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ABSTRACT

Innovating public administrations, for instance by means of E-Government, becomes an increasingly important issue in order to satisfy growing demands of citizens and to reduce costs of public service provision. Demographic change in industrialized countries, namely societal aging and depopulation, has various influences on the development of E-Government strategies. On the one hand, elderly citizens use services of their local government more often than people of younger age-groups. On the other hand, they are less likely to use complex electronic services in general and E-Government in specific. In addition, municipalities have to deal with increased cost pressure and the aging of the workforce within their local administrations as a result of the demographic change. Our quantitative analysis focuses on identifying the perceived importance of problems related to the demographic change in German and Japanese public administrations, addresses what areas of reform are related to these problems and points out implications for the development of innovation strategies by means of E-Government. We contrast the developments in both countries with respect to both demographic situation and public innovation in order to derive possible implications for the future.

Keywords

Public Innovation, Demographic change, E-Government, E-Inclusion, Japan, Germany

INTRODUCTION

Public sector modernization and E-Government have been subject to research from a variety of different perspectives. Reducing costs, increasing public service quality and creating transparency of processes are just some of the reform areas today's public administrations have to focus on in order to stay competitive. Especially the need to include all citizens and overcome usage barriers has become increasingly important. While the Declaration of Riga states that no citizen should be excluded from public service access (Ministers of the EU 2006), inclusive E-Government strategies also became a core element of the i2010 EU initiative.

On the other hand, demographic change has been one of the most discussed societal developments. While life expectancy is rising, a majority of industrialized countries experiences declining birth rates, thus leading to a critical process of societal aging. Referring to the tremendous speed of the process within their societies, especially Germany and Japan have often been mentioned in literature (Cutler Poterba Sheiner and Summers 1990; Malanowski 2008). Studies show that most industrialized countries are following in these demographic footsteps. Thus, age-aware public service delivery and E-Government design becomes an increasingly important aspect in both research and practice. While there have been various studies on technology acceptance by the elderly and problems related to the digital divide, back-end implications have not been subject to research up to now. Against this background our paper addresses the following research question:

> *What is the level of awareness towards the problems related to the demographic change in German and Japanese municipalities, what reform areas are related to these problems and how can E-Government support reforms in the different areas?*

In order to answer this research question, the following section will 1) point out the major demographic developments in Germany and Japan and 2) relate our analysis to prior studies (section 2). The research design and methodology will be discussed in section 3, followed by the quantitative analysis of data from a total of 537 public administrations in both Germany and Japan (section 4). In section 5, the results of this analysis will then be interpreted and discussed with respect to the research question. The paper concludes with a summary of the results and limitations of our analysis and gives an outlook on potential future research (section 6).

RELATED WORK

Demographic developments

Germany

As in most industrialized countries, the demographic change has severe impacts on the structure of the German population. While the total fertility rate dropped to a historical low of 1.331 children per woman in 2006, it had been under the replacement rate of 2.1 children for more than 40 years (German Statistical Office 2009).

Year	Total population	Birth surplus	Mean Age[1]
1970	61 001 164	72 073	35.7
1980	61 657 945	-86 582	37.6
1990	79 753 227	-15 770	38.8
2000	82 259 540	-71 798	40.5
2003	82 531 671	-147 225	41.2
2006	82 314 906	-148 903	42.0
2020[2]	80 057 000	n. a.	45.4
2050	68 743 000	n. a.	50.0

Table 1. Development of total population, birth surplus and mean age in Germany

Additionally, back in 1972, the birth rate dropped below the death rate, leading to a continuous decline in population that since 2003 was no longer compensated by migration. Since then, Germany's population is decreasing. Table. 1 shows these developments in terms of birth surplus, total population and mean age. While the overall population count is declining, the remaining people tend to become increasingly older. The 11th coordinated population projection shows that this trend will become more intense over the next years. For instance, the number of people older than 65 years will increase from 15.7 million in 2005 to 22.9 Mio in 2050 (German Statistical Office 2009). By 2050, the share of the elderly will take up more than 30 percent of the overall population and the mean age will be 50 years, an increase of 8 years in comparison to 2006 (see table 1). By 2010, the number of older people will have exceeded the number of younger ones.

Japan

Like in Germany the total fertility rate has reached a historical low level with 1.26 children per woman, less than 2/3 of the needed number for keeping up the current level of population. Since 1974 it has been constantly below replacement level. Since that year, the number of live-births has been declining by 30 percent to a value of 1.087 million in 2005. Within the same timeframe, the number of live-births in Germany only went down by 14 percent. This shows the enormous speed of the demographic transition in Japan. Nevertheless, the total population was constantly rising to 127.77 million people in 2006. Other than the early development in Germany, this increase was not due to migration but interrelated with a birth surplus until 2005.

However, studies show a heavy downward trend of this surplus (National Institute of Population and Social Security Research 2002). All these developments have already turned Japan in to the oldest country on the planet (measured by the percentage of people aged 65+). Table 2 shows that the mean age went up by more than 12 years from 1970 to 2006. MCCREEDY found that "[n]o country is aging as quickly as Japan, though many other industrialized countries are following in Japan's demographic footsteps." (McCreedy 2003). In 2005, Japan had the highest median age of the world with 42.64 years (Coulmas 2007). Already in 2003, HEWITT stated that "Japan is the world's oldest society, and therefore a case study for an aging world." (Hewitt 2003)

[1] Own calculations based on census data from German Federal Statistical Office. Age group "under 1 year" estimated with 0.5 and "85 and over" with 85.

[2] Projection alternative 1-W1 (German Federal Statistical Office) with constant fertility rate of 1.4 across whole timeframe, increase in life expectancy (until 2050) to a level of 88.0 years for girls and 83.5 years for boys and net migration of 100,000 per year.

Year	Total population	Birth surplus	Mean Age[3]
1970	104 665 000	1 211 000	31.0
1980	117 060 000	894 000	33.4
1990	123 611 000	417 000	37.0
2000	126 926 000	226 000	41.4
2003	127 694 000	115 000	42.5
2006	127 770 000	0	43.4
2020	124 107 000	n. a.	47.2
2050	100 593 000	n. a.	51.3

Table 2. Development of total population, birth surplus and mean age in Japan

Effects of the demographic developments on E-Government

Literature identifies various effects of aging on public service usage and thus also on the design of these services. On the one hand, Millard found that "citizens in the over 65 age group are 1.9 times more likely to be government users than the 18-24 age group" (Millard 2006). Thus, modernization strategies in this area have to include seniors as a major target group. However, according to NIEHAVES ET AL., aging cities experience a reduction in tax income while facing constant public infrastructure spending, thus limiting their capabilities for reforms (Niehaves Ortbach and Becker 2008b). Being confronted with a problematic financial situation, many cities have to revise their public service provision and to look for innovative and cost saving alternatives. Accordingly, BEKKERS ET AL. found that "the growing aging of the population and the corresponding increasing demands on public provisions [...] has been an important motive to modernize government" (Bekkers van Duivenboden and Thaens 2006).

On the other hand, seniors are less likely to use innovative E-Government services. Recent studies show, that the acceptance and usage of electronic services in general and E-Government in specific is much lower upon elderly prospects than within younger age groups (Becker Bergener Fielenbach Fuchs Herwig Karow Niehaves Räckers and Weiß 2008; Millard 2006). This phenomenon known as digital divide has been subject to analysis by a variety of researchers from different disciplines (Ito O'Day Adler Linde and Mynatt 2001; Lam and Lee 2006; Servon 2002; van Dijk and Hacker 2003). It is defined as an emerging polarization phenomenon in society creating a gap between the users and non-users of information and communication technology (European Commission 2004). In trying to answer the question why elderly are hesitant towards the usage of ICT and the internet, early studies identified that older people are lacking awareness of the advantages especially if they had not used ICT during their work-lives (National Telecommunications and Information Administration 2000). They are easily satisfied with their current situation and cannot imagine how ICT could improve their lives (Morris and Venkatesh 2000). However, even though access is a major issue, NIEHAVES ET AL. discovered for Germany that within the group of seniors that use ICT and the internet E-Government usage is still lower than within the total population. Searching for reasons they found the overall complexity of the services, concerns about additional costs and the missing personal contact to be mentioned more often among seniors than among the population average. It is stated that "Senior citizens are most affected by the digital divide and show lowest usage numbers in all dimensions." (Niehaves Bergener Räckers and Becker 2008a) To overcome the gaps E-Inclusion was identified as a core element of the i2010 EU initiative (European Commission 2004). Therefore, overcoming the digital divide is and will be one of the core future research schemes when it comes to modernizing public administrations.

In addition to these front-end aspects, aging of the society also implies an aging workforce. Even though elderly are not generally characterized by a lack of motivation or performance, younger employees often have stereotypical prejudices towards them (McGregor and Gray 2002). This, however, prevents knowledge transfer which can be considered a crucial factor in today's administrative environment. Knowledge and competences gain in importance in public sector administration because both processes and systems get more skill-intensive and complex (Rump and Eilers 2008). Thus, in addition to external challenges of aging and depopulation, the internal aging is the third major area that has to be considered with respect to public sector modernization.

[3] Own calculations based on census data from Japanese Federal Statistical Office. Age group "under 1 year" estimated with 0.5 and "85 and over" with 85.

RESEARCH METHODOLOGY

Our explorative study follows a country comparative design approach. Germany and Japan have been selected for analysis mainly due to two reasons. First, they both are among the fastest aging countries and literature has often considered them examples for demography related research (Cutler et al. 1990; Malanowski 2008). Additionally, both countries have been classified as "late comers" in terms of management-oriented reforms by POLLITT & BOUCKAERT and therefore can be considered similar in this area as well (Pollitt and Bouckaert 2004). In order to investigate the research question, a quantitative, explorative analysis was undertaken based on data gathered within a comparative study on public innovation in Germany and Japan. Questionnaires were sent to 8000 randomly selected public administrations in Germany and 400 in Japan. That way, data from 357 (Germany) and 180 (Japan) public administrations could be collected, thus, representing 3% of the total number of municipalities in Germany and around 10% of those in Japan. The sample was randomly selected and included cities of all sizes and from all 16 German states and all 13 large-area federal states in Japan (see table 3). To increase understandability of the questions and thus allow for higher participation, the questionnaire was provided in the language of each country. To ensure the common understanding of terms, definitions were given at the beginning of the survey. The proper translation of language specific terms was ensured by language experts. Additionally, some constructs were adapted according the individual country-specific settings. Table 3 gives an overview on the data collection procedure.

Criterion	*Germany*	*Japan*
Data collection process	▪ Pre-test (FEB 2008) ▪ Online questionnaire (MAR 2008 to APR 2008) in German language ▪ E-Mail invitation of 8,000 randomly selected public officials responsible for local government reforms in Germany ▪ Non-responses analysis (APR 2008)	▪ Paper-based questionnaire in Japanese language ▪ Postal mail to 400 randomly selected public officials responsible for local government reforms in Japan (MAR to MAY 2008)
Sample size, population size	Sample-DE: 357 Population-DE: 12,250	Sample-JP: 180 Population-JP: 1,800
Represen-tativeness	▪ ~3% of German local governments ▪ Random sample ▪ 13 out of 13 large-area federal states included (100%) ▪ No bias discovered through non-responses analysis	▪ 10% of Japanese local governments ▪ Random sample ▪ 44 out of 47 prefectures included (~94%)

Table 3. Data collection fact sheet

Our research is conducted in a three step approach. First, we aim on discovering differences in the level of awareness towards the demography related problems in both countries. The analysis in this part will be based on bivariate crosstabs measuring the perceived importance of the three reasons for public sector reforms as identified from literature, namely 1) societal aging, 2) depopulation and 3) aging of the workforce in Germany and Japan, all measured on a 5-point Likert scale from 'not important' to 'very important'. In a second step we will evaluate the correlations of these variables to other reasons for reforms and focus on both differences and similarities between the countries. The reform areas were derived from a qualitative pre-study. Due to the ordinal scale of the variables, Spearman's rank correlation coefficient will be used.

Significance will be tested using a two-tailed test. In interpreting the correlation we will follow COHEN in determining the size of the relationship (Cohen 1988). The third part of our research will include an analysis of correlations between perceived importances of the three demography related reform reasons to reform fields during the last 5 years. Here, the intensity of reforms in the different fields was measured on a five-point scale from 'no reforms' to 'very major reforms'. For all calculations, SPSS version 17.0.0 was used.

QUANTITATIVE ANALYSIS

Awareness of the demographic problems

The first part of our analysis addresses in how far 1) societal aging, 2) depopulation and 3) aging of the workforce is perceived as an important issue in public sector modernization and E-Government. Here, especially the differences between Germany and Japan are to be investigated. Table 4 shows the perceived importance of societal aging within the two countries. The pair-wise country difference for all three variables was confirmed to be significant on a 0.01 significance level. However, due to limitations in space, the tables are not included in this paper. It can be observed that aging is regarded much more important in Japan compared to Germany. While only a total of 6.7% of the Japanese local governments stated that reacting to an aging population is unimportant or less important to them in terms of public sector modernization, this was 24.9% in Germany and thus almost four times as high.

		Country		
		DE	JP	Total [a]
Reacting to aging population (as specific societal change)	(1) Unimportant	6.8%	1.7%	5.1%
	(2) Less important	18.1%	5.0%	13.7%
	(3) Neutral	36.7%	28.3%	33.9%
	(4) Important	27.7%	47.2%	34.3%
	(5) Very important	10.7%	17.8%	13.1%
Total		100.0%	100.0%	100.0%

[a] Total values include additional data sets (without response on "Reacting to an aging workforce in the public administration" DE: 4, JP: 0)

Table 4. Perceived importance of societal aging for public sector innovation and E-Government within Germany and Japan[4]

On the other hand, 65% of all Japanese but only 38.4% of all German local governments regarded aging as important or very important issues when it comes to reforming local administrations. A similar trend can be observed looking at the statements concerning the perceived importance of depopulation shown in table 5. Here, almost 50% of all participating German governments regarded modernizations as reaction to depopulation as either less important or completely unimportant. Only 20.2% saw them as important or very important. For Japan, the opposite is true. Here, only 15% stated that reacting to depopulation has a less important or unimportant influence on public sector reforms while 55% see it as important or very important.

		Country		
		DE	JP	Total[a]
Reacting to depopulation (as specific societal change)	(1) Unimportant	26.1%	5.0%	19.0%
	(2) Less important	23.3%	10.0%	18.8%
	(3) Neutral	30.3%	30.0%	30.2%
	(4) Important	14.6%	40.0%	23.1%
	(5) Very important	5.6%	15.0%	8.8%
Total		100.0%	100.0%	100.0%

[a] Total values include additional data sets (without response on "Reacting to an aging workforce in the public administration" DE: 2, JP: 0)

Table 5. Perceived importance of depopulation for public sector innovation and E-Government within Germany and Japan[4]

Nevertheless, a comparison of both the total percentages of both variables as well as the country specific values reveals that depopulation is regarded a less consequential issue for public innovation than societal aging. Taking both countries into account, 13.1% of all public administrations see 'reacting to aging' as very important while only 8.8% chose that option

[4] All percentage values rounded to first decimal place

regarding depopulation. Additionally, the difference of the two variables in the category 'important' is more than ten percent in favor of societal aging (34.3% for aging in comparison to 23.1% for depopulation). The last of the three variables to investigate in the bivariate part of our analysis is reacting to an aging workforce. Table 6 shows the country comparison for this variable. Compared to the first two variables, this one shows fewer differences between the two countries. While 7.6% of the German local governments have seen reacting to an aging workforce as a very important area for reforms, this number is only 2.2 percentage points higher in Japan. Additionally, while there was a country difference of more than 20 percentage points in the category 'important' for societal aging and depopulation, here the difference is only around 7 percent between Germany and Japan. Furthermore, the general awareness of both problems is significantly higher in Japan.

		Country		
		DE	JP	Total[a]
Reacting to an aging workforce in the public administration	(1) Unimportant	9.6%	3.3%	7.5%
	(2) Less important	21.7%	11.1%	18.1%
	(3) Neutral	35.5%	43.3%	38.1%
	(4) Important	25.6%	32.8%	28.0%
	(5) Very important	7.6%	9.4%	8.2%
Total		100.0%	100.0%	100.0%

[a] Total values include additional data sets (without response on "Reacting to an aging workforce in the public administration" DE: 3, JP: 0)

Table 6. Perceived importance of reacting to an aging workforce for public sector innovation and E-Government within Germany and Japan[4]

Nevertheless, it can be observed that German governments see the effects of an aging workforce as much more critical than those of depopulation. While the cumulated percentage of the categories 'important' and 'very important' is 22.2% for reacting to depopulation, it is 33.2% for reacting to an aging workforce. In Japan the opposite is true.

Correlations among reform reasons

Table 7 shows the Spearman correlations of various areas of reform that could be confirmed on a 0.05 level of significance. 'Reacting to aging' and 'reacting to depopulation' show the highest correlation among all variables and within both countries. Thus, public administrations in both Germany and Japan are aware of the fact that these two demographic developments come hand in hand. However, the correlation within the subset of Japanese local governments is significantly higher than the one in Germany, contributing to the finding of a higher general awareness of the problems in Japan within the first part of the analysis. However, this is not the case when it comes to the perceived importance of reacting to an aging workforce. Here, the correlation to both other variables is comparatively low. Therefore, public administrations in both countries do not perceive a striking connection between aging/depopulation and the aging workforce even though they see the need to react to all issues (see above).

Within Germany, the three reform areas that show the highest correlation (apart from the variables on demographic issues) to the variable measuring the perceived importance of the aging population are 1) increasing employee motivation, 2) increase transparency and 3) carrying out a political agenda. In Japanese public administrations, reforms in reaction to aging were correlated with those to increase transparency as well. Here, they especially see 1) improving political-administrative decision making, 2) increasing transparency and 3) coping with growing responsibilities for local administrations as necessary reactions to societal aging. For both countries, all three correlations are positive meaning that with increasing perceived importance of reacting to aging the perceived importance of the other reform areas increases as well. Regarding reacting to depopulation, the highest correlated areas of reform in Germany include 1) carrying out a political agenda, 2) increasing accountability and 3) carrying out central or prefectural government requests. For Japan, 1) improving political-administrative decision making and 2) coping with growing responsibilities for local administrations were the items with the highest correlations, followed by 3) increasing public service quality. Here, especially the correlation with the latter is significantly higher than on the German subset where it is the lowest among all variables. With respect to reacting to an aging workforce, increasing employee motivation is among the three variables with the highest correlation in both countries. Therefore, with rising perceived importance of the aging workforce, the perceived importance of enhancing employee motivation increases as well. In addition, the analysis of Germany shows that 'improving political-administrative decision making' and 'increasing accountability' are associated with reforms on reacting upon the aging workforce as well.

	Reacting to aging population (as specific societal change)		Reacting to depopulation (as specific societal change)		Reacting to an aging workforce in the public administration	
	DE	JP	DE	JP	DE	JP
Reacting to aging population (as specific societal change)	1.000	1.000	.509**	.698**	.329**	.329**
Reacting to depopulation (as specific societal change)	.509**	.698**	1.000	1.000	.318**	.258**
Reacting to an aging workforce in the public administration	.329**	.329**	.318**	.258**	1.000	1.000
Reducing administrative costs	.163**	.150*			.132*	.176*
Increasing public service quality	.231**	.240**	.113*	.272**	.148**	.167*
Increasing citizen involvement	.201**	.259**		.225**		.167*
Increasing employee motivation	.305**	.232**	.192**		.286**	.277**
Improving administrative structures and processes	.151**	.235**		.182*	.254**	.207**
Improving political-administrative decision making	.255**	.394**	.204**	.372**	.162**	.399**
Increasing transparency	.294**	.297**	.169**	.185*		
Increasing accountability	.251**	.260**	.242**	.198**	.244**	
Carrying out central or prefectural government requests	.124*		.223**			.153*
Coping with growing responsibilities for local administrations	.211**	.288**	.180**	.283**	.239**	.218**
Applying general reform trends in the public sector	.146**		.143**	.175*	.223**	
Carrying out a political agenda	.272**	.245**	.339**	.173*	.158**	.156*

** significant on a 0.01 level of significance
* significant on a 0.05 level of significance

Table 7. Spearman correlations among selected reform reasons in Germany and Japan

Correlations with activity in reform fields within the last 5 years

The third part of our analysis focuses on the correlation of the demography related variables to the activity in different reform fields within the last 5 years as shown in table 8. Here, reforms in the field of customer orientation were found to be significantly correlated with the perceived importance of both reacting to an aging population and reacting to depopulation. This holds true for both countries. Regarding reacting to an aging workforce, both countries showed significant correlations to the reform area of business process management. In Germany also personnel management was among the two highest correlated reform fields. Electronic government, however, was not to be found significantly correlated with neither 'reacting to an aging population' nor 'reacting to depopulation'. Only in Germany, a correlation with 'reacting to an aging workforce' could be verified on a 0.01 level of significance.

	Reacting to aging population (as specific societal change)		Reacting to depopulation (as specific societal change)		Reacting to an aging workforce in the public administration	
	DE	JP	DE	JP	DE	JP
Organizational structure					.156**	
Accounting system and budgeting						
Personnel management	.108*				.161**	
Performance measurement	.115*				.120*	
Business process management	.137**		.114*		.186**	.157*
Electronic government					.149**	
Customer orientation	.149**	.169*	.109*	.187*		
Privatization and outsourcing				.154*		
Strategic planning		.190*				
Others						

Table 8. Spearman correlations among selected reform fields in Germany and Japan

DISCUSSION AND INTERPRETATION

The overall perceived importance of the problems related to the demographic change is found to be higher in Japan compared to Germany. This is no surprise since the problems concerning aging and depopulation in Japan were also found to be more intense. According to literature, Japan can be seen as a reference for developments in this area (Hewitt 2003; McCreedy 2003). Thus, awareness might rise in countries like Germany if the problems become more urgent.

1) Reacting to an aging population. In both countries, 'increasing transparency' was among the reform reasons with one of the highest correlations to 'reacting to aging population'. The belief that increasing transparency could help dealing with acceptance issues of (electronic) public service delivery confirms recent findings by NIEHAVES ET AL. stating that the complexity of services is a major reason for seniors not to use them. Elderly citizens, more than the average of population, perceive public services as too complex (Niehaves et al. 2008a). 'Improving political administrative decision making' also showed a comparatively high positive correlation especially in Japan. Thus, with rising perceived importance of reacting to an aging population, the perceived need to enhance decision processes e.g. by reducing needed time or improving role allocation increases as well. Looking at the correlations to reform areas of the last 5 years, especially customer orientation was found to have a significant correlation in both country subsets. Through the effects of the demographic change, the main focal point of tasks has shifted. Continuous examination of duties concerning their relevance for the administration therefore has to be a core goal of demography-aware public service delivery. Due to demographic change, new tasks were generated but also were existing ones rendered redundant (Krolle 2006).

2) Reacting to depopulation. Especially concerning the improvement of (electronic) services for companies, increasing public service quality might turn out to be a valuable approach for local administrations to counter problems related to depopulation. According to recent studies, 64% of companies see potential for cost reduction within effective electronic public services (Hövekamp 2002). Getting companies to settle in problematic regions is a crucial factor to counter depopulation in municipalities because they create jobs and therefore offer an incentive for young people to immigrate (Kröhnert Medicus and Klingholz 2007). This shows that through providing easy to access administrative services, parishes can generate specific regional advantages to offer to companies. In this sense, increasing E-Government quality may be one approach to react to depopulation.

3) Reacting to an aging workforce. In both countries, especially 'increasing employee motivation' was found to have a comparatively high positive correlation. This implies that motivation needs to be rethought regarding the increasing median age of employees and the internal digital divide within public administrations. In order to be prepared for the future, administrations have to incorporate training programs and focus on establishing an internal culture of learning for the elderly. The qualification process can be supported by innovative knowledge management and E-Learning techniques. Regarding the changing age-structure, BILL stated that strategic human resource management is one of the most important adjustment screws to turn in order to create a future-proof and efficient public administration (Bill 2005). In addition, research in the area of E-Learning is found to contribute to overcoming the internal digital divide and increase older employees' willingness for innovation because it always imparts media skills besides the know-how it is intended for (Gerteis 2003). This reflects why the only significant correlation with reforms in the field of E-Government could be identified with the variable measuring the perceived importance of reacting upon an aging workforce. Regarding correlated reform areas, business process management was found to be significantly correlated. A recent study showed that especially older people feel "more often than the others that the work pace, things to be remembered, rules to be taken into consideration, difficulty of tasks, and monitoring of their work had increased." Business process management could help to reduce complexity and increase transparency of processes within the administrations and thus help to increase the work-power of elderly employees.

CONCLUSION

Concerning the demographic change, literature especially identifies problems related to 1) aging society, 2) depopulation and 3) aging workforce as important factors to consider in public administrations. Regarding the two countries under investigation, the following main aspects could be derived from the study:

- Awareness towards the problems associated with all three of the three mentioned factors can be considered higher in Japan compared to Germany. Japanese public administrations not only perceive them as generally more important but are also more aware of interdependencies between them.
- Both countries see reacting to an aging population as the most urgent problem. Here, especially the need to increase transparency of services was found to be correlated to the variable in both countries. Looking at dependencies to

reform areas, both Japan and Germany showed significant correlations between the perceived importance of reacting to an aging population and the reform area of customer orientation. Increasing the possibility of (electronic) participation might be a valuable approach.

- While German public administrations perceive problems related to an aging workforce as more important than those related to depopulation, the opposite is true for Japan.
- Regarding depopulation, increasing public service quality for companies could help to oppose the problem. With respect to an aging workforce, especially focusing on enhancing employee motivation should be in the minds of public officials in aging countries. Furthermore, business process management can help to reduce complexity in processes and thus increase work-power of elderly employees.

However, these findings are beset with certain limitations. In our study, we polled one relevant public official in each of the 537 local governments. While the statistical analysis might be able to compensate for potential subjectivity of the actors, still only local governments were taken into account. As a consequence, generalizing the findings to e.g. the central government level is not possible. Our single study has focused on identifying the level of awareness towards the different problems in both countries and to get an overview on possible related reform reasons and fields. One can generalize that creating age-aware services has to be considered more complex than presented in the existing literature. There are multiple areas that need thorough research with regard to aging including business process management, application of E-Learning in public administrations, maturity research or aspects of citizen involvement in the design process.

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