over unpaid work in the household and family were accordingly strong.<sup>29</sup>

Paid work thus became the key factor that decided about inclusion or exclusion in the system of social rights and obligations and thus about belonging to society, its periphery or being an outsider. The rapid expansion of labour law and the welfare state, which in Germany took place especially in the first third and third quarter of the 20<sup>th</sup> century, has driven and strengthened this process. The National Socialist dictatorship did not stop this development but continued it, though characterized by racism and significantly deliberated. Overall, a societal order developed whose economic performance,

social cohesion, cultural orientation and political steering were based to a large degree on paid work. Never before had work – as paid work – been such a central pillar of society. This was also true for the GDR, even if paid work in this case was stripped of a significant part of its foundation, namely the reference to the market and character of commodity.

### 2.3 Change of the work-oriented society: new negotiations, de-limitation, restructuring

The imprint of the society oriented towards paid work continues to exist in Germany today. Work does not cease to exist for the work-oriented society, and there is no abandonment of paid work. Rather, the employment rate continues to increase significantly, in particular due to the labour market entry of more and more women, while the employment rate among men remains unchanged. This not only poses a challenge to the old roles of male paid work and female reproductive work, which is the focus of chapter 6. It also leads to the marketization of previously private, unpaid services through which the employment rate increases further. The market and the state continue to privilege paid work, and status in the work process influences the life opportunities and affiliations of people.

In recent years, however, the pattern of the long dominant, masculine-shaped, normal full-time work relationship started to crumble. This is due to at least six developments.

First, the concept of the male breadwinner erodes in view of the increasing participation of women in paid work. The new feminism of the 1970s and 1980s already made clear that the unpaid and little recognized care and family work of women

<sup>29</sup> On the changing structures of female paid work since 1945, see Frevert (1986), pp. 253 – 60. In the 2000s, with an overall increasing employment rate of women, almost every second employed female worked part time. More recent studies moreover indicate that female employees with and without migration background correlated with regard to so-called atypical employments (part time, Mini-job, solo self-employment). This is even more the case for the second generation of women who originally migrated from Turkey than for the first (Höhne 2016).

was a precondition for men to be able to be free for paid work. The more women have a paying job the more likely the reconciliation of work and family becomes a societal field of conflict that is no longer only dealt with in private (and on the backs of the women). It remains unclear how this development will continue. It is undisputed that the gaps between men and women in paid work and in care work need to be closed, as do the many resulting gaps in hourly wage, income, and retirement payments. But what does this mean for the common employment and family model? Gaps are closed if women continue to increase their activity in paid work. They also close, however, if men reduce their activity in paid work. Do we want full-time employment for everyone? How would then reproductive and care work be organized in all its breadth? Where do the boundaries of marketization lie? Or do we propose a “low full-time” for everyone? Economically, neither work volume nor productivity would in that case necessarily decrease in comparison to the current standard. The volume of work would be redistributed among men and women and productivity would increase with slightly reduced working hours (see chapter 6).

Second, the prerequisites, content and framework conditions of paid work change. Occupation profiles and content of qualification continuously change, not least due to digitalization. This does not mean that the strong orientation towards occupation, as found in the German system of vocational education, is a model of the past. There are, however, new challenges: education, continuing education and professional adaptation will become necessary beyond the once learned profession. This can occur parallel to one’s work and requires time and financial security for a second and third vocational education during working life. The institutional trisection of the life course – preparation

for paid work, paid work and retirement<sup>30</sup> – is replaced by hybrid and progressive forms of paid and unpaid work. Continuing education and paid work, retirement and paid work, care and paid work could, like other combinations, exist side by side (see chapters 3 and 5).

In paid work, one can observe a concentration of tasks, and the psychological and mental burden is increasing. A widely shared social experience is that work-related communication is being accelerated, multiplied and goes beyond the usual working hours. These tendencies are particularly apparent in the ongoing tertiarization and the emergence of post-industrial labour markets. Digitalization and technological innovations are drivers of this change, in which new business models, professions and profiles of activity develop (e.g., the platform economy discussed in chapter 4) and new forms of assessment of activities (monitoring, output orientation) gain significance. In the expanding service sector, one can observe a division of the labour market into cognitively demanding and science-based activities, on the one hand, and simple activities (services related to the household, gastronomy, tourism), on the other.<sup>31</sup> In this “services proletariat”, burdensome, socially precarious and low-wage forms of activities that resemble jobs rather than professions abound. Here, paid work does not automatically mean a materially sufficient life. New inequalities can be observed in the possibility of remote work. In enterprises where some employees are allowed to work remotely but others are not, this field of conflict is particularly apparent (see chapter 4).

Third, defossilization and the ecological transformation as a whole are

<sup>30</sup> Kohli (1994).

<sup>31</sup> Goos & Manning (2007).



changing the world of work. In this context, it is not only about how sustainably a product or a service can be produced but increasingly about what is acceptable at all as added value within the “planetary boundaries”.<sup>32</sup> Climate change, the melting of glaciers or the loss of biodiversity are usually not associated with work activities. Yet, in the future it will be discussed more strongly how a new relationship with nature can be developed and implemented in the world of work – as a central place of the transformation. Regulations can cause a wave of innovations in this context and thus upgrade associated activities.

Fourth, demographic development plays a significant role. In view of the ageing society, dilemmas emerge between paid and unpaid work. Thus, due to the increased life expectancy, especially women are confronted with the assumption that they will have to care for their parents(-in-law) in old age and reduce their own paid working hours as a result (see chapter 6). If care work and paid work are set against each other, this will also have an effect on the birth rate, which – without immigration – will further accelerate the ageing of society.<sup>33</sup> The ageing of the population and the demographic change also lead to bottlenecks in filling positions. The negotiating position of skilled workers is strengthened and the market power is shifted from the enterprises to the workers. Migration represents an essential building block in meeting the demand for skilled workers, but the recruitment and integration of foreign workers entail challenges. In spite of this, migration can under certain conditions contribute to covering the demand

for skilled workers and provide people with opportunities for participation in the receiving society via paid work.

Fifth, changing values and expectations towards work can be observed. This is particularly apparent among those employees that are well qualified and earn higher wages. A growing number of employees pursue biographically more flexible and temporally discontinuing models of ways of life. From their perspective, paid work not only serves getting money, but is also a source of purpose. It is supposed to consist of opportunities for self-realization and fulfil wishes for autonomy. This expectation is thus no longer solely limited to the expanding field of DIY activities after work but is increasingly connected to paid work and the standard of “individual biographical orientation”.<sup>34</sup> Paid work is similarly relativized in the growing field of voluntary, unpaid, civil society activities in associations, citizen initiatives, foundations, self-help groups and NGOs.<sup>35</sup> These activities gain functions of identity formation, socialization, purpose, they evade the laws of the market and go beyond paid work.

Sixth, the diverse and plural society demands as such more time for togetherness. Diversity means an increase of positions, attitudes, and identities, more cultural and religious roots, more professional attributions. Social cohesion requires mutual trust, which in turn requires encounters and the overlapping of social groups. In this context, especially the numerous forms of engagement on the

<sup>32</sup> Dixson-Declève et al. (2022).

<sup>33</sup> The Federal Statistical Office of Germany records a birth rate of 1.46 children per woman, a reduction of 7% compared to 2021. In order for society not to grow smaller – without immigration – approximately 2.1 children would have to be born per woman (Statistisches Bundesamt 2023a).

<sup>34</sup> Kohli (1994).

<sup>35</sup> According to data of the survey of volunteers, in 2019, almost 40% of all surveyed from age 14 on engage in these areas. In 2019, it was only 30.9%. The proportion was stable on this high level, however, between 2014 and 2010. <https://www.bmfsfj.de/bmfsfj/aktuelles/presse/pressemitteilungen/zahlen-daten-fakten-zur-entwicklung-des-freiwilligen-engagements-in-deutschland--176840>, accessed May 2, 2023.

level of civil society and the associations can play an important role if different societal groups assemble in them.

All developments have in common that guiding orientations as well as values and perspectives related to paid work are shifting. Those who demand a work-life balance cast a critical view on what is considered excessive professional engagement. Those who decide (and can afford) to reduce their weekly working hours create more room for other activities within the family or in the realm of civil society – and thus show that they also feel obligated to serve the common good and that one's own self-esteem does not exclusively depend on the recognition of professional achievements.

The change of the work-oriented society also leads to the emergence of new social risks. If the temporal, factual and spatial regulations of paid work are loosened or the separation of paid work and leisure / non-work in remote work is lifted, entrepreneurial and organizational interests become more present in everyday life. If the spheres of activity change or expand, questions regarding a social safety net need to be reconsidered as well. Since paid work remains essential for access to social welfare, eligibility cannot be gained through care work or activities for the common good. Socio-political models of social welfare as in the Scandinavian countries, which recognizably focus on citizen status, could be useful here. This would also make it possible to have capital gains and higher incomes participate in the financing of such models.

## 2.4 Perspectives for designing the activity-oriented society

These six developments provide stimuli to rethink the historically grown and

changeable concept of work and to reposition it for the future. This means that work should no longer be considered synonymous with paid work or to limit it to this understanding. Instead, the concept of work should be understood more broadly and include non-market-related activities such as citizen work, care work, education, family and household work.

This creates, first, a more complex understanding of the work-oriented society and explores potential dimensions of the *purpose of work* far beyond its market value and that of its results. Such an extended understanding of work takes up practical and intellectual developments of a time in which the concept of work was not yet overwhelmed or limited by industrial capitalism. It addresses work as an irreplaceable medium of individual fulfilment and self-realization, community building via cooperation and mutual recognition as well as the – even if indirect – participation in a larger whole, in being part of creating the common good beyond one's individual benefit and ultimately also beyond the service to the individual. One can put this into words and take up the considerations of Ralf Dahrendorf and speak of an “activity-oriented society” (“Tätigkeitsgesellschaft”) rather than a “work-oriented society” (“Arbeitsgesellschaft”).<sup>36</sup> This is more than a language policy or symbolic demand since language not only reflects societal reality but also shapes it. To the degree that non-market-related work is identified and dealt with as such, these activities – as a necessary precondition for and addition to paid work – are made visible. At the same time, it becomes apparent which tensions between paid work and other activities currently exist and which questions with regard to regulation and social safety nets

<sup>36</sup> Dahrendorf (1983); *ibid.* (2001); Littig & Spita (2011).



are associated with the different forms of activities.

Second, the concept of an activity-oriented society also entails a cultural enhancement of non-market-related activities. It should therefore be reflected in the cartographies of society and politics and gain access to economic figures. This would be a welcome contribution to gender equality since non-market-related activities are predominantly still carried out by women. In the long term, this could lead to a further alignment of male and female profiles of activity. Moreover, it would make a more flexible distribution of work between people of different ages and in different phases of life easier. The concept of unemployment, which so far is exclusively defined by lack of paid work, would likely also undergo change and be relativized.

Third, a broader understanding of work would shift the focus on health aspects. Healthy work should contribute to physical, mental and social well-being of the employees and to the sustainability of the workplace. Work-related health problems and illnesses should be avoided and the framework conditions should be designed so that a continuous health promotion and maintenance of industrial health and safety standards are guaranteed. In view of the increasing diversity of society, it is also important to involve the perspective and knowledge of the employees with sensitivity towards diversity.

At the same time, and fourth, a broader concept of work shifts the attention to the opportunities as well as limitations of individual self-realization in view of the challenges that have to be overcome together.

This shift toward the concept of an activity-oriented society does not lead to a

devaluation of market-related paid work. It remains a central and necessary element in order to ensure societal prosperity and enable unpaid activities. The chapters of this position paper focus in detail on current problems and future challenges of paid work in Germany and identify the elements of the classic work-oriented society that are worth preserving. Moreover, they assess the opportunities that lie in an activity-oriented society. This includes not least the opportunity that people can participate in flexibly shaping their work biographies and carry out other activities in parallel or consecutively without ending up in financial dead ends. For this purpose, a certain degree of federal regulation, welfare-oriented social security and the provision of public goods (education and continuing education, health and constructed environment) are necessary. Beyond that, the achievements will become visible that an activity-oriented society provides for the promotion of the common good.

In the following, we will illustrate which approaches and aspects of an activity-oriented society can already be recognized today and which potentials for development result from the interplay of different activities. In this context, it is decidedly not about an either or but about a response to the grand challenges of our time that is appropriate for the common good.

The likely potentials for development concern the societal organization of work on all levels: for the individual and his/her immediate environment, to the relationship of free enterprise and responsibility, to the design of political framework conditions. At the core, it is about a new balance between cooperation and competition, creation and appreciation of value and not least about the relationship between continuity and change.

## 3 Demography and life-course-oriented design of the labour market

### 3.1 Introduction

The activity-oriented society (“Tätigkeitsgesellschaft”) faces new challenges due to demographic change. While the following chapter is dedicated exclusively to the digital change and the resulting organizational forms of paid work, we will concentrate here on the demographic development and its effects on the design of life courses. In particular, the focus is on the processes that lead to new life course patterns at an older age. Chapter 5 will elaborate in how far the demographic change, in addition to other developments, will pose new challenges for large parts of the younger generation with respect to education, vocational education and continuing education.

### 3.2 Demographic change

The demographic change in Germany is particularly evident in a significant ageing of society since life expectancy has increased and birth rates have decreased. Due to the high net migration, however, the overall population in Germany remains largely stable.<sup>37</sup> The ageing of society will change the world of work significantly because the number of people of employable age will decrease but the number of those who want to take advantage of their work performances will not.<sup>38</sup> Workers – not only skilled workers – will thus become

scarce. From an economic standpoint, this scarcity endangers an activity-oriented society’s ability to function because unpaid care work and other activities mentioned in the introductory chapter are financed by paid work. In turn, however, unpaid care work and other non-market-related activities are preconditions for employment chances and the productivity of paid work.

How drastic this overall economic scarcity of workers will be depends especially on how labour market participation and migration will change in the future. In research, different scenarios are discussed in this regard. Figure 3a shows four of these potential developments: depicted is the expected labour force potential in Germany, measured in millions of people employed. The current change that is due to the retirement of the baby-boomer generation is clearly visible. This becomes particularly drastic in the (extreme) scenario 1, in which a constant employment rate and no migration are assumed. Here, labour force potential is reduced by almost 17 million people until the year 2060. This scenario is, however, just as unlikely as the other extreme scenario 4, which is based on a migration rate of on average 400,000 people per year. Only in this scenario 4 would the labour force potential remain the same. In scenario 2, on the other hand, increasing employment rates are assumed but gains in migration are not, which, however, is not to be expected. The most likely from today’s perspective are therefore scenarios in which employment rates are increasing and the migration rate is

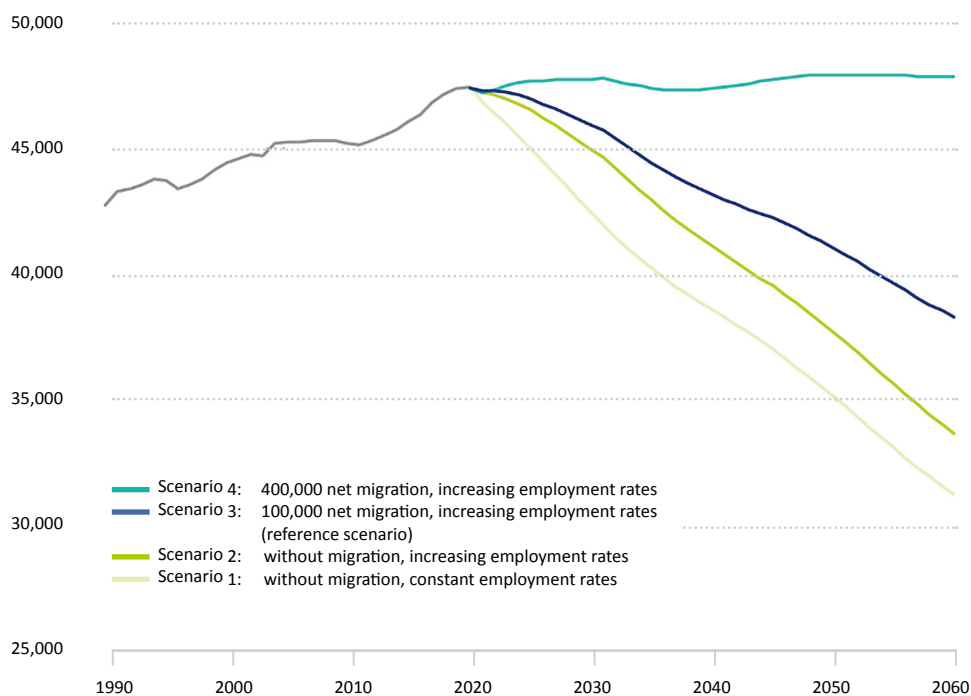
<sup>37</sup> Richter & Mühlbrock (2018); Stache & Howind (2014).

<sup>38</sup> Börsch-Supan (2002, 2011).

between 100,000 and 400,000 people. In scenario 3, for example, increasing employment rates and a migration rate of 100,000 people are assumed. Even in this case the labour force potential is reduced by approximately 10 million people by 2060. This reduction will not affect all sectors of the German economy to the same extent since there will also be other structural changes in addition to demographic change. This will be elaborated in the course of this chapter.

Thus, while the labour force potential in realistic assumptions regarding the net migration will most likely decrease due to the demographic change, the development of employment rates is uncertain. Figure 3b shows that employment rates increase until today.<sup>39</sup> This holds especially for older people but also for women and younger people. A large part of this increase is, however, based on part-time work. Between 2005 and 2021, the part-time rate among women increased from 44.3% to 49.1%, among men from 7.4% to 12.1%, here especially among older men.<sup>40</sup>

**Figure 3a:**  
**Scenarios for the development of labour force potential until 2060**  
in 1,000 employees, national concept



Note: The net migration used here is the annual difference between inflows and outflows of people aged 0 to 110 (thus not only workers).

Source: Fuchs et al. (2021) in IAB-Kurzbericht 25 | 2021

<sup>39</sup> OECD (2022a).

<sup>40</sup> Statistisches Bundesamt (2022).

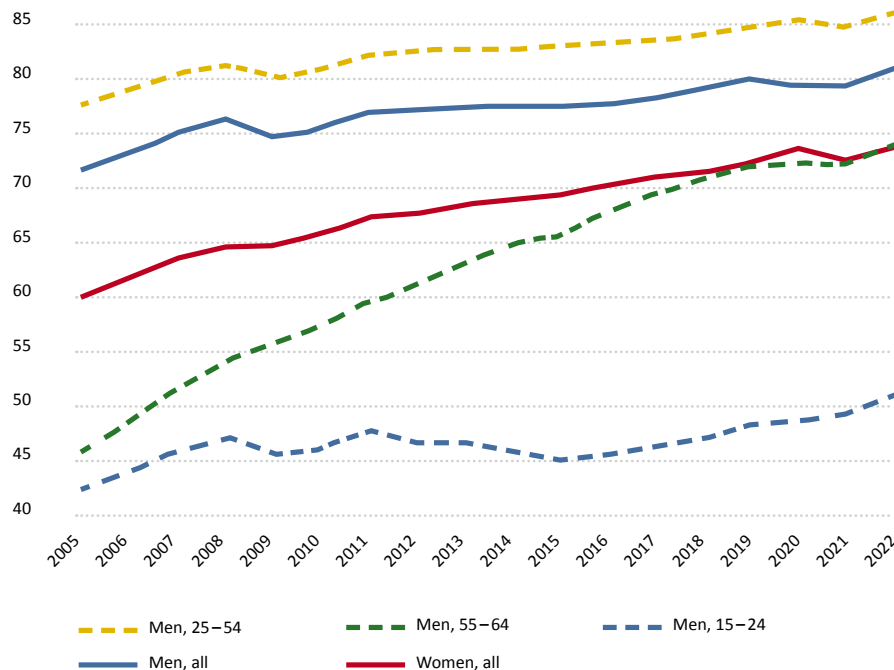
Accordingly, completed working hours on average decreased per employee from approx. 1,450 to 1,380 hours per year.<sup>41</sup> The increasing employment rate is not yet counteracted by the decreasing number of hours. Since the employment rate cannot be increased arbitrarily, the available overall volume of work will decrease.

Due to this expected development, concepts of an extended and/or flexible entry age into retirement, to activate additional people for the labour market, have already been presented since the 1990s as a preventive labour market policy that is resistant to demographics (e.g., through continuing education and health protection), and a redistribution of working periods in the life course (e.g., through long-term accounts (Langzeitkonten)).<sup>42</sup>

Little of this has been realized until now, on the contrary. Many employees take advantage of the opportunity of early retirement (full pension at 63, reduced earnings capacity pensions). In 2021, 58% of all retirement entries took place before the legal retirement age. The proportion of employees that took advantage of “Retirement at 63” has continuously increased since its introduction in 2014 and reached a rate of 54% of all early retirement entries in 2021 with 262,000 people.<sup>43</sup>

Some of the employees can and want to work beyond the current age limit. In 2022, these were 8% of people over 65. This proportion has increased in the past 10 years. In 2012, it was only 5% of people over 65. Among those from age 65 to below 70, the proportion increased more strongly: in 2012, 11% of this age

**Figure 3b:**  
Development of employment rate 2005 – 2022 in percent of the population



Source: OECD (2023), Employment rate. doi: 10.1787/1de68a9b-en (accessed May 17, 2023)

<sup>41</sup> Institut für Arbeitsmarkt- und Berufsforschung (2020).

<sup>42</sup> Seifert (2015); Klenner & Schulze Buschoff (2015); Börsch-Supan (2007, 2020).

<sup>43</sup> BMAS (2022a).

cohort continued to work, in 2022 already 19%.<sup>44</sup> In this context, it has to be taken into account that in 2019, the proportion of highly qualified people in the age group from 65 to 69 was at 26% and the proportion of low-qualified people was at 13%.<sup>45</sup>

These employees prefer shorter working hours and hybrid forms of work with which they can combine paid work and retirement. Due to the increasing scarcity of workers, the demand for older and experienced employees will increase on the side of employers.<sup>46</sup> As a result, the currently widespread age discrimination could decrease. We will discuss these shifts in the life course of older people in detail in section 3.3.

Aside from the ageing of employees, migration is changing the labour market. It has many facets and is in part contradictory to other drivers of demographic change. Thus, in recent years, especially young people migrated to Germany, which resulted in a rise in birth rates in 2019.<sup>47</sup> There are, however, still problems with regard to education, vocational education and labour market integration of migrants. Thus, first, the employment rate of people from non-EU states is significantly lower than the employment rate of people with German citizenship or from other EU states.<sup>48</sup> Second, the school competencies and school-leaving certificates are on average lower among children, adolescents and adults with a migration background, and the school and vocational education drop-out rates are higher than among people with no migration background. Third, while some migrant workers are well skilled, they are

employed in activities with low qualification standards. This represents a “brain waste”<sup>49</sup> for the employees and society. Moreover, the emigration of skilled workers can have detrimental effects for the migrants’ countries of origin.<sup>50</sup> At the same time, and fourth, especially simple work, for example, employment in digital platform companies (see section 4.3.3), represents an entry into the labour market for many. It can be empirically shown that the growth of the platform economy is based to a large extent on the migration of people to Germany.<sup>51</sup> In view of labour market shortages in simple as well as qualified activities, a lot of companies rely on migrant workers. This concerns not only the care sector, also fields such as logistics – which due to the rapid increase of online trade is booming – where the quickly growing logistics centres recruit many employees from Eastern Europe.

Regarding the scarcity of workers, demographic change and digitalization potentially have contrasting effects. While the demographic change will lead to lower employment rates and a scarcity of workers, digitalization is fuelling the fear of a loss of labour and workplaces because robots and Artificial Intelligence could replace human work in many sectors. Thus, the two megatrends are not threatening developments to the same degree but could balance each other out in the best case. Even if digitalization will lead to the loss of some activities and professions, history shows that, at the same time or subsequently, new fields of activity and professions emerge. Examples are the transition from an agrarian to an industrial society or the replacement of manual looms by mechanical looms. In addition, digitalization can help people in many

44 Statistisches Bundesamt (2023a).

45 Statistisches Bundesamt (2021)

46 Fuchs et al. (2021).

47 Grobecker et al. (2021), p. 16.

48 Wingerter (2021), p. 154.

49 Yamamura (2009).

50 E. g., Spielberg (2015).

51 Schaupp (2021).

professions to work more productively, which at least to some extent could compensate the decrease of labour supply due to demographic change. While these professional and sectoral shifts can cause high frictional unemployment (cf. the recommendations for action), they have in the history of development eventually led to a higher standard of living. The described effects of digitalization, however, do not fall from the sky: a precondition is a solid foundation of education, lifelong learning and innovative forms of applying new technologies in companies that also use the qualifications of humans. We will return to these aspects in chapter 5.

### 3.3 New forms of shaping life-courses in older age

#### 3.3.1 Paid work at retirement age

The material prosperity of Germany and its ability to finance non-market-related activities is based to a large degree on the high productivity of its workers, measured according to the contribution of a working hour to the national income. The good news is that, in contrast to common conceptions, the thus calculated productivity in standard professions does not decrease with age.<sup>52</sup> The experience of older people compensates the decreasing cognition and physical strength. In these standard professions, work flows are strongly structured and oriented towards average performances, not top performances. However, many employees declare a lack of motivation or increasing boredom. Here, especially the employers need to ensure the appreciation of paid work in older age.

At the same time, employers face the task of implementing adequate forms of work for older people. In designing the workplace, there are many concrete examples, such as, for instance, stand-up stools in assembly line work of the automobile industry or robots that lift heavy parts and transport them to the employees. Some employers have also introduced frequent breaks in which, if needed, employees can do back exercises.

Yet there are also many discouraging examples because hard- and software engineers often do not put a lot of thought into how older people see and think. This needs to change. Providers should adjust digital products (particularly those used in everyday work) more strongly to the needs of older people. Software and hardware should function intuitively and not require time-consuming training programmes. Digitalization needs to be adjusted to people, not people to digitalization.

Most elderly people favour more flexible working hours, that decrease with age and develop into a combination of retirement and paid work instead of a sudden end of full-time work to full-time retirement.<sup>53</sup> This is also reflected by the fact that labour market participation of older people in retirement age has increased in many European countries in the last ten years. In Germany, according to the Federal Statistical Office, 23% of 65- to 70-year-old men were employed in 2022; among women the proportion was 16%. The employment rate in this age group among men and women was above the EU-27 average.<sup>54</sup> Typically, these working relationships while also receiving pensions (“bridge jobs”) were carried

<sup>53</sup> Richardson & Antonello (2022).

<sup>54</sup> Statistisches Bundesamt (2023a); Börsch-Supan & Coile (2020).

<sup>52</sup> Börsch-Supan & Weiss (2016, 2020).

out part-time, often independently or as a minor activity (“520 Euro jobs”).

The increasing labour market participation in retirement age results in a hybrid life phase that is characterized by a de-standardization of the classic transition from employment to retirement. As a consequence, the transition to retirement marks less and less the entry into the life phase of old age but in many cases an extension or encore to adulthood (“encore adulthood”). In this context, and especially in Anglo-Saxon countries, forms of “un-retirement” and “re-retirement” can be observed as well.<sup>55</sup> The labour market participation in retirement age is thus often volatile, phases of employment (mostly at reduced working hours) and non-market-related activities alternate. This contributes to a further de-standardization and pluralization of the life phase of older age.

While financial reasons do play an important role in these age groups, individual and social motives are mentioned more often, such as, for example, “contact with other people” or “fun at work”.<sup>56</sup> People perceive work as an anchor of life that predetermines the daily/weekly rhythm, enables contact with colleagues or customers and gives life an additional meaning. Counteracting this by providing incentives for early retirement or even a strict mandatory retirement age as in public service is, from the perspective of society as a whole, a mistake.

As the results of the study “Transitions and Old Age Potential” (TOP)<sup>57</sup> show, the decision to participate on the labour market in retirement age can be described with a multi-phase model of

action.<sup>58</sup> Here, individual characteristics (e.g., health) have to come together with the right planning and opportunities on the labour market in order to satisfactorily realize an employment in retirement age.<sup>59</sup> Financial incentives also influence the decision when to enter retirement and which combinations in partial retirement models are chosen.<sup>60</sup> In this context, especially the narrow limitations in statutory pension insurance for gaining additional income posed an obstacle. This, however, was changed on January 1, 2023, so that even in case of early retirement one can gain limitless additional income. Yet, no adjustment was made to the additions and deductions. This leads to incentives to work part-time already before the legal retirement age instead of staying in a full-time job. This reduces the overall economic work volume.<sup>61</sup> Experiences from other countries show how counterproductive corresponding rules can be: there, the increased work volume after retirement age was lower than the reduced work volume before retirement age. In these countries, the overall economic work volume therefore decreased instead of increased as was hoped.<sup>62</sup>

Due to comparatively low normative standards, the “third age” has until now been viewed especially as the “individual project”<sup>63</sup> of older people since there are actually no societal guidelines. This is an argument that quite strongly corresponds with Rosenmayr’s concept of “late freedom”<sup>64</sup> or Burgess’ “roleless role”.<sup>65</sup> The above mentioned results of

<sup>55</sup> Wang & Shultz (2010).

<sup>56</sup> Mergenthaler et al. (2020).

<sup>57</sup> Ibid.

<sup>58</sup> Cf. Beehr (1986).

<sup>59</sup> Cihlar et al. (2019).

<sup>60</sup> Gruber & Wise (1999); Börsch-Supan (2000); Börsch-Supan & Coile (2020).

<sup>61</sup> Börsch-Supan et al. (2018a).

<sup>62</sup> Börsch-Supan et al. (2018b).

<sup>63</sup> Moen (2011).

<sup>64</sup> Rosenmayr (1989).

<sup>65</sup> Burgess (1960).



the TOP study on labour market participation in retirement age also refer to the meaning of individual decision-making processes in this life phase.<sup>66</sup> The transition from full-time employment to full-time retirement, however, does not only depend on individual decisions but also on the efforts of the employer to provide adequate working conditions as well as on the administrative framework conditions. Particularly in a time in which guidelines are lacking is it a societal task to provide people with an appropriate framework for decision-making and support. The state, the employer and employees have to take responsibility together.

### 3.3.2 Health aspects

Good health and the opportunity to continue to work for the last employer make employment in retirement age more likely. Contrary to common belief, most people between 60 and 70 years of age are in very good health. There is no firm evidence for the assumption that the majority of people are physically “exhausted” or even “worn out” when they reach the current retirement age of 67, but there is evidence for a large heterogeneity of the health of this age group. The majority is healthy, a significant minority is not, regardless of how health is defined. Data from the Survey of Health, Ageing and Retirement in Europe (SHARE) from 2013–2021 show that this is true for subjectively perceived health (“How do you feel?”), work-related health (“Do any health limitations obstruct you in your professional work?”) or objectively measured health (e.g., muscle strength, cognitive tests).<sup>67</sup> In a survey of the Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA) in 2011 on

the self-reported overall health condition of employees according to age and profession, the proportion of those who estimated their health condition to be poor increased, however, with age from around 10% (18–34 year olds) to around 30% (55–64 years old).<sup>68</sup> This also means that around 70% of the employees (55–64 years old) view their health as good. The SHARE data were similar: here, about 80% of the people between 63 and 68 stated that they do not have any health restrictions in their profession.<sup>69</sup> Here, too, significant socio-economic differences could be observed. Among the 20% who do have health limitations, people with low income or lower level education – mostly both – were strongly overrepresented.<sup>70</sup> Particularly in socially vulnerable groups do these health limitations decrease the opportunities of extended employment or social participation in the life phase of older age.

### 3.3.3 The role of voluntary work

Beyond paid work, voluntary activities or family-related care work play an essential role in the concept of active, resp. productive, ageing.<sup>71</sup>

Engagement in voluntary work is often discussed as a functional equivalent to paid work in retirement age. Even though there are indications for a role substitution, when a voluntary work after ending a professional job replaces so to speak the paid work, the voluntary work is more to be understood in the sense of

<sup>68</sup> According to the BAuA survey, the proportion of those who considered their health to be poor increased among men from 9% (18–34 years old) to 31% (55–64) and among women from 13% (18–34) to 33% (55–64) (BAuA 2011). Also heavy lifting, work in a certain position and working while standing up burden employees from 55 years old at least subjectively more than younger people (BAuA, 2014).

<sup>69</sup> Börsch-Supan et al. (2013).

<sup>70</sup> Cf. Lampert et al. (2017).

<sup>71</sup> Cf. Butler & Gleason (1985).

<sup>66</sup> Cihlar et al. (2019).

<sup>67</sup> The European SHARE Panel is described in Börsch-Supan et al. (2013).



a role extension. Voluntary work thus underlies a path dependency in the life course: if people were engaged in voluntary work already in their younger years, the chance increases that they will continue to do so in retirement.<sup>72</sup>

The reconciliation between extended paid work, voluntary engagement and family-related care work is becoming more important for older people in the course of productive ageing. In this context, the question is how can prolonged employment be reconciled with family-related care or nursing work. Findings of international studies are mixed, whereby most analyses observe that labour participation or work volume decrease when family-related care work is taken up. This connection is more strongly pronounced among women than among men (see chapter 6).<sup>73</sup>

### 3.4 Recommendations for action

In view of the demographic change and the consequently increasing scarcity of workers, whose wages are eventually also financed by non-market-related activities, first of all, the flexibility in the relationship between paid work and other forms of activities in the life course need to be strengthened for all employees. On the other hand, care work and non-market-related activities are a precondition for the functioning of a society and thus for paid work that needs to be flexibly designed accordingly. Overall, it is about taking advantage of the existing potential as well as possible, so that periods, in which paid work due to child education, caring for elderly or continuing education is not at the centre, can be made possible and motivated as well as financially secured. The imperative of higher flexibility is further

strengthened by the high heterogeneity regarding health and wishes with respect to activities. There are a number of models for such a life-course-oriented design of work, such as working hours of choice and temporary part-time work, regulations of leave, sabbaticals, and long-term accounts of working hours.<sup>74</sup> The model of optional working hours takes up existing proposals and develops them further.<sup>75</sup> It envisions that basically all humans should have a time budget of about nine years that enables them to interrupt, resp. reduce, their paid work for socially relevant activities, and to still have financial security during this period. These approaches are, in part, already carried out, their broad testing, in part, is still pending.

The described concepts are, however, tied to a regular employment relationship. It is therefore important to create opportunities for “weaker” groups on the labour market and to correspondingly balance the costs for the interruption of a job or a lower working period. In view of fiscal bottlenecks, not additional subsidies should be the priority but the flexibilization of employment relationships. All people should be able to find the necessary time for work, family, care, and continuing education. This also concerns those who are employed in new forms of paid work such as platform work.

In the following, we will sketch out areas where immediate or short-term action is required:

- The change of paid work is characterized by different, partly contrasting trends. While the demographic change rather leads to stagnation or (in some scenarios) reduction of work force potential in Germany, the technologi-

<sup>72</sup> Cf. Erlinghagen (2008).

<sup>73</sup> Cf. Bauer & Souza-Poza (2015); Lilly et al. (2007).

<sup>74</sup> Seifert (2015); Klenner & Schulze-Bischoff (2015).

<sup>75</sup> Jurczyk & Mückenberger (2020).

- cal change (e.g., digitalization) entails opportunities of increasing productivity that can compensate the demographic change. Such a restructuring can lead to a more flexible world of work, but cause strong frictions during the transition (especially temporary unemployment) which needs to be compensated by existing labour market instruments.
- Supporting such a flexibilization of the world of paid work and courses of employment is important for the activity-oriented society because it can create more room for opportunity for unpaid work in some life phases but also better and more flexible opportunities of (at least partly) paid work in other phases of life (such as e.g., in older age).
  - More concretely, opportunities regarding sabbatical months or years should be extended in order to be able to use the time for more family and care work or for continuing education.
  - More flexibility is also important with regard to retirement age since health condition, motivation to work, and demand by the family are just as different as the demand according to profession. Many people perceive work as an anchor of life that determines the daily/weekly rhythm, provides contact with other people and gives life an additional meaning. To undermine this through incentives to early retirement or a strict mandatory retirement age as in public service is a mistake from a societal perspective.
  - The concept of a uniform retirement age, determined legally or in wage agreements, should thus be abolished and replaced by a retirement window in which people can freely choose their age of retirement and thus their amount of pension. A lower threshold for a mandatory pay-as-you-go pension system is inevitable; an upper limit should give employers the opportunity to negotiate work contracts flexibly from a certain age on.<sup>76</sup>

<sup>76</sup> Wissenschaftlicher Beirat beim BMW (2021).

## 4 Digital transformation and new forms of organization in paid work

### 4.1 Introduction

Aside from the already discussed demographic development with its diverse effects on the organization of life courses, the transition from a work-oriented society (“Arbeitsgesellschaft”) to an activity-oriented society (“Tätigkeitsgesellschaft”) is also influenced by the digital transformation, a changed international division of labour as well as a change of values not only among the younger generation. These trends overlap and pose great challenges to society, especially because many of them are complex and hard to predict.

In this chapter, we will focus on some aspects of these enormous changes and point out fields that have hitherto received little attention in the literature. We will largely exclude the large complex of industry 4.0 with the many position papers from the side of employers and employees, from foundations and academies and not least from international comparative research and refer to existing elaborations.<sup>77</sup> The many effects resulting from transformation processes on the organization and timing of education and continuing education will be dealt with in chapter 5. In the following, we will focus mainly on service occupations, well aware that this is a very narrow perspective.

The starting point for our considerations here is also the conviction that paid work will always be and has to be of central importance. Its innovative capacities and productivity – both in the economic sense and in the broader sense of collective and individual effectiveness formulated by Ralf Dahrendorf – will be decisive for the development and prosperity of our society. Thus, this chapter will always refer to the analytical framework of the activity-oriented society that the interdisciplinary research group has chosen for this paper and elaborated in the introductory chapters: for us, it is about the new balance between paid work and non-market-related activities that has become necessary for many reasons.

In the following, we will first describe which developments digitalization can cause in paid work. Subsequently, we will look at digitalization in connection with other transformation processes and the change of values. Finally, we will turn our attention to new forms of organization of paid work associated with digitalization.

<sup>77</sup> Cf. e.g., Forschungsbeirat der Plattform Industrie 4.0 (2019); Kagermann et al. (2016); Lerch & Jäger (2020); Wichmann et al. (2019).

## 4.2 Digitalization and the change of paid work

### 4.2.1 Dimensions of digitalization

We understand digitalization as a massive “change of economy and work overall driven by changes in information technology”.<sup>78</sup> In order to underline this change and to distinguish it from a simple computerization and networking of previously analogous processes, it was suggested in the German discussion to use the concept of “digital transformation”.<sup>79</sup> In fact, computerization and networking can only be initial steps of the transformation of enterprises, which need to be followed by further steps in the sense of greater transparency, prognostic capacity and adaptability, along with new organizational structures and cultures. We share this argumentation but we continue to use the term digitalization, which has established itself in public and political language.

Digitalization leads to at least four developments whose design is essential in order to ensure high quality and productivity of paid work. First, since the invention of the internet and later of cloud infrastructures, huge amounts of data can be processed and work processes can be networked digitally and remotely.<sup>80</sup> These innovations influence business models (in the sense of remote work) and offer new opportunities for more flexible working hours. They thus also support the employees.<sup>81</sup> In the German context, enterprises, trade associations and state actors<sup>82</sup> try to advance the development and use of cloud infrastructures and other technologies,

such as artificial intelligence. Service and production processes can be reorganized, for example, by using data in work processes in order to optimize or automate them. This development is and will be central for the design of paid work and the future of Germany as an industrial location.<sup>83</sup>

Second, through the interplay of technological development (cloud computing) and the expansion of venture capital, which was especially advanced in the USA by deregulation, the platform economy emerged.<sup>84</sup> It brought forth new business and organizational models that play a role in many service and manufacturing industries. Connected to this is a transformation of paid work that occurs in almost all sectors and industries. In this context, the uncertainties and in part insufficient working standards of platform work are mostly, and for good reason, referred to, but this type of paid work can also be very attractive for people who seek a main or additional source of income in the short term.

Third, in some areas, digitalization entails a surge of automation. Tasks are thus completed without any human support or by means of digital assistant systems. The automation processes take place in many sectors, concern a lot of professions and are thus an enormous challenge for the labour markets.<sup>85</sup> The long-term dynamics and effects remain to be seen. Prominent diagnoses that a rapid automation (especially by using artificial intelligence)<sup>86</sup> could lead to a far-reaching “technological unemployment” have turned out to be exaggerated from today’s perspective. Current studies expect rather a gradual process that will change qualifi-

<sup>78</sup> Bundesministerium für Arbeit und Soziales (2017) (our translation).

<sup>79</sup> Schuh et al. (2020).

<sup>80</sup> Kushida et al. (2011); Forschungsbeirat der Plattform Industrie 4.0 (2019).

<sup>81</sup> At the same time, they can be powerful surveillance instruments, see Zuboff (2019).

<sup>82</sup> Forschungsunion & acatech (2013).

<sup>83</sup> Bundesministerium für Wirtschaft und Energie (2019).

<sup>84</sup> Rahman & Thelen (2019); Kenney & Zysman (2016).

<sup>85</sup> Hirsch-Kreinsen (2020).

<sup>86</sup> Frey (2019); Brynjolfsson & McAfee (2014).

cation standards to some degree but will not be able to function without a human workforce.<sup>87</sup> The further development of technologies of automation therefore continues to be of central importance for a high-wage country like Germany in the global competition.

Fourth, digitalization also changes the conditions for employees' representation of interests. Areas of application of digital assistant systems are characterized by weak representation of interests of employees.<sup>88</sup> Moreover, we observe an upward trend of low qualified and Tayloristic work, for example, in the platform economy, which is wholly outside the rules of co-determination.<sup>89</sup> In addition, in industrial sectors like chemistry or the automobile industry, highly qualified, academically-based employment is continuously expanded, whereas production work decreases. As a result, areas with traditionally higher union organization become smaller. These developments create new challenges for labour relations and co-determination.<sup>90</sup>

#### 4.2.2 Digitalization in the context of further transformation processes

Processes of digitalization overlap with a number of further fundamental changes. We will mention them here but they are not the focus of the following elaborations.

First, processes of defossilization are to be mentioned. The abandonment of fossil energies and rapid exit from a number of technologies (e.g., combustion engines) change business models and

work processes massively in a series of industries and thus affect employment in development and production.<sup>91</sup> Often processes of digitalization and defossilization overlap, for example, when investments are made in new product lines and more and more digital technologies are introduced in this context, or when digitalization opens up new opportunities to save energy and material.<sup>92</sup> The spread of digital technologies can also cause so-called rebound effects with which potential savings can again be made obsolete.<sup>93</sup>

The findings about the effects of defossilization on employment diverge strongly, as the example of the automobile industry shows: studies looking at the direct effects of defossilization conclude that tens of thousands of jobs in the production of combustion motors could be lost.<sup>94</sup> Studies which take into account private and especially public investments in mobility infrastructures (charging infrastructure for electric vehicles, trains and public transportation), on the other hand, point out that the defossilization of the mobility system could create hundreds of thousands of jobs.<sup>95</sup> Overall, it seems, however, that the effects of defossilization on employment will be more comprehensive than those of digitalization.

87 Krzywdzinski (2021); Arntz et al. (2020); Autor et al. (2020); Benanav (2020); Dengler & Matthes (2019); Autor (2015).

88 Hoose et al. (2019); Kassem (2022).

89 Hirsch-Kreinsen et al. (2017); Butollo & Koepp (2020); Schaupp (2023).

90 Haipeter (2018); Kuhlmann & Schumann (2015).

91 Schade et al. (2020); Hoch et al. (2019).

92 Beier et al. (2022).

93 Lange (2020).

94 Bauer et al. (2018).

95 Schade et al. (2020).

#### Box 4a: Defossilization in Germany

With the Paris Climate Agreement in 2015 almost all governments agreed to reduce their greenhouse gas emissions in order to prevent irreversible effects of global warming. According to the current state of climate research, the global average temperature must not rise by 1.5 to 2 degrees over the pre-industrial level. The Federal Government has announced the goal to decrease Germany's greenhouse gas emissions by 65% until 2030 compared to 1990, and to create a balance between emission and reduction of greenhouse gas.<sup>96</sup>

Between 1990 and 2001, in Germany, the emissions of carbon dioxide, the most released greenhouse gas by far, were reduced by about 35% (see Fig. 4a). Until 2030, however, annual reductions have to be higher than so far in order to achieve the announced goal. For this purpose, a more determined reshaping of our economic system is necessary in which the use of fossil energies is to a large extent abolished and a number of technologies are no longer used.

In Germany, the largest amounts of carbon dioxide are emitted since decades in the production of energy (34.9% of CO<sub>2</sub>-emission in the year 2021).<sup>97</sup> The climate strategy of the federal government aims at a significant expansion of renewable energies and appropriate network infrastructures.<sup>98</sup> It is unclear whether this project will be rather accelerated or slowed down in view of the Russian war against Ukraine. Opposing tendencies in the quest for greater independence from Russia and state subsidies for fossil energies can be observed.<sup>99</sup>

In addition to the energy sector, also industrial production (overall 24.9% of emissions in the year 2021), road-, air-, and rail-travel (21.8%) as well as households and small consumers (17.8%) contribute significantly to the carbon dioxide emissions.<sup>100</sup> The Federal Government aims to particularly reduce the emissions of the steel industry until 2030 and to begin with the establishment of energy supply based on hydrogen.<sup>101</sup> Scientists moreover demand a higher and stepwise increasing pricing of CO<sub>2</sub>.<sup>102</sup>

The rearrangement of the economic structure to one with little carbon dioxide also leads to a change of the world of work and qualification standards, even though the effects on employment are controversial.<sup>103</sup> In this context, it will primarily not be about entirely new professions but about new standards of competence within existing employment relationships and professions. Thus, competencies with regard to hydrogen have seen a rapid increase in demand within a few years.<sup>104</sup> There are also indications that structurally weak regions will profit more strongly from increases in employment in fields such as wind energy and ecological agriculture than regions that are structurally strong. The simultaneous rearrangement of several partial systems (energy, transportation etc.) on the national, European and global levels will make it difficult for employees, labour markets and social welfare systems to achieve this change. Scientists emphasize, however, that not implementing decisive measures would entail high economic costs in the long term.<sup>105</sup>

> Figure 4a

96 Bundes-Klimaschutzgesetz from 2019, changed 2021.

97 Umweltbundesamt (2022).

98 BMWi (2021), p. 42.

99 Cf. e.g., Allianz Trade (2022); Germanwatch (2022).

100 Umweltbundesamt (2022).

101 BMWK (2021), p. 41; cf. Nationale Akademie der Wissenschaften Leopoldina (2022).

102 Nationale Akademie der Wissenschaften Leopoldina (2019a), pp. 16 – 19; Nationale Akademie der Wissenschaften Leopoldina (2022).

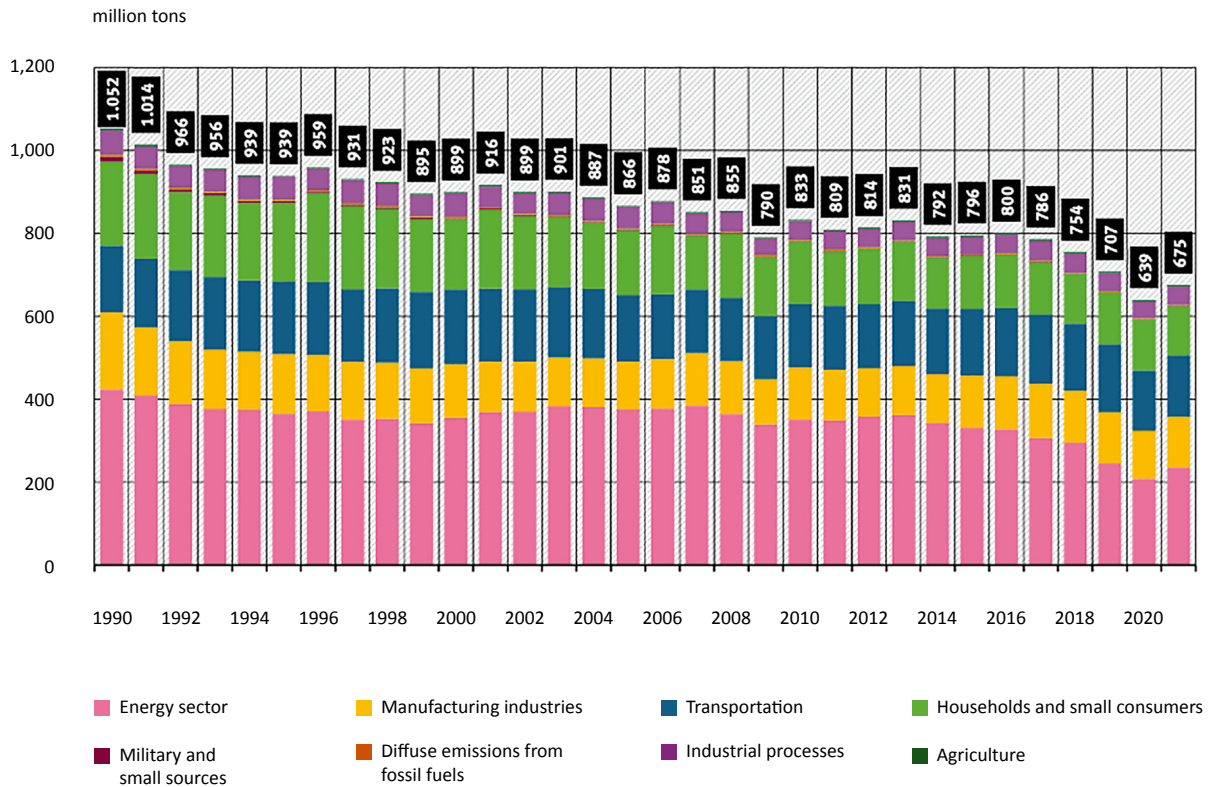
103 Cf. Grunau et al. (2020).

104 Grimm et al. (2021); Janser & Stops (2022).

105 Nationale Akademie der Wissenschaften Leopoldina (2019b), pp. 14 – 15.



**Figure 4a:**  
Emissions of carbon-dioxide according to categories



Carbon-dioxide emissions: without land use, land use change and forestry

Transportation: without agricultural and forestry transportation

Households and small consumers: with military and further small sources (among others, agricultural and forestry transportation)

Source: Umweltbundesamt, Nationale Treibhausgas-Inventare 1990 bis 2021 (as of March 2023), for 2022 preliminary data (as of March 15, 2023)

The second megatrend associated closely with digitalization is globalization. Digital technologies first of all made it possible to develop production sites in low-wage countries, through which Southeast Asia became an industrial hub.<sup>106</sup> Subsequently, also service sector activities such as accounting, call-centres, IT support and later programming and development could be outsourced to low-wage countries.<sup>107</sup> These trends have

strongly changed employment structures in high-wage countries like Germany. In some professions, jobs with low qualification standards were massively downsized, even though low-skilled simple work has not disappeared from Germany.<sup>108</sup> In parallel, employment expanded in the Global South: first in factories, then in service centres, and recently in data centres in which data for AI-technologies are curated.<sup>109</sup> These developments enabled

<sup>106</sup> Miller (2022).

<sup>107</sup> Coe & Yeung (2015).

<sup>108</sup> Abel et al. (2014).

<sup>109</sup> Birhane (2020).

economic growth in the Southeast Asian countries, but the jobs created are frequently characterized by low wages and poor working conditions.

As a result of this global division of labour, an economic structure emerged in Germany that is to a large extent specialized on goods and services of high and medium technology levels. The competitiveness of the German economy depends on the constant advancement of technological abilities. With industry 4.0, a concept was developed which connects different steps of the digital transformation and which was taken up globally.<sup>110</sup>

Since the beginning of the 2020s, digitalization has, however, also become the starting point for a discussion about de-globalization. The question as to who controls digital technologies leads to growing conflicts between the USA and China. It is still unclear how these conflicts will develop, but they will significantly influence the economy and thus the world of work.

The third trend associated with digitalization in addition to demographics is the change in values in the world of work. Calls for a new balance between paid and care work increase and are more frequently articulated.<sup>111</sup> In this context, it is in particular about the volume and flexibility of working time as well as choice of work location. The growing individual demands for autonomy, however, also refer to the desire for more leeway in decision-making and design in paid work as well as for a working activity that provides one with a purpose.

#### Box 4b: Global division of labour

The starting points of this position paper are the world of labour and the life-world in Germany. Many of the topics dealt with can, however, be solved on the national level only to a limited extent and require global efforts and regulation.

This concerns especially global supply chains. The success of the German economy is to a large extent dependent on the ability of German enterprises to distribute their products on global markets. The German chemistry-, pharmaceutical-, and automobile industries as well as engineering companies generate a large degree of their profits abroad. Since the introduction of the Euro, exports have increased strongly.<sup>112</sup> Moreover, German enterprises have established global sites and supply chains in order to serve foreign markets and make use of their advantages such as low wages or large labour markets.

In view of massive global tensions, which have further increased with the Ukraine war, an intensive discussion has emerged on a “de-globalization” and the “reshoring” of production sites. It is to be expected, however, that global supply chains will rather shift and diversify than that world regions and economies will to a large extent decouple from each other and reverse previous off-shoring trends. It is therefore essential to ensure a high quality of global paid work. For this purpose, regulations with regard to working hours and work standards in global supply chains need to be advanced further without letting national interests dominate. In this context, there are already a number of mechanisms, for example, the work protection regime of the International Labour Organization (ILO), activities of international unions and initiatives such as the Clean Cloth Campaign or Fair-work, which investigates working conditions in the international platform economy. In addition, there are national laws such as the 2021 German law concerning corporate due diligence in supply chains, which expands the responsibility of enterprises for the protection of human rights and environmental standards to the entire supply chain.

>>>

110 Kagermann et al. (2016).

111 Samtleben et al. (2019a); Lott (2019); Büning & Eppers (2018).

112 E.g., Joebges et al. (2010), p. 2.



Working conditions will also have to be regulated further in the EU. This can take place via a strengthening of the European Works Councils which represent the employees of multinational enterprises on the European level. They are meanwhile established actors in many European enterprises but could be more strongly involved in matters of labour protection.<sup>113</sup> The European company law (e.g., the *Societas Europaea*) should also be scrutinized in order to prevent an undermining of national co-determination via the practice of regime-hopping. In this context, companies orient their restructuring activities to where unions have the least influence.

It is ultimately about decreasing bureaucratic hurdles in the implementation of existing rules. Moreover, migration into the German labour market is to be supported with new rules. Immigration contributes significantly to overcoming the double challenge of scarcity of skilled workers as well as demographic change.

Empirically, a sharp divide between the wishes of the people and the reality of work in the enterprises becomes visible.<sup>114</sup> While new approaches of designing work are discussed and implemented under the keyword “New Work”,<sup>115</sup> surveys indicate that employees would like even more leeway for design in enterprises, albeit with large differences between professions and companies.<sup>116</sup> Thus, in industries like care and nursing, for example, a gratification crisis has been diagnosed since poor working and wage conditions collide with demands of high performance and high individual standards with regard to paid work.<sup>117</sup>

In the opinion of the employees, many companies still too seldom grant the wish for more flexible working hours. A series of studies shows that employees would like more freedom in designing their working hours, for example, a rearrangement between men and women. Currently, there are massive differences between the genders since men mostly work full time and women part time (in part hardly economically viable). These differences could be solved if paid work and care work were equally distributed between the genders (see on this also chapter 6).<sup>118</sup>

It should be noted that tensions exist between individual expectations and the actual reality in the world of work, which so far have not been resolved. This finding is not new. During the Covid crisis, however, it became very clear that organizational cultures in many enterprises can indeed change. The forms of remote

113 Pulignano & Turk (2016).

114 Waltersbacher et al. (2018).

115 Singe & Tietel (2019).

116 Holman & Rafferty (2018).

117 Schmucker (2020); Schmucker (2019).

118 Allmendinger & Haarbrücker (2017); Blömer et al. (2021).

work enabled by digitalization became the driver of a change of traditional leadership concepts based on presence.<sup>119</sup> Wherever this change did not take place, employees often reacted by withdrawing from that branch, which in the United States is discussed under the keywords “Great Resignation” or “Big Quit”.<sup>120</sup>

### 4.3 Digitalization and new forms of organization of paid work

The development towards an activity-oriented society, the combination of market-related paid work and non-market-related activities that are socially of utmost importance makes a more flexible world of work necessary. There will always be periods, not only among mothers, where paid work does not represent the core but rather an addition to the respective stage of life.<sup>121</sup> In some areas, employees can already choose their working hours and (location of work). Many people also find themselves in different hybrid constellations of paid work and other activities throughout the life course, for example, during the transition from education to employment. Most students work in jobs during their course of study, many enter a phase of employment after the Bachelor degree before they decide to enrol in a Master’s programme. A similar de-standardization can be observed in the transition from employment to retirement (see chapter 3). Due to the increasing labour participation in retirement age, hybrid forms of paid work and other activities such as care work or voluntary work

emerge here as well. For many people in Germany, but also for the German economy, such a flexibilization of paid work is very important.<sup>122</sup>

The technological basis for a more flexible world of work is digitalization, which enables new forms of organization of paid work for many (though by far not all) professional groups. In the following, we will elaborate three of these forms of organization in more detail: digitally assisted work, mobile / remote work and platform work. These new forms of organization are in part still in their beginnings. They, moreover, go hand in hand with opportunities and risks, with improvements of the quality of work, but also with new (health) burdens, which we will take a closer look at here.

#### 4.3.1 Digitally assisted work

The technology-related change of paid work is probably most visible through the use of digital systems of assistance. They are a key element of industry 4.0 concepts and digitalization as a whole.<sup>123</sup> Digital assistance systems are based on the increasing digital networking of work processes and use different technical bases. Under the keyword “Augmented Worker”, systems are developed and implemented that provide employees with context-related information as well as instructions.<sup>124</sup> Such assistance systems are used in different connections. In industrial work processes, they guide employees in installations or logistics through their work steps and provide support in

119 Krzywdzinski et al. (2022a).

120 Cook (2021).

121 Klenner & Schulze Buschoff (2015).

122 Cf. Absenger et al. (2014); Klenner & Lott (2016). In chapter 5, we will elaborate on which needs for action emerge in this context with regard to qualifications.

123 Bovenschulte (2020).

124 Butollo et al. (2020); Falkenberg (2021); Lanza et al. (2018).

maintenance and problem-solving in facilities. In administrative processing, the used software gives recommendations on how certain tasks are to be completed. There are indications for progress in the area of artificial intelligence which will open up further opportunities for use of assistance systems in industry and maintenance, for example in data analysis, writing of reports or standard communication.<sup>125</sup> Assistance systems can meanwhile also provide support in agriculture in the planning of use of resources or maintenance processes. A new impulse comes from Large-Language-Models (LLM) like ChatGPT, whose effects on work processes cannot yet be estimated. They can be used to enter instructions and inquiries into assistance systems in natural language and thus make interaction with these systems a lot easier.

So far, there are no reliable data on the dissemination of assistance systems, which not least is due to the fact that these exist in very different forms. Initial indications are given by the 2019 SOEP Innovation Sample on the topic Digitalization of the World of Work.<sup>126</sup> Here, employees were asked how often they deal with different aspects of digital assistance systems in paid work. The automatic storage of data on completed work stages (daily or weekly) was part of everyday work of almost 39 % of those surveyed (see Fig. 4b), the automatic support in tasks of almost 21 %. Almost 17 % received instructions from automatic systems, 11 % automatic feedback on the quality of the work. Working with digital assistance systems thus concerns a relevant proportion of the employed, even though it has by far not reached the majority of jobs.

In research, the use of assistance systems is discussed controversially.<sup>127</sup> An important motive for the use of digital assistance systems is to optimize production processes and thus increase quality (without errors) and productivity as well as to use workers flexibly. In many cases, digital assistance systems can also support employees in work processes with a high complexity or high safety standards, for example, in maintenance processes in facilities or more recently in data analysis and programming. Here, assistance systems open up opportunities to improve work.<sup>128</sup> At the same time, assistance systems are also used for standardization and reduction of skill requirements. We turn to the dangers further below and would like to emphasize at this point that the long-term development remains open and will depend on negotiation processes between the occupational actors.

By using assistance systems, also shorter working hours and more interruptions of work without loss of productivity can be facilitated. This aspect is important in view of the development towards an activity-oriented society. If the amount of part-time work and interruptions of paid work (for example, due to care work, citizen service and education work) increases, the continuity of working activity and thus experience build-up decreases. This can be compensated by digital assistance systems.

There are also diverse approaches to reduce the physical burden by means of technical assistance systems. The Motion-Capture-Technology, i. e., different forms of digital analysis of motion, can be used in order to show deficits in the

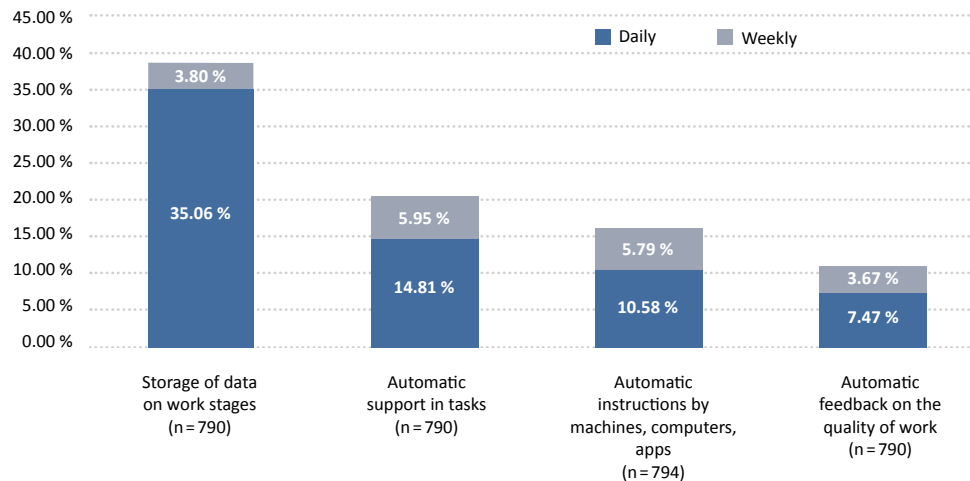
<sup>125</sup> Behrens et al. (2021).

<sup>126</sup> Fedorets et al. (2021).

<sup>127</sup> Kirchner et al. (2020).

<sup>128</sup> Krzywdzinski et al. (2022b); Mohan et al. (2021).

**Figure 4b:**  
**Frequency of paid work with digital assistance systems**



Source: Own presentation based on SOEP IS (2019)

ergonomics of industrial workplaces and to make suggestions for improvement.<sup>129</sup> Moreover, intelligent work clothes are developed, which measure the position of the body and indicate burdens in order to prevent work-related, muscular and skeletal ailments.<sup>130</sup> Currently, there are, however, still challenges in these technologies with regard to data processing capacities, measurement of individual muscles and joints as well as quality of motion models.

It can be noted that a design of assistance systems that is adequate for humans bears great potential for the improvement of working conditions and to increase productivity.<sup>131</sup> This development, however, entails several challenges that need to be confronted.

- Assistance systems are in many cases used to advance standardization of the work process, whereby training periods and opportunities for action of the employees decrease and assistance systems threaten to become instruments of a continuing Taylorization of work and a de-skilling of employees.<sup>132</sup> Since digital assistance systems guide humans in work processes, so that the latter need less knowledge about the process and less training. Enterprises in logistics or installation work, for example, increasingly hire migrant workers who are trained for narrowly defined tasks on a short time basis.<sup>133</sup> This de-skilling is not only detrimental to humans but also to the safety of the process: in case of disruptions that cannot be solved by the system itself, the human workers involved then lack

<sup>129</sup> Brandl et al. (2016).

<sup>130</sup> Peters & Wischniewski (2020).

<sup>131</sup> Lanza et al. (2018).

<sup>132</sup> Krzywdzinski et al. (2022b).

<sup>133</sup> Falkenberg (2021).

- the necessary knowledge to solve the problem. Therefore, it is important to use the digital assistance systems as support and to connect them with training measures that clarify the systems' functions and limitations.<sup>134</sup>
- Moreover, there is a challenge to prevent misuse through control and surveillance. Digital assistance systems create a high degree of transparency by generating data about work processes, about time, location, and under certain circumstances also about the person, e.g., by measuring bodily functions such as pulse by means of devices like smart-watches.<sup>135</sup> This transparency entails dangers of surveillance and control<sup>136</sup> that are hard to estimate for employees.<sup>137</sup> Processes of data protection control and co-determination, in which the potentials and dangers of monitoring-technologies, the forms of their introduction and use are regulated, are therefore of special importance.<sup>138</sup>
  - If digital assistance systems are used for decision-making processes regarding recruitment or personnel development, the quality of the data and of the used models as well as potentially integrated distortions need to be considered.<sup>139</sup> Data-based decision-making systems always rely on historical data sets by which algorithms and models are created for deciding. These are thus vulnerable to indirect discrimination,<sup>140</sup> for example, when digital assistance systems in human resources are supposed to select suitable persons according to their life courses, but were trained with data that reflect earlier processes of discrimination in which graduates of certain schools or universities were preferred.<sup>141</sup> Against this background, robust procedures are essential with which quality of data and models are checked before and during the application of such systems.<sup>142</sup>

<sup>134</sup> Huchler et al. (2020); Vladova et al. (2020).

<sup>135</sup> Cf. Krzywdzinski et al. (2022b). See also on the concept of algorithmic management, Lee et al. (2015).

<sup>136</sup> Bovenschulte (2020).

<sup>137</sup> Kim & Bodie (2021); Hornung & Hofmann (2018).

<sup>138</sup> DGB (2020).

<sup>139</sup> Kim & Bodie (2021).

<sup>140</sup> Cf. Žliobaitė (2017); Eubanks (2017).

<sup>141</sup> Cf. Van den Broek et al. (2021); Spielkamp & Geißler (2020).

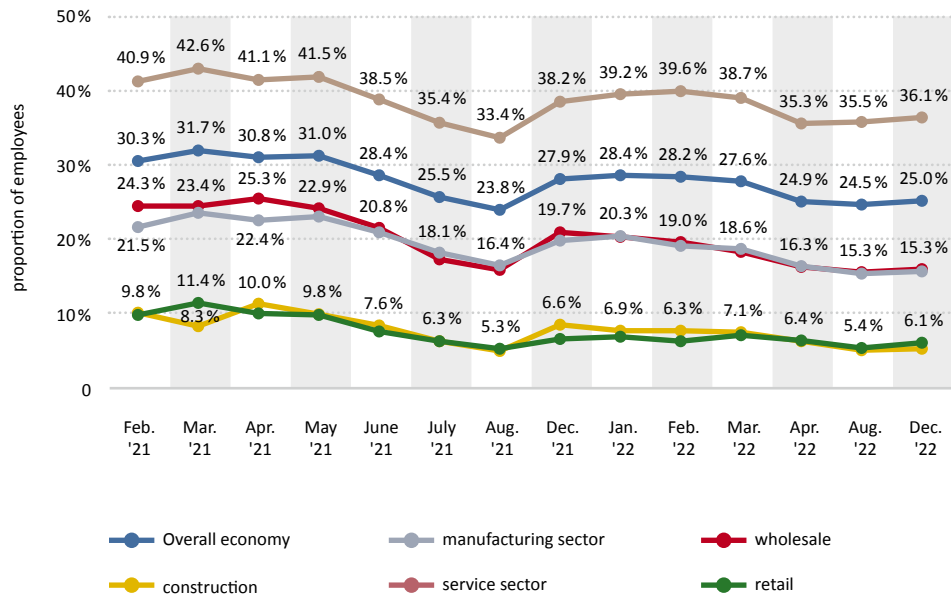
<sup>142</sup> Asatiani et al. (2020); cf. High-Level Expert Group on Artificial Intelligence (2019).

### 4.3.2 Mobile working

The increasing dissemination of mobile working redesigns the relationship between paid work and other activities. Mobile working is a form of work that is not restricted to one location and where employees carry out their work outside of their workplace.<sup>143</sup> Thus, this type of work could be described more precisely with the term “mobile paid working”. Since the concept of mobile working is established in the public and political context, we will also use it in this position paper, but always relate it to paid work.

The Corona pandemic has accelerated the trend towards mobile working. As initial studies show, earlier reservations with respect to digital work have decreased due to own experiences, also because investments were made in hitherto lacking infrastructures such as collaboration- and communication tools.<sup>144</sup> Thus, the proportion of employees who worked at least partly from home increased significantly (see Fig. 4 c). During the lockdown phases, it was above 30 %, in times where some restrictions were lifted it decreased slightly and was stable at the end of the pandemic with around 25 % of employees working remotely.

**Figure 4c:**  
Proportion of employees who work at least partly from home, according to economic sectors on Germany from February 2021 to November 2022



Source: ifo-Institut (2022a)

143 Cf. e.g., Bundesministerium für Arbeit und Soziales (w.y.).

144 Grunau & Haas (2021); Fordermann et al. (2021).

Figure 4c also shows, however, that the proportion of employees who work from home differs strongly according to sectors. At the end of 2022, the proportions were 6% in construction, 15% in manufacturing, and 36% in the service sector, respectively. Also, within the service sector there is a strong divergence between accommodation (1%) and gastronomy (2%), on the one hand, and management consulting (70%) and IT sector (72%), on the other.<sup>145</sup> These numbers decreased only slightly with the end of mandatory remote work on March 20, 2022. The ifo-Institut assumes that many enterprises have accepted more flexible models and remote work as permanent. According to other prognoses, mobile working will strongly shape the world of work after the pandemic.<sup>146</sup>

For the majority of employees working from home, it was a new experience that paid work and life at home became mingled.<sup>147</sup> Most of them, however, were satisfied with their situation of working remotely.<sup>148</sup> The (at least partly) no longer necessary commute to work was viewed positively. This saves time and money and is good for the environment and health. Commuting, especially in the case of long distances, is considered burdensome. Other positive aspects of remote work are higher flexibility and greater freedom with regard to time. This can benefit the reconciliation of private life and profession. The saving of time as well as more presence at home often lead to more exchange and common meals within families.<sup>149</sup>

At the same time, as a result of mobile working, employees were faced with uncommon challenges regarding self-organization and isolation.<sup>150</sup> Due to the not only local but also temporal demarcation, employees in remote work tend to work longer and overtime.<sup>151</sup> As a consequence, breaks and rest periods can unintentionally be omitted, which causes problems when switching off or decreases the quality of sleep.<sup>152</sup> This can lead to work-related exhaustion,<sup>153</sup> which, in turn, has negative effects on the professional performance.<sup>154</sup> If remote work takes place at atypical working hours, then, moreover, “socially precious” time for family, private life and leisure time is lacking. This can cause work-family conflicts.<sup>155</sup>

Research shows a clear connection between digital work and the increase of psychological illnesses, such as emotional exhaustion, burn out or anxieties.<sup>156</sup> Since many apartments do not have sufficient room for undisturbed working, there were spatial conflicts, sometimes even domestic violence, during the pandemic, especially in phases of home-schooling or closures of day-care centres.<sup>157</sup>

In addition, the restricted social contacts in remote work can be truly burdensome if they exist for a longer period. The regular exchange with colleagues, which can help reduce work-related stress, is lacking,<sup>158</sup> which is why they in part returned to their usual work in presence

145 ifo-Institut (2022b).

146 Cf. Kunze et al. (2021).

147 Kunze et al. (2021).

148 BMAS (2020a).

149 E. g., Grunert et al. (2021).

150 Niebuhr et al. (2022).

151 Lott (2020); Berk et al. (2022).

152 Bonin et al. (2020).

153 Eurofound (2020); Ojala et al. (2014); Wöhrmann & Brauner (2020).

154 Gimpel et al. (2018); Gimpel et al. (2019).

155 Zhang et al. (2020); Amlinger-Chatterjee (2016); Arlinghaus & Nachreiner (2016); Georg et al. (2017).

156 Albiez (2020); Aroles et al. (2019); Rohwer et al. (2020).

157 Steinert & Ebert (2020).

158 Bonin et al. (2020); Charalampous et al. (2019); Hoornweg et al. (2016).



since mandatory remote work ended. There are, however, also reports in the media about increasing loneliness.<sup>159</sup> This could indicate that paid work is in danger of losing its “socializing power” (see chapter 2). If the company as a collective space no longer exists, informal encounters with other people decrease, social circles become narrower and demarcate more strongly from each other. It is unclear in how far these developments are compensated by new places of paid work. In view of the increasing demands among employees for more flexibility, many enterprises have rented workplaces in co-working spaces and offered them to their employees.<sup>160</sup> Such co-working spaces provide a location for social encounters that even goes beyond the respective context of the company (see also chapter 7).

Aside from psychological health, mobile working and working from home also affect physical health.<sup>161</sup> Not only was an increased, unhealthy snacking throughout the day observed.<sup>162</sup> Long and uninterrupted sitting, fewer breaks, lack of movement, a static position can lead to muscular and skeletal ailments in the neck and shoulder areas, wrists and spine, and cause neck pains and headaches.<sup>163</sup> Such problems can be increasingly observed among employees in remote work also because their workplaces are in part improvised and the ergonomic equipment is often not as good as in office workplaces.<sup>164</sup>

More monotonous computer time and lack of variety in visual experience at too little daylight are also detrimental to the health of one’s eyes.<sup>165</sup> Meta-analyses show that the best prevention against short-sightedness are at least two hours of daylight outside;<sup>166</sup> Changing between near and far vision is also helpful.<sup>167</sup> Studies from China and other countries indicate that the number of people with short-sightedness and the extent of short-sightedness have increased during the lockdown phases. This concerns especially children, while conclusive studies on adults are still outstanding.<sup>168</sup>

It is also unclear how mobile working affects productivity and communication in work processes. Results of existing studies differ with respect to how employees work as well as types of collaboration within the team and do not allow general conclusions.<sup>169</sup> Moreover, there are indications that not all activities can be equally well achieved in remote work. In particular creative and innovation-related tasks seem to require physical presence.<sup>170</sup> In the future design of mobile working, it is therefore important to keep an eye on the productive collaboration within the company aside from the flexibility of work.

Other inequalities that go hand in hand with the dissemination of remote work have so far not been solved:

159 Cf. Killgore et al. (2020); Becker et al. (2022).

160 Cf. Bundesverband Coworking Spaces (2020); Hofmann et al. (2020).

161 Bouziri et al. (2020).

162 E. g., Mata et al. (2021).

163 Montreuil & Lippel (2003); Skov et al. (1996).

164 Bouziri et al. (2020).

165 E. g., Mata et al. (2021).

166 Xiong et al. (2017).

167 Lagrèze & Schaeffel (2017).

168 E. g., Klaver et al. (2021); Xu et al. (2021).

169 Mulet et al. (2016).

170 Brucks & Levav (2022); cf. Chuli et al. (2017).

- Thus, inequalities between employees in office activities and those in production and logistics increase. Employees in offices can often work remotely and choose their working hours in a way that they can better carry out private tasks. For them, mobile working means a gain in flexibility and autonomy. On the other hand, there are many industries in which such flexibility is not possible.<sup>171</sup> While internet-based remote work in certain areas of manufacturing work (e.g., monitoring facilities, maintenance) can be introduced, it is still open which effects this would have.
- Mobile working can increase inequalities with regard to living space and health. One can better concentrate in a separate, quiet office than in small apartments in which also other family members work on improvised workplaces. Also, the costs of mobile working, such as heating and equipment or renting co-working spaces cannot be afforded by everyone to the same degree.
- The advantages of a better reconciliation of job and family through mobile working can turn into a re-arrangement of traditional gender roles. During the pandemic, women fulfilled a larger part of education, household-, and care work in addition to their regular job than men; this proportion has in part even increased.<sup>172</sup> Such inequalities can affect career opportunities. Thus, a study<sup>173</sup> shows that male software developers had a much higher productivity during the pandemic than their female colleagues.

### 4.3.3 Platform work

Platform work, too, redesigns the relationship between paid work and other areas of activity – and this form of organization is discussed controversially as well.<sup>174</sup> Platform work is an employment relationship in which digital platforms act between supply and demand.<sup>175</sup> In this context, these platforms take on an important role that goes far beyond a simple mediation between assignment and execution. They gain importance in all countries and industries, for example, in the organization of labour markets and industrial processes of value creation, in logistics, entertainment media and tourism.<sup>176</sup>

Platform work is mostly deregulated paid work in connection with precarious working situations,<sup>177</sup> as they have been known for a longer time now in the area of solo-self-employment, temporary and limited employment. Many of the challenges associated with platform work are, however, new due to the special character of the platforms. Here, it needs to be considered that the phenomenon of platform work comprises numerous activities. On the one hand, there is the larger area of highly skilled activities such as software testing, programming or design,<sup>178</sup> which represent classic fields of self-employed paid work and can mostly not be summarized under the concept of employee or the concept of “employee-like” activities. On the other hand, there are low-skill activities such as in the area of delivery services and data processing on online platforms, often concerning dependent employees. Particularly in the area of delivery services, mostly regular

<sup>171</sup> Detje & Sauer (2021).

<sup>172</sup> Allmendinger (2021); Hipp & Bünning (2021).

<sup>173</sup> Hipp & Konrad (2021).

<sup>174</sup> Wood et al. (2019).

<sup>175</sup> De Stefano (2015); Kocher (2021); Kirchner (2019).

<sup>176</sup> Kenney & Zysman (2020); Staab (2017).

<sup>177</sup> Stuth et al. (2018); Eichhorst et al. (2017); Emmenegger et al. (2012).

<sup>178</sup> Lücking (2019); Leimeister (2016); Gerber & Krzywdzinski (2019).

employment relationships have therefore prevailed in Germany – in other fields of low-skill platform work, however, the classification remains controversial, which affects workers' access to the social security system.<sup>179</sup>

Since exact numbers do not exist, it can only be estimated how widespread platform work in Germany is. The non-transparency of the platforms, the lack of information about how they function, the extent of employment, the level of income etc. are a central problem that needs to be urgently dealt with through corresponding data surveys. Estimations and calculations assume about 1% to 4% of the working population, thus about 400,000 to 1.7 million people. During the Corona pandemic, platform employment has likely increased. Thus, in view of restaurant closures, remote work and contact restrictions, delivery services have turned into important supply infrastructures in which very many migrant workers are employed.<sup>180</sup>

The majority of people who carry out platform work use it in order to achieve additional income aside from other forms of employment.<sup>181</sup> For them, platform work means a gain in flexibility and a source of income, which, according to demand, can be carried out in the short term. Correspondingly, platforms promise a better work-life balance and adjustment of the volume of income to one's respective life situation. The flipside of flexibility are uncertainties in the continuity and level of income as well as social security, for example, in the case of illness. Moreover, power relations are reproduced in platform work. Both in the location dependent gig-

work (e.g., food delivery services or other transport services like Uber) as well as in crowd-work<sup>182</sup> carried out online do platforms control the network of the workers and take over quality and performance control. While they exert significantly control over work processes, platform enterprises only rarely recognize their role as employer.

Furthermore, the representation of workers' interests is at least not guaranteed where no regular employment relationships exist.<sup>183</sup> The Works Constitution Act does not apply here and the collective representation of interests through unions in part encounters antitrust issues.<sup>184</sup> While it was possible to found initial works councils in the area of delivery services, there are, however, information asymmetries between platforms and their workers as well as between platforms and the federal regulation authorities.<sup>185</sup> These asymmetries often prevent an effective representation of interests of the workers and make an efficient regulation more difficult.

179 Cf. Kocher (2021).

180 Van Doorn & Vijay (2021).

181 Bonin & Rinne (2017); Serfling (2019); Pongratz & Bormann (2017); Piasna et al. (2022).

182 Woodcock & Graham (2019); Gerber & Krzywdzinski (2019).

183 Pongratz & Abbenhardt (2018).

184 Mohr (2019).

185 Rosenblat & Stark (2016).

#### 4.4 Recommendations for action

Developments of the socio-technical relations of production offer the opportunity to design the world of work in a new and more flexible way and adapt it to the needs of the people. These transformation processes have to be accompanied by societal discourses and an agreement on commonly supported values. Also, health aspects need to be considered. Moreover, legal regulations and orders have to be adjusted to these transformation processes. In view of the speed of transformative processes, all this has so far only been insufficiently achieved with delay. How then can these processes not only be administered passively but also oriented to the future and organized according to values? Which role can forms of co-determination that are crucial for the legitimization of this complex structural change play in this context?

Due to the speed of digitalization, it becomes all the more necessary to reflect on questions of regulation and co-determination not only in the implementation and use of new technologies but already in their development. Essential characteristics of digital systems are often determined in their development phase and can only be influenced to a limited extent by organizational actors such as works councils and management. For this reason, the open letter “Pause Giant AI Experiments”, which appeared in March 2022 and was initiated by the Future of Life Institute and signed by many AI experts, called for a temporary halt of the developments of certain AI systems until regulations and control instances were created on an international level for the design and development of secure AI applications. In the European context, it is discussed in the course of the planned “AI-Act” to categorize AI systems into risk classes, whereby high-risk applications need to be certified

prior to their use. This unclear definition of AI systems, however, is met with criticism. The question is posed as to which systems are to be classified as “high-risk” and are thus to be especially controlled.<sup>186</sup> So far, there are no blueprints for a regulation and co-determination during the development of digital technologies and how these requirements can be reconciled with the promotion of innovation.

For the corporate actors, the challenge is not only to regulate the use of complex, technological solutions, in whose design they were not involved, but also to take the individual demands of the employees with regard to flexibility into account. Such individual demands can come into conflict with general (work) safety regulations. This tension becomes very apparent in the negotiations in companies about mobile working. On the one hand, employees would like flexible solutions, even though this means that paid work can no longer be clearly demarcated from other activities. Individual solutions, on the other hand, contradict the traditional orientation of works councils and management who demand sharply defined limitations for working hours. Here, new procedural rules are necessary that allow individual leeway without undermining reliable foundations of employee-employer relationships.

In the following, we will sketch out recommendations for action that are to be taken up in the short term.

<sup>186</sup> Cf. Müller (2022).

#### 4.4.1 Digitally assisted work

Paid work with digital assistance systems changes skill requirements: these systems can upgrade paid work but also lead to a standardization and de-skilling of work. Therefore, their design is essential, which allows a co-existence of humans and technology.<sup>187</sup> Supporting systems have to be developed in such a way that they help people with decision-making in complex situations instead of confronting them with decisions made by the technology. It is basically about understanding how assistance systems function, their opportunities and limitations and to use them appropriately.<sup>188</sup>

Assistance systems collect and use numerous data about the work process. Here, it needs to be ensured that these data are used for support and not for surveillance. It is moreover to be expected that digital assistance systems will increasingly be combined with technologies of artificial intelligence, especially where data analyses are used for support in decision-making. A central challenge for training AI is to define, monitor and advance the design of algorithms (and AI models) and their use in the company.<sup>189</sup> In Germany, a responsible use of AI that is oriented toward the common good has already been announced as the objective.<sup>190</sup> In addition, the parliament passed a works council modernization law (Betriebsrätemodernisierungsgesetz) that explicitly names AI technologies as the object of co-determination and stipulates the involvement of experts. Functioning structures for the evaluation of AI technologies as well as clear rights of those affected are needed in order to be able to sue for the testing of implemented assistance systems and AI technologies.

<sup>187</sup> Cf. Huchler et al. (2020); Lanza et al. (2018).

<sup>188</sup> André et al. (2021).

<sup>189</sup> Cf. Algorithmwatch (2020).

<sup>190</sup> Bundesregierung (2018).

It is recommended:

- To promote research on the design of assistance systems suitable for humans involving company actors, to systematically summarize already existing broad and especially disparate knowledge about development perspectives and design opportunities of work, and derive from this further need for research,
- To develop training programmes for works councils and management in order to design in partnership the selection and implementation processes of technology as well as to connect questions of technology and organizational development (in particular also for smaller and mid-sized companies),
- To promote projects that test and further develop control and certification structures for AI technologies in the area of digital assistance and decision-making systems in the world of work,
- To strengthen co-determination in the area of data protection, for example, in the context of an independent employee data protection law.

#### 4.4.2 Mobile working

At the core of the discussion on mobile working are questions that are immediately connected with everyday practice. Here it is about ensuring good (health-promoting) working conditions, for example, via rules for workplace equipment in remote work; about questions regarding the recording of working hours that are worked at home or in the company.<sup>191</sup> A “right to working from home” is discussed under the latter point and how far such a right can go.<sup>192</sup>

<sup>191</sup> Cf. ifaa (2019).

<sup>192</sup> Lott (2017).

Since mobile working will likely disseminate further, there also needs to be a discussion about the development of new organizational cultures. Mobile working requires a high amount of self-organization among the employees and comes into conflict with hierarchically-oriented cultures in companies. It is therefore necessary to re-negotiate the freedom in decision-making of employees with regard to working hours and carrying out their tasks, and to enable them to organize themselves accordingly. New leadership concepts and corresponding skills for management, resp. their staff are necessary.<sup>193</sup> Here it should be ensured that mobile working does not undermine the role of the company as a place of socialization, learning and innovation.

Co-determination has to be further developed as well. It should be discussed whether the works councils should demand clear rules, for example, for working hours in remote work, or rather promote procedural rules.<sup>194</sup> Procedural rules would then mean that working time and availability are to be negotiated individually and the works councils intervene in case of conflicts.

In some areas, mobile working will also require a stronger co-determination. This concerns especially data protection since, due to mobile working, the question of digital performance control is of heightened sensitivity.<sup>195</sup>

It is recommended:

- A right to partial remote work where possible; voluntariness of paid work in working from home and preservation of in-presence workplaces,
- Promotion of projects and experiments for the development of new approaches of work organization (in combination of mobile and in-presence work) and of competencies relevant for remote work for employees and management,
- Projects on the identification of best-practices with regard to material and procedural rules for working hours, availability and performance control in remote work.

#### 4.4.3 Platform work

In order to counter non-transparency of platform work, the obligations on the side of platforms are decisive, for example, to provide information about contract conditions of workers, their wages and working hours.<sup>196</sup> There are meanwhile academic and civil society initiatives such as the Fairwork Project<sup>197</sup> as well as corresponding suggestions on behalf of the EU Commission.<sup>198</sup> A central objective is to control false self-employment more strongly and implement regular employment relations in platform work.

<sup>193</sup> Cf. Ver.di (2019).

<sup>194</sup> Cf. Gerst (2020).

<sup>195</sup> Cf. Beirat zum Beschäftigtendatenschutz (2022).

<sup>196</sup> BMAS (2020).

<sup>197</sup> Fairwork (2021).

<sup>198</sup> EU-Kommission (2021).

In spite of these efforts, the classification of many workers on platforms as dependent employees (with corresponding protection rights) will not be possible, so that they cannot be included in existing social security systems.<sup>199</sup> Here, new concepts need to be developed. There are initial ideas on this with the “Digital Social Security”.<sup>200</sup> In this context, a transnational system of individual social security accounts is to be established to which the platforms would have to transfer contributions for each transaction. The employees would thus collect entitlements that they could transfer to the social security system of their home country. Surely this point can be solved on the national level only to a limited extent since platform work is organized globally. Therefore, the challenge is to develop a reasonable mixture between national and transnational rules and to strengthen the actors, resp. institutions of a transnational regulation.

In addition, it will be important to create new forms of representation of interests for platform work. Traditional forms of corporate co-determination or organization of unions are difficult to realize in platform work since there often is no central workplace.<sup>201</sup> New forms of representation of interests need to be adjusted to the particularities of a very heterogeneous, spatially spread and partly also transnational workforce.<sup>202</sup> Suggestions to create specific “platform councils” with representation of interests of the employees, NGOs as well as experts are also worth considering.<sup>203</sup>

It is recommended:

- Introduction of obligations of platforms to provide information with regard to employment and working conditions,
- Promotion of projects on testing a system of “Digital Social Security”,
- Promotion of projects on testing new forms of representation of interests in platform work.

The described approaches focus first of all on the immediate problems that have emerged due to the new forms of organization of paid work in the course of the advancing digitalization. An important task for the public, science, and politics is to think about alternatives to the existing forms of property and organization, which holistically take into account the here described approaches and need for action.

199 Schwarze (2019).

200 Weber (2019); cf. also Hill (2020).

201 Vandaele (2018).

202 E. g., Gegenhuber et al. (2022).

203 Kettemann (2023).



## 5 Education and continuing education in the activity-oriented society

### 5.1 Introduction

Education is the key for individual and societal participation of people and is essential for the economic development of a country. People with higher education are more likely to be politically interested and active, perceive themselves as having self-efficacy, are able to better adjust to changed framework conditions, and have a higher trust in science and politics,<sup>204</sup> all characteristics that are required in today's times of diverse upheavals.<sup>205</sup> Moreover, education is an important factor for maintaining one's own health as well as preserving the livelihoods of our planet.<sup>206</sup> All activities, even those that are achieved without payment due to the societal negotiation process (such as part of care work), require education. Education in all its forms must therefore not be limited to its exploitation on the labour market.

The advancing digitalization, defossilization, demographic change and changing understandings regarding gender-specific roles pose fundamental challenges to the system of education, vocational education and continuing education. Digital technologies are increasingly present in numerous professions, work processes are becoming digitally networked more strongly, and everyday life is to a high degree permeated by digitalization. The education system has to react comprehen-

sively to this, particularly via the training of digital competencies. The same holds for the ecological rearrangement of economy and society. The Green Economy brings forth new professions, requires new knowledge and a different handling of the world. Opportunities for a steady continuing education are required here as well, one vocational education in early life will no longer be sufficient.

At the same time, the structure of the population in Germany is changing: the proportion of older people increases, as does the proportion of people with a migration background. Great efforts are needed in order to motivate older people for continuing education and thus enable their participation in society in view of the digital change. People with a migration background need to find quick access to education and continuing education from the start, only then can integration be achieved and solidified.

All these transformation processes have one thing in common: they increase the pressure to act on the education system and threaten to intensify the enormous inequalities in access to education and continuing education according to social status, gender and origin. Already today the number of people without sufficient competencies, without professional qualification and without necessary further qualification is increasing.<sup>207</sup> At the same time, personnel in education, in

<sup>204</sup> Faus et al. (2019); Best et al. (2023).

<sup>205</sup> Best et al. (2023).

<sup>206</sup> Target 4 of the Sustainable Development Goals of the United Nations; <https://unric.org/de/17ziele/sdg-4/>

<sup>207</sup> Wößmann et al. (2023).

particular preschool educators as well as teachers, are lacking.

The tectonic shifts that take place in the world of work in Germany also lead to massive new challenges regarding the design of one's own life. Which competencies will become necessary with the advancing digitalization and defossilization cannot be foreseen in detail. It seems clear, however, that more flexible working relationships, changed and new professions and diverse life plans – aside from digital competencies – require a high degree of communicative and emotional skills, personal initiative, competencies in designing work and change, and an awareness of one's own physical health as well as health competency.

School curricula need to react to these changes in order to prepare people for these new challenges. A good starting point for this are the OECD Future Skills, which describe in particular three fundamentals for future learning: cognitive, health, and socio-emotional ones.<sup>208</sup> The cognitive basis comprises the ability to read and write (literacy), mathematical abilities (“numeracy”) and “digital literacy”, i. e., the digital knowledge and abilities that enable social participation in a networked society. The health basis includes physical and mental health as well as well-being. The social and emotional basis includes moral and ethical aspects. In the OECD Learning Compass 2030, these fundamentals are connected to transformative competencies, own responsibility and super-ordinate social values in order to provide a comprehensive and sustainable framework for life-long learning. This model is thus much broader than the competencies named by Standing Conference of the Ministers

of Education and Cultural Affairs of the Länder (Kultusministerkonferenz) that were passed in 2021 (“be able to successfully communicate, to find creative solutions, to act competently, to think critically, as well to collaborate with others”, our translation).<sup>209</sup>

Re-arranged and further developed curricula alone, however, will not suffice. A good education system consists of at least five components. First, a solid chain of educational institutions over the entire life course is necessary, from early childhood institutions to all-day schools, high quality vocational education, continuing education and the opportunity of a second or third vocational education. Second, these institutions have to be well established, both with regard to personnel as well as space, with multi-professional teams that help each other, with school leadership one can trust and grant leeway for design. Excessive demands, withdrawal or even anxiety among the teachers lead to a further decline of the profession and intensify already existing problems. Third, the above-mentioned curricula are required, which mediate competencies as well as specific knowledge that, in turn, dovetail the continuity and ability to adapt to new needs of the economy. Fourth, the institutions need to be outreaching, with employees who actively recruit children, youth and adults of every age, to inform them about opportunities in a transparent, preventive, and inclusive manner. Fifth, a determined collective effort of the government and the federal states is necessary, as are supporting common goals, openness and the desire to learn from each other. Withdrawal is poison for the development of our education system.

208 Cf. OECD Future of Education and Skills 2030 Project, OECD (2019).

209 [https://www.kmk.org/fileadmin/veroeffentlichungen\\_beschluesse/2021/2021\\_12\\_09-Lehren-und-Lernen-Digi.pdf](https://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2021/2021_12_09-Lehren-und-Lernen-Digi.pdf)

With such an understanding of education and the institutions that mediate it, the potential of all people can be improved, educational poverty can be prevented and top education can be promoted. For this, everyone needs to acknowledge that some people have better opportunities and easier access to education than others, are supported more strongly by their parents both personally and materially. Thus, focused efforts that start early are required as well as more resources for those who are particularly disadvantaged.<sup>210</sup>

In order to achieve these goals, and to be economically successful, socially integrative and individually empowering, Germany needs an education offensive. This is not a new insight. In October 2008, the then chancellor and the state ministers already announced at the Dresden education summit nothing less than an “education republic”. Specific goals were agreed upon for the pre-school phase, for schools, vocational schools, higher education institutions, including the funding rates. These goals were not achieved. Until today, all political parties complain about lacking preschool institutions, low competence scores of German pupils in the international comparison, a high level of educational poverty and too few graduates in MINT subjects. In fact, little has improved. During the Corona pandemic, it moreover became clear that education still does not receive the necessary attention in politics.

The present position paper cannot take up all vulnerable points of our education system and not all phases of education. This is also not necessary since there are already recommendations for

many areas,<sup>211</sup> for example, with reference to the unsatisfactory education for MINT professions,<sup>212</sup> the less successful efforts to recruit foreign workers,<sup>213</sup> and the large deficits in preschool education.<sup>214</sup> We therefore limit ourselves to a small section of the education chain and show the extent of educational poverty and social selectivity using the example of competencies among fourth graders. It quickly becomes clear how urgent an immediate education offensive is. We then focus on two central areas that still receive too little attention: digital school education and continuing education.

## 5.2 Educational poverty and social selectivity

In Germany, too many children, adolescents and adults remain below a level of competency that is considered the minimum for the full participation in the economy and society and is often also described as educational poverty.<sup>215</sup> Educational poverty can be measured in a number of ways: according to low competencies, unachieved school-leaving certificates, lack of a vocational education, and also lack of continuing education or retraining, which allow people to remain in the labour system until retirement or participation in our rapidly changing society. On the other hand, there are only few

<sup>211</sup> Bürgerrat Bildung und Lernen (2021); on further recommendations on key competencies, see European Commission, <https://education.ec.europa.eu/de/focus-topics/improving-quality/key-competences>

<sup>212</sup> acatech & Joachim Herz Stiftung (2023); Zandt (2022).

<sup>213</sup> Schultz (2022).

<sup>214</sup> Bock-Famula et al. (2022); Klinkhammer & Erhardt (2018); BMFSFJ (2016); Nationale Akademie der Wissenschaften Leopoldina (2014). For more information on early childhood education, see also the Dossier Bildung, developed in collaboration between the Bundeszentrale für politische Bildung and the Wissenschaftszentrum Berlin für Sozialforschung: <https://www.bpb.de/themen/bildung/dossier-bildung/174699/fruehkindliche-bildung/>

<sup>215</sup> Allmendinger (1999); Allmendinger et al. (2018).

<sup>210</sup> Cf. Hanuscheck et al. (2016).

people that can be considered as having a rich education, measured here according to very high competency scores. On both sides, educational potentials are not fully exploited.

It is particularly disappointing that the education crisis has intensified again in recent years – in spite of many warnings and the knowledge how essential education is for a solidary society and a booming economy. We demonstrate this using the example of achieved competencies of children in fourth grade since there is current data in the time course. Other data sources, looking at other educational phases and the use of other indicators of the educational level come to comparable results.

The newest data of educational trends of the Institut zur Qualitätsentwicklung im Bildungswesen (IQB)<sup>216</sup> show that, in the competence area of reading, almost 58% of fourth graders in all of Germany reach the normal standard, almost 19% are below the minimum standard.<sup>217</sup> In the competence area of listening / paying attention, almost 59% of all children in Germany achieve the normal standard, 18% are below the minimum standard. In the competence area of orthography, the results are the worst for the country as a whole. Only 44% achieve the normal standard, around 30% do not reach the minimum standard. The divergence between the states is enormous: In Berlin and Brandenburg, almost every second child is below the minimum standard (46%), in Bavaria it is “only” 21%. We

now turn to mathematics. Here, a little more than half of all pupils of fourth grade reach the normal standard (55%), almost 22% do not reach the minimum standard. Looking at the development over time, one can observe significant losses (see Fig. 5a). In mathematics, the proportion of fourth graders, who reach the normal standard, decrease from almost 68% in 2011 to almost 55% in 2021. In reading, it drops from 67% in this period to almost 58%.

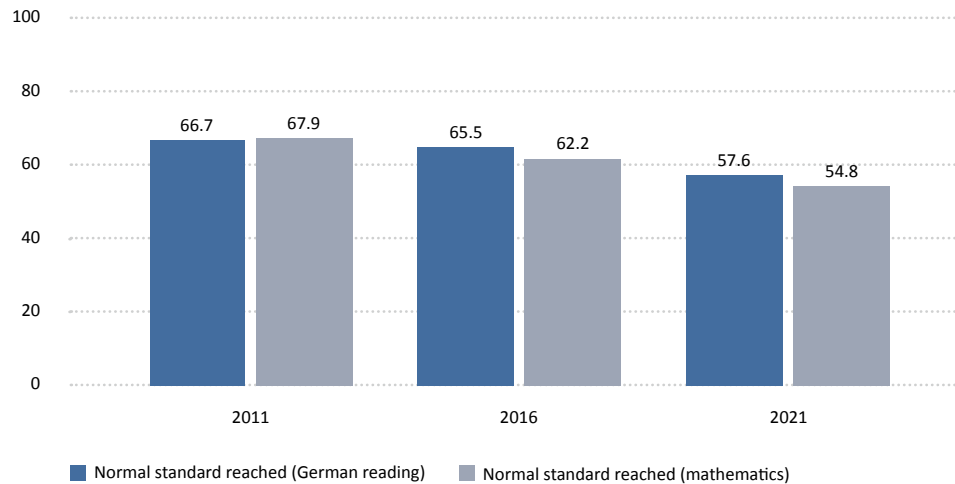
In the achieved competency scores on average and their reduction over time, there are great differences between social groups. Of importance here are the socio-economic status of the parents, in particular their level of education, and the migration background of the children, especially the language spoken at home. Children from families with a high socio-economic status and German as their home language have a far better point of departure than other children. The strong decrease in competencies between 2011 and 2021 is likely also due to school closures and their consequences during the Corona pandemic.

Let us first look at the influence of the migration background on the achieved competency scores and then turn to the selectivity of the education results in general. Figure 5b shows how the achieved competency scores in German (reading, listening, orthography) and mathematics have developed between 2011 and 2021. The average scores are depicted in blue. Furthermore, the performance level is distinguished between children whose parents were born in Germany (black line), children whose parents were born abroad, they themselves, however, were born in Germany (2<sup>nd</sup> generation, light gray line), and children whose parents and themselves were born abroad (1<sup>st</sup> generation, gray-blue line). Three results should be noted: 1) between 2011 and 2021, the

216 For more information, see: <https://deutsches-schulportal.de/bildungswesen/iqb-bildungstrend-die-wichtigsten-ergebnisse/>

217 Minimum standard is understood as a defined minimum of competencies that all pupils should have achieved up to a certain educational phase. Normal standards are understood as competencies that should have been achieved on average by pupils until a certain educational phase.

**Figure 5a:**  
**Proportion (in percentage) of pupils in fourth grade who reach the normal level in mathematics and reading, 2011, 2016, 2021**



Source: IQB Bildungstrend (2021), <https://www.iqb.hu-berlin.de/bt/BT2021/Bericht/>

performance level of all groups decreases. 2) The performance level of children without a migration background is continuously above the scores of children of the second generation, whose scores are continuously above those of the first generation. 3) The difference between the groups increases over time.

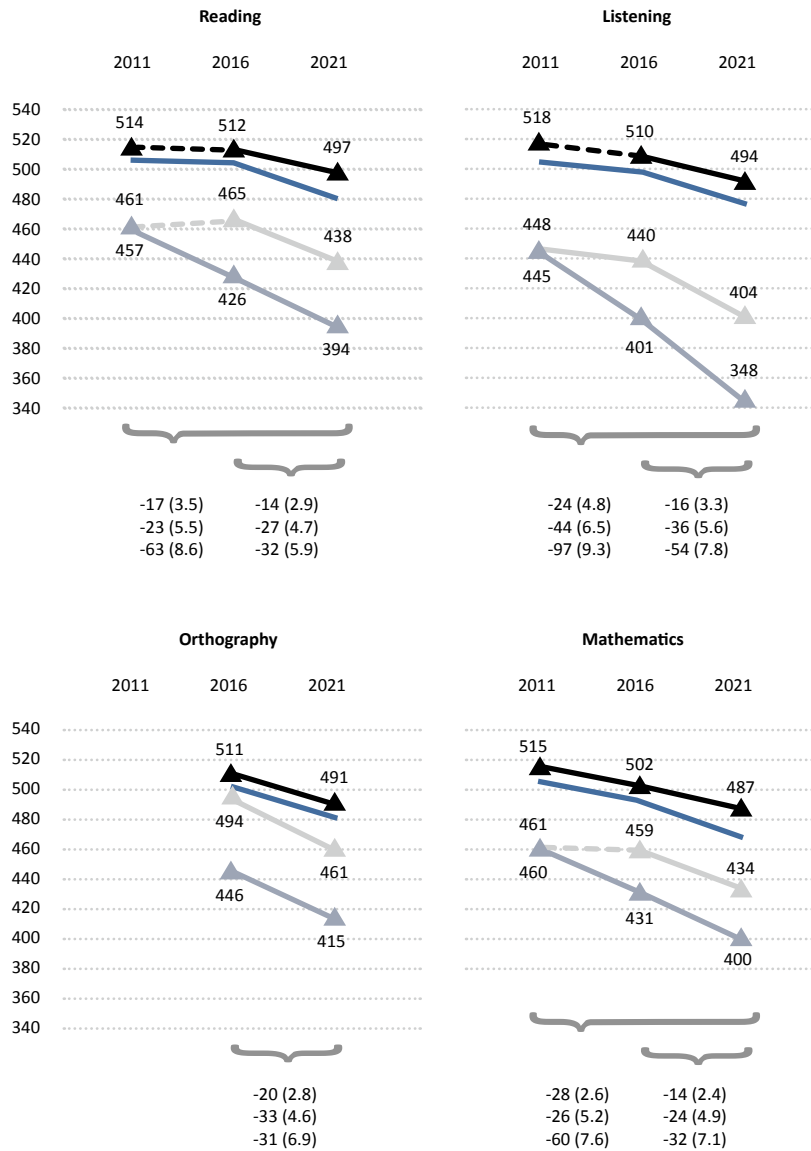
The loss of competencies and increasing group differences cannot be explained by the basic cognitive abilities of the children. There are plausible reasons as to why children in 2021 are generally “dumber” than in 2011, and children of the first generation of migrants are “dumber” than those of the second generation. It is clear: too little is done for the education of our children, a very early and focused promotion of all children, especially those

with migration background and those of the first generation is lacking. We can observe this among the group of those children who do not attend a day-care centre. These children over-proportionally come from families with a poor socio-economic status who additionally have a migration background. If we want to provide the children with living spaces and opportunities for creativity and create a workforce for our economy of tomorrow, we need to do more for early childhood education.

The selectivity of the German education system does not only become visible according to identified competencies but also when the number of children in different stages of education are looked at whose parents have or do not have a higher education degree.

Figure 5b:

Mean scores of achieved competencies in the subjects German and Mathematics for pupils with and with no migration background overall in the years 2011, 2016, and 2021 in comparison, as well as deviations from the German overall mean score



Notes: Rounded scores are given. As a result, the difference of the mean scores can slightly deviate from the presented difference under the curved brackets. The presented trajectory in colour marks the trend for Germany overall (Mean score +/- standard error). Differences printed in bold are statistically significant ( $p < .05$ ).

- With no migration background ( $\Delta M$  first line): both parents were born in Germany
- 2<sup>nd</sup> generation (second line): both parents were born abroad, the child was born in Germany
- 1<sup>st</sup> generation (third line): both parents as well as the child were born abroad (including refugee children)
- ▲ Score deviates statistically significant ( $p < .05$ ) from the score for Germany overall
- - - Statistically not significant difference between time of survey 2011 and 2015, resp. 2016 and 2021
- Statistically significant difference ( $p < .05$ ) between time of survey 2011 and 2015, resp. 2016 and 2021
- ⏟ Difference between the time of survey 2011 and 2015, resp. 2016 and 2021

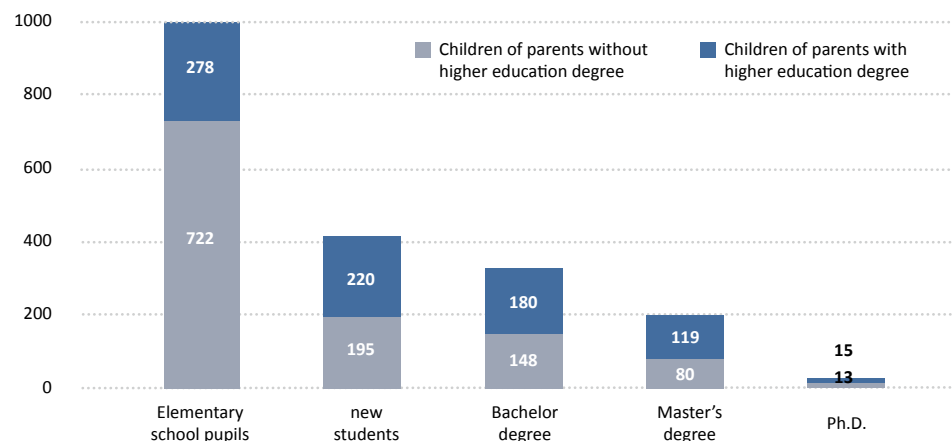
The so-called education funnel (Bildungstrichter) (see Fig. 5c) shows that in elementary school, there are far more children of parents without a higher education degree than children of parents with a higher education degree. This changes with new students and further qualification levels since the attrition rate of children of parents without higher education degree is immense, among children of academic households, however, very low. Concretely: of 100 non-academic children, 27 begin a course of study, among academic children the rate is 78 of a 100. Of 100 non-academic children, 11 achieve a master's degree, whereas among academic children, this rate is 43 of 100. The European comparison confirms that such a close connection between educational success of children and education of the parents is certainly not inevitable.<sup>218</sup>

The partial presentation of significant gaps in the level of education of children and the high social selectivity in Germany underscore the urgency for action is. The scarcity of workers in times of an ageing population and new challenging activity profiles that emerge due to the technological and ecological change cannot be dealt with nor can the competencies of people be developed in this way. This is all the more disappointing since, aside from the European comparison, the comparison among the federal states shows how much one could learn from each other in spite of all the differences in the socio-economic composition of schools, particularly via a targeted promotion of children and adolescents as is demonstrated in Hamburg.

Figure 5c:<sup>219</sup>

**How does the social composition of the pupils differ in the individual levels of education?**

Number of children of parents with and without higher education degree according to levels of education



Source: Stifterverband für die Deutsche Wissenschaft e. V. (2021): Vom Arbeiterkind zum Doktor.

Der Hürdenlauf auf dem Bildungsweg der Erststudierenden. Diskussionspapier, Nr. 2/2021.

Online: [https://www.stifterverband.org/medien/vom\\_arbeiterkind\\_zum\\_doktor](https://www.stifterverband.org/medien/vom_arbeiterkind_zum_doktor)

Bundeszentrale für politische Bildung, [www.bpb.de](http://www.bpb.de), und Wissenschaftszentrum Berlin für Sozialforschung, [www.wzb.eu](http://www.wzb.eu), 2022

<sup>218</sup> OECD (2022); OECD (2018).

<sup>219</sup> The numbers presented in the figure are representative of the absolute number of academic- and non-academic children in different phases of education. For more information on this, see Meyer-Guckel et al. (2021), p. 4.



### 5.3 Preparing for the digital world

Educational institutions in Germany can prepare for a life with digital technologies if they start in early childhood, are equipped accordingly and the teaching personnel is comprehensively trained. This is often not the case. Thus, the Corona pandemic revealed significant deficits in the digital equipment of schools with regard to hardware and infrastructure: networked learning platforms were non-existent and didactic formats hardly developed.<sup>220</sup> Most adolescents were able to use a smartphone or another digital device, but one third did not have sufficiently fast internet or a quiet workplace at home.<sup>221</sup> Moreover, there were huge discrepancies. Children from difficult social backgrounds could participate in digital classrooms during lockdown less frequently than other children. This is all the more serious since deficits in digital education in Germany have been known for many years and no efforts have been made to solve or deal with this. As the current International Computer and Information Literacy Study (ICILS) shows,<sup>222</sup> the digital degree of maturity with regard to Wi-fi access, continuing training of teachers or the development of a curriculum for digital teaching content has not improved much since the first survey in 2013.<sup>223</sup> Financial means provided by the government via the Digitalpakt 2018 to the states for the acquisition of digital devices are only sluggishly retrieved. The unclear responsibilities on the level of states, municipalities and communities are only one of many reasons.

In their review in 2022, the Standing Scientific Commission on Education Policy (Ständige Wissenschaftliche Kommission der Kultusministerkonferenz – SWK) therefore developed concrete proposals to accelerate the digitalization in educational institutions and to solve deficits, from day-care centres to higher education. Among other things, the focus is on integrating digital media education into the orientation framework from day-care centres onwards to a permanent establishment of centres of digital education (Zentren für digitale Bildung – ZdB) and to train the teaching staff.<sup>224</sup>

The Federal Ministry of Education and Research launched another initiative in 2021 with the national education platform in order to better network the decentralized programmes of the states and to establish common standards and formats.<sup>225</sup> The national education platform should be designed in a way so that the digital learning platforms of the individual states are inter-operable and able to work together. Access to learning material and the exchange across states thus becomes possible. In addition, licensing learning materials as Open Educational Resources as well as making accessibility<sup>226</sup> a priority would also be welcome. The education platform of the government is currently facing the problem, however, that very different developments in federal states have already advanced, which makes standardization and networking more difficult.

<sup>220</sup> GEW (2022).

<sup>221</sup> beWirken (2021).

<sup>222</sup> Fraillon et al. (2019).

<sup>223</sup> Cf. GFDB (2018).

<sup>224</sup> Ständige Wissenschaftliche Kommission der Kultusministerkonferenz (2022).

<sup>225</sup> For more information: [https://www.bmbf.de/bmbf/de/home/\\_documents/erstes-pilotprojekt-fuer-nationale-bildungsplattform-startet.html](https://www.bmbf.de/bmbf/de/home/_documents/erstes-pilotprojekt-fuer-nationale-bildungsplattform-startet.html)

<sup>226</sup> Under free accessibility we understand the unlimited usability of digital offers independent of personal preconditions of the users. This means that digital events as well as websites, documents and applications need to be designed in a way that they are equally findable, accessible and usable". (our translation), Hochschulforum Bildung (2022), p. 7.

The further development of curricula is also not uniform in the federal states. Some states have introduced computer science (Informatik) as a mandatory subject in schools in order to lay the foundations for a “digital literacy”<sup>227</sup> early on. The state of implementation, however, differs significantly in the individual states so that there continue to be large discrepancies regarding the level of education in computer science education, which increase the inequality of educational opportunities between the states.<sup>228</sup> It is still unclear whether the subject computer science, as recommended by the SWK, will be introduced as a mandatory subject across the country from the school year 2024/2025 on.<sup>229</sup>

In order to remove or at least reduce inequalities, counter action is required. The objective is a comprehensive, also digital education that will be visible in the future in every educational biography. For this purpose, corresponding offers and programmes need to be expanded and designed as easily accessible. The population expects this as well. Thus, according to a representative survey of the branch association bitkom<sup>230</sup>, three quarters of people approve the introduction of the mandatory subject computer science, coupled with a general right to digital education. This would increase the opportunities for participation and strengthen the capacity for criticism. The states face the enormous task of soundly training the teachers.<sup>231</sup>

A further, future-oriented development of the digital learning opportunities also requires reacting more strongly to social hardship and the exclusion of

precarious groups. Here, adequate measures need to be taken in order to increase accessibility, social acceptance and the necessary resources (internet access, hardware, etc.). In addition, social and cultural hurdles in usage have to be reduced in order to be able to soften inequalities. A current study assigned by the Union of Education and Science (Gewerkschaft Erziehung und Wissenschaft (GEW)) comes to the conclusion that, while the Corona pandemic did cause a push in digitalization („Digitalisierungsschub“) in the classroom, the technological infrastructure continues to be below average, which makes accessibility more difficult especially for socially weaker strata of society.<sup>232</sup> This manifests itself in “different digital competencies of groups of pupils according to their origin”.<sup>233</sup>

The promise of a more just society, which would emerge in and through the internet,<sup>234</sup> could thus not be fulfilled – on the contrary. The social upheavals become even more apparent as a result of digitalization (see Fig. 5 d).<sup>235</sup> Almost 10 % of children who attend a gymnasium (the highest secondary school in Germany) can be located on the low competency levels 1 and 2, among all other children it is an astonishing 46 %. Significant differences also exist between children from parental homes where cultural goods (such as books etc.) are present and those where this is not the case. The migration history plays a role as well. Thus, 27 % of children whose family language is German show very low digital competencies, among children with other family languages it is a sobering 50 %. Therefore, more attention needs to be paid to bridging the digital divide and involving different digitally “lost” groups.<sup>236</sup>

227 Cf. Martens & Hobbs (2015).

228 Gesellschaft für Informatik (2021), pp. 5–6.

229 Ständige Wissenschaftliche Kommission der Kultusministerkonferenz (2022).

230 Bitkom (2021).

231 Mußmann et al. (2021), pp. 23–29, pp. 135–42.

232 GEW (2022).

233 Ibid. p. 50 (our translation).

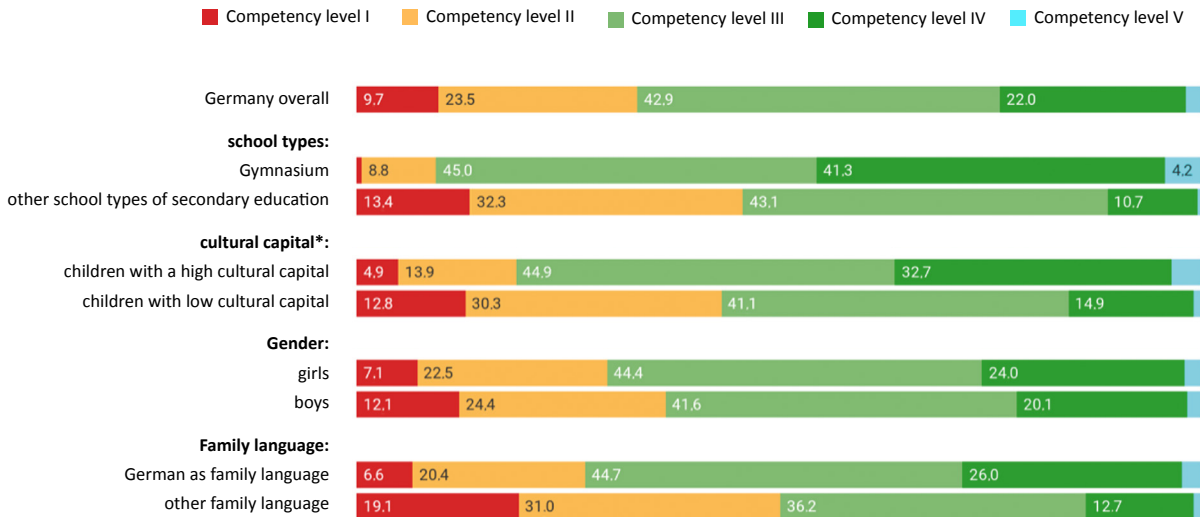
234 Negroponte (1995), p. 68.

235 Cf. Emerald (2020).

236 Initiative D21 (2019).

**Figure 5d:****How well can eight graders deal with computers and digital information?**

Dissemination of eight graders overall, according to school type, cultural capital, gender and family language to competency levels I-V in computer- and information-related competency (2018)



\* “Cultural capital” in sociology of education means things with which one typically would associate “being educated”, such as academic degrees, but also cultural goods such as, for example, artwork, musical instruments or books. Capital of a family is often grasped by the question as to how many books exist in the household. Children whose household contains fewer than 100 books thus have low cultural capital; children with more than 100 books in the household have high cultural capital.

\*\* The competency levels include: (I) rudimentary, primarily receptive competencies and very simple competencies of application; (II) basic knowledge and skills regarding the identification of information and processing of documents; (III) guided identification of information and processing of documents as well as creating simple information products; (IV) Independent identification and organization of information and independent production of documents and information products; (V) competent assessment and organization of independently identified information and creation of sophisticated information products both formally and regarding content.

Graphics: Online-Dossier Bildung – ein Projekt von Bundeszentrale für politische Bildung (bpb) und Wissenschaftszentrum Berlin für Sozialforschung (WZB), <https://www.bpb.de/shop/zeitschriften/apuz/politische-bildung-2022/>

Source: Eickelmann, Birgit et al. (Hrsg.) (2019): ICILS 2018 # Deutschland. Computer- und informationsbezogene Kompetenzen von Schülerinnen und Schülern im zweiten internationalen Vergleich und Kompetenzen im Bereich Computational Thinking.

Waxmann: Fig. 4.2, 4.5, 9.2, 10.2 and 11.5

**Box 5a:**  
**Examples from practice: App camps  
 and fobizz – continuing education  
 for teachers in digital education**

App Camps is a model project founded in 2014 that offers cost-free classroom material on computer science/informatics, programming and media competency. The goal of App Camps is to show pupils the opportunities of the digital age. App Camps supports teachers in teaching topics like App development, Scratch and other programming languages, media competency or how to handle data. The company aims to provide current knowledge and thus to counterbalance the lack of computer science teachers. In 2021, 12,000 teachers as well 300,000 pupils used the platform to gain access to classroom material. Since distant learning takes place via video conferences in schools, App Camps mediates also “role models” from the digital and media industry to interested schools, including material for the preparation to this communication format.

Fobizz is a platform of continuing education for teachers, which was created, among others, by the founders of App Camps. It offers self-learning courses as well as live webinars. The content of the platform is curated by teachers themselves. Fobizz is currently being used by 200,000 teachers and is, according to its own statements, the largest German-speaking platform for continuing education for this group. In contrast to App Camps, Fobizz does not provide cost-free access to content. Payment is made primarily in private by the teachers, increasingly, however, also via school licenses for the entire teaching staff. Since recently, also state licenses are possible.

Since approaches in schools to strengthen “digital literacy” on a broader level were lacking and continuing education for teachers did not meet the quantitative and qualitative standards,<sup>237</sup> some NGOs focused on digital (continuing) education. They provided children, adolescents and teachers with mostly cost-free offers that lie outside the school curriculum. Here, significant actors are, for example, Hacker School,<sup>238</sup> App Camps,<sup>239</sup> Junge Tüftler,<sup>240</sup> Calliope<sup>241</sup> or the network of FabLabs.<sup>242</sup> The evaluation of these programmes is still outstanding so that it cannot be estimated yet as to which target groups they have reached, thus whether they have been accepted again by socially better positioned strata of society. It can positively be noted, however, that the digital education landscape in Germany has become much more diverse through these offers, and learning opportunities were quickly at hand which in turn stimulated their curricular implementation.

237 Ghomi et al. (2020)

238 <https://hacker-school.de>

239 <https://appcamps.de>

240 <https://junge-tueftler.de>

241 <http://calliope.cc>. One of the authors, Gesche Joost, was co-founder of this charitable initiative in 2016.

242 <https://www.fablabs.io>

#### 5.4 Professional continuing education

Due to the demographic change, a significant reduction of the proportion of employees among the overall population is to be expected. This can be countered through immigration, a better fit between vocational education and required professional competencies, decrease in early retirements, and hybrid forms of paid work and retirement, surely also through gains in productivity in the course of the digital change.<sup>243</sup>

The current system of continuing education can fulfil these tasks only to a limited extent: it is not sufficiently structured and overall not oriented enough towards content and knowledge dissemination but rather on maintaining structural guidelines (such as the sufficient provision of spaces and personnel). In addition, it is non-transparent, certificates are – insofar as they are not regulated on a federal level – only marginally informative, access to programmes is not ensured via a uniform infrastructure, there is hardly any quality assurance and, lastly, also its financing is insufficient. Whether the establishment of a digital networking infrastructure for education – also termed “National Education Platform” (Nationale Bildungsplattform) – will at least partly increase transparency can only be seen in the medium-term through its actual usage. Among other things, it is supposed to network the area of continuing education. It would be necessary to establish the system of continuing education as a fourth pillar of the education system (next to

school, higher education, and professional education).<sup>244</sup> Already 50 years ago the German Education Council (Deutscher Bildungsrat) called for the expansion of public responsibility for continuing education and to design it as an equal part of the education system.<sup>245</sup> However, this call was never taken up.

Today, continuing education is especially subject to market mechanisms. Privatization and commercialization are the main focus. At the same time, continuing education was reinterpreted under the label employability (Beschäftigungsfähigkeit)<sup>246</sup> as an individual obligation, whereby it remains open for which social groups access is enabled and for which it is made more difficult.

The landscape of continuing education is dominated by several actors. First, there are the people who want to or should undergo continuing education. Whether they are able to do so is also decided by companies that under certain circumstances finance continuing training: private sector-oriented companies, chambers of crafts, resp. Chambers of Industry and Commerce, union or employer-friendly organizations, municipal or state bodies, adult education centres and others. Here, a broad development in supply can be observed which is oriented towards the changed demand.

243 In 2021 the average retirement entry age was 64.1 (Deutsche Rentenversicherung Jahresbericht 2021; <https://www.demografie-portal.de/DE/Fakten/renteneintrittsalter.html>). Here it has to be distinguished between retirement due to reduced earning capacity and due to age. Moreover, it has to be considered that since 2012, the normal retirement age, which was hitherto at 65, was increased stepwise to 67. (<https://www.demografie-portal.de/DE/Fakten/renteneintrittsalter.html>).

244 On this and the following, see extensively Pothmer et al. (2019).

245 Cf. Deutscher Bildungsrat (1970), p. 208.

246 On the history of “Beschäftigungsfähigkeit”, see Gazier (1999).

### Box 5b: Forms of continuing education

The **initial vocational education** consists, in the general understanding, of school education and professional education in the dual system, vocational schools or higher education institutions. The term initial vocational education indicates that additional educational phases can follow, whereby these activities are termed **continuing education**.

Continuing education is differently defined and demarcated, depending on the question posed.<sup>247</sup> Thus, the term **adult education** characterizes especially a didactic perspective. Looking at content, it is often distinguished between **professional, private and political continuing education**. However, **basic competencies** can also be strengthened.

The demarcation between **individual and operational continuing education** aims to indicate from where the initiative for continuing education originates, resp. who has a particular interest in it. Concepts like **advanced further training or refresher training** refer to the current job position and the existing level of qualification and knowledge of a person. If continuing education is looked at under the aspect of “time”, it can be distinguished, on the one hand, according to full or part time, and, on the other hand, whether it takes place in **leisure time**, during **working hours**, or, for example, in a phase of registered unemployment.

**Financing** plays a special role and can refer to participation (e.g., course fees), to additional costs (e.g., transportation costs, costs for necessary accommodation during participation) and livelihood. Continuing education can be financed by the learning person, by companies, public funds, foundations etc. or via combinations. Correspondingly, it can be distinguished between **non-funded** and **funded continuing education**.

It is also differentiated as to **how continuing education is carried out**. Due to the Corona pandemic, for example, there was a lot of discussion about switching to **hybrid** formats or entirely **digital** continuing education instead of in-presence events. Here, it also plays a role whether the education takes place via **classroom teaching, supervised training, or self-learning**.

There is often also the following demarcation:<sup>248</sup> **Formal continuing education** should lead to a professional qualification in a course of study, a school-leaving certificate that was achieved later in life or a qualification in a recognized skilled education. The latter are often also referred to as retraining, which, however, is only adequate in the narrower sense if the person already possesses a professional qualification. **Non-formal continuing educations** have a certain degree of organization and take place in courses or training sessions. Verifications or certifications can but do not have to be issued. **Informal continuing education** takes place neither in courses nor does it lead to a qualification. Mostly it is a self-organized learning process, such as reading specific literature or attending a talk.

<sup>247</sup> Cf. on this and the consequences for an empirical account, Eisermann et al. (2014).

<sup>248</sup> On the difference between informal, non-formal and formal continuing education, see Kleinert & Matthes (2009); Bäumer et al. (2012).

**Box 5c:**  
**Examples from practice: Continuing education at Cornelsen eCadamy**

The Cornelesen publishing company, specialized originally in school education, has operated the platform “eCadamy” for online continuing education offers since 2010. The platform provides digital learning content for companies of different sizes, for education providers and public institutions such as vocational education schools. In doing so, Cornelsen aims to counteract the scarcity of skilled workers in industrial and technical professions and to meet the increasingly differentiated demands regarding employees’ competencies. In view of a generational change among trainees, companies are to be supported in further qualifying their staff.

At the same time, considerable non-transparency emerges due to the clash of different interests. This is apparent, for example, in the individual job-related continuing education, which mostly takes place in leisure time and aims at further professional development or a change into another company. The 2022 data report of the Federal Institute for Vocational Education and Training (Bundesinstitut für Berufsbildung (BIBB)) states that in 2020, there were 219 federal advanced training regulations that are based on the vocational training act and the crafts code. In addition, there are “1,419 legislations on 544 regulations on further training examinations by relevant parties”.<sup>249</sup> However, there is no guarantee that state-specific certificates are recognized in other states, resp. certificates of individual chambers are recognized in other districts.<sup>250</sup> This historically grown lack of structure in continuing education

was recently intensified through numerous digital offers. A “Checklist quality of professional continuing education”<sup>251</sup> published by the Federal Institute for Vocational Education and Training (BIBB) is supposed to support people interested in continuing education in selecting offers. This help consists of almost 50 pages and does not claim to replace a counselling interview.<sup>252</sup> Such a landscape of courses and offers for people seeking continuing education is not only selective and vague, but employers can also not always recognize which knowledge is in fact behind a certificate.

The National Education Report 2018 therefore rightly cautions that the question “to what extent Germany is still able to afford such a fragile institutionalization of continuing education needs to be posed again and with high urgency”.<sup>253</sup> The report also calls for testing in how far “dominant market-related mechanisms of participation in continuing education are to be reduced and opportunities of access to continuing education as well as right to learning periods are to be ensured for all social groups”.<sup>254</sup>

Participation rate in job-related continuing education in 2020 was at 54 %, an increase of 6 % compared to 2018.<sup>255</sup> In this context, significant differences can be observed between groups of different qualifications. Among persons without a professional qualification, the participation rate was 31 %, whereas among persons with a (university of applied sciences) / higher education degree was 71 % (see Fig. 5 e).<sup>256</sup>

<sup>249</sup> Bundesinstitut für Berufsbildung (2022), p. 305.

<sup>250</sup> Cf. von Hagen (2018), p. 410.

<sup>251</sup> Bundesinstitut für Berufsbildung (2018).

<sup>252</sup> Ibid. p. 7.

<sup>253</sup> Bildungsbericht (2018), p. 188 (our translation).

<sup>254</sup> Ibid. p. 190 (our translation).

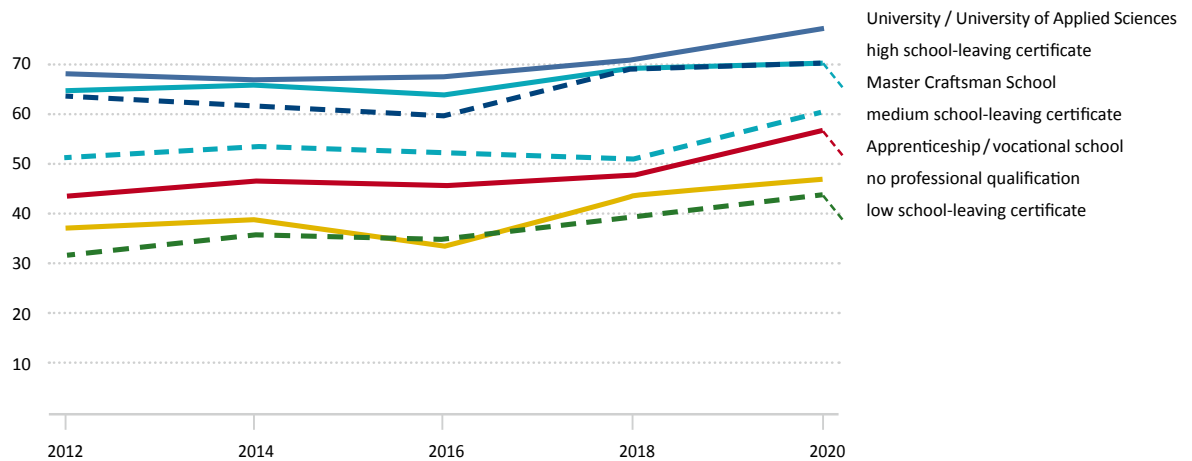
<sup>255</sup> Bundesinstitut für Berufsbildung (2022), p. 308.

<sup>256</sup> Ibid. p. 311.



**Figure 5e:**  
**Participation rate in continuing education according to highest school degree and professional qualification (2012 – 2020)**

Basis: 18–64-year-olds. Rate of participation in percentage points.



The respective highest school degrees were summarized as follows: low = Hauptschule (general school) or below, medium = Mittlere Reife (intermediate school-leaving certificate), high = Fachabitur (vocational baccalaureate diploma) or higher. Source: Bundesministerium für Bildung und Forschung 2022 – created with Datawrapper

On average, therefore, those individuals who have also completed school and initial vocational education relatively successfully take advantage of continuing education opportunities more often. In research, this phenomenon is termed “Matthew effect”. There are indications that this is a causal connection.<sup>257</sup> Moreover, it becomes apparent that job and the company play a big role for participation in continuing education.<sup>258</sup> Individuals with more analytical and varied jobs are more likely to participate in continuing education as persons with manual and repetitive jobs. We can interpret these results in such a way that the initial vocational education determines access to certain fields of work. In these fields of work, the employers then decide according to the respective job whether contin-

uing education takes place. In addition, company structures<sup>259</sup> and labour market institutions have an influence on the connection between job/activities and continuing education.<sup>260</sup> As current analyses of the National Education Panel during the Corona pandemic confirm, digital continuing education does not appear to soften the Matthew effect.<sup>261</sup> Such an effect also exists, albeit with a lesser causal connection, between completed and future measures of continuing education.<sup>262</sup> Taking over part of the direct costs can also counteract this connection to a limited extent.<sup>263</sup>

Without participation in continuing education, an increasing “social

<sup>257</sup> Kramer & Tamm (2018).

<sup>258</sup> E.g., Kleinert & Wölfel (2018); Lörz & Schindler (2011); Korpi & Tahlin (2021).

<sup>259</sup> Heß et al. (2019).

<sup>260</sup> Ehlert (2020).

<sup>261</sup> Kleinert et al. (2021).

<sup>262</sup> Dos Santos et al. (2021).

<sup>263</sup> Kantar (2019).

polarization of the age transition” is to be expected. On the one hand are higher qualified employees, who in part continue to work even after reaching the standard retirement age and whose “burdens and demands in work life also allow a continuation of work” with regard to their health. On the other hand are employees with low qualification, who are rather active in physically demanding jobs, psychologically burdened and enter retirement earlier.<sup>264</sup> Education, health and socio-economic status are closely connected and affect the life course via different loops.<sup>265</sup> Raising the mandatory age, moreover, would create “the threat of a new social inequality” (see also chapter 3).<sup>266</sup>

A sufficient supply of continuing education alone, however, does not guarantee that formally low-qualified people will take advantage of it. The offers need to be known and one has to be able to afford them. A wage subsidy payment to the company or a (partial) takeover of the costs of continuing education for employees increases the incentive for companies only to a limited extent to grant learning time for less educated people.<sup>267</sup> Existing rules on learning periods on different levels – such as the legislations of the states (Bildungsfreistellungsgesetze), wage agreements and company agreements – hardly have any effect. This is also true regarding the expansion of funding continuing education for employees.<sup>268</sup> In both cases, the lack of enforceability vis-à-vis the employer could play a role.<sup>269</sup>

By providing opportunities for continuing education and qualification, obtaining a second or third professional qualification and new competencies, the risk of early retirement and unemployment can be softened.<sup>270</sup> Some steps have already been taken, for example, the National Skills Strategy (Nationale Weiterbildungsstrategie) was brought to life as well as the Qualification Opportunities Act (Qualifizierungschancengesetz) and the Work-of-tomorrow Act (Arbeit-von-morgen-Gesetz) were passed. However, there remains an enormous need for action on behalf of politics, the companies and associations.<sup>271</sup>

## 5.5 Recommendations for action

### 5.5.1 Exploiting education potentials better

Many children and adolescents are lost in the course of our school system. In 2021, 47,500 children (approximately 6%) did not achieve a general school-leaving certificate (Hauptschulabschluss), without any formal educational qualification it was even 18% of the 20–34-year-olds.<sup>272</sup> Additionally, there are a lot of children whose competencies have to be labelled insufficient. Overall, the proportion of poorly educated children and adolescents is thus quite high. Most of these children come from parental homes in precarious conditions and/or in which German is not the family language. The potentials of these children and adolescents can and must be better promoted.

International comparative research shows that a good education system depends on the interaction of many areas, among others on the education of the teachers, on multi-professional teams, the

264 Vierter Monitoring-Bericht des Netzwerks für eine gerechte Rente (2010).

265 Blane (2006); Power & Kuh (2006); Heckman & Conti (2013).

266 Hess et al. (2016); Naegele (2017); Naegele & Hess (2018).

267 Kruppe et al. (2021).

268 Klaus et al. (2020).

269 Kocher et al. (2013).

270 Friebe et al. (2020).

271 Ibid.

272 Klemm (2023), p. 8.

management of the schools, their administration through bodies, municipalities and states, on the infrastructures of the schools, the composition of pupils, on curricula and school hours, collaboration between government and the state. At this point, not all causal mechanisms can be described. We focus on the measures that seem particularly appropriate to lower the proportion of the poorly educated.

Education needs to begin as early as possible. Day-care centres for children must be expanded rapidly so that all children receive their rightful place in a day-care centre. Since a mandate for day-care centres can only be introduced with great difficulty, pre-school classes should be implemented (again) on a broader level. Special effort is required to purposefully reach children from parental homes in precarious conditions and / or with migration background. The ‘Start Opportunities Programme’ (Startchancenprogramm) provides a good starting point but needs to be significantly expanded and intensified.<sup>273</sup> Children of the first migration generation should immediately attend German language courses, in the best case already prior to their arrival in Germany. Research shows that linguistic competencies significantly improve integration in school, professional education, and labour market. All-day schools need to provide additional language courses in the afternoons, and school-accompanying support has to be expanded.

Education of the children and socio-economic status of the parental home are closely connected. Therefore, everything possible needs to be done in order to reduce child poverty. The proposed basic child allowance (Kindergrundsicherung) thus needs to contain mea-

asures that specifically benefit the education of children. A close network between political departments as well as government and the states is required. Germany loses too much time due to power plays, which, eventually, is carried out on the backs of the children and of the future of economy and society.

### 5.5.2 Purposefully strengthening digital education

Digital competencies have to be mediated already in day-care centres. Consequently, they should be integrated into the curriculum in elementary schools, also outside of the mandatory subject computer science/informatics. This should be implemented nationwide in order to better reach socially weaker strata of society, as is also demanded by the SWK. School curricula should be oriented towards the OECD Future Skills, for example, to instill digital competencies already from elementary school onwards. The Stifterverband für die Deutsche Wissenschaft has developed an alternative model of “Future Skills” that is particularly oriented towards digital competencies and skill profiles of future professions.<sup>274</sup> Such profiles should be consequently taken into account in the necessary further development of the German system of education and continuing education in order to strengthen “digital literacy” as well as self-responsibility and value orientation in school education. Additional model projects, such as the Turing Bus,<sup>275</sup> which purposefully provides educational opportunities in rural regions, can be viewed as important supplements.

Initiatives that explicitly focus on schools in disadvantaged areas and schools with a higher need for support should be

<sup>273</sup> Helbig (2023).

<sup>274</sup> <https://www.future-skills.net/>

<sup>275</sup> <https://turing-bus.de>

helped financially more strongly in order to overcome the digital divide. For balancing social inequalities, it would be very important to allocate funds for schools in an evidence-based manner, thus according to a social index. This is already practiced in some states (e. g., Hamburg).

In addition, the responsibilities for providing schools with equipment and continuing training of teachers need to be clarified on the state level in order to streamline the processes and accelerate digitalization. Each school could, as is already the case in North-Rhine Westphalia, receive a budget for continuing training in digital education.<sup>276</sup> In this context, school development should holistically involve technologies and advanced training of teachers.<sup>277</sup>

### 5.5.3 Institutionally anchoring continuing education

A right to continuing education via government legislation seems to be necessary. This would create a right to a “period reserved for education” (Bildungszeit), also in the form of a “period reserved for education part time” (Bildungsteilzeit) as well as for people who are not in an employment relationship entailing mandatory social security and particularly with claims to learning time for people with obligations in care work. Such legislation (Weiterbildungsgesetz) would strengthen the meaning and utilization of continuing education. Continuing education could then be institutionally anchored and receive equal status as an independ-

ent pillar of the system of initial vocational education.

For useful qualifications on the labour market, federal regulations and responsibilities of the public sector are necessary. In the area of professional continuing education, a committee would make sense that sets standards and develops labour market-relevant modules on the federal level. A participation of social partners in this committee could ensure timeliness, practical relevance and transferability of the acquired qualifications and competencies. Specific requirements could additionally be covered through local continuing education and certificates of chambers of industry and commerce. The certification of continuing education would be transparent for all parties involved, both on the local and national level. Moreover, such a certification could become a prerequisite, so that continuing education is promoted.

So far, consultation offers on funded continuing education are known only to a relatively small circle and are being used by comparatively few employees and companies.<sup>278</sup> Easily accessible,<sup>279</sup> consultation offers are therefore indispensable. This is especially true since these consultations increase the likelihood that measures of continuing education are taken up.<sup>280</sup> A broadly disseminated, high quality and independent consultation infrastructure is currently non-existent. Starting point could thus be the consultation on continuing education of the Federal Employment Agency and its cooperation with already established consultation structures, whereby both sides refer to each other.

<sup>276</sup> This proposal was made by the founder of fobizz, Diana Knodel, in conversation with the interdisciplinary research group. She advocated to view continuing training of the teachers as part of school development and especially make sure in this context that all teachers are reached – for example, via the acquisition of school licenses for offers in continuing education.

<sup>277</sup> Zylka (2018); Schulz-Zander (2001).

<sup>278</sup> Osiander & Stephan (2018); Kruppe et al. (2021).

<sup>279</sup> Ibid.

<sup>280</sup> Schanne & Weyh (2017).

In order to improve consultations, AI-based systems can be used. During the consultation process, these can help in achieving an adequate fit between individual profile and available options for continuing education. In particular, the focus is on networking of existing offers of continuing education on digital platforms, the comparison of learning success to improve pathways of learning and the matching of learning modules that build on each other also with different providers.<sup>281</sup> Using AI-systems in vocational and continuing education is, however, a relatively new procedure, so that efficiency, efficacy and quality of results are not yet reliable.

With regard to form and content, especially small and medium-sized companies increasingly use digital platforms for the continuing education of their employees. On these platforms, offers regarding specific professional profiles and skilled occupations are consolidated, in part also together with the chambers of industry and commerce. In this context, new forms of human-technology interaction as well as augmented and virtual reality are utilized in order to illustrate, for example, the design of a complex circuit. Blended learning and hybrid learning with digital offers that are combined with in-presence formats are used. Thus, the market for continuing education opportunities splits up more and more and new providers join in who react to the needs of enterprises.

The financing of continuing education needs to be rearranged. Integration measures and action against illiteracy as well as completing school-leaving certificates or higher education degrees at a later stage should all be publicly financed since this continuing education is of a common

societal interest: promotion of democratic values, cultural participation, integration and completing education that was financed for others already in their initial vocational education. Here, it can also be derived that there is neither an optimal time for continuing education, nor that the financing of continuing education should be limited to a certain age. Continuing education must not be reduced to immediate usability on the labour market.

An “insurance of continuing education” (Weiterbildungsversicherung) could be institutionalized as an independent book of social security (Sozialgesetzbuch) for measures that are covered by a right to continuing education. This could be financed equally by employees and employers, on the one hand, and by a tax subsidy, on the other.<sup>282</sup> The tax subsidy could then take place anti-cyclically in order to provide increased funds for continuing education especially in times of crisis. This form of financing – in the framework of a work insurance and as part of social security – would underline the societal responsibility for the area of continuing education. Part of the funding, also of a second professional qualification, would be refinanced by the returns in taxes and social security contributions in ongoing employment as well as the savings through social transfers.<sup>283</sup> In contrast to learning accounts and training funds with fixed drawing rights, the advantage is that groups that so far participated in continuing education to a lower degree could receive stronger support.

<sup>281</sup> Cf. BMBF (2022).

<sup>282</sup> Cf. Schmid (2012), p. 262.

<sup>283</sup> Hans et al. (2017); Kruppe et al. (2019).

## 6 Paid work and care work in the activity-oriented society

### 6.1 Introduction

Care work, such as supervising a child or nursing a family member, comprises an important area of the activity-oriented society (“Tätigkeitsgesellschaft”) since it is decisive for the common good, social cohesion and solidarity between the generations. In addition, it plays an enormous role for the relationships of societal production and reproduction. The current allocation of paid work and care work is, however, characterized by grave differences between women and men. Moreover, care work will become more important in the future due to demographic change.

Unpaid care and support within the family often have an obligatory character for the immediate family members.<sup>284</sup> The risk that these activities compete with paid work is therefore higher than in voluntary engagement, which, in principle, can be terminated at any time. Especially in time-intensive care work within the family, there is often a “role overload” which can lead to the fact that the amount of paid work is unwillingly reduced or even given up entirely (“role substitution”).<sup>285</sup> This potentially conflicting relationship between unpaid care work and paid work entails significant societal challenges. Therefore, in the following, the focus is especially on unpaid care work, and specific attention is paid to its relationship with paid work in different phases of life. We will also look at societal, economic and

infrastructural problems in connection with paid, resp. professional care work, as it takes place, for example, in the form of live-in-care arrangements.

### 6.2 On the relationship between paid and care work – current state of research

#### 6.2.1 Large inequalities between men and women

Paid work and care work are unequally distributed between women and men in Germany.<sup>286</sup> While the employment rate among women has continuously increased in the past two decades and is meanwhile one of the highest in Europe, almost half of all employed women work part time. Among men it is approximately 12%.<sup>287</sup> Thus, the gender gap in labour participation has decreased significantly but the gender gap in weekly working hours is still large and tends to grow further. In addition, women take family-related time outs much more often and longer than men.<sup>288</sup>

<sup>284</sup> Burr et al. (2007).

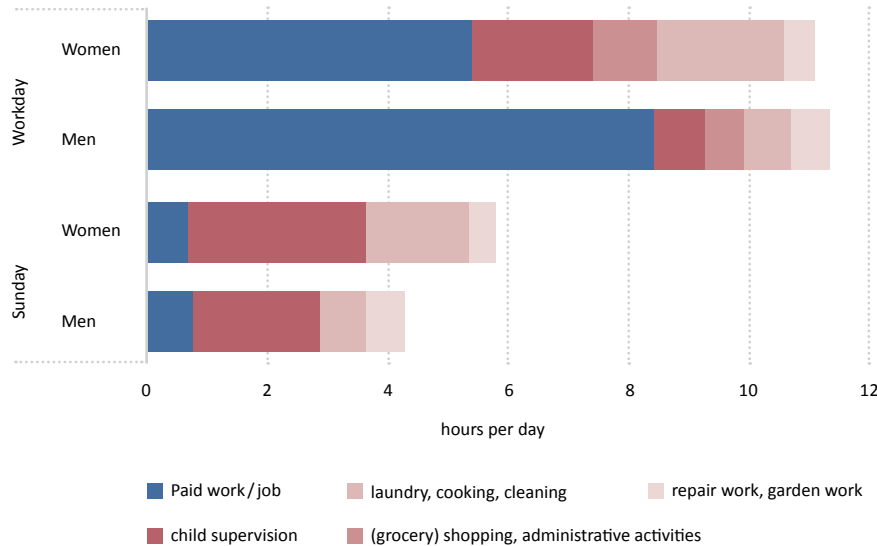
<sup>285</sup> Choi et al. (2007).

<sup>286</sup> In the following, we refer especially to heterosexual couples. This is not supposed to exclude other life forms such as, e.g., homosexual couples, but is solely due to the state of research in the area of reconciling paid and care work.

<sup>287</sup> Kümmerling & Schmieja (2021).

<sup>288</sup> Samtleben et al. (2019b).

**Figure 6a:**  
**Time spent of men and women on workdays and Sunday**  
 in hours per day



Source: Samtleben (2019)

Aside from paid work, unpaid care work is also unequally divided between women and men. Women carry out one-and-a-half times more unpaid care work than men, and among couples with children under age three in the household it is even double. Women also carry out significantly more unpaid house work and child supervision on Sundays and holidays than men. Accordingly, not only differences in paid work are responsible for the unequal distribution of unpaid care work. The proportion of men who take over house work and child supervision has moderately increased since the 1990s. The reason for this, however, is not a greater engagement of men but a decrease of the average number of hours that women spend on housework (e.g., cooking, cleaning and doing the laundry).<sup>289</sup>

If one takes a closer look at unpaid care work, other differences between women and men become apparent: in the area of work “on people” (especially childcare and care of a family member<sup>290</sup>), inequality is much higher than in the area of work “on things” (household activities, repair work, garden work etc.). This is due to the fact that care work on people is less flexible with respect to time and associated with a significantly higher responsibility and cognitive burden than care work connected with things.<sup>291</sup> The concept of “mental load” describes these demands quite well and can explain why mothers carried a particular burden and thus felt exhausted during the closures of day-care centres and schools due to the pandemic.<sup>292</sup> Yet we can also see differences in housework: women are predominantly busy with housework that is hardly

<sup>289</sup> Samtleben (2019). If one looks at the overall amount of average hours in paid work and unpaid care work, data of the socio-economic panel (SOEP) show that there are practically no differences between men and women. Thus, a double burden due to paid work and housework, resp. care work, as described by the double-burden concept, cannot be confirmed at least with regard to the average work volume, even though working hours differ significantly according to activity (Samtleben 2019).

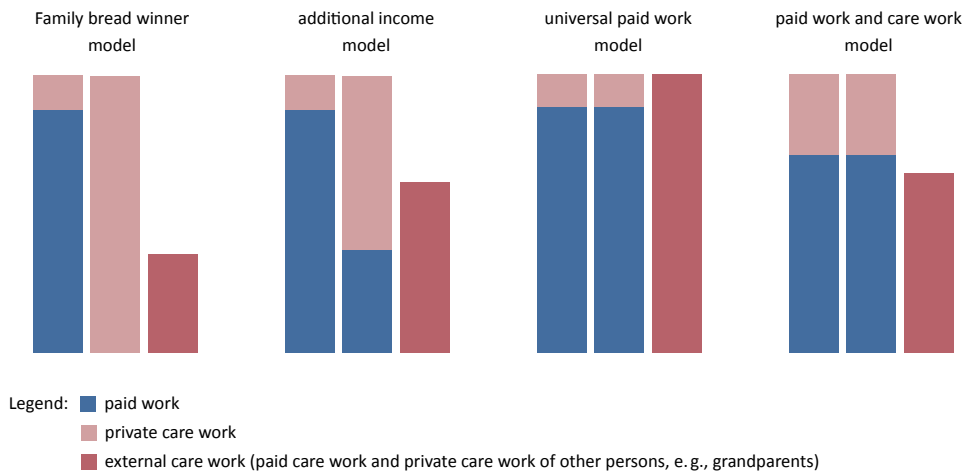
<sup>290</sup> The long-term care insurance law of the Social Security Code SGB XI defines persons as being in need of care who due to an illness or disability are permanently and to a considerable extent dependent on help and support in everyday life.

<sup>291</sup> Allmendinger (2021).

<sup>292</sup> Huebener et al. (2020).



**Figure 6b:**  
**Different arrangements of care work and paid work in relationships of couples**



Note: The presentation assumes a dyadic relationship of couples, in which the first two columns represent partner one and two. The third column refers to persons who are not immediately part of the relationship, such as grandparents or other family members, but also external care institutions.

Source: Zweiter Gleichstellungsbericht der Bundesregierung (2017), Themenblatt 1 „Erwerbs- und Sorgearbeit“

flexible with respect to time, thus has to be done regularly, such as cooking meals and doing the laundry.<sup>293</sup>

The unequal distribution of paid work and care work begins with starting a family and then remains on a very high level. From age 30, women take time outs for the family and reduce their job much more often than men.<sup>294</sup> In approximately three quarters of all family households with children up to age 12, the distribution of paid work and care work is thus according to the “additional income model” (see Fig. 6b), i. e., “father works full time, mother does not work or works part time”.<sup>295</sup>

The unequal distribution of care work and paid work between men and women continues after the life phase with small children. In the second half of life, care of family members at home and supervision of grandchildren increase as

forms of unpaid care work. Here, too, an unequal distribution between men and women can be observed, especially with regard to in-house support services in the case of illness, resp. in care. Data of the Deutsche Alterssurvey (DEAS) show that the differences in the in-house care rates among men and women from age 40 onwards have remained nearly stable between 1996 and 2014. In 2014, across all age groups in the second half of life, around every fifth woman was active in care work, whereas among men it was 13%.<sup>296</sup> The data of the Freiwilligen survey (FWS)<sup>297</sup> 2019 confirm that among the 30 to 79-year-olds women take over unpaid care work more often than men, and the

<sup>296</sup> Klaus & Tesch-Römer (2017).

<sup>297</sup> Question on care work in the Freiwilligen survey (FWS) 2019, wave 5 (N=27.762): “Are there persons that, due to their health, you care for or support privately or unpaid?” “Are they relatives, neighbours, friends, acquaintances or others?” Under this question, thus, in principle also care work for family members or parents could be recorded. Whether partners fall into this category is less clear. It is moreover differentiated as to whether the person in care lives in the same household. In addition, it is asked about the weekly hours spent per day/week/month in the past 12 months on care work. This variable was converted into average hours per week for the analysis.

<sup>293</sup> Samtleben (2019).

<sup>294</sup> Zucco & Schrenker (2020).

<sup>295</sup> Müller et al. (2020).

average weekly hours are higher among women than among men. Thus, 22 % of the women (including diverse) between 30 and 59 years of age cared for, resp., supported persons with health restrictions privately or unpaid, whereas among men it was 16 %. There is a similar distribution among the 60 to 69-year-olds: here, 31 % of women (including diverse) cared for elderly persons with health restrictions, among men it was only every fifth. Among the 70 to 79-year-olds, the proportions of men and women moved closer together, caring women (including diverse) were more frequent with 19 % than men (16 %). The proportions of men and women in care activities were only equal at 15 % from 80-year-olds on and older.

The “additional income model”, in which both parents are employed but paid work and care work are still unequally distributed, and which represents the majority, has negative effects on the income of women. In part time jobs, lower hourly wages are paid than in full time jobs.<sup>298</sup> Moreover, career opportunities are not as good since one is seldom able to get a leadership position after working for a longer period part time and such a position can hardly be carried out part time. As a consequence of all this, women have a significantly lower life income than men, significantly lower pensions (keyword: gender pension gap) and are more often threatened by poverty in old age.<sup>299</sup>

### 6.2.2 Increasing demand for care work

Due to demographic change, care work will become even more important in the future since the trend towards the “beanpole family”<sup>300</sup> decreases the inner-family networks, whereas the demands for care work and support of the growing population group of old age people (80 years and older) continue to increase.<sup>301</sup> The 15<sup>th</sup> coordinated population projection of the Federal Statistical Office assumes that the number of 80-year-olds and older will be around 6 million people by 2030 and after that increase until 2050 to 8.4 to 9.9 million.<sup>302</sup>

298 Gallego Granados et al. (2019).

299 Grabka et al. (2017).

300 This is understood as multi-generation families with comparatively few members per generation, which, however, due to higher life expectancy have a longer common life span than earlier generations. On the concept of the beanpole family, see, e.g., Bengtson et al. (1990).

301 On the other hand, relationships between the generations, e.g., between grandparents and grandchildren, can be strengthened by the development towards the beanpole family since young and old have more common time available.

302 Statistisches Bundesamt (2023b).

**Box 6a:****Care work in times of demographic change**

The age structure of the German population is shifting: due to decreasing birth rates and an increasing life expectancy, the proportion of the older compared to the younger population has grown. Even the slight increase in birth rates since 2012 cannot reverse this change. Regarding care work, this development has consequences especially for childcare and the care of older people.

Even though the number of under 25-year-olds will continue to decrease, the number of children in childcare will increase according to some prognoses – insofar as there is a corresponding childcare supply.<sup>303</sup> The demand for childcare will likely also increase due to the ongoing growth in employment rates among women. At the same time, day-care centres for children already suffer from a scarcity of personnel. It is expected that this discrepancy will continue to increase.

Regarding health condition and the associated demand for care among older people, the concept of the third age is established in social gerontology, which is understood as the life phase between the end of employment and the beginning of permanent health limitations.<sup>304</sup> In view of the diversity of life situations and styles of life that characterize this phase, it is also spoken of “differential ageing”.<sup>305</sup> Among the 60-80-year-olds, care need occurs still relatively seldom. Thus, the proportion of those in need of long-term care among the 60 to 64-year-olds is overall around 3%, whereas among the 75-80-year-olds it increases to 14%, and most cases are cared for at home.<sup>306</sup>

According to the care statistics of the Federal Statistical Office, 4.1 million people were in need of long-time care in Germany, which is an increase of around 700,000 people compared to 2017.<sup>307</sup> The risk of being in need of care is clearly associated with old age: around 80% of those in need of care were 65 or older, whereby cases occur especially often in the highest age group of 80-years and older. Here, two-thirds of those in need of care were women.<sup>308</sup> The risk of needing care increases with age and is highest in the age group of 90-years or older: the share of those in need of care in the overall number of persons in this age group (care rate) in 2019 was 81% of women and 64% of men.<sup>309</sup> The need for long-term care is thus a life situation that is especially prevalent in the so called fourth age.

In 2019, four of five of those in need of long-term care were cared for at home by family members. Only one fifth of those (approx. 818,000 people) were treated in one of the 15,400 approved partly-in-patient or in-patient nursing homes across Germany. In these nursing homes, 796,000 people were employed, the majority of which worked part time and among which women were clearly overrepresented.<sup>310</sup>

In the age group of the 60-80-year-olds, many people are engaged in the area of informal care work, but possess great potential also in other areas of productive activities. Such potentials of older people are often described in the sense of personal or societal opportunities for development,<sup>311</sup> resp. hitherto unused opportunities of social and economic participation,<sup>312</sup> and their meaning is discussed as a “resource” for an ageing population.<sup>313</sup>

303 Schwarz & Sommer (2009), pp. 523 – 24.

304 E. g., Laslett (1995); Weiss & Bass (2002); Rowland (2012).

305 Philipp & Mayer (2005); Mergenthaler et al. (2015).

306 Ibid.

307 Statistisches Bundesamt (2020).

308 Böhm (2021).

309 Statistisches Bundesamt (2020).

310 Ibid.

311 Kruse & Schmitt (2010).

312 E. g., BMFSFJ (2005).

313 Klös & Naegele (2013).

These developments lead to conflicts of objectives between an ever longer period of paid work and an increasing need of care at home. On the one hand, the welfare state formulates the requirement of an uninterrupted full time employment, which is also a precondition for a sufficient pension. On the other hand, it becomes necessary to reduce the amount of paid work as soon as care work within the family is taken up. In this context, taking up care work within the family can also not only be due to a lack of supply of professional care. Rather, personal preferences in providing care for a family member and the costs of professional care also play a role. The latter refer to social inequalities on the labour market, which lead to unequal financial resources in overcoming potential conflicts of objectives between paid work and care work. Thus, for socio-economically privileged persons it is more likely that they are able to engage a professional nursing service in case care is needed and to continue working full time than for persons with a lower socio-economic status.

Moreover, due to the stepwise increase of the retirement age of two years since 2012, the reduction of incentives for early retirement,<sup>314</sup> better labour market conditions and an increased tendency towards employment as well as need for employment as a result of the growing risk of old-age poverty,<sup>315</sup> there is a longer period of employment in life and an increase in employment rates especially among older employees. Extended employment until age 67 and sometimes

even longer can collide with the increasing need for care work at home since this is especially carried out by the 55 to 67-year-olds. As presented, this primarily affects women. Families often solve this conflict in that women work part time, which negatively affects the expected amount of pension and increases the likelihood of poverty in old age. Or care work and thus inequality is outsourced by paying for external care and nursing services, in part in the form of very precarious working relationships, especially in the case of foreign live-ins.<sup>316</sup>

Results of international research also show, to different degrees according to countries, a mostly negative connection between care work and labour market participation. It is confirmed that care work leads to reduced paid work or, commonly, lower employment participation. Again, this concerns women more strongly than men.<sup>317</sup> In general, the strongest connections can be observed in time-intensive care activities, which are primarily carried out by women in working age. Compared to men, resp. non-care workers, they are less often in full time jobs and have a low income.<sup>318</sup> Women in mid- or late adulthood with low socio-economic status are less likely to completely leave the labour market if they care for a chronically ill or disabled family member.<sup>319</sup> This indicates that for these women, exiting the labour market is associated with particularly high losses and disadvantages. This finding underscores that labour market-related and gender-related inequalities have to be considered when assessing the connection between paid work and care work and the potentially resulting conflicts.

314 These measures mark the preliminary endpoint of a “double paradigm change” of German retirement policy (Bäcker et al. 2009): While a trend towards early retirement was demanded from the 1970s to 1990s in order to “make room” on the labour market for successive generations, a reversal of this development can be observed since the 1990s, which is expressed in the “retirement at 67” (Mergenthaler et al. 2017).

315 Kott (2021).

316 Edmunds & Habel (2020).

317 Kotsadam (2011); Moussa (2019).

318 E.g., Lilly et al. (2007); Bauer & Souza-Poza (2015).

319 Austen et al. (2015).

### 6.2.3 Increasing use of external care services

The conflict between paid work and care work is also solved by those involved by outsourcing care for family members to external care services. In this context, often live-in care personnel take over the activity in the form of a “24-hour-care”. Exact numbers on the extent of these employment relationships do not exist. Rough estimates, however, assume that 500,000 to 700,000 people are active in this form of activity.<sup>320</sup> These individuals, overwhelmingly women from Eastern Europe, live in intervals for a certain amount of time with those in need of long-term care, then again in their home country. It is therefore a form of commuting migration in which the time spent for care work mostly varies between a few weeks to up to several months.<sup>321</sup>

Legally, this is organized according to the “self-employed model” and due to the only partly legal formalization represents a “grey market”, which is expected to have the same volume as care work arranged via the black market.<sup>322</sup> Through the “self-employed model” it is possible to partly circumvent the German labour and social law. Therefore, this type of organization of external care services entails numerous problems, such as increasing demarcation of work and leisure time, resp. privacy among the care workers, low wages, hardly any local support in case of difficulties or in the sending countries.<sup>323</sup> Since the minimum wage does not have to be adhered to in the “self-employed model”, live-in care workers earn mostly 1,000 and 1,500 Euros per month in Germany.<sup>324</sup> Moreover, the extremely long

working hours without any (rules on) breaks are questionable from a legal and ethical perspective. They show that care workers are not sufficiently protected from exploitation, whereby their precarious situation on the labour market and in society is intensified.<sup>325</sup> On average, live-in care workers have a weekly working time of at least 69 hours.<sup>326</sup>

In contrast to the precarious working conditions and wages of live-ins, it can be assumed that the households of those in need of long-term care are mostly of persons of a better socio-economic status, since they pay a certain sum to the mediating agencies that is significantly higher than the monthly wage of the live-ins.<sup>327</sup> There is thus often an enormous social and economic disparity between the live-in care workers and the persons in need of long-term care and their family members. This not only leads to new social inequalities in the context of paid care, resp. nursing work but also intensifies existing inequalities between the genders as well as between domestic and foreign workers.

Against this background, international organizations such as the United Nations and the International Labour Organization have looked at the precarious working and living conditions of live-in care workers in German private households. They demand that live-in care workers are protected from exploitation and treated equally to employees of other branches regarding wages and the regulation of working hours.<sup>328</sup> These demands have so far been mostly neglected in the German public and politics.<sup>329</sup>

320 Lutz (2018b). A press release of the Bundesverband für häusliche Betreuung und Pflege (VHBP) in January 2022 mentions similar numbers, online: <https://www.vhbp.de/aktuelles/detail/pressemitteilung-berlin-12/>

321 Emunds & Habel (2020).

322 Emunds & Habel (2020).

323 E. g., Lutz (2018a).

324 Bucher (2018); Rossow & Leiber (2019).

325 Emunds & Habel (2020).

326 Hielscher et al. (2017).

327 Emunds & Habel (2020).

328 UN-CESCR (2018); ILO-CEACR (2017).

329 Emunds & Habel (2020).

In the “sending model”, which is among others widespread in Austria and often viewed as an alternative to the “self-employed model”, the care worker is employed at an agency abroad. This agency, in turn, commits itself to the private households via contract to take over the care work.<sup>330</sup> In this model, the social security regulations of the sending country remain valid, which mostly means lower additional costs than in the “self-employed model” so that the service can be provided cheaper. In the “sending model”, there are also grave legal problems. For example, similar to the “self-employed model”, working hours exceed the legal maximum of 48 hours in most cases by far.<sup>331</sup> The “sending model” is thus based on the practice that the state does not control the working hours of live-in care workers.<sup>332</sup>

wishes of the people.<sup>333</sup> Not only women but also men are dissatisfied with this division of work. Current surveys of the Institut für Demoskopie Allensbach (IfD) conclude that almost half of all fathers (45%) with children under ten years of age would prefer a division of childcare within the partnership. Only a fifth of all fathers (17%), however, state that they actually practise such a division of childcare. Often, financial motives are named as reasons.<sup>334</sup> The German tax and transfer system sets financial incentives that promote an unequal division of care work and paid work. The interplay of splitting income taxation of couples (Ehegattensplitting), taxation of income through mini-jobs and the cost-free co-insurance of spouses in statutory health insurance favours a division of work in line with the “additional income model”.<sup>335</sup>

### 6.3 Recommendations for action

If politics has the goal of reducing the above-mentioned inequalities and to increase employment among women, then the following recommendations for action could be appropriate steps.

#### **Step 1:**

#### **Promote the more equal distribution of paid work and care work through changes in the tax and transfer system on a governmental level.**

As shown above, the “additional income model” that is currently practised in Germany by a majority of couples has several disadvantages. In addition, the unequal distribution of paid work and care work does not always reflect the

In order to support a more equal division of paid work and care work, reforms are necessary, for example, the expansion of the “partner months” (Partnermonate) in parental benefits and a rearrangement of splitting income taxation for couples (Ehegattensplitting) to a ‘Realsplitting’ with low amount to be transferred. At the same time, Mini-jobs have to be abolished or should only be accessible to pupils, students as well as retired people. Other measures are conceivable as well, such as a ‘family work time’ (Familienarbeitszeit), in which parents, after the end of parental leave, resp. parental benefits, receive a transfer payment for some years if both parents are employed part time with near full-time working hours.<sup>336</sup> Taken together, these measures could help reduce the gender care gap.

<sup>330</sup> Ibid.

<sup>331</sup> Bucher (2018).

<sup>332</sup> Rossow & Leiber (2019).

<sup>333</sup> E. g., Beckmannshagen & Schröder (2022).

<sup>334</sup> BMFSFJ (2021), pp. 10–11, 16.

<sup>335</sup> Blömer et al. (2021); Lembcke et al. (2021).

<sup>336</sup> Müller et al. (2018).

**Step 2:**  
**Promote the social and socio-political equivalence of different forms of work**

Unpaid or low wage work in the informal sector, such as the above mentioned care and support activities, play an important role economically (keyword: care-economy). They should therefore not only be upgraded socially but also taken into account socio-politically. Among others, wage replacement benefits in case of care-related interruption of paid work, as is mentioned in the current coalition contract of the Federal Government,<sup>337</sup> could serve as a role model. The same holds for the existing recognition of ‘education time’ for children in pensions.

**Step 3:**  
**Provide infrastructures in nursing and care and qualified personnel**

An equivalent model of paid work and care, in which paid work and unpaid care work are equally divided among the genders, requires reliable infrastructures for care work outside the house. Aside from day-care for children of all age groups until school entry as well as all-day schools, resp. afternoon supervision for school children, we here also mean outpatient and inpatient care institutions, resp. services, that guarantee a professional or voluntary care of chronically ill or disabled people.

Since the mid-2000s – especially in Western Germany – day-care for children under three years as well as afternoon care for school children has been massively expanded. Since 2013, from its first birthday, every child has the right to

a place in a day-care centre. Calculations of the German Youth Institute (Deutsches Jugendinstitut (DJI)), among others, show, however, that in many regions of Germany, day-care places are lacking.<sup>338</sup> Therefore, the expansion of day-care places for children until school entry needs to continued, also the afternoon supervision for elementary school children, whereby the quality of the supervision must not be neglected.<sup>339</sup>

Due to demographic change and the associated increase of older and very old people, the need for outpatient and inpatient care will continue to grow in the coming years. This, accordingly, also concerns the care personnel in hospitals or rehabilitation institutions. A political reaction to this challenge was the “Konzertierte Aktion Pflege” (KAP), which since 2019 has announced measures and targets across departments in order to improve and continuously evaluate the professional conditions as well as vocational and continuing education of care personnel in Germany.<sup>340</sup> Concretely, it is about the vocational education of care workers, the attractiveness of the care profession and the overall expansion of care personnel, also via targeted immigration from abroad. Promotion of the announced measures should continue in the future and, if necessary, be further developed and adjusted to changing framework conditions. The challenge here is to improve the supply and quality of professional care services and at the same time increase the attractiveness of the care profession.

337 See the coalition contract 2021-2025 between SPD, Bündnis 90/Die Grünen and FDP under: <https://fragdenstaat.de/dokumente/142083-koalitionsvertrag-2021-2025/>

338 Hubert et al. (2019).

339 E. g., Stahl & Schober (2020).

340 Bundesministerium für Gesundheit (2021).



**Step 4:  
Recognize paid care work  
financially and socially**

Aside from informal, unpaid care work in the private environment, paid, resp. professional care work plays a central role in supporting ill persons and those in need of long-term care. During the Corona pandemic, it came to public attention what kind of burdens the care personnel in clinics and retirement homes is exposed to and how comparatively low the wages are for these socially highly relevant professions.<sup>341</sup> Adequate wages and a corresponding societal recognition of care professions are important in order to make these professions more attractive in the future and to counteract the scarcity of skilled workers. In particular, the precarious situation of live-in care workers from abroad needs to be improved. This includes legal regulations of the currently uncontrolled labour market for these care workers, higher wages, qualification opportunities and more local support.

The financial means that are used for the care sector in Germany are currently much lower than in other European countries and should be upgraded in the future. Thus, results of the research project “Assessing Needs of Care in European Nations” of the German Institute for Economic Research (DIW) show that in Denmark or Finland, people have to pay a lower amount themselves for inpatient care than in Germany, and governmental support is already granted in cases of low need of care (e. g., help in the household).<sup>342</sup> Regarding expenditures for care measured as percentage of the GDP, Germany was in 2016 with 1.3% below the EU average of 1.6%.<sup>343</sup> The

Netherlands (3.5%), Sweden (3.2%) and Denmark (2.5%) had significantly higher care expenditures than Germany, which is largely due to different financial and performance structures of the care systems.<sup>344</sup>

**Step 5:  
Improve reconciliation of longer  
paid work and care work**

Informal care work of older people is an important contribution to solidarity between the generations. At the same time, a prolonged labour participation is an important building block for the stability of pensions and mitigating the decreasing number of employees in the course of demographic change. Both areas of activity can therefore be understood as potentials of older people in an ageing society through which their reconciliation in the second half of life increasingly moves into focus. Especially among older women there is a relatively high risk for conflict between longer employment and-family care work. Flexible work models, such as remote work regulations or working time accounts, could be appropriate instruments to defuse this conflict. In this context, politics and the employers are required to create corresponding framework conditions, resp. to further improve existing models. This includes recognizing the diversity of the life phase “older age” and to counter, resp. prevent, discrimination against an allegedly “unproductive” ageing.

<sup>341</sup> Schrenker et al. (2021).

<sup>342</sup> Schulz (2012).

<sup>343</sup> European Commission (2018).

<sup>344</sup> Kraus et al. (2020).

## 7 The activity-oriented society and the constructed environment

### 7.1 Introduction

In a position paper on the future of work, a chapter on the constructed environment may come quite unexpected. We think it is imperative. The organization of work and the maintenance of the work force have always been dependent on the smart conception of cities and spaces. In the 19<sup>th</sup> century, cities could not have grown so fast nor become so highly dense if city planning had not faced the numerous spatial and social challenges and had not found innovative solutions. This included fighting pandemics through improved public health and hygiene. Thus, for example, the sewer system of Paris conceptualized by Georges-Eugène Haussmann for rain-water was fundamentally redesigned to also uptake wastewater and faeces from individual houses.<sup>345</sup> In addition, public parks as the “green lungs” of cities have created at least partly a balance to the narrow and polluted residential districts and thus improved the health of workers.

Mainly due to health considerations on maintaining the work force, the model of a functionally separated city emerged in the 20<sup>th</sup> century, in which industrial sites and residential districts were strictly separated. Correspondingly, cities were planned new, re-organized and made less dense.

Today, the concept of the functionally separated city comes under pressure. It is criticized as being too stiff and con-

sidered as unsuitable to react to the new challenges of defossilization, digitalization, and the associated stronger spatial linkage of paid work and non-market-related activities. The Corona pandemic made this abundantly clear. Here, rapid and non-bureaucratic action was required to react to the new circumstances. Considerations to better prepare buildings, living quarters, and cities for future challenges received an enormous boost. The city was (again) understood as an “epidemiological laboratory” through which the reconstruction to resilient and liveable cities could be accelerated.<sup>346</sup>

These considerations were supported by technological opportunities, in particular digitalization. Thus, especially activities that could be carried out digitally at the work desk received a boost in innovation and a hitherto hardly conceivable flexibilization. In these professional branches, paid work has left its previous workplace in part or entirely, shifted to the private sphere or takes place at a “third place”, for example, in “co-working spaces”, as well as cafés, libraries, public parks or hotel rooms. The mobility of the employees has changed accordingly, so has their social interaction with colleagues, the spatial quality of their workplace, the need for room in the own apartment as well as their consumer behaviour.

Since the advancing digitalization is changing also industrial processes in particular, with the concept of the “urban

<sup>345</sup> Gandy (1999).

<sup>346</sup> DeLanda (2000); McNeill (1977).

production” the previously strictly drawn boundaries between industrial sites and residential districts – and thus between the world of work and the life world – can be dissolved in a stepwise manner. Thus, it can be observed that manufacturing industries more frequently move from suburban isolation back to the urban, inner city context.

While at first, these were smaller craft trade companies and manufactories, it is now increasingly entire factories that can again become a good neighbour in the urban environment through forms of production that save place and have lower emissions. The manufacturing industries benefit from better access to urgently needed skilled workers, a connection to public transportation, and the opportunity to network with cooperation partners, such as institutions for research and development.<sup>347</sup>

A prerequisite for urban production is that it is suitable for the city, which is given “... when it treats spaces and resources economically, when it follows the key objective of the compact city with short distances, enables the maintenance of climate goals and does not oppose a social mixture and urban lifestyle as well as a European image of a city”.<sup>348</sup> With new concepts for logistics and traffic or closed biogeochemical cycles, conflicts of use can be avoided if, due to companies with low emissions moving into residential districts, living quarters emerge that are again more mixed and long distances to work can be saved. As already described (see Chapter 4), however, not all socio-economic groups benefit from this development. Low-income groups feel the consequences of “re-urbanization” because the rents in inner-city living quarters increase. Processes of displace-

ment, which can already be observed in large Western European cities, accelerate: people with low and medium income, for example, in care and service professions, in craft trades, even teachers, can hardly afford living in the city anymore.

Additional pressure for action has emerged due to the ever more obvious effects of climate change. As a consequence, a greater willingness for sustainable planning can be observed. The necessity of a reform in construction, changed mobility behaviour and new spatial concepts concerns all places of life and work, from the single-family home to the factory hall, from the day-care centre to the hospital to the industrial park.

At this point, we cannot sketch out all facets of this development. We thus intentionally focus on office work, which has been massively subject to changes since 2020.

## 7.2 Building design for the office work of the future

### 7.2.1 Dissemination of remote work

In recent years, mobile working/remote work, in particular working from home, has increasingly disseminated (see Chapter 4 for details). For the constructed environment, different challenges have (re-) emerged as a result, especially regarding flexible use of living space, changed mobility behaviour, and the provision of public spaces for encounters.

Separate, resp. quiet offices or work areas are difficult to install in many apartments at a later stage due to lack of space. It is often impossible to divide large rooms with little effort and to adjust them to changing uses. Commonly used spaces that are also temporarily suitable for paid work are rare in apartment buildings.

<sup>347</sup> Läßle (2020), p. 16.

<sup>348</sup> Klanten & Schmitt (2020), p. 119 (our translation).

**Box 7a:**  
**Conversation about modular  
 and common living units**<sup>349</sup>

A current project of reference in housing, which unconventionally deals with the issue of the “shared spaces” and aims to give space to a new model of living together, is the assembly house “Kufu 142” at the corner of Kurfürstenstraße and Frobenstraße in Berlin. It was conceptualized long before the pandemic and finally completed in 2022. It was built according to the plans of the office June14 by Johanna Meyer-Grohnrügge and Sam Chermayeff and is described as a “house for the future ... , because, with its open rooms that can be interconnected in various way, it is prepared for a society whose needs and wishes regarding living are still unknown”.<sup>350</sup>

The house consists of 20 apartments between 64 and 140 square metres, four business units and a roof terrace that can be used commonly. It consists of six towers that overlap vertically and horizontally, whereby the stories interlock like fingers. All apartments are oriented towards the street as well as a green inner courtyard and open up to these with storey-high glass windows. In addition, all units have a 50 square metre large room across two

storeys which is connected to several smaller and lower areas. There are no hallways and with the exception of bathrooms also no inner walls.

The lower areas are between 2.30 and 2.50 metres high. They emerge due to the overlap of the respective neighbouring apartment and can thus theoretically belong to any of the units or be used commonly by both. That means, the determination of apartment layouts when moving in can be changed at any time, new breakthroughs are possible everywhere. The architects say that the structure calls for reconsidering the common definition of community: the entire building can be opened since every room is connected to many others. They invite the inhabitants to continuously renegotiate the boundaries between them and their neighbours, to give up a certain amount of privacy and withdrawal, and to dare the opening of new spaces for common interests and conviviality. These forms of living thus also stimulate a rethinking about regular housing.

<sup>349</sup> The conversation was held with the architect Sam Chermayeff on September 29, 2022.

<sup>350</sup> Maak (2022) (our translation).

### 7.2.2 Changes in the office worlds

The Corona pandemic has disrupted previous conventions and guidelines for workplaces by introducing the rule of keeping a distance of 1.5 metres to others. The number of participants in meetings in conference rooms had to be reduced, regular airing was recommended, but in many offices not possible due to mechanic air conditioning, narrow hallways and small elevators could only be used individually. Seating arrangements and office concepts are continuously discussed since narrow spaces remain places of discomfort even after the pandemic has ended. During the lockdowns, classic “cell”-like offices that can be used individually or interchangeably and which were considered outdated in recent years, have proven to be much more suitable in times of crisis than open space solutions because people were able to continue to work in them after agreeing on a schedule.

At the beginning of the pandemic, it was assumed that less office space and thus fewer office buildings would be used in the future since some employees would remain in remote work after the end of the pandemic, at least for some days. Initial prognoses, according to which companies could save a significant proportion of space as a result – PWC named a value of up to 20% in October 2020 – and a large real estate crisis could even emerge, were meanwhile discarded and replaced by much more moderate estimations. Many employees have returned permanently to the office for the majority of weekdays and also so-called flex-workers need a workplace if they come to the office spontaneously or for group discussions. This requires spatial buffers.

There are indications that traditional work patterns of office and home dissolve and some functions change their location: as was experienced by many employees, quiet and concentrated work is better possible at home.<sup>351</sup> A return to the office is especially perceived as positive because it is associated with social encounters, exchange, and common experiences.<sup>352</sup> New, post-pandemic office concepts therefore intentionally involve leisure time-oriented, seemingly private usages, such as wellness and sports opportunities or a common kitchen in which people can cook together.

The experiences with remote work showed companies and employees “for what one needs the company workplace and for what one does not”.<sup>353</sup> Creative exchange is more difficult to achieve in video conferences than in personal meetings. For this purpose, “real” and stimulating spaces are helpful in which planned or spontaneous meetings can take place and people can work together.<sup>354</sup> According to different prognoses, in areas of activity where this is possible, remote work for around two days per week will become the norm.<sup>355</sup> Thus, a balanced mixture of retreat and community between home and office could develop in the long term.

351 E. g., Ipsen et al. (2021).

352 Pfnür et al. (2022).

353 Ibid. (our translation).

354 Ibid.

355 Reintjes (2022); Corona Datenplattform (2021); see also Box 7b, Expertengespräch SAP.

**Box 7b:**  
**Expert conversation on**  
**the future of office work**  
**after Corona at SAP**<sup>356</sup>

Since a majority of SAP employees had already been equipped with digital tools for mobile working before the pandemic, it was possible to very quickly shift the entire personnel to remote work at the beginning of the pandemic. 80% would like to work flexibly also after the pandemic, as a survey in 2022 among SAP-employees revealed. Accordingly, SAP promises its employees in the framework of the global “pledge to flex” initiative a “hybrid work model for every role, every style of work along individual needs” – in line with local legislation and business requirements. The expanded flexibility affects three areas: “flex time”, “flex location”, and “flex workspace”. This means that employees can design their working hours and their workplace flexibly in agreement with their boss as long as it can be reconciled with their tasks and the customer and business requirements. The company provides opportunities for remote work which support the physical and mental health of the employees, such as, for example, advanced training on improved self-organization, mindfulness trainings, ergonomics, and virtual fitness courses. According to our conversation partner, the social partners welcome and support this approach – it is important that working from home does not become an obstacle to promotions.

In the sense of the “flex workspace”, the company adjusts the spatial design of the offices

to new forms of usage in a stepwise manner. The objective is a flexible and modular design of the offices, which should be usable for different purposes. The declared goal is to offer “for every task a suitable room”. It is distinguished between four main activities: “concentration” (individual and focused work), “collaboration” (project work, creativity, workshops), “communication” (telephone conferences, meetings) and “community” (informal knowledge exchange, breaks). While the area of “concentration” in the past often took up around 75% of the office spaces, demand for it will be significantly lower in the future. Correspondingly, the proportion of workplaces for “concentration” decreases, and the spatial need for “collaboration” and “community” increases.

SAP expects a balance between office work and “remote work” in the future, whereby the office is supposed to continue to play an important role as a place of social encounters in the sense of a “modern campfire”. The goal is that the workplace is no longer perceived as an obligation but rather as a destination – as an attractive place where one likes to meet for personal exchange or to use office equipment suitable for creative work. The first of such “employee worlds of experience”, as SAP describes these locations, operate already in London, Zurich, and Sydney, soon also in Berlin.

<sup>356</sup> This conversation was held on March 1, 2022 with Dr. Christian Schmeichel, Chief Future of Work Officer, SAP SE.

### 7.2.3 The third place: co-working

While the traditional functions of office at home and workplace undergo rearrangement, a “third place” benefits.<sup>357</sup> These outsourced workplaces can be parks, cafés, or public buildings with free internet access. As a commercial service, co-working in principle serves the desire for a third place, i. e., for an opportunity to work flexibly outside of the office and the home – with proportionately usable technological infrastructure, perhaps even secretariat services or catering, ideally in the company of others from whom and with one learns and shares one’s knowledge. This principle is not new and has received a noticeable boost already before the Corona pandemic. According to the Bundesverband Coworking, the number of locations between 2018 and 2020 has increased from around 300 to around 1,200. A global, non-representative survey among providers of co-working spaces in December 2021 revealed that most companies (67%) recorded a further increase of user numbers in the previous three months and expected even higher numbers for the following quarter. Nearly 50% of the providers also viewed the growth of employees, spaces, and sales positively.<sup>358</sup> Originally conceptualized for solo-self-employed people, co-working spaces became attractive during the pandemic also for those employees who were not able to come to the office, did not have adequate workplaces at home, or did not want to work alone at home.

So far, co-working spaces mostly emerged in central, inner-city areas, often through using already existing spaces and buildings. Meanwhile, new buildings are also constructed for this purpose. If private or publicly operated co-working spaces are run with the corresponding intention and equipped with advanced opportunities for use (see Box 7c and recommendations for action), they can have a community-promoting effect beyond the mere purpose and become fixed as a “third workplace”. The operators of these places would then become community managers who contribute to networking, bring people together and create communities.

For large enterprises, thinking in decentralized structures could increase the significance of their own “third places”: instead of a headquarters to which all employees commute, worlds of work could be created, which are less representative but communicative and nearer to home, rented, or even shared with other companies.<sup>359</sup> According to a March 2022 report by the Institute of Labor Economics (IZA) assigned by the Federal Ministry of Labour and Social Affairs, a public funding of co-working spaces can make sense particularly in rural areas to strengthen regional structures.<sup>360</sup>

357 Cf. Müller (2021).

358 Deskmag (2022).

359 Cf. Müller (2021).

360 BMAS (2022b).



**Box 7c:**  
**Expert conversation on the topic**  
**“third places” / co-working<sup>361</sup>**

The “betahaus” is a pioneering project for the idea of co-working in Germany, which originated in 2009 through an initiative by students in Berlin-Kreuzberg. The goal was to create an innovative and unconventional workplace for solo-self-employed people, knowledge workers, and creative artists, which is characterized by openness, collaboration, and the willingness to generate knowledge and share it with others. The project developed into a company with several locations, first in Germany, then in Europe.

The original offer consisted of moderately equipped office workplaces that could be booked via daily, part-time or full-time tickets, and a café that was to serve as a social meeting place and was to contribute 50% of the revenue. This division of space was, however, discarded so that the project would finance itself. So-called maker-areas with workshop-like character were added as were conference and event spaces. With the development of Berlin as a location for start-ups, also “incubator areas” were provided, which, in contrast to the actual “betahaus” spirit, were rather closed off from each other.

In the concept of the “betahaus”, the café has an essential social function: it is the creative core, promotes informal exchange and brings people together via events. With its street location, the café is easily accessible and can lead to unplanned encounters and therefore also to networking, creativity, and innovation.

As our conversation partner emphasizes, a successful co-working space is much more than rented spaces with desks and Wi-fi access but a contact and job forum and an expression of a personal style of work. While the idea of the “third place” increasingly gained importance during the Corona pandemic, the revenue of the “betahaus” rather decreased in this period, one location even had to be closed. Some new customers for individual workplaces were added and companies acquired co-working tickets for employees who worked at home under tight conditions. However, due to the rules of distance-keeping, rentable space was lost so that a significant amount of revenues was missing. Revenues generated through events also discontinued.

Co-working opportunities in part also emerged in rural regions. In Oderbruch, Brandenburg, for example, a project was installed in an old elementary school, which also contributed to bringing more life to the village. Usually, a large part of the population leaves the village in the morning to commute to work. Some of those who take advantage of this rural “third place” actually live in the city but converted their weekend houses into their permanent place of residence in the course of the pandemic. Even local farmers, who organize their organic cultivation digitally, take recourse to co-working offers. Co-working in rural regions, however, often faces the problem that a sufficient internet connection is not everywhere available.

<sup>361</sup> This conversation was held with Tonia Walter, co-founder of the “betahaus” Berlin on April 5, 2022.

Other arguments speak for co-working: additional and improved, also publicly funded co-working offers could provide employees, who live in confined conditions at home, with quiet and technically well-equipped workplaces. Employees who can afford it and who want to be able to decide themselves as to how and how much they work could be encouraged to give up classic employee relationships and work independently. A stronger dovetailing of co-working with companies could entail mutual synergies. If companies take advantage of large spaces in co-working spaces, they could co-finance affordable individual workplaces; in return, innovative forms of work and a creative start-up spirit could be brought into the companies.

### 7.3 Urban and residential development for the activity-oriented society

#### 7.3.1 City and countryside

Urban development policy currently almost exclusively focuses on the inner cities or inner-city residential buildings. The model of a polycentric urban development could help in focusing more on the inner-city peripheries as well as regional ties and infrastructures. Particularly during the pandemic, it became apparent that the contrast between city and countryside as well as classic models of inner city, periphery and hinterland miss the reality of the complex spatial interconnections.

Currently, a new appreciation of rural spaces as opportunities for retreat can be observed, connected with a massively increased demand for a freestanding single-family home with a garden. This appreciation of rural spaces is to be viewed as positive, whereas the further construction of single-family houses is

not, as this is associated with ecological dangers of soil sealing and increasing individual mobility.

Whether the urban exodus of mobile employees will be permanent or whether the inner cities will be revived through new forms of work remains to be seen. Accordingly, little can be said about the development of the individual traffic in the inner cities. Due to the changed shopping behaviour during the pandemic, many department stores and small shops had to close down. There was a growing vacancy rate and the inner cities threatened to become deserted. At the same time, apartments are urgently needed. Here, new approaches to repurposing are required to revive the inner cities, as are courage, and the willingness to take risks. A more flexible design, resp. quicker opportunities for changing construction plans could pave the way for other usages. Long-term vacancies should be made unattractive for owners and investors through higher taxation.

#### 7.3.2 Residential quarters and public space

Under the influence of the pandemic, the public space, especially any type of green space, has received enormous upgrading. It became a place of social encounters and not least of paid work. Moreover, the own neighbourhood and the short distances to things of daily need have gained in importance. It became very apparent which areas were already quite well positioned and where urgent action was necessary to ensure just and balanced access to appropriate opportunities within the cities. This is especially true for dense urban quarters. They urgently require free spaces, green zones, and parks that can be accessed easily by foot and serve as a balance, alternative, and extension of working from home and as a desperately needed recreation area.

### 7.3.3 City of quarters: a sustainable urban life form

The reorganization of a functionally separated city into a city of functionally mixed neighbourhoods has at least two important advantages: in the sense of the activity-oriented society (“Tätigkeitsgesellschaft”), it makes it easier to connect paid work and other activities with each other. Moreover, it also supports the urgently needed transformation of our cities to climate neutral systems. A defossilization of our urban societies can only be achieved through fundamental transformations in mobility, energy, and construction. The example of many European cities like Barcelona or Copenhagen already shows that a consequent dismantling of the automobile-friendly city and fossil infrastructures makes sense ecologically and socially and is future-oriented. Sealed logistic spaces as well as polluted and noisy roadways can be transformed into a city of short distances, public spaces and new as well as mixed types of living, working and activity in general, which offer a significantly higher quality of life. As a consequence, it is difficult to imagine expert discourses and public debates on the socio-ecological transformation of European cities without referring to concepts such as “automobile-free neighbourhoods”, “superblocks” or “15-minute cities”.

Barcelona with its so-called superblocks provides a groundbreaking example of the socio-ecological transformation of a city in the sense of a sustainable activity-oriented society. In this context, nine housing blocks were re-organized so that inner streets were completely freed from traffic and converted into spaces of neighbourhood and social encounters. Sustainability assessments clearly show that this reorganization has positively influenced the local economy, public health, and social cohesion, while at the same time, the consumption of fossil fuels, carbon-dioxide emissions and air pollution could be reduced.<sup>362</sup> The ideal of the “15-minute city”, to which Paris is committed, is to be viewed similarly positive. It stands for a city of short distances in which inhabitants can reach workplaces, apartments, schools, shops, and leisure time opportunities in the shortest amount of time – with the bicycle as the main means of transportation. Correspondingly, many of the inner-city traffic axes could be deconstructed without large protests. In Hamburg and Berlin, too, there are approaches towards a transformation of traffic by deconstructing streets in neighbourhoods. Here, however, also the potential for social conflict of transforming cities is apparent, as banning motorized traffic and creating green areas can accelerate local dynamics of gentrification.

<sup>362</sup> Zimmermann & Zimmermann (2020).

**Box 7d:  
Barcelona's "superblocks" as an example  
of a sustainable urban re-development**

In 2016, the municipal administration of Barcelona passed a concept for sustainable mobility to counteract the high volume of traffic in the inner city and its associated air pollution. At the core was the "Superilles programme 2016 – 2019" in which the city council identified several districts in the historic C rda Plan area for a reduction of traffic. The idea was to reorganize nine of the characteristic square housing blocks and to summarize them to a 400 by 400 metre large "super island". The streets within the super island were to be mostly free of traffic and turned into neighbourhood spaces. The programme was first tested in 2017 in the Poblenou quarter in the district of Sant Marti, a former industrial area that was thus less densely populated. The pilot project was initially met with resistance by business people and those dependent on automobiles and received mixed reactions from residents. One feared disadvantages as a result of the restricted through traffic, one-way streets, and speed limits to 10 kilometres per hour or lack of parking spaces. Thanks to a transparent, participatory procedure local conflicts could be solved creatively. The feared dying of businesses did not occur and the pilot project was a success. In 2018, the project was awarded the European Prize for Urban Public Space. International media also celebrated the project as a breakthrough and under the name "superblocks" it became one of the most important projects of reference in the European discussion on the transformation of traffic.

Thanks to the uniform inner-city grid in Barcelona, the experiences collected in Poblenou could be used in the planning, participation, and implementation of measures for the entire city. The superblocks quickly became the (still today) most important model for an integrated sustainable urban re-development. Aside from the original intention of reordering mobility and conquering air pollution, there is meanwhile a much broader

spectrum of objectives: "The goal is to create a healthy, greener, fairer and safer public space that promotes social relations and the local economy".<sup>363</sup> The urban re-development not only enables a better quality of life but also fosters a stronger mixture of usage of the residential areas (living, working, and leisure time) and climate adaptation through the ecosystem services associated with unsealing and greening of soils. Science-based sustainability assessments also confirm that urban re-development has a positive effect on local economy, public health, and social cohesion and contributes to reducing consumption of fossil fuels, carbon-dioxide emissions, and air pollution.<sup>364</sup> The concept of re-development proves to be robust and able to change with regard to the integration of new objectives. Currently an expansion of the programme through measures of housing policy is discussed to counter problems of gentrification within the traffic-restricted, and thus upgraded, areas.

In the long term, up to 503 superblocks are supposed to be built. 60% of the streets previously used by automobiles would become free for other purposes as a result. A study of the Barcelona Institute for Global Health (BCNecologia Barcelona) under the leadership of Salvador Rueda<sup>365</sup> shows which positive effects the implementation would have: accordingly, the life expectancy of the inhabitants would increase by almost 200 days. The reduction of exhaust gases would lead to less noise and fewer heat islands – and could prevent almost 300 early deaths per year. According to the study, private usage of automobiles could decrease from 1.19 million rides per week to 230,000. The emission of nitrogen dioxide would be reduced from currently 47 micrograms per cubic metre air to 36 micrograms – and thus fall below the reference value of 40 micrograms of the World Health Organization.<sup>366</sup>

363 Quotation of the official project website of the city administration: <https://ajuntament.barcelona.cat/superilles/en/>

364 Zimmermann & Zimmermann (2020).

365 Rueda (2019).

366 <https://www.barcelona.de/de/barcelona-superblocks.html>

## 7.4 Multifunctional spaces and a new culture of sharing

In the cities and in architecture, the boundaries between hitherto clearly separated spheres and activities become blurry – and thus reflect the work in the activity-oriented society. This “merging” concerns activities at home and in the office, in public and private spaces, inside and outside, as well as at private or shared locations. New zones of overlap have emerged that can promote encounters and exchange, the quality of which and positive impact on wellbeing and health has to be ensured.

In this context, “sharing” receives a new meaning, both literally and figuratively. What has frequently developed out of necessity – a workplace in the office is often not only reserved for one person alone but used interchangeably; the number of several users of flexibly shared co-working spaces increases; business meetings are held on park benches; a living room table in part becomes a desk for work – can become a new guiding motive. For this, new concepts for hybrid, common usages, for a “shared” public space, divided buildings, rooftop gardens, spaces, furniture and many more, are required. This sharing also makes reconciliation of different types of activities easier – be they paid work, voluntary work, or care work – in the activity-oriented society. Co-working spaces then are located within walking or bicycle distance, offices are built in a more flexible manner and possess an interior design that enables different seating, standing, and mobility positions, new forms of common catering in community rooms emerge.

All these developments offer new and special opportunities for a solidary, sustainable, and healthy activity-oriented society inspired by the common good. This and a culture of sharing should be promoted and appreciated.

## 7.5 Recommendations for action

### 7.5.1 Flexible solutions in construction

- In private apartments, suitable space for work activities needs to be provided, for example, through solutions in construction for more flexible apartment layouts, more spaces in apartment buildings that can be used commonly or for work;
- Office worlds of work have to be built socially and ecologically sustainable, be flexibly usable and adjustable to change between remote work and in-presence work or varying work volume;
- Office worlds of work need to provide space for informal working, breaks, recreation, and interpersonal exchange (e.g., via outside areas such as balconies, loggias, and green roof gardens);
- Office worlds of work have to preserve and promote health, for example, through less sitting, more movement, and changing situations of work, a healthy work climate through natural air circulation or high quality air filters.

**7.5.2 “Third places”, resp. co-working areas**

- The number of “third places”, resp. co-working areas should grow in general, particularly in rural regions. These workplaces should be close to home and connected to public transportation; in the future, they should be mandated in newly constructed living quarters per “workplace key”<sup>367</sup> and, in inner cities, preferably be located in vacant buildings in order to reactivate these;
- “Third places”, resp. co-working areas should not only be operated in the private sector but also (co-)operated municipally, publicly funded, and declared as tenants worth protecting if they have a community-promoting function and come under pressure; they should, if possible, be combined with public usages and developed into neighbourhood centres that are easily accessible for all interested parties.
- In residential quarters, diverse and easily accessible spaces or zones for social encounters and exchange should be provided that (other than conventional parks) are furnished with seating areas and tables so that, aside from recreation, also working and teaching is possible in fresh air;
- In residential quarters, hybrid outside areas such as balconies, loggias, and green rooftop gardens for informal working, breaks, and recreation should be promoted;
- In residential quarters, access to healthy, reasonably priced nutrition (e.g., in market halls) and exercise, e.g. through bicycle fast lanes and an infrastructure for pedestrians should be promoted.

**7.5.3 Functionally mixed neighbourhoods**

- In an activity-oriented society urban and residential planning should be conducted in a way that promotes the common good and solidary, healthy working through decentralized, public service close to home – in the sense of a polycentric urban development, resp. a “15-minute city”;
- In residential quarters, a high density of formal and informal opportunities such as co-working centres, office hubs or societal workspaces for flexible activities should be provided;

<sup>367</sup> Cf. Müller (2021).

## 8 Towards an activity-oriented society: five fields of action

There is no blueprint for the path to a just and sustainable activity-oriented society (“Tätigkeitsgesellschaft”) that can face the enormous challenges of our time. The individual developments are too contradictory and the consequences of external interventions can often not be assessed. At the same time, the current crises require an economy that is oriented towards the common good in which collective goods and natural resources are protected to preserve the livelihoods for all. Therefore, a “carry on” is increasingly unrealistic and it would be irresponsible to not want to work towards change.

The world of work is currently undergoing a structural transformation – that is the starting point of the present position paper. What counts as work? Who decides about what counts as work? Whereby should the use for the individual and for society be measured? The debates of the last years about such questions, also and in particular during the pandemic, show that the public in Germany is struggling with regard to a new understanding of work and its role in society. Corresponding discourses can be understood as search movements with open results.

In this position paper, the interdisciplinary research group therefore aimed to identify relevant developments and to formulate recommendations that can support the common quest for answers in politics, economy, and society.

We oriented ourselves along the image of the activity-oriented society described at the beginning. In the 21<sup>st</sup> century, it is timely and necessary to no longer narrow down work to paid work but to also recognize non-market-related activities as work. Accordingly, the concept of work is to be understood much broader, and the spectrum of associated activities is to be expanded, even if they only indirectly prepare the monetary income or go beyond it. Activities that have hitherto hardly or not received any appreciation thus gain a higher recognition in politics, economy and society. In the design of new forms of employment, the role of other activities in the life of the working population is considered. For this purpose, transitions between the different forms of employment and activities as well as criteria for their assessment are to be newly developed.

Overall, it is about a holistic picture of work: from the perspective of the dependent employees, we see an employment biography in which a productive relationship between paid work and other activities is sought for. In this context, a co-existence of different productive activities independent of age and gender (e.g., paid work and continuing and advanced education or family care work) could replace the relatively stiff sequence of vocational education, paid work and retirement. This age-integrated life course could also contribute to better promoting the potentials of older people without which the demographic change cannot



be overcome. From the perspective of the employers, we observe a new look at the added value that can be measured in the treatment of all those involved and thus takes account in a timely manner of what are the basics of good business management in a social market economy.

These aforementioned considerations can be summarized in five imperatives for action that sketch out initial contours of an activity-oriented society.

### 8.1 Adapting employment biographies to demographic change

A higher flexibility in the relation between paid work and other forms of activities in the life course is necessary for the transition into an activity-oriented society. Especially due to demographic change, there need to be more room for unpaid work and better and more flexible opportunities of (at least partly) paid work in certain stages of life, for example, in old age. Concrete measures for a more flexible life-course-oriented design of work are, among others, to expand the possibility of sabbatical months or years as well as replacing the mandatory retirement age by a retirement window in which people can choose their entry into retirement themselves.

Moreover, a re-entry into the labour market in later adulthood should be made easier if this is desired by individuals. In this context, a stigmatization of allegedly “unproductive” older people, who from a certain age on cannot or do not want to be available for the labour market anymore, has to be avoided. A future-oriented and activity-oriented design of work also includes supporting the re-entry into paid work after other phases of activity.

In addition to such a life course-oriented design of working time, a reliable care and nursing infrastructure is also important. For this, it is necessary to expand all-day offers in day-care centres and schools and to guarantee all-day supervision for children in all age groups until school entry. This, however, also includes the expansion of outpatient and inpatient care institutions and services for chronically ill or disabled people.

### 8.2 Adapting organizational forms of paid work to digital change

A re- and new assessment of human work first of all requires a change in attitude, which can only be successful if the organizational forms of paid work are adapted to digital change.

For this purpose, regulations have to be adopted in the area of new forms of work, for example, in dealing with opportunities and risks of digitally assisted work. It is already clear that the design of digital assistance- and decision-making systems suitable for humans offers opportunities for relief but also entails risks, for example, in the area of data protection. Using technological innovations for the benefit of the activity-oriented society moreover requires setting clear company rules for working hours, availability and performance control in remote work, as well as newly defined employment relationships in platform work. Finding concrete and context-sensitive solutions to these questions requires that employees have a say, both within existing structures of corporate co-determination as well as – in particular for platform work – in formats that are to be newly developed.

### 8.3 Orienting education, vocational and continuing education stronger towards the grand challenges

In Germany, more needs to be done for education in all its forms. The performance level of children is low, in particular when they come from socially precarious families and from families in which no German is spoken. The divergence of educational outcomes according to place of origin is significant. This has repercussions on the participation of children, economic development as well as societal cohesion. The entire education system of a society and the level of education of its population determine which forms of work prevail in the short-, medium- and long term and which results can be achieved.

Early childhood education needs to be expanded. The earlier educational measures are applied in the life course, the larger the expected gain, measured according to the level of achieved performances and the reduction of inequalities. We need more day-care centres for children, ones that involve educational opportunities at an earlier age, we need target-oriented support for our very young children, especially when they grow up in difficult circumstances. The “Startchancenprogramm” (early childhood educational opportunities programme) for pupils of elementary schools needs to be expanded and orientated to those schools and children that require help. A half-hearted programme with widespread distribution would only increase inequality and leave potentials unused.

Successfully dealing with new insecurities and uncertainties moreover requires further developing the (pre-) school curriculum. In this context, a stronger orientation to the OECD Future Skills, especially with respect to “digital

literacy”, individual responsibility and value orientation, could be useful. The aim is to raise citizens who develop as a personality and who can apply their knowledge and skills for a viable and productive society in harmony with nature, both in the context of their paid work as well as in other forms of activity.

In view of the transformation of work and demographic change, continuing education needs to be moved more to the centre as well. Aside from personal adaptation this involves also adapting to technological developments, which includes opportunities of a second or third vocational education for a new job. A “period reserved for education” (Bildungszeit) could provide incentives to explore new areas of activity in adulthood, to improve one’s own employability and thus shape one’s own employment biography with more self-determination. Framework conditions could be designed as an “insurance of continuing education” (Weiterbildungsver-sicherung). Another approach would be the expansion of the consulting services of the Federal Employment Agency and its cooperating partners, including easily accessible consulting services for supported continuing education.

### 8.4 Reducing gender-related inequalities in the distribution of paid work and care work

If work is narrowed down to classic paid work only, the idea of an activity-oriented society cannot be realized. Its full potential remains unused. Therefore, the different forms of human work should be recognized as productive activity as well as promoted comprehensively and deliberately.

This could especially be achieved by reducing inequalities in the distribu-

tion of paid work and care work, by significantly increasing the work productivity of women and simultaneously recognizing different forms of care work as productive activities. Here it is recommended to change the tax and transfer system so that it promotes a more balanced relationship of classic paid work and care work as an unpaid activity and to set financial incentives for a more equal distribution of paid work and care work among both parents. A lot of elements of the tax and transfer system benefit the unequal distribution of care work and paid work between men and women, which is why these federal instruments do not meet the standards of an activity-oriented society. Important starting points here would be to expand the so-called partner months (Partnermonate) in parental benefits (Elterngeld), to reform tax splitting among married couples to a “Realsplitting” with a low amount to be transferred and to abolish so-called Mini-jobs. More financial means for the care sector should be made available, infrastructures in care and nursing should be expanded, personnel should be increased, and the attractiveness of the profession should be improved. Moreover, the status of live-in care workers from abroad needs to be improved so that these already existing forms of paid care work can experience a stronger societal recognition.

Other measures that should be developed in the future include a “family working time”, benefit replacement rates for certain care and support activities and their recognition for retirement as well as flexible work models that, among other things, make it easier for older women to reconcile a longer employment with care work within the family.

Furthermore, unpaid and low-paid work in the informal area should be taken more strongly into consideration

socio-politically. Here, “time accounts” for voluntary work (as part of the flexibilization of employment biographies) and an organizationally easier leave from paid work for a “voluntary work time” (in addition to “parental time” and “care time”) could be considered. Another option would be extensive tax advantages for voluntary work. Opportunities for counter-financing would result from the reform of tax splitting among married couples, the financial incentives for Mini-jobs or the cost-free co-insurance of spouses in statutory health insurance.

### 8.5 Adapting spatial and constructional framework conditions

The current crises radically put into question existing solutions with regard to work places as well as their infrastructures and follow-up costs. Due to the permanent introduction of mobile/remote work for part of the employed population, especially in the form of remote work, new, flexible and health-promoting constructional concepts are necessary in the private and professional field of activity. This ranges from flexible layouts to labour and health protection. The office of the future needs to be designed in a socially and ecologically sustainable manner, and it also needs to involve the exteriors more strongly.

In the activity-oriented society, remote work, office and “third places” form an innovative triad for those professions whose workplace is not determined by the task as such. Here, the idea of the economy oriented towards the common good is particularly powerful: “third places” and co-working spaces should not only be operated by private enterprises but also by the municipalities and should be publicly funded wherever they have a function that benefits the community. In

that case, they should be declared “tenants worth protecting”, if possible combined with public usages and developed into neighbourhood centres, and easily accessible for all interested parties. Corresponding planning and construction regulations could thus strengthen the sense of community and solidary, healthy work in an activity-oriented society. They could ease the transitions between paid work and other forms of activities significantly – even more: they become their indispensable prerequisite.

\*\*\*

The sketched-out suggestions regarding five fields of action are meant to exemplarily show how the change towards an activity-oriented society can be achieved. A new structure of the world of work can also contribute to overcoming the current crises and grand challenges of our time. The individual suggestions are thought of as a contribution for an urgently necessary discussion, which already takes place regarding some points, including corresponding legislation procedures. Further research is necessary, however, on the financing possibilities of many of the mentioned recommendations for action, which also discusses the socio-economic distribution effects of the recommendations.

Already, different efforts towards an activity-oriented world of work can be observed in corporate practice. These range from new models on duration, situation and locality of paid work to the promotion of social activities of employees and continuing education in the broadest sense. Steps towards the activity-oriented society can be felt most clearly where companies orient business models to the common good and adjust the content of work and work processes accordingly. An example are the approaches that can be sum-

marized under the heading “New Work”. Another approach to integrate non-market-related activities in the context of paid work is the offer by many companies to become engaged in voluntary work during working hours (e.g., “Social Day”, “Voluntary Days”, relief efforts).

Taking all these aspects and factors into account, however, especially health (at work) needs to be newly conceptualized and shaped, based on evidence. There is still need for scientific research and practical recommendations for action on the health effects that are associated with the change of work and the transformation processes.

It is clear that a transition to an activity-oriented society would also have positive effects on the health of the people because by upgrading non-market-related activities, the principle of the market would not simply be transferred to other forms of human activities. Rather, it is about an acknowledged co-existence and, in the best case, a productive togetherness. The measures recommended here would support tendencies that are apparent in the current structural change of work anyway. They thus do not aim at a turning point or reversal. They stand for additional creativity, courage and consequence in dealing with the great crises of our time, for a stronger orientation towards the common good. The proposed changes of the world of work would also not necessarily lead to a decrease in productivity.<sup>368</sup> On the contrary: a life course-friendly design and health-friendly forms of paid work could contribute to reducing educational poverty, and preventing an increase of working time for women as well as massive early retirements, which can be observed in some areas.

<sup>368</sup> OECD (2011); Prognos (2022).

This, in turn, would benefit productivity but requires at the same time a broader knowledge on what should count as productive. Because: being productive means being effective – in a form that needs to be developed for the activity-oriented society. Becoming active and remaining active then mean greater individual and collective effectiveness, in the sense of Ralf Dahrendorf's concept of a "life as activity", in which freedom and common good promote each other.

In sum: work in the activity-oriented society is conducive to personality and agreeable with the common good. With the contours of the activity-oriented society, new perspectives open up for companies how to conceive their transformation efforts from the view of human work and how human strengths can be made productive. Despite all tensions, herein lies the key for innovation and added value. For the dependent employees, the perspective of the "activity-oriented society" can open up new opportunities for a purposeful design of their work life in which their performance is viewed and appreciated in a comprehensive manner. Also, dead ends in (employment) biographies can be avoided in this way. For society as a whole, the transition to an activity-oriented society could be a step on the pathway to securing its own survival and viability.

## Contributors

### Spokeswoman of the research group

Prof. Dr. h. c. Jutta Allmendinger, Ph.D.	WZB Berlin Social Science Center
---	----------------------------------

### Members of the research group

Prof. Dr. h. c. Axel Börsch-Supan, Ph.D.	Max Planck Institute for Social Law and Social Policy, Munich
Prof. Dr. Andreas Eckert	Humboldt-Universität zu Berlin
Prof. Dr. Dr. h. c. Ute Frevert	Max Planck Institute for Human Development, Berlin
Prof. Dr. med. Detlev Ganten	Stiftung Charité, Berlin
Prof. Dr. Lisa Herzog	University of Groningen
Prof. Dr. Gesche Joost	Berlin University of the Arts
Prof. Dr. Dr. h. c. mult. Jürgen Kocka	Freie Universität Berlin
PD Dr. Thomas Kruppe	Institute for Employment Research (IAB), Nuremberg
Prof. Dr. Martin Krzywdzinski	WZB Berlin Social Science Center
Regine Leibinger	Barkow Leibinger Gesellschaft von Architekten mbH, Berlin
Prof. Dr. Dr. h. c. mult. Christoph Marksches	Berlin-Brandenburg Academy of Sciences and Humanities, Berlin
Prof. Dr. Jutta Mata	University of Mannheim
Prof. Dr. Steffen Mau	Humboldt-Universität zu Berlin
Prof. Dr. Maximilian Mayer	University of Bonn
Dr. Andreas Mergenthaler	Federal Institute for Population Research, Wiesbaden
Prof. Dr. Timo Meynhardt	HHL Leipzig Graduate School of Management
Prof. Dr. Philipp Misselwitz	Technische Universität Berlin, Bauhaus Earth, Berlin
Prof. Dr. Susanne Völter-Mahlknecht	Charité – Universitätsmedizin Berlin
Prof. Dr. Katharina Wrohlich	German Institute for Economic Research (DIW), Berlin

### Guests

Katrin Voermanek	Berlin International University of Applied Sciences
Dr. Amelie Wiedemann	DearEmployee GmbH, Berlin

### Scientific Coordination

Dr. des. Yuca Meubrink	Berlin-Brandenburg Academy of Sciences and Humanities
Moritz Neugebauer, Ph.D.	Berlin-Brandenburg Academy of Sciences and Humanities

### Administrative Coordination

Dr. Kathrin Happe	German National Academy of Sciences Leopoldina
Luise Ortloff	acatech – National Academy of Science and Engineering
Dr. Robert Spät	Berlin-Brandenburg Academy of Sciences and Humanities
Dr. Stefanie Westermann	German National Academy of Sciences Leopoldina

## Reviewers

Prof. Dr. Thomas K. Bauer	RWI – Leibniz Institute for Economic Research, Essen, and Ruhr University Bochum
Prof. Dr. Hartmut Hirsch-Kreinsen	TU Dortmund University
Prof. Dr. Corinna Kleinert	Leibniz Institute for Educational Trajectories, University of Bamberg
Prof. Sandrine Kott	Université de Genève, New York University
Prof. Dr. Felicitas Macgilchrist	Carl von Ossietzky University of Oldenburg and Leibniz Institute for Educational Media, Brunswick
Isabel Rothe und Kolleg*innen	Federal Institute for Occupational Safety and Health, Dortmund
Prof. Dr. Sophie Wolfrum	Technical University of Munich

## Responsible for the chapters

### 1. Introduction

Lisa Herzog, Timo Meynhardt

### 2. Work as a concept

Ute Frevert, Jürgen Kocka, Christoph Marksches, Steffen Mau

### 3. Demography and life-course-oriented design of the labour market

Axel Börsch-Supan, Andreas Mergenthaler

### 4. Digital transformation and new forms of organization in paid work

Martin Krzywdzinski, Andreas Eckert, Maximilian Mayer

### 5. Education and continuing education in the activity-oriented society

Jutta Allmendinger, Detlev Ganten, Gesche Joost, Thomas Kruppe, Susanne Völter-Mahlknecht

### 6. Paid work and care work in the activity-oriented society

Andreas Mergenthaler, Katharina Wrohlich

### 7. The activity-oriented society and the constructed environment

Regine Leibinger, Jutta Mata, Philipp Misselwitz, Katrin Voermanek

### 8. Towards an activity-oriented society: five fields of action

Jutta Allmendinger, Lisa Herzog, Timo Meynhardt



## References

- Abel, Jörg; Hirsch-Kreinsen, Hartmut & Ittermann, Peter (2014). *Einfacharbeit in der Industrie: Strukturen, Verbreitung und Perspektiven*. Berlin: edition sigma.
- Absenger, Nadine; Ahlers, Elke; Bispinck, Reinhard; Kleinknecht, Alfred; Klenner, Christina; Lott, Yvonne; Pusch, Toralf & Seifert, Hartmut (2014). "Arbeitszeiten in Deutschland. Entwicklungstendenzen und Herausforderungen für eine moderne Arbeitszeitpolitik." *WSI-Report*, 19.
- Acatech & Joachim Herz Stiftung (2023). *MINT Nachwuchsbarometer 2023*. München: acatech, Hamburg: Joachim Herz Stiftung. <https://www.acatech.de/publikation/mint-nachwuchsbarometer-2023/>
- Albiez, Milena (2020). "Systemische, soziale und emotionale Herausforderungen und Glücksmomente im beruflichen Alltag von haupt- und nebenberuflichen YouTuber\*innen." *Gruppe. Interaktion. Organisation. Zeitschrift Für Angewandte Organisationspsychologie (GIO)*, 51, 457–468.
- Algorithmwatch (2020). *Positionen zum Einsatz von KI im Personalmanagement. Rechte und Autonomie von Beschäftigten stärken – Warum Gesetzgeber, Unternehmen und Beschäftigte handeln müssen*. Berlin: Algorithmwatch.
- Allianz Trade (2022). *Back on the (climate) track – The quest for independence powers Germany's energy transition*. Allianz Research Paper. [https://www.allianz-trade.com/en\\_global/news-insights/economic-insights/germany-energy-transition.html](https://www.allianz-trade.com/en_global/news-insights/economic-insights/germany-energy-transition.html)
- Allmendinger, Jutta (1999). "Bildungsarmut: Zur Verschränkung von Bildungs- und Sozialpolitik." *Soziale Welt*, 50, 5–50.
- Allmendinger, Jutta (2021). *Es geht nur gemeinsam! Wie wir endlich Geschlechtergerechtigkeit erreichen*. Berlin: Ullstein.
- Allmendinger, Jutta & Haarbrücker, Julia (2017). "Arbeitszeiten und die Vereinbarkeit von Beruf und Familie: Ergebnisse der Beschäftigtenbefragung der IG Metall 2017." *WZB Discussion Paper*, P 2017–002.
- Allmendinger, Jutta; Nikolai, Rita & Ebner, Christian (2018): "Soziologische Bildungsforschung." In: Tippelt, Rudolf & Schmidt, Bernhard (Eds.). *Handbuch für Bildungsforschung*. Wiesbaden: VS Verlag für Sozialwissenschaften, 47–72.
- Amlinger-Chatterjee, Monisha (2016). "Psychische Gesundheit in der Arbeitswelt. Atypische Arbeitszeiten." *Baua Bericht*, Projekt F 2353.
- Anderson, Elizabeth (2017). *Private Government: How Employers Rule Our Lives (and Why We Don't Talk about It)*. Princeton: Princeton University Press.
- André, Elisabeth; Aurich, Jan; Bauer, Wilhelm; Bullinger-Hoffmann, Angelika; Heister, Michael; Huchler, Norbert; Neuburger, Rahild; Peissner, Matthias; Stich, Andrea & Suchy, Oliver (2021). *Kompetenzentwicklung für KI. Veränderungen, Bedarfe, Handlungsoptionen*. München: Plattform Lernende Systeme.
- Arlinghaus, Anna & Nachreiner, Friedhelm (2016). "Unusual and Unsocial? Effects of Shift Work and Other Unusual Working Times on Social Participation." In: Iskra-Golec, Irena; Barnes-Farrell, Janet & Bohle, Philip (Eds.): *Social and Family Issues in Shift Work and Non Standard Working Hours*. Springer International Publishing Switzerland, 39–57.
- Arntz, Melanie; Gregory, Terry & Zierahn, Ulrich (2020). "Digitization and the future of work: Macroeconomic consequences." In: Zimmermann, Klaus F. (Ed.): *Handbook of labor, human resources and population economics*. Cham: Springer, 1, 1–29.
- Aroles, Jeremy; Mitev, Nathalie & De Vaujany, François-Xavier (2019). "Mapping themes in the study of new work practices." *New Technology Work and Employment*, 34 (3), 285–299.
- Asatiani, Aleksandre; Malo, Pekka; Nagbøl, Per R.; Penttinen, Esko; Rinta-Kahila, Tapani & Salovaara, Antti (2020). "Challenges of Explaining the Behavior of Black-Box AI Systems." *MIS Quarterly Executive*, 19 (4), 259–278.
- Austen, Siobhan; Jefferson, Therese; Lewin, Gill; Ong, Rachel & Sharp, Rhonda (2015). "Care roles and employment decision-making: The effect of economic circumstance." *Journal of Industrial Relations*, 57(5), 665–685.
- Autor, David; Mindell, David & Reynolds, Elisabeth (2020). *The Work of the Future: Building Better Jobs in an Age of Intelligent Machines*. Cambridge, MA: MIT Industrial Performance Center.
- Autor, David (2015). "Why are there still so many jobs? The history and future of workplace automation." *Journal of economic perspectives*, 29 (3), 3–30.
- Backes, Gertrud M. & Höltge, Jacqueline (2008). "Überlegungen zur Bedeutung des ehrenamtlichen Engagements im Alter." In: Erlinghagen, Marcel & Hank, Karsten (Eds.): *Produktives Altern und informelle Arbeit in modernen Gesellschaften. Theoretische Perspektiven und empirische Befunde*. Wiesbaden: VS Verlag für Sozialwissenschaften, 277–299.

- Bäcker, Gerhard; Brüssig, Martin; Jansen, Andreas; Knuth, Matthias & Nordhause-Jan, Jürgen (2009). *Ältere Arbeitnehmer. Erwerbstätigkeit und soziale Sicherheit im Alter*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Bäumer, Thomas; von Maurice, Jutta; Blossfeld, Hans-Peter & Janik, Florian (2012). "Lebensverläufe im Längsschnitt: der Beitrag des Nationalen Bildungspanels für ein Monitoring des Lernens im Erwachsenenalter." *DIE Zeitschrift für Erwachsenenbildung*, 4, 35–39.
- Bass, Scott A. & Caro, Francis G. (2001): "Productive aging. A conceptual framework." In: Morrow-Howell, Nancy; Hinterlong, James & Sherraden, Michael Wayne (Eds.): *Productive aging. Concepts and challenges*. Baltimore, Md, London: Johns Hopkins University Press, 37–78.
- Bauer, Jan Michael & Souza-Poza, Alfonso (2015). "Impacts of Informal Caregiving on Caregiver Employment." *Population Ageing*, 8, 113–145.
- Bauer, Wilhelm; Riedel, Oliver; Herrmann, Florian & Borrmann, Daniel (2018). *ELAB 2.0. Wirkungen der Fahrzeugelektrifizierung auf die Beschäftigung am Standort Deutschland*. Stuttgart: Fraunhofer Institut für Arbeitswirtschaft und Organisation.
- Becker, William; Belkin, Liuba; Tuskey, Sarah & Conroy, Samantha (2022). "Surviving remotely: How job control and loneliness during a forced shift to remote work impacted employees work behaviors and wellbeing." *Human Resource Management*, 61, 449–464.
- Beckmannshagen, Mattis & Schröder, Carsten (2022). "Entwicklung der Arbeitszeiten treibt die Ungleichheit der Erwerbseinkommen." *DIW-Wochenbericht*, 89 (33/44), 427–434.
- Behr, Terry A. (1986). "The Process of Retirement: A Review and Recommendations for Future Investigation." *Personnel Psychology*, 39 (1), 31–55.
- Beier, Grischa; Matthes, Marcel; Guan, Ting; Grudzien, David Iubel de Oliveira Pereira; Xue, Bing; Lima, Edson Pinheiro de & Chen, Ling (2022). "Impact of Industry 4.0 on corporate environmental sustainability: Comparing practitioners' perceptions from China, Brazil and Germany." *Sustainable Production and Consumption*, 31, 287–300.
- Beirat zum Beschäftigtendatenschutz (2022). *Bericht des unabhängigen, interdisziplinären Beirats zum Beschäftigtendatenschutz*. Berlin: Denkfabrik Digitale Arbeitsgesellschaft beim Bundesministerium für Arbeit und Soziales.
- Behrens, Jan Henning; Heindl, Andreas; Winter, Johannes; Biam, David & Fecht, Danielle (2021). *Sachbearbeitung und künstliche Intelligenz: Forschungsstand, Einsatzbereiche und Handlungsfelder*. Stuttgart: Fraunhofer Verlag.
- Benanav, Aaron (2020). *Automation and the Future of Work*. London: Verso.
- Bengtson, Vern L.; Rosenthal, Carolyn J. & Burton, Linda M. (1990). "Families and aging: Diversity and heterogeneity." In: Binstock, Robert H. & George, Linda K. (Eds.): *Handbook of ageing and the social sciences*. San Diego, CA: Academic Press, 263–287.
- Berk, Beatrice van; Ebner, Christian & Rohrbach-Schmidt, Daniela (2022). "Wer hat nie richtig Feierabend? Eine Analyse zur Verbreitung von suchthaftem Arbeiten in Deutschland." *Arbeit*, 31 (3), 257–282.
- Best, Volker; Decker, Frank; Fischer, Sandra & Küppers, Anne (2023). *Demokratievertrauen in Krisenzeiten – Wie blicken die Menschen in Deutschland auf Politik, Institutionen und Gesellschaft?* Friedrich-Ebert-Stiftung. <https://library.fes.de/pdf-files/pbud/20287-20230505.pdf>
- Bettger, Roland (1985). "Verlagswesen, Handwerk und Heimarbeit." In: Grimm, Claus (Ed.): *Aufbruch ins Industriezeitalter. Vol. 2. Aufsätze zur Wirtschafts- und Sozialgeschichte Bayerns 1750–1850*. München: Oldenbourg Verlag, 175–183.
- beWirken (2021). *Jugend und die Auswirkungen von Corona. beWirken Jugendhebung 2021*. beWirken. <https://www.bewirken.org/wp-content/uploads/2021/09/Auswertung-und-Ergebnisse-beWirken-Jugenderhebung-2021.pdf>
- Bildungsbericht (2018). *Bildung in Deutschland 2018*. Bielefeld: Autorengruppe Bildungsberichtserstattung, WVB Publikation.
- BIPP (2022). *Datenreport zum Berufsbildungsbericht 2022*. BIPP. [https://www.bibb.de/dokumente/pdf/Datenreport%202022\\_20102022\\_online.pdf](https://www.bibb.de/dokumente/pdf/Datenreport%202022_20102022_online.pdf)
- Birhane, Abeba (2020). "Algorithmic Colonization of Africa." *SCRIPTed*, 17(2), 389–409. <https://script-ed.org/?p=3888>
- Bitkom (2021). *Drei Viertel der Bevölkerung fordern Informatik als Schul-Pflichtfach*. Bitkom. <https://www.bitkom.org/Presse/Presseinformation/Drei-Viertel-der-Bevoelkerung-fordern-Informatik-als-Schul-Pflichtfach>
- Blane, Davis; Netuveli, Gopalakrishnan & Bartley, Mel (2006). "Does Quality of Life at Older Ages Vary with Socio-Economic Position?" *Sociology*, 41, 717–726.
- Blömer, Maximilian; Brandt, Przemyslaw & Peichl, Andreas (2021). *Verteilungswirkungen des Kinderbonus und der temporären Mehrwertsteuersenkung im Jahr 2020*. München: Ifo Institut.

- Bock-Famulla, Kathrin; Girndt, Antje; Vetter, Tim & Kriechel, Ben (2022). *Fachkräfte-Radar für KiTa und Grundschule 2022*. Gütersloh: Bertelsmann Stiftung. <https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/fachkraefte-radar-fuer-kita-und-grundschule-2022-all>
- Böhm, Karin (2021). *Pflegebedürftigkeit*. bpb.de, March 10. <https://www.bpb.de/kurz-knapp/zahlen-und-fakten/datenreport-2021/gesundheit/330109/pflege/>
- Börsch-Supan, Axel (2000). "Incentive effects of Social Security on labor force participation: Evidence in Germany and across Europe." *Journal of Public Economics*, 78, 25 – 49.
- Börsch-Supan, Axel (2002). "Mehr Zuwanderung? Zur Rolle des Auslands bei der Stabilisierung der gesetzlichen Rentenversicherung in Deutschland." *Vierteljahreshefte zur Wirtschaftsforschung*, 71, 187 – 198.
- Börsch-Supan, Axel (2007). "Rational Pension Reform." *Geneva Papers on Risk and Insurance: Issues and Practice*, 4, 430 – 446.
- Börsch-Supan, Axel (2011). "Ökonomische Auswirkungen des demografischen Wandels." *Aus Politik und Zeitgeschichte (APuZ)*, 61, 19 – 26.
- Börsch-Supan, Axel (2020). "Alternativlose Rentenpolitik: Anpassung an die demografischen Veränderungen." *Deutsche Rentenversicherung* (online first), 1/2020, 77–91.
- Börsch-Supan, Axel; Brandt, Martina; Hunkler, Christian; Kneip, Thorsten; Korbmacher, Julie; Malter, Frederic; Schaan, Barbara; Stuck, Stephanie & Zuber, Sabrina (2013). "Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE)." *International Journal of Epidemiology*, 42, 992 – 1001.
- Börsch-Supan, Axel; Bucher-Koenen, Tabea; Goll, Nicolas & Kutlu Koc, Vesile (2018). "Dangerous Flexibility – Retirement Reforms Reconsidered." *Economic Policy*, 33(94), 315 – 355.
- Börsch-Supan, Axel & Coile, Courtney C. (2020). *Social Security and Retirement Programs around the World: Reforms and Retirement Incentives*. Chicago: University of Chicago Press.
- Börsch-Supan, Axel; Hunkler, Christian & Weiss, Matthias (2021). "Big Data at Work: Age and Labor Productivity in the Service Sector." *Journal of the Economics of Ageing*, 19.
- Börsch-Supan, Axel & Weiss, Matthias (2016). "Productivity and Age: Evidence from Work Teams at the Assembly Line." *The Journal of the Economics of Ageing*, 7, 30–42.
- Bonin, Holger; Eichhorst, Werner; Kaczynska, Jennifer; Kümmerling, Angelika; Rinne, Ulf; Scholten, Annika & Steffes, Susanne (2020). *Verbreitung und Auswirkungen von mobiler Arbeit und Homeoffice: Kurzexper-tise*. (Forschungsbericht / Bundesministerium für Arbeit und Soziales, FB549). Berlin: Bundesministerium für Arbeit und Soziales; Universität Duisburg-Essen Campus Duisburg, Fak. für Gesellschaftswissenschaften, Institut Arbeit und Qualifikation (IAQ); Zentrum für Europäische Wirtschaftsforschung (ZEW) GmbH; Institute of Labor Economics (IZA). [https://www.ssoar.info/ssoar/bitstream/handle/document/70079/ssoar-2020-bonin\\_et\\_al-Verbreitung\\_und\\_Auswirkungen\\_von\\_mobiler.pdf?sequence=1&lnkname=ssoar-2020-bonin\\_et\\_al-Verbreitung\\_und\\_Auswirkungen\\_von\\_mobiler.pdf](https://www.ssoar.info/ssoar/bitstream/handle/document/70079/ssoar-2020-bonin_et_al-Verbreitung_und_Auswirkungen_von_mobiler.pdf?sequence=1&lnkname=ssoar-2020-bonin_et_al-Verbreitung_und_Auswirkungen_von_mobiler.pdf)
- Bonin, Holger; Rinne, Ulf (2017). "Omnibusbefragung zur Verbesserung der Datenlage neuer Beschäftigungsformen." *IZA Research Report*, 80. Bonn: IZA.
- Bouziri, Hanifa; Smith, David; Descatha, Alexis; Dab, William & Jean, Kevin (2020). "Working from home in the time of COVID-19: how to best preserve occupational health?" *Occupational and Environmental Medicine*, 77(7), 509 – 510.
- Bovenschulte, Marc (2020). "Kognitive Assistenzsysteme." *Themenkurzprofil*, 38. Berlin: Büro für Technikfolgenabschätzung beim Deutschen Bundestag.
- Brandl, Christopher; Bonin, Dominik; Mertens, Alexander; Wischniewski, Sascha & Schlick, Christopher M. (2016a): "Methodik zur Unterstützung des ergonomischen Interventionsprozesses am Beispiel einer automatisierten OWAS-basierten Generierung von Vorschlägen zur technischen Gestaltung von Arbeitsplätzen." *Arbeit in komplexen Systemen. Digital, vernetzt, human?! Bericht zum 62. Arbeitswissenschaftlichen Kongress vom 2. – 4. März 2016*, RWTH Aachen, Institut für Arbeitswissenschaft (IAW) Dortmund: GfA-Press, Projektnummer: F 2348 – EngAge4Pro.
- Brucks, Melanie & Levav, Jonathan (2022). "Virtual communication curbs creative idea generation." *Nature*, 605, 108 – 112.
- Brunner, Otto (1956). "Das ‚Ganze Haus‘ und die alteuropäische ‚Ökonomik‘." In: Brunner, Otto (Ed.): *Neue Wege der Verfassungs- und Sozialgeschichte*. Göttingen: Vandenhoeck & Ruprecht, 103 – 127.
- Brynjolfsson, Erik & McAfee, Andrew (2014). *The second machine age: work, progress, and prosperity in a time of brilliant technologies*. New York: W. W. Norton & Company.
- Bucher, Barbara (2018). *Rechtliche Ausgestaltung der 24-h-Betreuung durch ausländische Pflegekräfte in deutschen Privathaushalten. Eine kritische Analyse*. Baden-Baden: Nomos Verlag.

- Budrich, Barbara; Eisermann, Merlind; Janik, Florian & Kruppe, Thomas (2014). "Weiterbildungsbeteiligung: Ursachen unterschiedlicher Teilnahmequoten in verschiedenen Datenquellen." *Zeitschrift für Erziehungswissenschaft*, 17(3), 473–495.
- Bücker, Teresa (2022): *Alle Zeit. Eine Frage von Macht und Freiheit. Wie eine radikal neue, sozial gerechtere Zeitkultur aussehen kann*. Berlin: Ullstein.
- Bünning, Mareike & Eppers, Nina (2018). "Wie wollen Eltern arbeiten? Ein geschlechtergerechter Arbeitsmarkt braucht neue Modelle." *WZB-Mitteilungen*, 161, 24–27.
- Bürgerrat Bildung und Lernen (2021). *Empfehlungen für ein Sofortprogramm*. Bonn: Montag Stiftung Denkwerkstatt. <https://www.buergerrat-bildung-lernen.de/sfortprogramm/>
- Bundesinstitut für Berufsbildung (2022). *Datenreport zum Berufsbildungsbericht 2022. Informationen und Analysen zum Berufsbildungsbericht*. Bonn: Bundesinstitut für Berufsbildung. [https://www.bibb.de/datenreport/de/datenreport\\_2022.php](https://www.bibb.de/datenreport/de/datenreport_2022.php)
- Bundesinstitut für Berufsbildung (2018). *Checkliste Qualität in der Weiterbildung*. Bonn: Bundesinstitut für Berufsbildung. <https://www.bibb.de/veroeffentlichungen/de/publication/download/8596>
- Bundesministerium für Arbeit und Soziales (2017). *Weißbuch Arbeiten 4.0*. Berlin: BMAS. <https://www.bmas.de/DE/Service/Publikationen/Broschueren/a883-weissbuch.html>
- Bundesministerium für Arbeit und Soziales (2020). "Faire Arbeit in der Plattformökonomie." *Positionspapier des BMAS*. Berlin: BMAS. <https://www.bmas.de/SharedDocs/Downloads/DE/Pressemitteilungen/2020/eckpunkte-faire-plattformarbeit.html>
- Bundesministerium für Arbeit und Soziales (2022a). *Rentenversicherungsbericht 2022*. Berlin: BMAS. [https://www.bmas.de/SharedDocs/Downloads/DE/Rente/rentenversicherungsbericht-2022.pdf?\\_\\_blob=publicationFile&v=2](https://www.bmas.de/SharedDocs/Downloads/DE/Rente/rentenversicherungsbericht-2022.pdf?__blob=publicationFile&v=2)
- Bundesministerium für Arbeit und Soziales (2022b). *Bedeutung von Coworking Spaces als Dritter Arbeitsort in Deutschland*. Bonn: Forschungsinstitut zur Zukunft der Arbeit GmbH (IZA). <https://www.bmas.de/DE/Service/Publikationen/Forschungsberichte/fb-595-expertise-bedeutung-von-coworking-spaces.html>
- Bundesministerium für Arbeit und Soziales (o. J.). *Arbeitsrecht. Homeoffice*. <https://www.bmas.de/DE/Arbeit/Arbeitsrecht/Teilzeit-flexible-Arbeitszeit/homeoffice.html>
- Bundesministerium für Familien, Senioren, Frauen und Jugend (2005). *Fünfter Bericht zur Lage der älteren Generation in der Bundesrepublik Deutschland. Potenziale des Alters in Wirtschaft und Gesellschaft. Der Beitrag älterer Menschen zum Zusammenhalt der Generationen*. Berlin: o. V. <https://www.bmfsfj.de/resource/blob/79080/8a95842e52ba43556f9ebfa600fo2483/fuenfter-altenbericht-data.pdf>
- Bundesministerium für Familie, Senioren, Frauen und Jugend (2016). *Gleiche Chancen durch frühe Bildung. Gute Ansätze und Herausforderungen im Zugang zur Kindertagesbetreuung*. Bundesministerium für Familie, Senioren, Frauen und Jugend. <https://www.bmfsfj.de/resource/blob/112554/a73b1eb50d3b49105e13eb2213501581/gleiche-chancen-durch-fruehe-bildung-data.pdf>
- Bundesministerium für Familien, Senioren, Frauen und Jugend (2021). *Väterreport. Update 2021*. Berlin: o. V. <https://www.bmfsfj.de/bmfsfj/service/publikationen/vaeterreport-update-2021-186180>
- Bundesministerium für Gesundheit (2021). *Konzertierte Aktion Pflege. Zweiter Bericht zum Stand der Umsetzung der Vereinbarungen der Arbeitsgruppen 1 bis 5*. [https://www.bundesgesundheitsministerium.de/fileadmin/Dateien/3\\_Downloads/K/Konzertierte\\_Aktion\\_Pflege/KAP\\_Zweiter\\_Bericht\\_zum\\_Stand\\_der\\_Umsetzung\\_der\\_Vereinbarungen\\_der\\_Arbeitsgruppen\\_1\\_bis\\_5.pdf](https://www.bundesgesundheitsministerium.de/fileadmin/Dateien/3_Downloads/K/Konzertierte_Aktion_Pflege/KAP_Zweiter_Bericht_zum_Stand_der_Umsetzung_der_Vereinbarungen_der_Arbeitsgruppen_1_bis_5.pdf)
- Bundesministerium für Wirtschaft und Energie (2019). *Leitbild 2030 für Industrie 4.0. Digitale Ökosysteme global gestalten*. Berlin: BMWK. <https://www.bmwk.de/Redaktion/DE/Schlaglichter-der-Wirtschaftspolitik/2019/10/kapitel-1-5-leitbild-2030-fuer-industrie-4-0.html>
- Bundesministerium für Wirtschaft und Klimaschutz (2021). "Neues Klimaschutzgesetz. Bundesregierung setzt sich ambitionierte Ziele." In: Bundesministerium für Wirtschaft und Klimaschutz (Ed.): *Schlaglichter der Wirtschaftspolitik: Oktober 2021*. [https://www.bmwk.de/Redaktion/DE/Publikationen/Schlaglichter-der-Wirtschaftspolitik/schlaglichter-der-wirtschaftspolitik-10-2021.pdf?\\_\\_blob=publicationFile&v=22](https://www.bmwk.de/Redaktion/DE/Publikationen/Schlaglichter-der-Wirtschaftspolitik/schlaglichter-der-wirtschaftspolitik-10-2021.pdf?__blob=publicationFile&v=22)
- Bundesministerium für Wirtschaft und Klimaschutz (2022). *Erneuerbare Energien in Zahlen. Nationale und internationale Entwicklungen im Jahr 2021*. [https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/erneuerbare-energien-in-zahlen-2021.pdf?\\_\\_blob=publicationFile&v=1](https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/erneuerbare-energien-in-zahlen-2021.pdf?__blob=publicationFile&v=1)
- Bundesregierung (2018). *Strategie Künstliche Intelligenz der Bundesregierung*. Berlin: Bundesregierung. <https://www.bundesregierung.de/resource/blob/997532/1550276/3f7d3c41c6e05695741273e78b8039f2/2018-11-15-ki-strategie-data.pdf>

- Bundesverband Coworking Spaces (2020). *Zahl der Coworking Spaces hat sich vervielfacht*. Bundesverband Coworking Spaces e.V. <https://www.bundesverband-coworking.de/2020/06/zahl-der-coworking-spaces-hat-sich-vervierfacht/>
- Burgess, Ernest W. (1960). "Aging in Western culture." In: Burgess, Ernest W. (Ed.): *Aging in Western societies*. Chicago: Chicago University Press, 3–28.
- Burr, Jeffrey A.; Mutchler, Jan E. & Caro, Francis G. (2007). "Productive Activity Clusters among Middle-Aged and Older Adults: Intersecting Forms and Time Commitments." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 62(4), 267–275.
- Burr, Jeffrey A.; Caro, Francis G. & Moorhead, Jennifer (2002). "Productive aging & civic participation." *Journal of Aging Studies*, 16(1), 87–105.
- Butler, Robert N. & Gleason, Herbert P. (1985). *Productive aging. Enhancing vitality in later life*. New York: Springer.
- Butollo, Florian; Jürgens, Ulrich & Krzywdzinski, Martin (2020). "From lean production to Industrie 4.0: More autonomy for employees?" In: Meyer, Uli; Schaupp, Simon & Seibt, David (Eds.): *Digitalization in industry: Between domination and emancipation*. Basel: Springer International Publishing, 61–80.
- Butollo, Florian & Koepf, Robert (2020). "Die doppelte Einbettung der Logistikarbeit und die Grenzen prekärer Beschäftigung." *WSI-Mitteilungen* 73-3, 174–181.
- Caro, Francis G. & Bass, Scott A. (1995). "Dimensions of productive engagement." In: Bass, Scott A. (Ed.): *Older and active. How Americans over 55 are contributing to society*. New Haven: Yale University Press, 204–216.
- Caro, Francis; Bass, Scott & Chen, Yung-Ping (1993). "Introduction: Achieving a productive aging society." In: Caro, Francis; Bass, Scott & Chen, Yung-Ping (Eds.): *Achieving a productive aging society*. Dover, Massachusetts: Auburn House, 3–25.
- Charalampous, Maria; Grant, Christine A.; Tramontano, Carlo & Michailidis, Evie (2019). "Systematically reviewing remote e-workers' well-being at work: A multidimensional approach." *European Journal of Work and Organizational Psychology*, 28(1), 51–73.
- Choi, Lona H. (2003). "Factors affecting volunteerism among older adults." *Journal of Applied Gerontology*, 22(2), 179–196.
- Choi, Namkee G.; Burr, Jeffrey A.; Mutchler, Jan & Caro, Francis G. (2007). "Formal and informal volunteer activity and spousal caregiving among older adults." *Research on Aging*, 29(2), 99–124.
- Cihlar, Volker; Micheel, Frank; Konzelmann, Laura; Mergenthaler, Andreas & Schneider, Norbert F. (2019). "Grenzgänge zwischen Erwerbsarbeit und Ruhestand. Prozesse der Arbeitsmarkt-beteiligung älterer Menschen." In: Bundesinstitut für Bevölkerungsforschung, (Ed.). *Beiträge zur Bevölkerungswissenschaft*, 53. Berlin: Barbara Budrich.
- Coe, Neil M. & Yeung, Henry Wai-Chung (2015). *Global production networks: Theorizing economic development in an interconnected world*. Oxford: Oxford University Press.
- Conze, Werner (1972). Artikel 'Arbeit'. In: Brunner, Otto; Conze, Werner & Koselleck, Reinhart (Eds.): *Geschichtliche Grundbegriffe. Historisches Lexikon zur politisch-sozialen Sprache in Deutschland*, Vol. 1. Stuttgart: Klett-Cotta, 154–215.
- Cook, Ian (2021). "Who Is Driving the Great Resignation?" *Harvard Business Review Online*, September 15. <https://hbr.org/2021/09/who-is-driving-the-great-resignation>
- Corona Datenplattform (2021): *Themenreport 02, Homeoffice im Verlauf der Corona-Pandemie*, Issue July, Bonn.
- Dahrendorf, Ralf (1983). *Die Chancen der Krise. Über die Zukunft des Liberalismus*, Stuttgart: Deutsche Verlags-Anstalt, 88–100.
- De Landa, Manuel (2000). *A Thousand Years of Nonlinear History*. Princeton: Princeton University Press.
- De Stefano, Valerio (2015). "The rise of the just-in-time workforce: On-demand work, crowd work, and labor protection in the gig-economy." *Bocconi Legal Studies Research Paper*, 2682602.
- Dengler, Katharina & Matthes, Britta (2019). "Digitalisierung in Deutschland: Substituierbarkeitspotenziale von Berufen und die möglichen Folgen für die Beschäftigung." In: Dobischat, Rolf; Käßlinger, Bernd; Molzberger, Gabriele & Münk, Dieter (Eds.): *Bildung 2.1 für Arbeit 4.0?*. Wiesbaden: Springer VS, 49–62.
- DeskMag (2022). "2021-22 Coworking Space Trends Survey." *DeskMag*. <https://www.deskmag.com/en/coworking-news/2022-results-of-the-coworking-space-business-trends-survey>
- Detje, Richard & Sauer, Dieter (2021). *Corona-Krise im Betrieb*. Hamburg: VSA.
- Deutscher Bildungsrat (1970). *Strukturplan für das Bildungswesen*. Stuttgart: Ernst Klett Verlag.
- DGB (2020). *DBG-Konzept: Künstliche Intelligenz für Gute Arbeit*. DGB. <https://www.dgb.de/aktuelles/news/dgb-konzept-kuenstliche-intelligenz-fuer-gute-arbeit/>



- Dixon-Declève, Sandrine; Gaffney, Owen; Ghosh, Jayati; Randers, Jorgen; Rockstrom, Johan & Stoknes, Per Espen (2022): *Earth for All: A Survival Guide for Humanity: a report to the Club of Rome*. Canada: New Society Publishers.
- Dos Sonatos, Sascha; Dieckhoff, Martina; Ehlert, Martin & Mertens, Antje (2021). "The causes of labor market careers without further training – Does training beget training over the life course in Germany and the UK?" In: *Technicality. Understanding the relation between technological innovation and social inequality. Research project based at Maastricht University*, 103 – 134.
- Dummert, Sandra (2018). *Betriebliche Berufsausbildung und Weiterbildung in Deutschland*. Nürnberg: IAB.
- Ehlert, Martin (2020). "No Future, no Training? Explaining Cross-national Variation in the Effect of Job Tasks on Training Participation." *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 72 (60), 483 – 510.
- Eichhorst, Werner; Marx, Paul & Wehner, Caroline (2017). "Labor market reforms in Europe: towards more flexicure labor markets?" *Journal for Labour Market Research*, 51 (3).
- Eichler, Melanie & Pfau-Effinger, Birgit (2008). "Pflegtätigkeit von Frauen in der nachberuflichen Phase." In: Erlinghagen, Marcel & Hank, Karsten (Eds.): *Produktives Altern und informelle Arbeit in modernen Gesellschaften: Theoretische Perspektiven und empirische Befunde*. Wiesbaden: VS Verlag für Sozialwissenschaften, 165 – 187.
- Emerald (2020). *The evolving digital divide: from the first to the third level*. Bingley: Emerald Publishing. <https://www.emeraldgrouppublishing.com/topics/open-access/news/evolving-digital-divide-first-third-level>
- Emmenegger, Patrick; Häusermann, Silja; Palier, Bruno & Seeleib-Kaiser, Martin (2012). *The Age of Dualization: The Changing Face of Inequality in Deindustrializing Societies*. Oxford: Oxford University Press.
- Emunds, Bernhard & Habel, Simone (2020). "Von der Schwarzarbeit zum „grauen Markt“ – und darüber hinaus? Neuere und künftig notwendige Entwicklungen der sog. 24-Stunden-Pflege." In: Jacobs, Klaus; Kuhlmei, Adelheid; Greß, Stefan; Klauber, Jürgen & Schwinger, Antje (Eds.): *Pflege-Report 2020*. Berlin, Heidelberg: Springer, 111 – 121.
- Erlinghagen, Marcel (2008). "Ehrenamtliche Arbeit und informelle Hilfe nach dem Renteneintritt. Analysen mit dem Sozio-oekonomischen Panel (SOEP)." In: Erlinghagen, Marcel & Hank, Karsten (Eds.): *Produktives Altern und informelle Arbeit in modernen Gesellschaften. Theoretische Perspektiven und empirische Befunde*. Wiesbaden: VS Verlag für Sozialwissenschaften, 93 – 117.
- Eubanks, Virginia (2017). *Automating Inequality*. New York: Picador.
- Eurofound (2020). *Living, working and COVID-19, COVID-19 series*. Publications Office of the European Union. Luxemburg. <https://www.eurofound.europa.eu/en/publications/2020/living-working-and-covid-19>
- European Commission (2018). *The 2018 Ageing Report: Economic and budgetary projections for the 28 EU Member States (2016 – 2070)*. Joint Report prepared by the European Commission (DG ECFIN) and the Economic Policy Committee (AWG). Institutional Papers, 079. Brussels: Directorate-General for Economic and Financial Affairs. [https://economy-finance.ec.europa.eu/publications/2021-ageing-report-economic-and-budgetary-projections-eu-member-states-2019-2070\\_en](https://economy-finance.ec.europa.eu/publications/2021-ageing-report-economic-and-budgetary-projections-eu-member-states-2019-2070_en)
- European Commission (2021). *Proposal for a Directive of the European Parliament and of the Council on improving working conditions in platform work*. 2021/0414 (COD). Brussels: European Commission.
- Fairwork (2021). *Fairwork 2021 Annual Report*. Oxford: Berlin: Fairwork.
- Falkenberg, Jonathan (2021). *Taylor's Agenten: Eine arbeitssoziologische Analyse mobiler Assistenzsysteme in der Logistik*. Baden-Baden: Nomos Verlag.
- Faus, Rainer; Mannewitz, Tom; Storcks, Simon; Unzicker, Kai & Vollmann, Erik (2019). *Schwindendes Vertrauen in Politik und Parteien. Eine Gefahr für den gesellschaftlichen Zusammenhalt?*. Gütersloh: Bertelsmann Stiftung. [https://www.bertelsmann-stiftung.de/fileadmin/files/Projekte/Gesellschaftlicher\\_Zusammenhalt/ST-LW\\_Studie\\_Schwindendes\\_Vertrauen\\_in\\_Politik\\_und\\_Parteien\\_2019.pdf](https://www.bertelsmann-stiftung.de/fileadmin/files/Projekte/Gesellschaftlicher_Zusammenhalt/ST-LW_Studie_Schwindendes_Vertrauen_in_Politik_und_Parteien_2019.pdf)
- Fedorets, Alexandra; Kirchner, Stefan; Adriaans, Jule & Giering, Oliver (2022). "Data on Digital Transformation in the German Socio-Economic Panel." *Jahrbücher Für Nationalökonomie und Statistik*, 242(5 – 6), 691 – 705.
- Filipp, Sigrun-Heide & Mayer, Anne-Kathrin (2005). "Zur Bedeutung von Altersstereotypen." *Aus Politik und Zeitgeschichte*, B 49 – 50, 25 – 31.
- Finley, Moses I. (1993). *Die antike Wirtschaft*. München: dtv Wissenschaft.
- Flüter-Hoffmann, Christiane (2010). "Der Weg aus der Demografie-Falle. Lebenszyklusorientierte Personalpolitik als innovatives Gesamtkonzept – gerade für High Potentials." In: Naegele, Gerhard (Ed.): *Soziale Lebenslaufpolitik*. Wiesbaden: VS Verlag für Sozialwissenschaften, 411 – 428.

- Fordermann, Corinna; Grunau, Philipp; Haas, Georg-Christoph; Müller, Dana (2021). Homeoffice in Zeiten von Corona. Nutzung, Hindernisse und Zukunftswünsche. IAB-Kurzbericht, 5. <https://doku.iab.de/kurzber/2021/kb2021-05.pdf>
- Forschungsbeirat der Plattform Industrie 4.0 (2019). *Themenfelder Industrie 4.0*. München: acatech. <https://www.plattform-i40.de/IP/Redaktion/DE/Downloads/Publikation/Themenfelder.html>
- Forschungsunion & acatech (2013). *Umsetzungsempfehlungen für das Zukunftsprojekt Industrie 4.0*. Berlin: Forschungsunion/acatech. <https://www.acatech.de/publikation/umsetzungsempfehlungen-fuer-das-zukunftsprojekt-industrie-4-0-abschlussbericht-des-arbeitskreises-industrie-4-0/>
- Frailon, Julian; Ainley, John; Schulz, Wolfram; Duckworth, Daniel & Friedman, Tim (2019). *IEA International Computer and Information Literacy Study 2018 Assessment Framework*. Basel: Springer, Cham.
- Frevert, Ute (1986). *Frauen-Geschichte zwischen bürgerlicher Verbesserung und neuer Weiblichkeit*. Frankfurt: Suhrkamp.
- Frey, Carl Benedikt (2019). *Technology Trap: Capital, Labor, and Power in the Age of Automation*. New Jersey: Princeton University Press.
- Friebel, Guido; Gohl, Niklas; de Haan, Peter W. & Weinhardt, Felix (2020). "Rente mit 67: Nötige Weiterbildung der Beschäftigten ist kein Selbstläufer." *DIW aktuell*, 56. Berlin: Deutsches Institut für Wirtschaftsforschung (DIW).
- Frodermann, Corinna; Grunau, Philipp; Haas, Georg-Christoph & Müller, Dana (2021). "Homeoffice in Zeiten von Corona: Nutzung, Hindernisse und Zukunftswünsche." *IAB-Kurzbericht*, 5/2021. Nürnberg: Institut für Arbeitsmarkt-und Berufsforschung.
- Fuchs, Johann; Söhnlein, Doris & Weber, Brigitte (2021). "Demografische Entwicklung lässt das Arbeitskräfteangebot stark schrumpfen." *IAB-Kurzbericht*, 25/2021. Nürnberg: Institut für Arbeitsmarkt-und Berufsforschung.
- Gallego Granados, Patricia; Olthaus, Rebecca & Wrohlich, Katharina (2019). "Teilzeiterwerbstätigkeit: Überwiegend weiblich und im Durchschnitt schlechter bezahlt." *DIW-Wochenbericht*, 845 – 850.
- Gandy, Matthew (1999). "The Paris Sewers and the Rationalization of Urban Space." *Transactions of the Institute of British Geographers*, 24(1), 23 – 44.
- Gazier, Bernard (1999). "Executive Summer." In: Gazier, Bernard (Ed.) *Employability: Concepts and Policies*, Report 1998. Beschäftigungsobservatorium der Europäischen Kommission DG V. Nürnberg: Institute for Labor Markets and Socio-Economics.
- Gegenhuber, Thomas; Schuessler, Elke; Reischauer, Georg, Gegenhuber, Thomas; Schuessler, Elke; Reischauer, Georg & Thäter, Laura (2022). "Building collective institutional infrastructures for decent platform work: The development of a crowdwork agreement in Germany." In: Gümüşay, Ali Aslan; Marti, Emilio; Trittin-Ulrich, Hannah & Wickert, Christopher (Eds.): *Organizing for societal grand challenges*. Bingley: Emerald Publishing Limited, 43 – 68.
- Gemeinwohl Deutschland (2019). *Gemeinwohl und ich*. *GemeinwohlAtlas*. [www.gemeinwohlatlas.de/gemeinwohl-und-ich](http://www.gemeinwohlatlas.de/gemeinwohl-und-ich)
- Georg, Arno; Katenkamp, Olaf & Guhlemann, Kerstin (2017). "Digitalisierungsprozesse und das Handeln von Betriebsräten. Strategien und Handlungsoptionen von Betriebsräten in der Arbeitswelt 4.0." *Arbeit*, 26(2), 251 – 274.
- Gerber, Christine & Krzywdzinski, Martin (2019). "Brave new digital work? New forms of performance control in crowd work." *Research in the Sociology of Work*, 33, 121 – 143.
- Germanwatch (2022). *Deutschland widerspricht mit Tankrabbatt selbst vorangetriebener Einigung bei G7-Treffen*. Press release June 1, 2022. <https://www.germanwatch.org/de/85471>
- Gerold, Stefanie (2022). "Reevaluations of work. Enabling and combining a diversity of activities." In: Seidl, Irmi & Zahrt, Angelika (Eds.): *Post-Growth Work. Employment and Meaningful Activities within Planetary Boundaries*. Abingdon: Routledge, 43 – 54.
- Gerst, Detlef (2020). "Mitbestimmung in digitalen und agilen Betrieben – das Modell einer prozessualen partnerschaftlichen Konfliktkultur." In: Bader, Verena & Kaiser, Stephan (Eds.): *Arbeit in der Data Society*. Wiesbaden: Springer, 35 – 56.
- Gesellschaft für Informatik (2021). *Informatik-Monitor*. Gesellschaft für Informatik. [https://informatik-monitor.de/fileadmin/GI/Allgemein/PDF/GI\\_Informatik-Monitor\\_01.pdf](https://informatik-monitor.de/fileadmin/GI/Allgemein/PDF/GI_Informatik-Monitor_01.pdf)
- GEW (2022). *Die Umsetzung des Digitalpakts Schule. Perspektiven der schulischen Praxis auf zentrale Steuerungsfragen und -herausforderungen*. Gewerkschaft Erziehung und Wissenschaft. <https://www.gew.de/index.php?eID=dumpFile&t=f&f=122208&token=dc37c39c9bffa0402645c869ce5224b77f6212738&sdowload=&n=20220502-PK-Digitalpakt-Bericht.pdf>
- GFDB (2018). *Zentrale Ergebnisse der Studie ICILS 2019 – Stillstand in der digitalen Bildung seit 2013?* Gesellschaft für digitale Bildung. <https://www.gfdb.de/icils-2018>
- Ghomi, M., Dictus, C.; Pinkwart, Niels & Tiemann, Rüdiger (2020). "DigCompEduMINT: Digitale Kompetenz von MINT-Lehrkräften." *k:ON – Kölner Online Journal für Lehrer\*innenbildung*, 1, 1 – 22.



- Gimpel, Henner; Lanzl, Julia; Regal, Christian; Urbach, Nils; Wischniewski, Sascha; Tegtmeier, Patricia; Kreilos, Mathias; Kühlmann, Torsten M.; Becker, Julia; Eimecke, Jörgen & Derra, Nicholas Daniel (2019). *Gesund digital arbeiten?! Eine Studie zu digitaler Stress in Deutschland*. Augsburg: Fraunhofer FIT. <https://doi.org/10.24406/fit-n-562039>
- Gimpel, Henner; Lanzl, Julia; Manner-Romberg Tobias & Nüske, Niclas (2018). *Digitaler Stress in Deutschland: Eine Befragung von Erwerbstätigen zu Belastung und Beanspruchung durch Arbeit mit digitalen Technologien*. Working Paper Forschungsförderung #101. Düsseldorf: Hans-Böckler-Stiftung. <https://www.econstor.eu/handle/10419/216026>
- Goos, Maarten & Manning, Alan (2007). "Lousy and lovely jobs: The rising polarization of work in Britain." *The Review of Economics and Statistics*, 89 (1), 118 – 133.
- Grabka, Markus; Jotzo, Björn; Rasner, Anika & Westermeyer, Christian (2017). "Der Gender Pension Gap verstärkt die Einkommensungleichheit von Männern und Frauen im Rentenalter." *DIW Wochenbericht*, 5 / 2017, 87 – 95.
- Graeber, David (2019). *Bullshit Jobs: Vom wahren Sinn der Arbeit*. Stuttgart: Klett-Cotta.
- Grimm, Veronika; Janser, Markus & Stops, Michael (2021). *Neue Analyse von Online-Stellenanzeigen: Kompetenzen für die Wasserstofftechnologie sind jetzt schon gefragt*, 11, p. 8. <https://doku.iab.de/kurzber/2021/kb2021-11.pdf>
- Grobecker, Claire; Krack-Roberg, Elle; Pötzsch, Olga & Sommer, Bettina (2021). "Bevölkerungsstand und Bevölkerungsentwicklung." In: Statistisches Bundesamt; Wissenschaftszentrum Berlin für Sozialforschung; Bundesinstitut für Bevölkerungsforschung (Eds.): *Datenreport 2021. Ein Sozialbericht für die Bundesrepublik Deutschland*. Bonn: Bundeszentrale für politische Bildung, 11 – 29.
- Gruber, Jonathan & Wise, David A. (1999). *Social Security and Retirement around the World*. Chicago: University of Chicago Press.
- Grunau, Philip & Haas, Georg-Christoph (2021). *Homeoffice in der Corona-Krise: Vorbehalte haben abgenommen*. IAB-Forum. <https://www.iab-forum.de/homeoffice-in-der-corona-krise-vorbehalte-haben-abgenommen/>
- Grunau, Philipp; Janser, Markus; Laible, Marie-Christine; Lehmer, Florian; Matthes, Britta; Stops, Michael & Vicari, Basha (2020). "Covid-19-Pandemie und Klimawandel als Beschleuniger des Strukturwandels: Fachkräftesicherung in Zeiten von Digitalisierung und Defossilisierung." *IAB-Stellungnahme*. Nürnberg: Institut für Arbeitsmarkt-und Berufsforschung.
- Grunert, Klaus G.; De Bauw, Michiel; Dean, Moira; Lähteenmäki, Liisa; Maison, Dominika; Pennanen, Kyösti; Sandell, Mari A.; Stasiuk, Katarzyna; Stickel, Lisa; Tarrega, Amparo; Vainio, Annukka & Vranken, Liesbet (2021). "No lockdown in the kitchen: How the COVID-19 pandemic has affected food-related behaviours." *Food Research International*, 150 (A / 2021), 110752.
- Haipeter, Thomas (2018). "Digitalisierung, Mitbestimmung und Beteiligung – auf dem Weg zur Mitbestimmung 4.0?" In: Hirsch-Kreinsen, Hartmut; Ittermann, Peter & Niehaus, Jonathan (Eds.): *Digitalisierung Industrieller Arbeit*. Baden-Baden: Nomos Verlagsgesellschaft, 303 – 321.
- Handelsblatt Research Institute & Deutsche Vermögensberatung (2022). *Neustart im Beruf? Wechselbereitschaft wird facettenreicher*. Düsseldorf: Handelsblatt Research Institute; Deutsche Vermögensberatung.
- Hank, Karsten & Erlinghagen, Marcel (2008). "Produktives Altern und informelle Arbeit: Stand der Forschung und Perspektiven." In: Erlinghagen, Marcel & Hank, Karsten (Eds.): *Produktives Altern und informelle Arbeit in modernen Gesellschaften. Theoretische Perspektiven und empirische Befunde*. Wiesbaden: VS Verlag für Sozialwissenschaften, 9 – 24.
- Hank, Karsten & Erlinghagen, Marcel (2010). "Volunteering in "Old" Europe: Patterns, Potentials, Limitations." *Journal of Applied Gerontology*, 29(1), 3 – 20.
- Hans, Jan Philipp; Hofmann, Sandra; Sesselmeier, Werner & Yollu-Tok, Aysel (2017). *Umsetzung, Kosten und Wirkungen einer Arbeitsversicherung*. Bonn: Friedrich-Ebert-Stiftung.
- Hanushek, Erik A.; Rivkin, Steven G. & Schiman, Jeffrey C. (2016). "Dynamic effects of teacher turnover on the quality of instruction." *Economics of Education Review*, 55, 132 – 148.
- Haug, Frigga (2014). "Die Vier-in-Einem-Perspektive und Hegemoniekämpfe um Arbeit." In: Konzeptwerk neue Ökonomie (Ed.): *Zeitwohlstand*. München: Konzeptwerk neue Ökonomie, 33 – 38.
- Heckman, James J. & Conti, Gabriella (2013). "The Developmental Approach to Child and Adult Health." *Pediatrics*, 131, 133–141.
- Helbig, Marcel (2023). *Eine „faire“ Verteilung der Mittel aus dem Startchancenprogramm erfordert eine ungleiche Verteilung auf die Bundesländer. Eine Abschätzung der Mittelbedarfe für die deutschen Grundschulen anhand der Armutsquoten in den Sozialräumen*. WZB Discussion Paper P 2023 – 001. Berlin: WZB.
- Herzog, Regula A.; Kahn, Robert; Morgan, James; Jackson, James & Antonucci, Toni (1989). "Age differences in productive activity." *Journal of Gerontology: Social Sciences*, 44(4), 29 – 138.

- Hess, Moritz, König, Stefanie & Hofäcker, Dirk (2016). "Retirement transitions under changing institutional conditions: towards increasing inequalities? Comparing evidence from 13 countries." In: Hofäcker, Dirk; Hess, Moritz & König, Stefanie (Eds.): *Delaying retirement. Progress and challenges of active ageing in Europe, the United States and Japan*. London: Palgrave Macmillan, 363–378.
- Heß, Pascal; Janssen, Simon & Leber, Ute (2019). "Digitalisierung und berufliche Weiterbildung: Beschäftigte, deren Tätigkeiten durch Technologien ersetzbar sind, bilden sich seltener weiter." *IAB-Kurzbericht # 16*, Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung. <https://doku.iab.de/kurzber/2019/kb1619.pdf>
- Hielscher, Volker; Kirchen-Peters, Sabine & Nock, Lukas (2017). "Pflege in den eigenen vier Wänden: Zeitaufwand und Kosten. Pflegebedürftige und ihre Angehörigen geben Auskunft." *HBS-Study 363*. Düsseldorf: Hans-Böckler-Stiftung.
- High-Level Expert Group on Artificial Intelligence (2019). *The Assessment List for Trustworthy Artificial Intelligence*. Brussels: European Commission.
- Hill, Steven (2020). "Can Society Afford to Hail a Ride in a Post-Prop 22 World?" *Zocalo Public Square*, December 3. <https://www.zocalopublicsquare.org/2020/12/03/prop-22-gig-economy-workers-social-safety-net/ideas/essay/>
- Hipp, Lena & Bünning, Mareike (2021). "Parenthood as a driver of increased gender inequality during COVID-19? Exploratory evidence from Germany." *European Societies*, 23(1), 658–673.
- Hipp, Lena & Konrad, Markus (2021). "Has Covid-19 increased gender inequalities in professional advancement? Cross-country evidence on productivity differences between male and female software developers." *Journal of Family Research*, 34(1), 134–160.
- Hirsch-Kreinsen, Hartmut (2020). *Digitale Transformation von Arbeit: Entwicklungstrends und Gestaltungsansätze*. Stuttgart: Kohlhammer Verlag.
- Hirsch-Kreinsen, Hartmut & ten Hompel, Michael (2017). "Digitalisierung industrieller Arbeit: Entwicklungsperspektiven und Gestaltungsansätze." In: ten Hompel, Michael; Bauernhansl, Thomas & Vogel-Heuser, Birgit. *Handbuch Industrie 4.0. Bd. 3: Logistik*. Wiesbaden: Springer Vieweg, 357–376.
- Hoch, Markus; Lambert, Jannis; Kirchner, Almut; Simpson, Richard; Sandhövel, Myrna & Mündlein, Tabea (2019). *Jobwende. Effekte der Energiewende auf Arbeit und Beschäftigung*. Bonn: Friedrich-Ebert-Stiftung.
- Hochschulforum Bildung (2022). "Leitfaden zur Digitalen Barrierefreiheit im Hochschulkontext." *Arbeitspapier Nr. 66*, November. [https://hochschulforumdigitalisierung.de/sites/default/files/dateien/HFD\\_AP\\_66\\_Leitfaden\\_Digitale\\_Barrierefreiheit.pdf](https://hochschulforumdigitalisierung.de/sites/default/files/dateien/HFD_AP_66_Leitfaden_Digitale_Barrierefreiheit.pdf)
- Höhne, Jutta (2016). *Migrantinnen und Migranten auf dem deutschen Arbeitsmarkt: Vergleich der Jahre 2005 und 2013*. Statistisches Bundesamt WISTA. [https://www.destatis.de/DE/Methoden/WISTA-Wirtschaft-und-Statistik/2016/07\\_Sonderheft/migranten-deutscher-arbeitsmarkt-072016.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Methoden/WISTA-Wirtschaft-und-Statistik/2016/07_Sonderheft/migranten-deutscher-arbeitsmarkt-072016.pdf?__blob=publicationFile)
- Hofmann, Josephine; Piele, Alexander & Piele, Christian (2020). *Arbeiten in der Corona-Pandemie – Auf dem Weg zum New Normal*. Stuttgart: Fraunhofer IAO.
- Hokema, Anna & Lux, Thomas (2015). "The Social Stratification of Work beyond Pension Age in Germany and the UK: Quantitative and Qualitative Evidence." In: Scherger, Simone (Ed.): *Paid Work beyond Pension Age. Comparative Perspectives*. Basingstoke: Palgrave Macmillan, 57–80.
- Holman, David & Rafferty, Anthony (2018). "The Convergence and Divergence of Job Discretion between Occupations and Institutional Regimes in Europe from 1995 to 2010." *Journal of Management Studies*, 55(4), 619–647.
- Honneth, Axel (2023). *Der arbeitende Souverän*. Berlin: Suhrkamp.
- Hoornweg, Nicky; Peters, Pascale & van der Heijden, Beatrice (2016). "Finding the Optimal Mix between Telework and Office Hours to Enhance Employee Productivity: A Study into the Relationship between Telework Intensity and Individual Productivity, with Mediation of Intrinsic Motivation and Moderation of Office Hours." In: De Leede, Jan (Ed.): *New ways of working practices. Antecedents and outcomes*. Bingley, U. K.: Emerald Group Publishing Limited, 1–28.
- Hoose, Fabian; Thomas Haipeter & Ittermann, Peter (2019). "Digitalisierung der Arbeit und Interessenvertretungen." *Arbeit* 28(4), 423–444.
- Hornung, Gerrit & Hofmann, Kai (2018). "Datenschutz als Herausforderung der Arbeit in der Industrie 4.0." In: Hirsch-Kreinsen, Hartmut; Ittermann, Peter & Niehaus, Jonathan (Eds.): *Digitalisierung industrieller Arbeit*. Baden-Baden: Nomos, 233–256.
- Hubert, Sandra; Lippert, Kerstin & Alt, Christian (2019). *Unerfüllte Betreuungswünsche*. München: Deutsches Jugendinstitut.
- Huchler, Norbert; Adolph, Lars; André, Elisabeth; Bauer, Wilhelm; Bender, Nadine; Müller, Nadine; Neuburger, Rahild; Peissner, Matthias; Steil, Jochen; Stowasser, Sascha & Suchy, Oliver (2020). *Kriterien für die Mensch-Maschine-Interaktion bei KI (Whitepaper)*. München: Plattform Lernende Systeme.
- Huebener, Mathias; Spieß, Katharina; Siegel, Nico & Wagner, Gert (2020). "Wohlbefinden von Familien in Zeiten von Corona: Eltern mit jungen Kindern am stärksten beeinträchtigt." *DIW Wochenbericht*, 30–31, 527–537.

- Ifo-Institut (2022a). *Anteil der Beschäftigten, die zumindest teilweise im Homeoffice arbeiten, nach Wirtschaftssektoren in Deutschland von Februar 2021 bis November 2022*. Ifo Institut. <https://de.statista.com/statistik/daten/studie/1260179/umfrage/beschaeftigte-im-homeoffice-nach-sektoren/>.
- Ifo-Institut (2022b). *Homeoffice-Nutzung sinkt trotz Ende der Pflicht zur Telearbeit kaum*. Ifo Institut. <https://www.ifo.de/node/69501>
- IGBCE (2022). *BAVC und IGBCE schließen Sozialpartnervereinbarung zum digitalen Zugangsrecht in Chemieindustrie*, August 11. <https://igbce.de/igbce/bavc-und-igbce-schliessen-sozialpartnervereinbarung-zum-digitalen-zugangsrecht-in-chemieindustrie-210864>
- ILO-CEACR (International Labour Organization – Committee of Experts on the Application of Conventions) (2017). *Comments. Direct Request – adopted 2016, published 106th ILC session. Domestic Workers Convention 2011, No. 189*. [https://www.ilo.org/dyn/normlex/en/f?p=1000:13100:0::NO:13100:P13100\\_COMMENT\\_ID:3300808:NO](https://www.ilo.org/dyn/normlex/en/f?p=1000:13100:0::NO:13100:P13100_COMMENT_ID:3300808:NO)
- Initiative D21 (2019). *D21 Digital Index 2018/2019: Jährliches Lagebild zur Digitalen Gesellschaft*. Initiative D21 e.V. [https://initiated21.de/app/uploads/2019/01/d21\\_index2018\\_2019.pdf](https://initiated21.de/app/uploads/2019/01/d21_index2018_2019.pdf)
- Institut für angewandte Arbeitswissenschaft (2019). *Checkliste zur Gestaltung mobiler Arbeit*. Düsseldorf: ifaa.
- Institut für Arbeitsmarkt- und Berufsforschung (2020): *Durchschnittliche Arbeitszeit und ihre Komponenten*. Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung. <https://iab.de/daten/durchschnittliche-arbeitszeit-und-ihre-komponenten/>
- Ipsen, Christine; van Veldhoven, Marc; Kirchner, Kathrin & Hansen, John Paul (2021). “Six Key Advantages and Disadvantages of Working from Home in Europe during COVID-19.” *International Journal of Environmental Research and Public Health*, 18(4), 1826.
- Joebges, Heike; Lindner, Fabian & Niechoj, Torsten (2010). “Mit dem Export aus der Krise? Deutschland im Euroraumvergleich.” *IMK Report*, 53, August.
- Jürgens, Kerstin; Hoffmann, Reiner & Schildmann, Christina (2017). *Arbeit transformieren! Denkanstöße der Kommission „Arbeit der Zukunft“*. Bielefeld: transcript.
- Jurczyk, Karin (2015). “Zeit für Care: Fürsorgliche Praxis in ‘atmenden Lebensverläufen’.” In: Hoffmann, Reiner & Bogedan, Claudia (Eds.): *Arbeit der Zukunft*. Bielefeld: transcript, 260 – 288.
- Jurczyk, Karin & Mückenberger, Ulrich (2020). *Selbstbestimmte Optionszeiten im Erwerbsverlauf*. München: Deutsches Jugendinstitut.
- Kagermann, Henning; Anderl, Reiner; Gausemeier, Jürgen; Schuh, Günther & Wahlster, Wolfgang (2016). *Industrie 4.0 im globalen Kontext. Strategien der Zusammenarbeit mit internationalen Partnern* (acatech Studie). München: Herbert Utz Verlag.
- Kantar (2019). *Evaluation des Bundesprogramms Bildungsprämie (BiP)*. Bundesministerium für Bildung und Forschung. [https://www.bibb.de/dokumente/pdf/BiP\\_Evaluation\\_Endbericht\\_final.pdf](https://www.bibb.de/dokumente/pdf/BiP_Evaluation_Endbericht_final.pdf)
- Kassem, Sarrah (2022). “Labour realities at Amazon and COVID-19: obstacles and collective possibilities for its warehouse workers and MTurk workers.” *Global Political Economy*, 1.1, 59 – 79.
- Katholische Arbeitnehmer-Bewegung (2005). *Arbeitszeit ist Lebenszeit – Arbeitszeitoffensive zur Durchsetzung der ‚Tätigkeitsgesellschaft‘*. Diskussionspapier. [https://www.kab.de/fileadmin/user\\_upload/kab\\_de/Downloads\\_pdf/Diskussionspapier\\_arbeitszeit.pdf](https://www.kab.de/fileadmin/user_upload/kab_de/Downloads_pdf/Diskussionspapier_arbeitszeit.pdf)
- Kenney, Martin & Zysman, John (2020). “The platform economy: restructuring the space of capitalist accumulation.” *Cambridge Journal of Regions, Economy and Society*, 13(1), 55 – 76.
- Kenney, Martin & Zysman, John (2016). “The Rise of the Platform Economy.” *Issues in science and technology*, 32, 61 – 69.
- Kettemann, Matthias C. & Schulz, Wolfgang (Eds.) (2023): *Platform: //Democracy – Perspectives on Platform Power, Public Values and the Potential of Social Media Councils*. Hamburg: Verlag Hans-Bredow-Institut.
- Killgore, William D.S.; Cloonan, Sara A.; Taylor, Emily C. & Dailey, Natalie S. (2020). “Loneliness: A signature mental health concern in the era of COVID-19.” *Psychiatry Research*, 290, 113 – 117.
- Kim, Pauline & Bodie, Matthew (2021). “Artificial Intelligence and the Challenges of Workplace Discrimination and Privacy.” *Journal of Labor and Employment Law*, 35(2), 289 – 315.
- Kirchner, Stefan (2019). “Arbeiten in der Plattformökonomie: Grundlagen und Grenzen von Cloudwork und Gigwork.” *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 71(1), 3 – 25.
- Kirchner, Stefan; Meyer, Sophie-Charlotte & Tisch, Anita (2020). *Digitale Taylorismus für einige, digitale Selbstbestimmung für die anderen? Ungleichheit der Autonomie in unterschiedlichen Tätigkeitsdomänen*. Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (BAuA), Dortmund, F 2490.
- Klanten, Christoph & Schmitt, Gisela (2020). “Urbane Produktion im Fokus integrierter Stadtentwicklung.” In: BBSR (Ed.): *Neue Arbeitswelten – Wie wir in Zukunft arbeiten*. IZR – Informationen zur Raumentwicklung, 6. <https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/izr/2019/6/izr-6-2019.html>

- Klaus, Anton; Kruppe, Thomas; Lang, Julia & Roesler, Konrad (2020). "Geförderte Weiterbildung Beschäftigter: Trotz erweiterter Möglichkeiten noch ausbaufähig." *IAB-Kurzbericht*, 24. Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung.
- Klaus, Daniela & Tesch-Römer, Clemens (2017). "Pflege und Unterstützung bei gesundheitlichen Einschränkungen: Welchen Beitrag leisten Personen in der zweiten Lebenshälfte für andere?" In: Mahne, Katharina; Wolff, Julia Katharina; Simonson, Julia & Tesch-Römer, Clemens (Eds.): *Altern im Wandel. Zwei Jahrzehnte Deutscher Alterssurvey (DEAS)*. Wiesbaden: Springer VS, 185–200.
- Klaver, Caroline C. W.; Polling, Jan R. & Enthoven, Clair A. (2021). "2020 as the Year of Quarantine Myopia." *JAMA Ophthalmology*, 139(3), 300–301.
- Kleilein, Doris & Meyer, Friederike (2021). *Die Stadt nach Corona*. Berlin: Jovis.
- Kleinert, Corinna & Wölfel, Oliver (2018). "Technologischer Wandel und Weiterbildungsteilnahme." *Zeitschrift des Bundesinstituts für Berufsbildung*, 47, 11–15.
- Kleinert, Corinna & Matthes, Britta (2009). "Data in the field of adult education and lifelong learning: Present situation, improvements and challenges." *Working Paper Series of the German Council for Social and Economic Data* 91. <http://dx.doi.org/10.2139/ssrn.1452638>
- Klemm, Klaus (2023). *Jugendliche ohne Hauptschulabschluss. Demographische Verknappung und qualifikatorische Vergeudung*. Gütersloh: Bertelsmann Stiftung. <https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/jugendliche-ohne-hauptschulabschluss-1>
- Klenner, Christina; Lott, Yvonne (2016). "Arbeitszeitoptionen im Lebensverlauf. Bedingungen und Barrieren ihrer Nutzung im Betrieb." *WSI Working Paper No. 203*. Düsseldorf: Hans-Böckler-Stiftung, Wirtschafts- und Sozialwissenschaftliches Institut.
- Klenner, Christina & Schulze-Bischoff, Karin (2015). "Vielfältige Optionen eröffnen, gesicherte Übergänge gestalten: Veränderte Erwerbsverläufe und Lebenslaufpolitik." In: Hoffmann, Reiner & Bogedan, Claudia (Eds.): *Arbeit der Zukunft. Möglichkeiten nutzen – Grenzen setzen*. Frankfurt am Main: Campus, 334–362.
- Klinkhammer, Nicole & Erhardt, Katharina C. (2018). "Ein Blick in die Qualität der frühkindlichen Bildung und Erziehung." In: Bundeszentrale für politische Bildung & Wissenschaftszentrum Berlin für Sozialforschung (Eds.). *Bildung*. Berlin. <https://www.bpb.de/themen/bildung/dossier-bildung/278950/ein-blick-auf-die-qualitaet-der-fruehkindlichen-bildung-und-erziehung/>
- Klös, Hans-Peter & Naegle, Gerhard (2013). "Alter als „Ressource“ – Befunde und verteilungspolitische Implikationen." In: Hüther, Michael & Naegle, Gerhard (Eds.): *Demografiepolitik: Herausforderungen und Handlungsfelder*. Wiesbaden: Springer VS, 123–141.
- Kocher, Eva (2021). "Reshaping the Legal Categories of Work: Digital Labor Platforms at the Borders of Labor Law." *Weizenbaum Journal of the Digital Society*, 1(1).
- Kocka, Jürgen (2015). *Arbeiterleben und Arbeiterkultur. Die Entstehung einer sozialen Klasse*. Bonn: Dietz Verlag.
- Kocka, Jürgen (2016), *Capitalism. A Short History*, Princeton, N.J.: Princeton UP.
- Kocka, Jürgen (2005). "Mehr Last als Lust. Arbeit und Arbeitsgesellschaft in der europäischen Geschichte." *Jahrbuch für Wirtschaftsgeschichte/Economic History Yearbook*, 203–224. <https://doi.org/10.1524/jbwg.2005.46.2.185>
- Kocka, Jürgen & Offe, Claus (2000). *Geschichte und Zukunft der Arbeit*. Frankfurt: Campus.
- Kohli, Martin (1994). "Institutionalisierung und Individualisierung der Erwerbsbiographie." In: Beck, Ulrich & Beck-Gernsheim, Elisabeth (Eds.): *Risikante Freiheiten*. Frankfurt/Main: Suhrkamp, 219–244.
- Korpi, Tomas & Tahlin, Michael (2021). "On-the-job training: a skill match approach to the determinants of lifelong learning." *Industrial Relations Journal*, 52(1), 64–81.
- Kotsadam, Andreas (2011). "Does Informal Eldercare Impede Women's Employment? The Case of European Welfare States." *Feminist Economics*, 17(2), 121–144.
- Kott, Kristina (2021): "Armutgefährdung und materielle Entbehrung." *Datenreport 2021. Ein Sozialbericht für die Bundesrepublik Deutschland*, 222–228. [https://www.destatis.de/DE/Service/Statistik-Campus/Datenreport/Downloads/datenreport-2021.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Service/Statistik-Campus/Datenreport/Downloads/datenreport-2021.pdf?__blob=publicationFile)
- Kramer, Anica & Tamm, Marcus (2018). "Does learning trigger learning throughout adulthood? Evidence from training participation of the employed population." *Economics of Education Review*, 62, 82–90.
- Kraus, Markus; Föbleitner, Sophie & Riedel, Monika (2020). "Pflegesysteme im internationalen Vergleich." In: Jacobs, Klaus; Kuhlmeier, Adelheid; Greß, Stefan; Klauber, Jürgen & Schwinger, Antje (Eds.): *Pflege-Report 2020*. Berlin, Heidelberg: Springer, 23–37.
- Kruppe, Thomas; Lang, Julia & Leber, Ute (2021). *Nur jeder zehnte Betrieb nutzt die Weiterbildungsförderung der Bundesagentur für Arbeit*. IAB-Forum. <https://www.iab-forum.de/nur-jeder-zehnte-betrieb-nutzt-die-weiterbildungsfoerderung-der-bundesagentur-fuer-arbeit/>

- Kruppe, Thomas (2020). "Gestärkte Weiterbildung weiter stärken." *WSI-Mitteilungen*, 73(4), 304 – 306.
- Kruppe, Thomas & Baumann, Martina (2019). "Weiterbildungsbeteiligung, formale Qualifikation, Kompetenzausstattung und Persönlichkeitsmerkmale." *IAB-Forschungsbericht*, 01 / 2019. Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung.
- Kruppe, Thomas; Mühlhan, Jannek; Weber, Enzo & Wiemers, Jürgen (2019). "Gesamtfiskalische Wirkungen von Weiterbildungsförderung: Öffentliche Ausgaben generieren hohe Rückflüsse." *IAB-Kurzbericht*, 08 / 2019. Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung.
- Kruse, Andreas & Schmitt, Eric (2010). "Potenziale des Alters im Kontext individueller und gesellschaftlicher Entwicklung." In: Kruse, Andreas (Ed.): *Potenziale im Altern: Chancen und Aufgaben für Individuum und Gesellschaft*. Heidelberg: Akademische Verlagsgesellschaft, 3 – 30.
- Krzywdzinski, Martin (2021). "Automation, Digitalization, and Changes in Occupational Structures in the Automobile Industry in Germany, Japan, and the United States: A Brief History from the Early 1990s until 2018." *Industrial and Corporate Change*, 30(3), 499 – 535.
- Krzywdzinski, Martin; Butollo, Florian; Flemming, Jana; Gerber, Christine; Wandjo, David; Delicat, Nina; Herzog, Lorena; Bovenschulte, Marc & Nerger, Michael (2022a). "Wachsende Kluft zwischen Vorreiterunternehmen und Nachzüglern: Digitalisierung, Automatisierung und organisatorischer Wandel in Folge der COVID-19-Krise." *Weizenbaum Series 24*. Berlin: Weizenbaum Institut für die vernetzte Gesellschaft.
- Krzywdzinski, Martin; Pfeiffer, Sabine; Evers, Maren & Gerber, Christine (2022b). "Measuring Work and Workers. Wearables and Digital Assistance Systems in Manufacturing and Logistics." *WZB Discussion Paper SPIII 2022 – 301*. Berlin: WZB.
- Kümmerling, Angelika & Schmieja, Vanessa (2021). "Arbeitszeiten während der Coronapandemie: Wachsende Unterschiede zwischen Frauen und Männern." *IAQ-Report*, 7. Duisburg: Institut Arbeit und Qualifikation.
- Künemund, Harald (2006). "Tätigkeiten und Engagement im Ruhestand." In: Tesch-Römer, Clemens; Engstler, Heribert & Wurm, Susanne (Eds.): *Altwerden in Deutschland: Sozialer Wandel und individuelle Entwicklung in der zweiten Lebenshälfte*. Duisburg: VS Verlag für Sozialwissenschaften, 289 – 327.
- Kuhlmann, Martin & Schumann, Michael (2015). "Digitalisierung fordert Demokratisierung der Arbeitswelt heraus." In: Hoffmann, Reiner; Bogedan, Claudia (Eds.): *Arbeit der Zukunft. Möglichkeiten nutzen – Grenzen setzen*. Frankfurt am Main: Campus, 122 – 140.
- Kunze, Florian; Hampel, Kilian & Zimmermann, Sophia (2021). *Homeoffice und mobiles Arbeiten?* Stuttgart: UTB.
- Kushida, Kenji E.; Jonathan Murray & Zysman, John (2015). "Cloud computing: From scarcity to abundance." *Journal of Industry, Competition and Trade*, 15 (1), 5 – 19.
- Läpple, Dieter (2020). "Neue Arbeitswelten – eine Einleitung." In: BBSR (Ed.): *Neue Arbeitswelten – Wie wir in Zukunft arbeiten. IZR – Informationen zur Raumentwicklung*, 6, 4 – 21. <https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/izr/2019/6/izr-6-2019.html>
- Lagrèze, Wolf A. & Schaeffel, Frank (2017). "Preventing Myopia." *Deutsches Arzteblatt international*, 114 (35 – 36), 575 – 580.
- Lampert, Thomas; Hoebel, Jens; Kuntz, Benjamin; Müters, Stephan & Kroll, Lars E. (2017). *Gesundheitliche Ungleichheit in verschiedenen Lebensphasen*. Robert Koch Institut. [https://www.rki.de/DE/Content/Gesundheitsmonitoring/Gesundheitsberichterstattung/GBEDownloadsB/gesundheitsliche\\_ungleichheit\\_lebensphasen.pdf?\\_\\_blob=publicationFile](https://www.rki.de/DE/Content/Gesundheitsmonitoring/Gesundheitsberichterstattung/GBEDownloadsB/gesundheitsliche_ungleichheit_lebensphasen.pdf?__blob=publicationFile)
- Lange, Steffen; Johanna Pohl & Santarius, Tilmann (2020). "Digitalization and energy consumption. Does ICT reduce energy demand?" *Ecological economics*, 176, 106760.
- Lanza, Gisela; Nyhuis, Peter; Fisel, Johannes; Jacob, Alexander; Nielsen, Lars; Schmidt, Matthias & Stricker, Nicole (2018). *Wandlungsfähige, menschenzentrierte Strukturen in Fabriken und Netzwerken der Industrie 4.0* (acatech Studie), München: Herbert Utz Verlage.
- Laslett, Peter (1995). *Das Dritte Alter. Historische Soziologie des Alterns*. Weinheim, München: Juventa.
- Lee, Min K.; Kusbit, Daniel; Metsky, Evan & Dabbish, Laura (2015). "Working with machines: The impact of algorithmic and data-driven management on human workers." *Proceedings of the 33rd annual ACM conference on human factors in computing systems*, 1603 – 12.
- Leimeister, Jan Marco; Durward, David & Zogaj, Shkodran (2016). *Crowd Worker in Deutschland: Eine empirische Studie zum Arbeitsumfeld auf externen Crowdsourcing-Plattformen*. Arbeitspapier 323. Düsseldorf: Hans-Böckler-Stiftung.
- Lembcke, Franziska; Nöh, Lukas; Schwarz, Milena (2021). *Anreizwirkungen des deutschen Steuer- und Transfersystems auf das Erwerbsangebot von Zweitverdienenden*. Arbeitspapier, 52. <https://www.econstor.eu/handle/10419/247312>



- Lerch, Christian & Jäger, Angela (2020). "Industrie 4.0 quo vadis?" In: Fraunhofer-Institut für System- und Innovationsforschung (Ed.): *Modernisierung der Produktion*. Karlsruhe: Fraunhofer-Institut für System- und Innovationsforschung, 76.
- Lilly, Meredith B; Laporte, Audrey & Coyte, Peter C (2007). "Labor market work and home care's unpaid caregivers: a systematic review of labor force participation rates, predictors of labor market withdrawal, and hours of work." *The Milbank Quarterly*, 85(4), 641–690.
- Lindenberg, Siegwart (1996). "Continuities in the theory of social production functions." In: Ganzeboom, Harry & Lindenberg, Siegwart (Eds.): *Verklarende sociologie; opstellen voor Reinhart Wippler*. Amsterdam: Thesis Publications, 169–184.
- Littig, Beate & Spita, Markus (2011). *Arbeit neu. Erweiterte Arbeitskonzepte im Vergleich. Literaturstudie zum Stand der Debatte um erweiterte Arbeitskonzepte*. Arbeitspapier 229. Düsseldorf: Hans-Böckler-Stiftung.
- Lörz, Markus & Schindler, Steffen (2011). "Bildungsexpansion und soziale Ungleichheit: Zunahme, Abnahme oder Persistenz ungleicher Chancenverhältnisse – eine Frage der Perspektive?" *Zeitschrift für Soziologie*, 40(6), 458–477.
- Lott, Yvonne (2017). "Selbst organisiertes Arbeiten als Ressource für Beschäftigte nutzen!" *Policy Brief der Forschungsförderung*, 3. Düsseldorf: Hans-Böckler-Stiftung.
- Lott, Yvonne (2019). "Weniger Arbeit, mehr Freizeit? Wofür Mütter und Väter flexible Arbeitszeitarrangements nutzen." *WSI Report*, 47. Düsseldorf: Hans-Böckler-Stiftung.
- Lott, Yvonne (2020). "Work-Life-Balance im Homeoffice: Was kann der Betrieb tun? Welche betrieblichen Bedingungen sind für eine gute Work-Life Balance im Homeoffice notwendig?" *WSI Report*, 54. Düsseldorf: Hans-Böckler-Stiftung. [https://www.boeckler.de/pdf/p\\_wsi\\_report\\_54\\_2020.pdf](https://www.boeckler.de/pdf/p_wsi_report_54_2020.pdf)
- Lott, Yvonne; Ahlers, Elke; Wenckebach, Johanna & Zucco, Aline (2021). "Recht auf mobile Arbeit – warum wir es brauchen, was es regeln muss." *WSI Policy Brief*, 55. Düsseldorf: Hans-Böckler-Stiftung.
- Lücking, Stefan (2019). *Arbeiten in der Plattformökonomie*. Düsseldorf: Hans-Böckler-Stiftung.
- Lutz, Helma (2018a). "Care migration: The connectivity between care chains, care circulation and transnational social inequalities." *Current Sociology Monograph*, 1–13.
- Lutz, Helma (2018b). *Die Hinterbühne der Care-Arbeit. Transnationale Perspektiven auf Care-Migration im geteilten Europa*. Basel, Weinheim: Beltz Juventa.
- Maak, Niklas (2022). "Ein Leuchten mitten in Berlin. So könnten wir auch wohnen." In: *Frankfurter Allgemeine Zeitung*, August 9. <https://www.faz.net/aktuell/feuilleton/ein-leuchten-mitten-in-berlin-18232757.html>
- Martens, Hans & Hobbs, Renee (2015). "How Media Literacy Supports Civic Engagement in a Digital Age." *Atlantic Journal of Communication*, 23(2), 120–137.
- Martinson, Marty & Minkler, Meredith (2006). "Civic Engagement and Older Adults: A Critical Perspective." *The Gerontologist*, 46(3), 318–324.
- Mata, Jutta; Wenz, Alexander; Rettig, Tobias; Reifenscheid, Maximiliane; Möhring, Katja; Krieger, Ulrich; Friedel, Sabine; Fikel, Marina; Cornesse, Carina; Blom, Annelies & Naumann, Elias (2021). "Health behaviors and mental health during the COVID-19 pandemic: A longitudinal population-based survey in Germany." *Social Science & Medicine*, 287.
- McNeill, William H. (1977). *Plagues and Peoples*. Hamburg: Anchor.
- Mergenthaler, Andreas; Cihlar, Volker; Micheel, Frank & Sackreuther, Ines (2017). "The changing nature of (un-)retirement in Germany: living conditions, activities and life phases of older adults in transition." *BiB Working Paper*, 3. Wiesbaden: Bundesinstitut für Bevölkerungsforschung.
- Mergenthaler, Andreas; Konzelmann, Laura; Cihlar, Volker; Micheel, Frank & Schneider, Norbert F. (2020). *Vom Ruhestand zu (Un-)Ruheständen. Transitions and Old Age Potential*. Bundesinstitut für Bevölkerungsforschung. [https://www.bib.bund.de/Publikation/2020/pdf/Vom-Ruhestand-zu-Un-Ruhestaenden.pdf?\\_\\_blob=publicationFile&v=9](https://www.bib.bund.de/Publikation/2020/pdf/Vom-Ruhestand-zu-Un-Ruhestaenden.pdf?__blob=publicationFile&v=9)
- Mergenthaler, Andreas; Sackreuther, Ines; Micheel, Frank; Büsch, Victoria; Deller, Jürgen; Staudinger, Ursula M. & Schneider, Norbert F. (2015). "Übergänge, Lebenspläne und Potenziale der 55- bis 70-Jährigen: Zwischen individueller Vielfalt, kulturellem Wandel und sozialen Disparitäten." In: Schneider, Norbert F.; Mergenthaler, Andreas; Staudinger, Ursula M. & Sackreuther, Ines (Eds.): *Mittendrin? Lebenspläne und Potenziale älterer Menschen beim Übergang in den Ruhestand*. Opladen, Berlin, Toronto: Verlag Barbara Budrich, 15–46.
- Meyer-Guckel, Volker; Klier, Julia; Kirchherr, Julian & Suessenbach, Felix (2021). *Vom Arbeiterkind zum Doktor Der Hürdenlauf auf dem Bildungsweg der Erststudierenden*. Stifterverband für Deutsche Wissenschaft e.V. [https://www.stifterverband.org/medien/vom\\_arbeiterkind\\_zum\\_doktor](https://www.stifterverband.org/medien/vom_arbeiterkind_zum_doktor)
- Meynhardt, Timo (2016). "Ohne Gemeinwohl keine Freiheit: Zur Psychologie des Gemeinwohls." In: Papier, Hans-Jürgen & Meynhardt, Timo (Eds.): *Freiheit und Gemeinwohl – Ewige Gegensätze oder zwei Seiten einer Medaille?* Berlin: Speersort, 173–192.

- Meynhardt, Timo (2018). "Der GemeinwohlAtlas: Die Vermessung des Gemeinwohls – Reflexionen zu einem neuen Ansatz." In: Flick, Corinne (Ed.): *Das Gemeinwohl im 21. Jahrhundert*. Göttingen: Wallstein Verlag, 143–158.
- Miller, Chris (2022). *Chip War: The Fight for the World's Most Critical Technology*. New York: Simon and Schuster.
- Moen, Phyllis (2011). "A Life-Course Approach to the Third Age." In: Carr, Dawn C. & Komp, Kathrin (Eds.): *Gerontology in the Era of the Third Age. Implications and Next Steps*. New York: Springer, 13–31.
- Mohr, Jochen (2019). "Soloselbständige zwischen Wettbewerbsrecht und Kollektivarbeitsrecht." In: Hanau, Hans & Matiaske, Wenzel (Eds.): *Entgrenzung von Arbeitsverhältnissen*. Baden-Baden: Nomos, 99–132.
- Montreuil, Sylvie & Lippel, Katherine (2003). "Telework and occupational health: A Quebec empirical study and regulatory implications." *Safety Science*, 41(4), 339–358.
- Moussa, Margaret M. (2019). "The relationship between elder care-giving and labour force participation in the context of policies addressing population ageing: A review of empirical studies published between 2006 and 2016." *Ageing and Society*, 39(6), 1281–1310.
- Mückenberger, Ulrich (2012). *Lebensqualität durch Zeitpolitik: Wie Zeitkonflikte gelöst werden können*. Düsseldorf: Hans-Böckler-Stiftung.
- Müller, Agnes (2021). "Vom Coworking Space zum Nachbarschaftsbüro." In: Kleilein, Doris & Meyer, Friederike (2021). *Die Stadt nach Corona*. Berlin: Jovis, 83–95.
- Müller, Angelika (2022). "Der Artificial Intelligence Act der EU: Ein risikobasierter Ansatz zur Regulierung von Künstlicher Intelligenz – mit Auswirkungen auf die Schweiz." *EuZ – Zeitschrift für Europarecht*, 1, A1–A25. <https://eizpublishing.ch/ausgabe/euz-zeitschrift-fuer-europarecht-ausgabe-1-2022/>
- Müller, Kai-Uwe; Neumann, Michael & Wrohlich, Katharina (2018). "The family working-time model: Towards more gender equality in work and care." *Journal of European Social Policy*, 28 (5), 471–486.
- Müller, Kai-Uwe; Samtleben, Claire; Schmieder, Julia & Wrohlich, Katharina (2020). "Corona-Krise erschwert Vereinbarkeit von Beruf und Familie vor allem für Mütter – Erwerbstätige Eltern sollten entlastet werden." *DIW Wochenbericht*, 19, 331–340.
- Mulet, Elena; Chulvi, Vicente; Royo, Marta & Galán, Julia (2016). "Influence of the dominant thinking style in the degree of novelty of designs in virtual and traditional working environments." *Journal of Engineering Design*, 27(7), 413–437.
- Mußmann, Frank; Hardwig, Thomas; Riethmüller, Martin & Klötzer, Stefan (2021). *Digitalisierung im Schulsystem 2021, Arbeitszeit, Arbeitsbedingungen, Rahmenbedingungen und Perspektiven von Lehrkräften in Deutschland*. Göttingen: Kooperationsstelle Hochschulen und Gewerkschaften der Georg-August-Universität Göttingen.
- Naegele, Gerhard (2017). "Altes und Neues zur ‚Arbeit trotz Rente‘ – Weiter wachsende Rentenerwerbsarbeit." In: Generali Deutschland AG (Ed.): *Generali Altersstudie 2017*. Berlin, Heidelberg: Springer, 73–79.
- Naegele, Laura & Hess, Moritz (2018). "Karrieren nach der Rente: Karriere- und Arbeitsvorstellungen von arbeitenden Rentner\*innen." *Gruppe Interaktion Organisation*, 49, 58–68.
- Nationale Akademie der Wissenschaften Leopoldina (2014). *Frühkindliche Sozialisation*. Halle: Nationale Akademie der Wissenschaften Leopoldina, München: acatech – Deutsche Akademie der Technikwissenschaften, Mainz: Union der deutschen Akademien der Wissenschaften. [https://www.leopoldina.org/uploads/tx\\_leopublication/2014\\_Stellungnahme\\_Sozialisation\\_web.pdf](https://www.leopoldina.org/uploads/tx_leopublication/2014_Stellungnahme_Sozialisation_web.pdf)
- Nationale Akademie der Wissenschaften Leopoldina (2019a). *Über eine CO2-Bepreisung zur Sektorenkopplung: Ein neues Marktdesign für die Energiewende*. Halle: Nationale Akademie der Wissenschaften Leopoldina, München: acatech – Deutsche Akademie der Technikwissenschaften, Mainz: Union der deutschen Akademien der Wissenschaften. [https://www.leopoldina.org/uploads/tx\\_leopublication/2019\\_ESYS\\_Impuls\\_Marktdesign.pdf](https://www.leopoldina.org/uploads/tx_leopublication/2019_ESYS_Impuls_Marktdesign.pdf)
- Nationale Akademie der Wissenschaften Leopoldina (2019b). *Klimaziele 2030. Wege zu einer nachhaltigen Reduktion der CO2-Emissionen*. Ad-hoc-Stellungnahme. [https://www.leopoldina.org/uploads/tx\\_leopublication/2019\\_Stellungnahme\\_Klimaziele\\_2030\\_Final.pdf](https://www.leopoldina.org/uploads/tx_leopublication/2019_Stellungnahme_Klimaziele_2030_Final.pdf)
- Nationale Akademie der Wissenschaften Leopoldina (2022). *Kommentar: Mit einfacheren Regeln den Technologiehochlauf von Wasserstoff schneller ermöglichen*. Halle: Nationale Akademie der Wissenschaften Leopoldina. [https://www.leopoldina.org/fileadmin/redaktion/Publikationen/Nationale\\_Empfehlungen/2022\\_Leopoldina\\_Kommentar\\_zu\\_Wasserstoffregelung.pdf](https://www.leopoldina.org/fileadmin/redaktion/Publikationen/Nationale_Empfehlungen/2022_Leopoldina_Kommentar_zu_Wasserstoffregelung.pdf)
- Negroponte, Nicholas (1995). "The digital revolution: Reasons for optimism." *The Futurist*, 29(6), 68.
- Niebuhr, Fiona; Borle, Prem; Boerner-Zobel, Franziska & Voelter-Mahlknecht, Susanne (2022). "Healthy and Happy Working from Home? Effects of Working from Home on Employee Health and Job Satisfaction." *International Journal Environmental Research*, 19(3), 11–22.



- OECD (2011). *Kochen, Pflegen, Putzen: OECD-Studie zeigt Ungleichgewicht der Geschlechter*. Paris: OECD Publishing, April 12. <https://www.oecd.org/berlin/presse/kochenpflegenputzenoecd-studiezeigtungleichgewicht-dergeschlechter.htm>
- OECD (2018). *A Broken Social Elevator? How to Promote Social Mobility*. Paris: OECD Publishing. [https://www.oecd-ilibrary.org/social-issues-migration-health/broken-elevator-how-to-promote-social-mobility\\_9789264301085-en](https://www.oecd-ilibrary.org/social-issues-migration-health/broken-elevator-how-to-promote-social-mobility_9789264301085-en)
- OECD (2019). *The OECD Learning Compass 2030*. OECD. <https://www.oecd.org/education/2030-project/teaching-and-learning/learning/>
- OECD (2022a). *Employment Outlook 2022*. OECD. <https://www.oecd.org/employment-outlook/2022/>
- OECD (2022b). *Education at a Glance 2022: OECD Indicators*. Paris: OECD Publishing. [https://www.oecd-ilibrary.org/education/education-at-a-glance-2022\\_3197152b-en](https://www.oecd-ilibrary.org/education/education-at-a-glance-2022_3197152b-en)
- Ojala, Satu; Nätti, Jouko & Anttila, Timo (2014). "Informal overtime at home instead of telework: Increase in negative work-family interface." *International Journal of Sociology and Social Policy*, 34, 69–87.
- Opitz, Claudia (1994). "Neue Wege der Sozialgeschichte? Ein kritischer Blick auf Otto Brunners Konzept des ‚Ganzen Hauses‘." *Geschichte und Gesellschaft*, 20, 88–98.
- Ormel, Johan; Lindenberg, Siegwart; Steverink, Nardi & Verbrugge, Lois M. (1999). "Subjective Well-Being and Social Production Functions." *Social Indicators Research*, 46, 61–90.
- Osiander, Christopher & Stephan, Gesine (2018). "Gerade geringqualifizierte Beschäftigte sehen bei der beruflichen Weiterbildung viele Hürden." *IAB-Forum*, August 2. <https://www.iab-forum.de/gerade-gering-qualifizierte-beschaeftigte-sehen-bei-der-beruflichen-weiterbildung-viele-huerden/>
- Peters, Markus & Wischniewski, Sascha (2020): "Evaluation of Physical Workload Using Simulation versus Motion Capturing Data for Biomechanical Models." In: Hanson, Lars; Högberg, Dan & Brolin, Erik (Eds.). *DHM 2020. Proceedings of the 6th International Digital Human Modeling Symposium*, August 31 – September 2, Projektnummer: F 2494, IOS Press, 380–387.
- Pfnür, Andreas; Eberhardt, Martin & Herr, Thomas (2022). *Geschäftsmodelle, Strukturen, Prozesse und Produkte im Wandel*. Wiesbaden: Springer.
- Piasna, Agnieszka; Zwysen, Wouter & Drahokoupil, Jan (2022). *The platform economy in Europe. Results from the second ETUI Internet and Platform Work Survey*, Working Paper. etui. European Trade Union Institute. [https://www.etui.org/sites/default/files/2022-02/The%20platform%20economy%20in%20Europe\\_2022.pdf](https://www.etui.org/sites/default/files/2022-02/The%20platform%20economy%20in%20Europe_2022.pdf)
- Polanyi, Karl (1978). *The Great Transformation. Politische und ökonomische Ursprünge von Gesellschaften und Wirtschaftssystemen*. Frankfurt: Suhrkamp.
- Pongratz, Hans J. & Abbenhardt, Lisa (2018). "Interessenvertretung von Solo-Selbständigen." *WSI-Mitteilungen*, 71(4), 270–278.
- Pongratz, Hans J. & Bormann, Sarah (2017). "Online-Arbeit auf Internet-Plattformen: empirische Befunde zum ‚Crowdworking‘ in Deutschland." *AIS-Studien*, 10(2), 158–181.
- Pongratz, Hans J. & Voß, Günter (2003). *Arbeitskraft-unternehmer. Erwerbsorientierungen in entgrenzten Arbeitsformen*. Berlin: edition sigma.
- Pothmer, Brigitte; Antony, Philipp; Bayer, Mechthild; Brümmer, Ute; Heister, Michael; Kruppe, Thomas & Schroeder, Wolfgang (2019). "Weiterbildung 4.0. Solidarische Lösungen für das lebenslange Lernen im digitalen Zeitalter." *Böll-Brief*, 8(36). [https://www.boell.de/sites/default/files/boell.brief\\_tg8\\_weiterbildung\\_4.0.pdf](https://www.boell.de/sites/default/files/boell.brief_tg8_weiterbildung_4.0.pdf)
- Power, Chris & Kuh, Diana (2006). "Life course development of unequal health." In: Siegrist, Johannes & Marmot, Michael (Eds.): *Socioeconomic position and health: New explanations and their policy implications*. Oxford: Oxford University Press, 77–115.
- Prognos (2022). *Vereinbarkeit von Familie und Beruf als Beitrag zur Fachkräftesicherung. Bundesministerium für Familie, Senioren, Frauen und Jugend*. Prognos. [https://www.prognos.com/sites/default/files/2022-10/221005\\_Policy-Paper\\_Vereinbarkeit.pdf](https://www.prognos.com/sites/default/files/2022-10/221005_Policy-Paper_Vereinbarkeit.pdf)
- Pulignano, Valeria; Turk, Jeff (2016). *European Works Councils on the Move: Management Perspectives on the Development of a Transnational Institution for Social Dialogue*. Working paper. Leuven: Centre for Sociological Research. <https://soc.kuleuven.be/ceso/wo/erlm/files/permevc-final-report-eng>
- Rahman, Sabeel & Thelen, Kathleen (2019). "The rise of the platform business model and the transformation of twenty-first-century capitalism." *Politics & Society*, 47(2), 177–204.
- Reintjes, Dominik (2022). "Diese Daten zeigen die Auswirkungen der Homeofficepflicht." *WirtschaftsWoche*, March 25. <https://www.wiwo.de/erfolg/beruf/bueroansturm-bleibt-aus-diese-daten-zeigen-die-auswirkungen-der-homeofficepflicht/28195242.html>

- Richardson, Nela & Antonello, Marie (2022). *People at Work 2022: A Global Workforce View*. ADP Research Institute.
- Richter, Götz & Mühlbrock, Inga (2018). "Herausforderungen und Handlungsbedarfe einer alters- und altersgerechten Arbeitsgestaltung." *WSI-Mitteilungen*, 71(1), 28 – 35.
- Rohwer, Elisabeth; Kordsmeyer, Ann-Christin; Harth, Volker & Mache, Stefanie (2020). "Boundarylessness and sleep quality among virtual team members – a pilot study from Germany." *Journal of Occupational Medicine and Toxicology*, 15, 30.
- Rosenblat, Alex & Stark, Luke (2016). "Algorithmic labor and information asymmetries: A case study of Uber's drivers." *International Journal of Communication*, 10, 27.
- Rosenmayr, Leopold (1989). *Die späte Freiheit: Das Alter – Ein Stück bewusst gelebtes Leben*. München: Siedler Verlag.
- Rossow, Verena & Leiber, Simone (2019). "Kein Schattendasein mehr. Entwicklungen auf dem Markt für ,24-Stunden-Pflege'." *Aus Politik und Zeitgeschichte*, 69 (33 – 34), 37 – 42.
- Rossow, Verena & Leiber, Simone (2017). "Zwischen Vermarktlichung und Europäisierung. Die wachsende Bedeutung transnational agierender Vermittlungsagenturen in der häuslichen Pflege in Deutschland." *Sozialer Fortschritt*, 66 (3 / 4), 285 – 302.
- Rowland, Donald T. (2012). *Population aging: The transformation of societies*. Heidelberg: Springer.
- Rowland, Donald T. (2012). "The Third Age." In: Rowland, Donald T. (Ed.): *Population Aging. The Transformation of Societies*. Heidelberg, New York, London: Springer, 167 – 181.
- Ruckdeschel, Kerstin & Ette, Andreas (2010). "Großeltern oder Kinderkrippe? Zur Bedeutung intergenerationaler Unterstützung bei der Kinderbetreuung im europäischen Vergleich." *Bevölkerungsforschung Aktuell*, 31(4), 4 – 7.
- Rueda, Salvador (2019). "Superblocks for the Design of New Cities and Renovation of Existing Ones: Barcelona's Case." In: Nieuwenhuijsen, Mark & Khreis, Haneen (Eds.): *Integrating Human Health into Urban and Transport Planning*. Cham: Springer International Publishing, 3 – 16.
- Samtleben, Claire (2019). "Auch an erwerbsfreien Tagen erledigen Frauen einen Großteil der Hausarbeit und Kinderbetreuung." *DIW Wochenbericht*, 10 (2019), 139 – 144.
- Samtleben, Claire; Bringmann, Julia; Bünning, Mareike & Hipp, Lena (2019 a). "What helps and what hinders? Exploring the role of workplace characteristics for parental leave use and its career consequences." *Social Sciences, Special Issue on Family and Work: Parental Leave and Careers*, 8 (270).
- Samtleben, Claire; Schäper, Clara & Wrohlich, Katharina (2019b). "Elterngeld und Elterngeld Plus: Nutzung durch Väter gestiegen, Aufteilung zwischen Müttern und Vätern aber immer noch sehr ungleich." *DIW Wochenbericht*, 35, 607 – 613.
- Schade, Wolfgang; Berthold, Daniel; Mader, Simon; Scherf, Christian; Wagner, Udo; Sievers, Luisa; Grimm, Anna & Doll, Claus (2020). "Synthese und Handlungsempfehlungen zu Beschäftigungseffekten nachhaltiger Mobilität: Eine systematische Analyse der Perspektiven in Deutschland bis 2035." *Arbeitspapier M-Five GmbH und Fraunhofer ISI*. Karlsruhe: M-Five GmbH.
- Schanne, Norbert & Weyh, Antje (2017). "Wirksamkeit von Weiterbildungsberatung – Quasi-experimentelle Evidenz aus den Dresdner Bildungsbahnen." In: Schober, Karen & Langner, Judith (Eds.): *Wirksamkeit der Beratung in Bildung, Beruf und Beschäftigung*. Bielefeld: wbv Publikationen, 91 – 102.
- Schaupp, Simon (2021). "Algorithmic integration and precarious (Dis)obedience: On the co-constitution of migration regime and workplace regime in digitalised manufacturing and logistics." *Work, Employment and Society*, 36(2), 310-327. <https://doi.org/10.1177/09500170211031458>
- Schaupp, Simon (2023). "Algorithmische Arbeitssteuerung und marktorientiertes Migrationsregime. Eine verkannte Wahlverwandtschaft." *WSI-Mitteilungen* 76 (2), 103 – 111.
- Scherger, Simone (2013). "Zwischen Privileg und Bürde. Erwerbstätigkeit jenseits der Rentengrenze in Deutschland und Großbritannien." *Zeitschrift für Sozialreform*, 59 (2), 137 – 166.
- Schmucker, Rolf (2020). "Arbeitsbedingungen in Pflegeberufen." In: Jacobs, Klaus; Kuhlmeier, Adelheid; Greß, Stefan; Klauber, Jürgen & Schwinger, Antje (Eds.): *Pflege-Report 2019. Mehr Personal in der Langzeitpflege – aber woher?*. Berlin: Springer, 49 – 60.
- Schrenker, Annkatrin; Samtleben, Claire & Schrenker, Markus (2021). "Applaus ist nicht genug. Gesellschaftliche Anerkennung systemrelevanter Berufe." *Aus Politik und Zeitgeschichte*, 13 – 15, 12 – 18.
- Schrenker, Annkatrin & Zucco, Aline (2020). "Gender Pay Gap steigt ab dem Alter von 30 Jahren stark an." *DIW-Wochenbericht*, 10, 137–145.

- Schuh, Günther; Anderl, Reiner; Dumitrescu, Roman; Krüger, Antonio & ten Hompel, Michael (Eds.) (2020). *Industrie 4.0 Maturity Index. Die digitale Transformation von Unternehmen gestalten*. München: acatech. <https://www.acatech.de/publikation/industrie-4-0-maturity-index-update-2020/>
- Schultz, Susanne U. (2022). *Fachkräftemigrationsmonitor 2022. Fachkräftengpässe von Unternehmen in Deutschland, Trends und Potenziale zum Zuzug ausländischer Fachkräfte*. Gütersloh: Bertelsmann-Stiftung. <https://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/fachkraeftemigrations-monitor-2022>
- Schulz, Erika (2012). "Das deutsche Pflegesystem im EU-Vergleich unterdurchschnittlich finanziert." *DIW-Wochenbericht*, 13, 10 – 16.
- Schulz-Zander, Renate (2001). "Neue Medien als Bestandteil von Schulentwicklung." In: Aufenanger, Stefan; Schulz-Zander, Renate & Spanhel, Dieter (Eds.). *Jahrbuch Medienpädagogik* 1, 263 – 281.
- Schwarz, Norbert & Sommer, Bettina (2009): "Auswirkungen des demografischen Wandels – Daten der amtlichen Statistik." In: Statistisches Bundesamt (Ed.): *Wirtschaft und Statistik* 6. [https://www.destatis.de/DE/Methoden/WISTA-Wirtschaft-und-Statistik/2009/06/auswirkung-demographischer-wandel-062009.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Methoden/WISTA-Wirtschaft-und-Statistik/2009/06/auswirkung-demographischer-wandel-062009.pdf?__blob=publicationFile)
- Schwarze, Roland (2019). "Diskontinuierliche Arbeit und Arbeitnehmerbegriff – Die Bedeutung der Digitalisierung für den arbeitsrechtlichen Aufgreifbestand." In: Hanau, Hans & Matiaske, Wenzel (Eds.): *Entgrenzung von Arbeitsverhältnissen*. Baden-Baden: Nomos, 49 – 69.
- Seidl, Irmi & Zahrnt, Angelika (Eds.) (2022). *Post-Growth Work. Employment and Meaningful Activities within Planetary Boundaries*. Abingdon: Routledge.
- Seifert, Hartmut (2014). *Renaissance der Arbeitszeitpolitik: Selbstbestimmt, variabel und differenziert*. Bonn: Friedrich-Ebert-Stiftung.
- Seifert, Hartmut (2015). "Anforderungen an eine innovative Arbeitszeitpolitik." In: Hoffmann, Reiner & Bogedan, Claudia (Eds.): *Arbeit der Zukunft. Möglichkeiten nutzen – Grenzen setzen*. Frankfurt am Main: Campus, 311 – 333.
- Serfling, Oliver (2019). *Crowdworking Monitor Nr. 2*. Kleve: Hochschule Rhein-Waal. DOI: 10.13140/RG.2.2.36135.91044.
- Sherraden, Michael W.; Morrow-Howell, Nancy; Hinterlong, James & Rozario, Philip (2001). "Productive aging: Theoretical choices and directions." In: Sherraden, Michael W.; Morrow-Howell, Nancy & Hinterlong, James (Eds.): *Productive aging: Concepts and challenges*. Baltimore: Johns Hopkins University Press, 260 – 284.
- Singe, Ingo & Tietel, Erhard (2019). "Demokratie im Unternehmen zwischen ‚New Work‘ und ‚Guter Arbeit‘. Gruppe. Interaktion. Organisation." *Zeitschrift für Angewandte Organisationspsychologie*, 50 (3), 251 – 259.
- Skov, Torsten; Borg, Vilhelm & Ørhede, Elsa (1996). "Psychosocial and physical risk factors for musculoskeletal disorders of the neck, shoulders, and lower back in salespeople." *Occupational and Environmental Medicine*, 53 (5), 351 – 356.
- Soffia, Magdalena; Wood, Alex J. & Burchell, Brendan (2021). "Alienation Is Not ‚Bullshit‘: An Empirical Critique of Graeber’s Theory of BS Jobs." *Work, Employment and Society*, 1 – 25.
- Spielberg, Petra (2015). "Ärztemigration: Balkan verliert immer mehr Ärzte." *Deutsches Ärzteblatt*, 112 (8), A314.
- Spielkamp, Matthias & Giefler, Sebastian (2020). "Automatisiertes Personalmanagement und Mitbestimmung." *Working Paper Forschungsförderung* No. 191. Düsseldorf: Hans-Böckler-Stiftung.
- Staab, Philipp (2019) *Digitaler Kapitalismus: Markt und Herrschaft in der Ökonomie der Unknappheit*. Berlin: Suhrkamp.
- Stache, Stefan; Howind, Sascha (2014). *Demografie und Arbeitspolitik. Herausforderungen und Chancen für betriebliche Akteure*. Düsseldorf: Hans-Böckler-Stiftung.
- Ständige Wissenschaftliche Kommission der Kultusministerkonferenz (2022). "Digitalisierung im Bildungssystem: Handlungsempfehlungen von der Kita bis zur Hochschule." *Gutachten der Ständigen Wissenschaftlichen Kommission der Kultusministerkonferenz* (SWK). [https://www.kmk.org/fileadmin/Dateien/pdf/KMK/SWK/2022/SWK-2022-Gutachten\\_Digitalisierung.pdf](https://www.kmk.org/fileadmin/Dateien/pdf/KMK/SWK/2022/SWK-2022-Gutachten_Digitalisierung.pdf)
- Stahl, Juliane & Schober, Pia (2020): "Early education and care quality: Does it matter for maternal working hours?" *Social Science Research* 86, 102378.
- Statistisches Bundesamt (2019). *Bevölkerung im Wandel. Annahmen und Ergebnisse der 14. koordinierten Bevölkerungsvorausberechnung*. Destatis. [https://www.destatis.de/DE/Presse/Pressekonferenzen/2019/Bevoelkerung/pressebroschuere-bevoelkerung.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Presse/Pressekonferenzen/2019/Bevoelkerung/pressebroschuere-bevoelkerung.pdf?__blob=publicationFile)
- Statistisches Bundesamt (2020). *Pflegestatistik: Pflege im Rahmen der Pflegeversicherung, Deutschland-ergebnisse*. Statistisches Bundesamt. [https://www.statistischebibliothek.de/mir/receive/DEHeft\\_mods\\_00146747](https://www.statistischebibliothek.de/mir/receive/DEHeft_mods_00146747)

- Statistisches Bundesamt (2021). *Pressemitteilung Nr. 041*. Statistisches Bundesamt, June 24. [https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/06/PD21\\_No41\\_12.html](https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/06/PD21_No41_12.html)
- Statistisches Bundesamt (2023a). *Erwerbstätigkeit älterer Menschen*. Statistisches Bundesamt. <https://www.destatis.de/DE/Themen/Querschnitt/Demografischer-Wandel/Aeltere-Menschen/erwerbstaetigkeit.html>
- Statistisches Bundesamt (2023b). *15. koordinierte Bevölkerungsvorausberechnung: Annahmen und Ergebnisse*. Statistisches Bundesamt. <https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsvorausberechnung/begleitheft.html?nn=208696#631546>
- Steinert, Janina; Ebert, Cara (2020). *The Impact of COVID-19 on Violence against Women and Children in Germany*. Projekt der TU München und des RWI – Leibniz-Institut für Wirtschaftsforschung. <https://www.hfp.tum.de/globalhealth/forschung/projekte/abgeschlossene-projekte/covid-19-and-domestic-violence/>
- Stuth, Stefan; Schels, Brigitte; Promberger, Markus; Jahn, Kerstin & Allmendinger, Jutta (2018). "Prekarität in Deutschland?!" *WZB Discussion Paper*, P 2018 – 004. Berlin: WZB.
- Thomas, Keith (1999). *The Oxford Book of Work*. Oxford: Oxford University Press.
- Umweltbundesamt (2022). *Kohlendioxid-Emissionen*. Umweltbundesamt. <https://www.umweltbundesamt.de/daten/klima/treibhausgas-emissionen-in-deutschland/kohlendioxid-emissionen>
- United Nations – Committee on Economic, Social and Cultural Rights (UN-CESCR, 2018). *Concluding observations on the sixth periodic report of Germany (E/C.12/DEU/CO/6)*. United Nations. <https://digitallibrary.un.org/record/1653881>
- Van den Broek, Elmira; Sergeeva, Anastasia & Huysman, Marleen (2021). "When the Machine Meets the Expert: An Ethnography of Developing AI for Hiring." *MIS Quarterly*, 45(3), 1557–1580.
- Van Doorn, Niels & Darsana Vijay (2021). "Gig work as migrant work: The platformization of migration infrastructure." *Environment and Planning A: Economy and Space*, 0(0).
- Vandaele, Kurt (2018). "Will trade unions survive in the platform economy? Emerging patterns of platform workers' collective voice and representation in Europe." *ETUI Research Paper-Working Paper*, 2018.05. Brussels: European Trade Union Institute.
- Ver.di (2019). *Mobile Arbeit. Empfehlungen für die tarif- und betriebspolitische Gestaltung*. Ver.di. <https://innovation-gute-arbeit.verdi.de/ueber-uns/forschungsprojekte/prentimo/++co++f16148e2-4632-11e9-b67c-525400afa9cc>
- Vladova, Gergana; Wotschack, Philip; de Paiva Lareiro, Patricia; Gronau, Norbert & Thim, Christof (2020). "Lernen mit Assistenzsystemen-Vor lauter Aufgaben den Prozess nicht sehen?" *Industrie 4.0 Management*, 36(3), 16 – 20.
- Vogel, Claudia & Tesch-Römer, Clemens (2017). "Informelle Unterstützung außerhalb des Engagements: Instrumentelle Hilfen, Kinderbetreuung und Pflege im sozialen Nahraum." In: Simonson, Julia; Vogel, Claudia & Tesch-Römer, Clemens (Eds.): *Freiwilliges Engagement in Deutschland: Der Deutsche Freiwilligensurvey 2014*. Wiesbaden: Springer VS, 253–283.
- Von Hagen, Joachim (2018). "Regelungen des Bundes, der Länder und der zuständigen Stellen für die berufliche Fortbildung und Umschulung." In: *BIBB-Datenreport*, 410. <https://www.bibb.de/datenreport/de/2019/101607.php>
- Wachtler, Günther & Wagner, Petra Sabine (1997). *Arbeit im Ruhestand. Betriebliche Strategien und persönliche Motive zur Erwerbsarbeit im Alter*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- Waltersbacher, Andrea; Zok, Klaus; Böttger, Sarah Jane & Klose, Joachim (2018). "Sinnerleben bei der Arbeit und der Einfluss auf die Gesundheit." *Fehlzeiten-Report 2018*. Berlin: Springer, 23–46.
- Wang, Mo & Shultz, Kenneth S. (2010). "Employee Retirement: A Review and Recommendations for Future Investigation." *Journal of Management*, 36(1), 172 – 206.
- Weber, Enzo (2019). "Digitale Soziale Sicherung." *Working Paper Forschungsförderung*, 137. Düsseldorf: Hans-Böckler-Stiftung.
- Weiss, Robert S. & Bass, Scott A. (2002). *Challenges of the third age. Meaning and purpose in later life*. Oxford: Oxford University Press.
- Wichmann, Robert Lawrence; Eisenbart, Boris & Gericke, Kilian (2019). "The Direction of Industry: A Literature Review on Industry 4.0." *Proceedings of the Design Society: International Conference on Engineering Design*, 1(1), 2129 – 2138.
- Wija, Petr & Ferreira, Monica (2012). "Productive aging. Conditions and Opportunities." In: Holmerova, Iva; Ferreira, Monica & Wija, Petr (Eds.): *Productive Aging. Conditions and Opportunities*. Prag: Charles University, 9 – 16.

- Wilson, John & Musick, Marc A. (1997). "Work and volunteering: The long arm of the job." *Social Forces*, 76(1), 251–272.
- Wingerter, Christian (2021). "Arbeitsmarkt und Verdienste." In: Statistisches Bundesamt; Wissenschaftszentrum Berlin für Sozialforschung; Bundesinstitut für Bevölkerungsforschung & SOEP (Eds.): *Datenreport 2021. Ein Sozialbericht für die Bundesrepublik Deutschland*. Bonn: Bundeszentrale für politische Bildung, 11–29.
- Wissenschaftlicher Beirat beim Bundesministerium für Wirtschaft und Energie (2021): *Vorschläge für eine Reform der gesetzlichen Rentenversicherung*. Berlin Bundesministerium für Wirtschaft und Energie. <https://www.bmwk.de/Redaktion/DE/Publikationen/Ministerium/Veroeffentlichung-Wissenschaftlicher-Beirat/wissenschaftlicher-beirat-vorschlaege-reformgutachten.html>
- Wöhrmann, Anne M; Brauner, Corinna & Michel, Alexandra (2020). "Arbeitszeitgestaltung." In: Michel, Alexandra & Hoppe, Annekatrin (Eds.): *Handbuch Gesundheitsförderung bei der Arbeit: Interventionen für Individuen, Teams und Organisationen*. Springer Fachmedien, 1–16.
- Wößmann, Ludger; Schoner, Florian; Freundl, Vera & Pfahler, Franziska (2023). *Der ifo-„Ein Herz für Kinder“-Chancenmonitor: Wie (un-)gerecht sind die Bildungschancen von Kindern aus verschiedenen Familien in Deutschland verteilt?*. ifo Institut für Wirtschaftsforschung. <https://www.ifo.de/publikationen/2023/aufsatz-zeitschrift/der-ifo-ein-herz-fuer-kinder-chancenmonitor>
- Wood, Alex J.; Graham, Mark; Lehdonvirta, Vili & Hjorth, Isis (2019). "Good gig, bad gig: autonomy and algorithmic control in the global gig economy." *Work, Employment and Society*, 33(1), 56–75.
- Woodcock, Jamie & Graham, Mark (2019). *The Gig Economy: A Critical Introduction*. Cambridge: Polity Press.
- Wotschack, Philip; Samtleben, Claire & Allmendinger, Jutta (2017). "Gesetzlich garantierte „Sabbaticals“ – ein Modell für Deutschland? Argumente, Befunde und Erfahrungen aus anderen europäischen Ländern." *WZB Discussion Paper*, SPI 2017–501. Berlin: WZB.
- Wotschack, Philip; Hildebrandt, Eckhart & Scheier, Franziska (2008). "Langzeitkonten – Neue Chancen für die Gestaltung von Arbeitszeiten und Lebensläufen?" *WSI-Mitteilungen*, 11+12, 619–26.
- Wunder, Heide (1992). *Er ist die Sonn', sie ist der Mond. Frauen in der Frühen Neuzeit*. Beck: München.
- Xiong, Shuyu; Sankaridurg, Padmaja; Naduvilath, Thomas; Zang, Jiajie; Zou, Haidong; Zhu, Jianfeng; Lv, Minzhi; He, Xiangui & Xu, Xun (2017). "Time spent in outdoor activities in relation to myopia prevention and control: a meta-analysis and systematic review." *Acta Ophthalmol*, 95(6), 551–566.
- Xu, Liangde; Ma, Yunlong; Yuan, Jian; Zhang, Yaru; Wang, Hong; Zhang, Guosi; Tu, Changsheng; Lu, Xiaoyan; Li, Jing; Xiong, Yichun; Chen, Fukun; Liu, Xinting; Xue, Zhengbo; Zhou, Meng; Li, Wen-Qing; Wu, Nan; Bao, Jinhua; Chen, Hao; Lu, Fan; Su, Jianzhong & Qu, Jia (2021). "COVID-19 Quarantine Reveals That Behavioral Changes Have an Effect on Myopia Progression." *Ophthalmology*, 128(11), 1652–1654.
- Yamamura, Sakura (2009). "„Brain Waste“ ausländischer Ärztinnen und Ärzte in Deutschland." *Wirtschaftsdienst*, 89, 196–201.
- Zandt, Florian (2022). *Technische Studiengänge: MINT mangelt es an Frauen*. Statista, Wissenschaftszentrum Berlin für Sozialforschung. <https://de.statista.com/infografik/27761/anzahl-ingeschriebener-mint-studentinnen-an-deutschen-universitaeten-nach-jahr/>
- Zhang, Yingfei & Ma, Zheng Feei (2020). "Impact of the COVID-19 Pandemic on Mental Health and Quality of Life among Local Residents in Liaoning Province, China: A Cross-Sectional Study." *International Journal of Environmental Research and Public Health*, 17(7), 2381.
- Zimmermann, Kai & Zimmermann, Lars (2020). "Nachhaltigkeitseffekte durch Smart Cities am Beispiel der Superblocks in Barcelona." *Journal für Mobilität und Verkehr*, 5.
- Žliobaitė, Indrė (2017). "Measuring discrimination in algorithmic decision making." *Data Mining and Knowledge Discovery*, 31(4), 1060–1089.
- Zuboff, Shoshana (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. London: Profile Books.
- Zylka, Johannes (2018). *Digitale Schulentwicklung. Das Praxisbuch für Schulleitung und Steuergruppen*. Weinheim: Beltz.



Deutsche Akademie der Naturforscher  
Leopoldina e. V.  
German National Academy of Sciences

Union of the German Academies  
of Sciences and Humanities

Jägerberg 1  
06108 Halle (Saale)  
Phone: 0049 345 472 39-600  
Fax: 0049 345 472 39-839  
E-Mail: politikberatung@leopoldina.org

Geschwister-Scholl-Straße 2  
55131 Mainz  
Phone.: 0049 6131 218528-10  
Fax: 0049 6131 218528-11  
E-Mail: info@akademienunion.de

Berlin Offices:  
Reinhardtstraße 16      Unter den Linden 42  
10117 Berlin              10117 Berlin

Berlin Office:  
Jägerstraße 22/23  
10117 Berlin

The German National Academy of Sciences Leopoldina and the Union of the German Academies of Sciences and Humanities provide policymakers and society with independent, science-based advice on issues of crucial importance for our future. The Academies' members and other experts are outstanding researchers from Germany and abroad. Working in interdisciplinary working groups, they draft statements that are published in the series of papers *Schriftenreihe zur wissenschaftsbasierten Politikberatung* (Series on Science-Based Policy Advice) after being externally reviewed and subsequently approved by the Standing Committee of the German National Academy of Sciences Leopoldina.

**Series on Science-Based Policy Advice**

ISBN: 978-3-949455-33-9