# Title:

**Worlds of Long-term-care: A Long-term Care System Typology of OECD countries**

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## Short biography – 50-100 words

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**Claus Wendt** …

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|  | **Ist** |
| Abstract (zählt nicht) | 172 |
| Intro | 172 |
| Theoretical background | 1705 |
| Methods | 939 |
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| **Tabels/Figures** |  |
| T1 (Methods) | 165 |
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| T2 (Results) | 184 |
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# Abstract – 172 words

Providing long-term care (LTC) to the elderly is a major challenge for all welfare states. However, LTC systems differ widely across countries. Moreover, due to recent maturation, economization and marketization of LTC an updated and extended typology is needed. In this paper we aim to typologize OECD LTC systems systematically..These advancements increase the empirical basis of comparative LTC systems research and make results more comparable to other welfare and healthcare typologies. Our results show a typology of 4+2 clusters with

**Keywords:** long-term care, elderly, typology, classification

# Introduction – 172 words

In most OECD countries demographic ageing poses serious challenges to the provision of long-term care (LTC) services. The period in which LTC services are needed (Rechel et al., 2013; Colombo et al., 2011) will extend, since longevity and the ageing of the baby boom generation leads to more elderly people with higher life expectancies(Rechel et al., 2013; Colombo et al., 2011)This double burden will increase both, the demand for LTC services and costs for their provision. Thus, countries reshape their LTC systems, on the one hand to make them more efficient and financially robust and on the other hand to increase the access and performance of LTC systems (Ranci and Pavolini, 2013). Many countries adopted marketization, economization, and corporatization reform measures which often tremendously altered the scope and functioning of established LTC systems (Farris and Marchetti, 2017; Ungerson, 1997). Thus, increasing problem pressure and numerous reforms in recent years have transformed LTC system in many OECD countries. A new and updated LTC typology will include these changes and show in which way they lead to new types of LTC systems. Compared to earlier typologies, we make three advancements.First, previous typologies often focus either on social services in general or on one aspect of LTC such as migration or family caregiving. We focus on characteristics of LTC *institutions*. Second, earlier typologies used either usedquantitative OECD or Eurostat data or standardized data on institutional and regulatory aspects of LTC systems. We integrate both approaches by using OCED data on supply, public-private mix, performance *as well as* institutional data on accessibility of systems. Third, we provide a felixible typology of LTC systems by taking different methods of clustering into account.

# Theory – 1705 words

## Long-Term Care

The OECD defines LTC as:

“Range of services required by persons with a reduced degree of functional capacity, physical or cognitive, and who are consequently dependent for an extended period of time on help with basic activities of daily living (ADL). This “personal care” component is frequently provided in combination with help with basic medical services such as “nursing care” (help with wound dressing, pain management, medication, health monitoring), as well as prevention, rehabilitation or services of palliative care. Long-term care services can also be combined with lower-level care related to “domestic help” or help with instrumental activities of daily living (IADL).” (Colombo et al., 2011: 11–2).

Although this definition is independent of age most LTC recipient are above 65 years old (Colombo et al., 2011). Thus, LTC systems mainly support the elderly.We focus the typology on the services and systems for this age group.

## Long-term Care Classifications

Typologizing welfare states or welfare state systems is a common endeavor in welfare state research, not at least since Esping-Andersen's (1990) seminal study on welfare states. His work and the following adaptions and discussions (Ferrera, 1996; Arts and Gelissen, 2002; Castles and Mitchell, 1993) still provide a basic template for case selection and evaluation in all areas of welfare state research, which includes social service research (Rostgaard, 2002). Nevertheless, since then a number of issue and area-specific typologies have been developed, e.g. for healthcare (Wendt, 2014; Reibling et al., 2019). Typologies including LTC or LTC facets can be divided into three major groups. A first group focuses on social services in general where LTC is just one part of a bigger social service picture (Anttonen and Sipilä, 1996; Bettio and Plantenga, 2004; Kautto, 2002; Leitner, 2003; Saraceno and Keck, 2010). The second group genuinely concentrates on LTC for the elderly, although they often include disability due to data reasons. (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010; Halásková et al., 2017; Pommer et al., 2009; van Hooren, 2012). Finally, the third group focuses on special aspects of LTC and zoom in on migration in the context of LTC (Anderson, 2012; Da Roit and Weicht, 2013; Simonazzi, 2008; van Hooren, 2012; Simonazzi, 2008), cash for care schemes in LTC (Da Roit and Le Bihan, 2010) and informal care by families (Di Rosa et al., 2011; Leitner, 2003; Pfau-Effinger, 2014; Simonazzi, 2008).

Because our focus lies on building a genuine LTC typology, we identified the second group of typologies as most relevant for our type of analysis.. In these typologies we identify a huge variety in the (number of) included country cases, data, methods, and results. Concerning dimensions and indicators, we furthermore see a huge variety of indicators and measurements.. Howeverfour central dimensionsare repeatedly analyzed in most of the studies.

### I. Supply

Most typologies under analysis, incorporate the dimension of supply. Indicators in this dimension include financial resources(Alber, 1995; Colombo, 2012; Damiani et al., 2011; Halásková et al., 2017; Kraus et al., 2010), but also staff and staffing levels (Alber, 1995) as well as bed density in institutional LTC (Alber, 1995; Damiani et al., 2011). Furthermore, the type of provision is often included in the supply dimension and operationalized via the percentage of people in ambulatory or residential care settings (Alber, 1995; Damiani et al., 2011; Halásková et al., 2017). As a measure of financial input into the system we therefore use LTC expenditure (health) per capita in US$ of purchasing power parities It includes all expenditure on bodily related LTC, mainly on “(basic) Activities of daily living (ADL)” like bathing, dressing or eating). We would have liked to include LTC expenditure (social) as well, which includes “instrumental activities of daily living (IADL), which would have given the LTC system expenditure a broader scope (Halásková et al., 2017). Unfortunately, data availability was extremely limited in this dimension. Institutional supply of services was measured by the number of LTC beds per 1000 population aged 65 or older while we measured the actual supply of spots in these facilities bythe number of LTC recipients in institutions measured as the percentage of all people aged 65 years and older

### II. Public-Private Mix

Often part of healthcare typologies (Reibling et al., 2019), the second dimension of public-private-mix operationalizes the role of the state and of private actors.For LTC typologies, only those which specialize on specific aspects or those taking a broader view on social services integrate this dimension (Anderson, 2012) by the intensity of informal care (Bettio and Plantenga, 2004), the reach of public funds (van Hooren, 2012), the proportion of for-profit-providers (Da Roit and Weicht, 2013; Simonazzi, 2008), or the expenditure on or use of uncontrolled cash benefit schemes (Da Roit and Weicht, 2013; Simonazzi, 2008).

To measure the public and private involvement in payments for care, the share of private (voluntary and out-of-pocket) expenditure in the total expenditure was included . We also adopted the availability of cash benefits as an approximation for formal and informal care provision. Research has shown that the availability as well as the unrestricted usage of cash benefits fosters family and migrant care (Da Roit and Le Bihan, 2010; Da Roit and Weicht, 2013).

### III. Performance

Measuring the performance of LTC systems is especially on an internationally comparative level still in its infancy. Indicators such as the number of institutional and home-based LTC patients with pressure ulcers or unintended weight loss are not available in many countries (Halfens et al., 2013). Hence, only few typologies include performance or quality indicators. Damiani et al. (2011) for example use the share of people over 80 reporting good or very good health and the perceived limitations in ADLs for people aged 65 or older. Kraus et al. (2010) take institutional indicators of mandatory quality assurance systems and the degree and functioning of integrated services. Therefore, we can only use indicators that are not exclusively but to a large part determined by the quality and performance of LTC services. Thus, we integrate life expectancy of people aged 65 or older and similar to Damiani et al. (2011) the percentage of the population who are 65 or older and perceive their health as good or very good.

### IV. Access regulation

(Reibling, 2010; Reibling et al., 2019)Restrictions in LTC systems may pose barriers especially for lower social status groups to access care. Common barriers are means-testing of benefits and limitations of choice (Bakx et al., 2015; Colombo et al., 2011). This access dimension has been proven of high relevance for healthcare typologies (Reibling, 2010; Reibling et al., 2019) and is operationalized via means-testing for benefits, entitlement to residential care, home-care benefits and cash benefits as well as choice restrictions in Kraus et al.'s (2010) typology.

We included three indicators on free and limited choice. Limitations in choice are regional restriction or restrictions due to insurance or benefit plans. The indicators are: choice of homes-care provider, choice of institutional care provider and choice between cash and in-kind benefits. We furthermore used means-testing for any benefit (cash benefits, in-kind benefits, other care related benefits).

(Halfens et al., 2013)Damiani et al.(2011)(Halfens et al., 2013)Damiani et al.(2011)Kraus et al.(2010)

### (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010)Pommer et al.(2009)Kraus et al.(2010)(Reibling, 2010; Reibling et al., 2019)Kraus et al.'s(2010)(Alber, 1995; Halásková et al., 2017; Pommer et al., 2009)(Damiani et al., 2011; Kraus et al., 2010)(Colombo, 2012)(Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010; Pommer et al., 2009)Damiani et al.(2011)Halásková et al.(2017)Kraus et al.(2010)(Damiani et al., 2011; Kraus et al., 2010; Colombo et al., 2011)Pommer et al.(2009)(Alber, 1995; Damiani et al., 2011; Halásková et al., 2017; Kraus et al., 2010; Pommer et al., 2009)Colombo(2012)Halásková et al.(2017)An overview on existing typologies

(Halfens et al., 2013)Damiani et al.(2011)Kraus et al.(2010)Most existing typologies are solely based on quantitative indictors, usually taking up OECD and Eurostat indicators(Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010), but also Share-Data (micro-data) are used (Pommer et al., 2009). Only Kraus et al. (2010) adopts quantitative *as well as* qualitative data on institutional setting and rules for access to the system, which are based on own primary data collection.

The results of these typologies are certainly influenced by their focus and aim but also by the number of included countries. Some studies included only about ten European/OECD country cases (Alber, 1995; Halásková et al., 2017; Pommer et al., 2009) while others analyzed about 20 and more European (Damiani et al., 2011; Kraus et al., 2010) and/or OECD cases (Colombo, 2012).

Despite the large variety in the number of clusters and the composition of those clusters in the different typologies some similarities and parallels can be depicted. The most robust cluster is a Scandinavian or northern European cluster that mostly includes Sweden, Norway, Denmark, Finland and often also the Netherlands (Alber, 1995; Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010; Pommer et al., 2009). Clusters which include only Eastern European countries can be found in the typologies by Damiani et al. (2011), Halásková et al. (2017) and Kraus et al. (2010) In these clusters often Bulgaria, Hungary, the Czech Republic, Estonia, and Slovakia are included, while other Eastern European countries sometimes join. In some studies a second cluster which incorporates Eastern-European as well as Southern European countries is built (Damiani et al., 2011; Kraus et al., 2010; Colombo et al., 2011) including Italy, Spain, and Greece. These countries are only depicted in a genuine Southern European cluster by Pommer et al. (2009). Continental European countries such as Germany, France, Austria, Belgium, and Luxemburg can be found in many typologies together in one cluster but mostly together with some Eastern European or Northern European countries (Alber, 1995; Damiani et al., 2011; Halásková et al., 2017; Kraus et al., 2010; Pommer et al., 2009). Non-European countries are rarely included in the typologies. The typology by Colombo (2012), which categorizes countries based on financing indicators include Japan and South Korea in a cluster with Germany, Luxemburg, and the Netherlands due to their common social insurance approach, whereas New Zealand and Canada are in a cluster with Greece, Spain, and Switzerland due to their universal but means-tested financing approach. Halásková et al. (2017) find Australia and South Korea in one cluster.

This short overview on existing LTC typologies shows room for extension. First, many typologies have a European focus or only use a small sample of countries. Thus, we would like to extend these typologies by using an OECD sample with as many countries as possible. Second, most typologies only use quantitative indicators where a huge weight lies on financing indicators. In contrast, institutional indicators focusing on access to long-term care are rarely used. We therefore combined both approaches to provide the most flexible form of typology possible.

# Methodology – 1104 words

## Data

Indicators for the typology of LTC systems came from two data sources (Table 1). First, six quantitative measures were extracted at the 10th of December 2018 for 36 countries on 18 time points (2000-2017) from OECD health data (OECD, 2018). Another six institutional indicators were distilled from information within the Missoc database (MISSOC, 2018), the Health in Transition reports (European Observatory on Health Systems and Policies, 2018) and the ESPN reports of the European Union (European Commission, 2018) In case of ambiguous information, we searched for additional information on the indicator within scientific publications and countries’ official websites

The codes refer to the national rules or the dominant rules in place, since in some countries regional or municipal rules prevail .. To double-check our coded values, we contacted national LTC policy experts sent them a questionnaire containing the coding scheme and our assessment of codesWe received XX questionaires with comments to our coding back between May and July 2019.

The availability of cash benefits (CASH) as part of the public-private-mix dimension thereby could take values of 0, describing a system where only inkind-benefits are available. If the use of cash benefits were bound to specific services and aids, the indicator was coded 1, while unbound benefits, where the use of the benefit was is to the benficiaries own discression, were coded with a 2. The access dimension consists of three choice and one means-testing indicators. Since this could lead to a strong overweighting of choice within the cluster analysis, we constructed a cumulative index from all three choice sub-indicators. This index (CIDX) may take values between 0-4, where 0 means absolute freedom of choice, while 4 reflects strong restrictions. Finally, if a country system applies no means-testing in LTC systems, it was coded 0 and 1 if means-testing takes place.

--- TABLE 1 ABOUT HERE ---

Table 1: Overview of LTC typology indicators

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Abbreviation | Mean | SD | Min. | Max. |
| *I: Supply* |  |  |  |  |  |
| Expenditure per capita in US$, PPP | EXPND | 709.89 | 524.81 | 9.48 | 1745.09 |
| Number of beds per 1000 inhabitants | BEDS | 47.73 | 18.27 | 12.2 | 85 |
| Number of recipients in institutions,  % of all people aged 65+ | RCPTIN | 3.88 | 1.66 | 0.43 | 7.17 |
| *II: Public-Private-Mix* |  |  |  |  |  |
| Share of private expenditure,  % of total expenditure | PEXPND | 15.84 | 11.09 | 0.19 | 34.56 |
| Cash Availability of cash ebenfits  (only inkind, Bound, Unbound) | CASH | 1.08 | 0.81 | 0 | 2 |
| *III: Performance* |  |  |  |  |  |
| Life expectancy 65+ | LEX 65+ | 19.77 | 1.35 | 16.48 | 21.85 |
| Self-perceived health status (very) good,  % of the population 65+ | SPH | 46.11 | 21.83 | 8.6 | 86.9 |
| *IV: Access regulation* |  |  |  |  |  |
| Choice Index (Unlimited - Limited) | CIDX | 1.64 | 0.5 | 0 | 4 |
| Choice of homecare provider | HC | 0.4 | 0.49 | 0 | 1 |
| Choice of institutional care provider | IC | 0.36 | 0.83 | 0 | 1 |
| Choice between cash vs inkind-benefits | CVSI | 0.88 | 1.25 | 0 | 2 |
| Means-testing for any benefit (No/Yes) | MTAB | 0.56 | 0.51 | 0 | 1 |

We excluded countries, where data was missing either completely (Chile, Mexico, Turkey) or on single indicators (Austria, Canada, Greece, Hungary, Iceland, Italy, Lithuania and Portugal) leading to an analysis sample of *N*=25 countries. We use the average values of the years 2014-2016. To furthermore handle missing values within quantitative indicators we conducted a three-step process: First, we estimated a multiple imputed chained equation (MICE) regression model using predictive mean matching (PMM) for 20 cycles. Following the findings and recommendations of CIT: White et al. 2010 & Kleinke et al. 2011, we imputed missing mean values of indicators by predictive mean matching of the next neighbor, here the next year. If for example the value was missing in 2105 for a specific country, we estimated the model with the full information from 2014 and aggregated the values of 20 cycles to yearly mean. Second, we aggregated imputed data to the yearly-mean of the specific indicator if the true value was missing. Finally, we calculated an overall mean of the observation period (Table 4, Online Appendix).

Both, the selection of quantitative measures as well as developing the coding scheme to distill the institutional indicators were theory-driven processes, with the aim of maximum conceptual validity of outlined dimensions. Nevertheless, cluster analysis profits from a small number of variables, since multicollinearity might weight individual variables too strong biasing the derivation of meaningful clusters (Milligan and Cooper, 1987).

## Cluster analysis

Cluster analysis is the standard method in welfare state typologies (Jensen, 2008; Reibling, 2010; Wendt, 2014) as well as in LTC typologies (Halásková et al., 2017; Kautto, 2002; Kraus et al., 2010; Saraceno and Keck, 2010) for classifying and developing system types. The innovative approach by Reibling et al. (2019), where the authors utilize multiple cluster analyses within the same methodological framework has several advantages compared to classical approaches that often lack accepted standards and statistical rules (Fonseca, 2013). Since researchers must make technical decisions that potentially shift findings in different ways of interpretation, a single cluster analysis is not appropriate for classifying such complex long-term care systems. The flexibility of the multi-cluster-analysis proposed by (Reibling et al., 2019: 615), however allows to combine results from different specifications “using the variability across those results as measure of confidence about the membership of two observations in one cluster” increasing reliability of the method itself.

Following the proposed framework we specified cluster analysis in Stata 16 with either z- and range-standardized variables, used Gower and squared Euclidian distance as measures of dissimilarity in both, a k-means partitioning analysis as well as a agglomerative cluster analysis with average and Wards algorithms as linkage methods and selected the first and second-best result determined by stopping rules of Calinski-Harabasz and Duda/Hart and Dendrogramms for each of the 24 separate cluster analysis.

Findings from 8 k-means and 16 hierarchical cluster analysis results went equally in the calculation on how often each country was in the same cluster with every other country. To classify as full membership within this network of long-term-care systems, a connection between two countries must show up in ≥ 66% of all cluster analysis and a country needs to have these strong ties with at least half of all countries in the cluster. A partial membership is defined as a connection of two countries in ≥ 50% of cluster analysis. We present one cluster solution which is based on the full membership rule and one cluster solution which also integrates the partial mebmerships into the solution. We mapped the cluster solution by a network graph, which was modelled by UNICNET6/Netdraw.

# Results – 1210 words

Figure 1 shows a graphical depiction of the clusters. All shown ties are larger or equal 50%. The graph visualizes groups of countries and how likely it is that two countries belong to a similar type of LTC system. Furthermore, the graph and the information in table 2 show the internal consistency of LTC systems. Nine clusters can be divided, based on the full membership rule:

--- FIGURE 1 ABOUT HERE ---

Figure 1: Network of OECD LTC systems.



Light grey: ≥ 50%; Full grey: ≥ 66%; Black: ≥ 90%.

--- TABLE 2 ABOUT HERE ---

Table 2: Clustering based on benchmark percentages of same cluster solutions

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| ≥ 0.66 and ≥ 0.5 cluster ties | CZ, LV, PL | DE, FI | DK, IE, NO, SE | JP, KR | AU, BE, CH, LU, NL | SI, SK | FR, IL, ES, UK, US | EE | NZ |
| ≥ 0.5 cluster ties |  |  | JP, KR | DK, IE, NO, SE | FR, UK, IL, SI, SK |  | AU, BE  CH, EE, LU, NL, NZ, SK, SI |  | FR, UK, US |
| Strongest tie  in full cluster | LV\_PL  (1,0) | FI\_DE  (0.94) | DK\_IE (1,0)  DK\_NO (1,0)  DK\_SE (1,0)  IE\_NO (1,0)  IE\_SE (1,0)  NO\_SE (1,0) | JP\_KR  (0.94) | LU\_NL (1,0) | SI\_SK  (0.72) | ES\_US  (0.94) |  |  |
| ≥ 0.9 cluster ties | CZ\_LV  CZ\_PL LV\_PL | FI\_DE | DK\_IE  DK\_NO  DK\_SE  IE\_NO  IE\_SE  NO\_SE | JP\_KR | BE\_LU  BE\_NL  LU\_CH  LU\_NL  NL\_CH |  | ES\_US |  |  |
| # of ties in  full cluster | 3/3 | 1/1 | 6/6 | 1/1 | 10/10 | 1/1 | 9/10 |  |  |

1. The first cluster consist of Czech Republic, Latvia, and Poland who form a distinct and highly consistent cluster, with all ties between these countries > 90%. No other country has a partial membership in this cluster.
2. Finland and Germany form another distinct cluster, ending up in the same cluster solution in 94% of performed analysis. Both countries do not have any partial membership in other clusters.
3. Denmark, Ireland, Norway, and Sweden show a high internal consistency. All countries can be found in the same cluster in all performed cluster analysis. They join a partial membership with cluster 4.
4. Japan and Korea have a strong tie among them (94%) and join as partial membersthe previous custer.
5. Australia, Belgium, Luxemburg, Netherlands, and Switzerlandform a dense cluster, in which each country shares strong ties to all other country in the cluster.
6. Slovenia and Slovakia have a strong tie, yet less strong than the other clusters of two by 72%. The countries have strong and weak ties to cluster 5 and cluster 7.
7. France, Israel, Spain, the United Kingdom, and the United States constitute anothercluster, in which the tie between the US and France is the only weak one in the cluster.
8. Estonia and 9) New Zealand are sole clusters, including only one country. Estonia has two weak ties to France and the US[[1]](#footnote-1) and is hence considered a partial cluster member of cluster four. New Zealand has three weak ties to cluster four and is hence considered a partial member in this cluster, too.

Although nine clusters were clearly distinguished from a methodological point of view, such a solution with clusters covering only one or two countries may not be suitable for most purposes.Our flexible typology is able to go beyond this interpretation. The clusters can be condensed based on their partial memberships. Four distinct cluster emerge, which have no tie ≥ 50%. Figure 1 depicts these four distinct groups graphically.However, two clusters (bottom right and bottom left in Figure 1) could be split up in two sub-clusters each, based on their tie strength. Thus, our LTC typology identifies 4+2 clusters:

--- TABLE 3 ABOUT HERE ---

Table 3: Means of quantitative indicators in LTC typology over (N=4) clusters with (N=4) subclusters

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 3a | 3b | 4 | 4a | 4b |
| Cluster composition | CZ, LV, PL | DE, FI | DK, IE, NO, SE, KR, JP | DK, IE, NO, SE | JP, KR | AU, BE, CH, EE, ES, IL, LU, FR, NL, NZ, SK, SI, UK, US | AU, BE, CH, LU, NL, SK, SI | EE, ES, FR, IL,NZ, UK, US |
| Cluster Size | 3 | 2 | 6 | 4 | 2 | 14 | 7 | 7 |
| EXPND | 161.82 | 811.33 | 1114.09 | 1369.15 | 603.97 | 639.61 | 819.81 | 459.42 |
| BEDS | 21.76 | 56.33 | 43.57 | 53.21 | 24.28 | 53.85 | 64.28 | 43.43 |
| RCPTIN | 1.18 | 4.4 | 3.65 | 4.16 | 2.63 | 4.49 | 5.51 | 3.46 |
| PEXPND | 5.77 | 23.94 | 13.05 | 10.49 | 18.17 | 18.03 | 11.81 | 24.25 |
| CASH | 1.67 | 2 | 0.17 | 0.25 | 0 | 1.21 | 1.57 | 0.86 |
| LEX 65+ | 17.49 | 19.84 | 20.31 | 19.93 | 21.06 | 20.02 | 19.90 | 20.15 |
| SPH | 16.08 | 42.73 | 49.84 | 63.43 | 22.68 | 51.43 | 49.99 | 52.88 |
| CIDX | 1 | 1 | 2.67 | 3 | 2 | 1.43 | 0.57 | 2.29 |
| MTAB | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |

**The low-performance and low -supply system**

The first system is marked by low levels of supply, which results in a low level of performance. It has by far the lowest overall expenditure, beds, and recipients in comparison to all other system-types. Although countries of this LTC system type have low acces barriers byappling no means-testing and a low level of choice restrictions, bound cash benefits hint at a high level of informal care provision. However, private LTC expenditure is the lowest of all system types. Performance of these systems measured by life expectancy and subjective health status are by far the lowest compared to all other systems.

**The access-oriented private system**

Access restrictions are among the lowest for all system with no-means-testing and limited choice restrictions. Supply can be evaluated as medium to high. Yet, this system show one of the highes shares of private expenditure and unbound cash benefits which hint at a high level of informal care provision. Performance levels are medium.

**The high performance public-orientated system**

This system is defined by above average performance and below average private expenditure. Benefits are mainly only available in-kind, which hints to a low level of informal care provision. Furthermore, choice is limited in these systems, yet, no means-test applies. The sub-types of this system are devided by high and low levels of supply.

**The high performance private oriented system**

Performance in theis LTC type is high with abova average life expectancy and self-rated health. As private expenditure are above average and cash benefits avaibale in almost all countries and often unbound, this type can be depicted as oriented towards pivate provision and financing. The sub-types differ by high and low supply. Both sub-types apply means-testing, yet only the low supply type is marked by considerable coice restrictions.

--- TABLE 4 ABOUT HERE ---

Table 4: Overview of cluster labels and characteristics within the 4+2 cluster typology

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3a | 3b | 4a | 4b |
| Cluster composition | CZ, LV, PL | DE, FI | DK, IE, NO, SE | JP, KR | AU, BE, CH, LU, NL, SK, SI | EE, ES, FR, IL,NZ, UK, US |
| Supply  EXPD  BEDS  RCPTIN | Low  Low  Low | Medium High  High | High  High  High | Medium  Low  Medium | Medium  High  High | Low  Medium  Medium |
| Public-Private Mix  PEXPND  CASH | Low  Medium | High  Medium | Medium  Low | Medium  Low | Medium  High | High  Medium |
| Peformance  LEX  SPH | Low  Low | Medium  Medium | Medium  High | High  Low | Medium  High | High  High |
| Access Regulation  CIDX  MTAB | Low  Low | Low  Low | High  Low | High  Low | Low  High | High  High |

# Discussion – 676 words

Focusing on the countries in the four clusters, we find expected patterns based on earlier studies, but also unanticipated countries joining these types. The high-performance, public-oriented, high-supply sub-system is led by the Nordic countries of Sweden, Norway, and Denmark- This group of countires is found in several studies (Alber, 1995; Colombo, 2012; Damiani et al., 2011), but mostly also includes Finland and the Netherlands (Colombo, 2012; Damiani et al., 2011; Kraus et al., 2010; Pommer et al., 2009). Furthermore, the low-supply, low-performance system is built by Poland, Latvia, and the Czech Republic – three Eastern European countries (Damiani et al., 2011). However, other Eastern European countries as Slovenia, Slovakia, and Estonia are loosely attached to the high performance private-oriented types. As we could only incorporate Spain into the typology as a southern European country, the results cannot show or negate the existence of a such a cluster of LTC systems. Continental European countries are mainly included in the high performance private-oriented types – especially in the high supply sub-cluster – yet the cluster includes Eastern European, Southern European, and Non-European OECD countries as well. As Japan and Korea have been attached to Germany and the Netherlands in earlier typologies due to their social insurance model in LTC (Colombo, 2012) our results show that the high performance and the public-private mix of these LTC systems are closer to those of Northern European LTC systems. Finding Finland and Germany in one cluster seems rare. Only one typology finds both counrties in one cluster, yet together with other clusters (Damiani et al., 2011). However on could speculate if this cluster would also include countries such as Austria or Luxembourg which were not included due to data limitations.

Despite many reforms in OECD countries’ LTC systems, in recent years, our results underline certain patterns of LTC system types. A low-performance and low-supply system marked by Eastern European countries, as well as a high-performance, public-oriented system. However, such a large group of countries in the high-performance, private-oriented systems is a new finding. This might show that privatization and marketization reforms in OECD LTC systems (Ranci and Pavolini, 2013; Farris and Marchetti, 2017) led to a convergence of these systems.

**Conclusion**

We provided an updated, innovative, and flexible LTC typology. We provided an updated typology, because we used the latest available data from the OECD database as well as a unique institutional dataset, which we developed ourselves and which has been checked by country policy experts. This is furthermore an innovative approach because most typologies rely heavily on quantitative indicators, especially when a larger country sample is included (Colombo, 2012; Damiani et al., 2011; Halásková et al., 2017). Only in cases of smaller country samples, which use more often qualitative comparisons, institutional indicators are considered. A larger country sample as well as a mix of quantitative and institutional indicators has only been adopted by Kraus et al. (2010). Moreover, we developed a flexible typology, where nine clusters are defined on methodological grounds and condensed to four clusters based on less strict methodolical as well as content-related considerations In the last century marketization, commodification and coporatization of care changed LTC systems all over the world (Farris and Marchetti, 2017), which makes a new and updated LTC typology necessary.

In terms of results we could show the validity of existing typologies but could also show that these reforms led to convergence of OECD LTC systems.

Still, typologies always imply generalizations. For example, in many countries LTC service provision and access have a high regional fragmentation (Spasova et al., 2018), which cannot be displayed on a brought basis in an internationally comparative typology. Furthermore, LTC systems have not that clear boundaries as other welfare state systems such as healthcare, unemployment, or pensions systems do. LTC can be provided via a separate LTC system or it can be partially integrated in healthcare, social assistance, or pension systems, where different access and provision rules apply (Nies et al., 2013). Furthermore, LTC is in many countries still a new issue in the welfare state, because the provision was traditionally devolved to families and now increasingly to migrant care workers (Colombo et al., 2011; Da Roit and Le Bihan, 2010). Unfortunately, indicators on informal care are not available and by nature not reliable. The only approximation, we have included, are cash benefits (especially unbound) which are an institutional measure to increase informal family and migrant care (Da Roit and Le Bihan, 2010; Da Roit and Weicht, 2013).

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Online Appendix

Table 5: Means LTC typology indicators over countries (N=25) and years (2014-2016)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Quantitative indicators | | | | | | Institutional indicators | | |
| ID | EXPND | BEDS | RCPTIN | PEXPND | LEX 65+ | SPH | CASH | CIDX | MTAB |
| AU | 99.86 | 52.53 | 6.40 | 5.87 | 20.88 | 76.40 | Unbound | 0 | Yes |
| BE | 1037.03 | 68.10 | 7.16 | 9.43 | 20.05 | 52.30 | Unbound | 2 | Yes |
| CZ | 314.19 | 38.87 | 2.24 | 0.19 | 17.90 | 23.57 | Unbound | 0 | No |
| DK | 1223.61 | 45.95 | 3.97 | 8.25 | 19.43 | 58.57 | In-kind | 3 | No |
| EE | 106.22 | 45.60 | 5.00 | 34.56 | 18.05 | 15.87 | In-kind | 4 | Yes |
| FI | 763.24 | 59.30 | 4.70 | 17.21 | 20.03 | 44.87 | Unbound | 2 | No |
| FR | 696.76 | 53.07 | 4.20 | 22.47 | 21.77 | 41.03 | Bound | 1 | Yes |
| DE | 859.42 | 53.35 | 4.10 | 30.67 | 19.65 | 40.60 | Unbound | 0 | No |
| IE | 1126.68 | 49.20 | 3.53 | 17.79 | 19.76 | 65.43 | In-kind | 2 | No |
| IL | 244.61 | 21.00 | 1.90 | 28.29 | 20.37 | 55.47 | Unbound | 1 | Yes |
| JP | 796.31 | 24.10 | 2.70 | 8.39 | 21.85 | 24.00 | In-kind | 2 | No |
| KR | 411.63 | 24.47 | 2.57 | 27.95 | 20.30 | 21.37 | In-kind | 2 | No |
| LV | 73.42 | 14.20 | 0.43 | 13.10 | 16.48 | 8.60 | Bound | 2 | No |
| LU | 1503.52 | 85.00 | 5.47 | 20.19 | 20.57 | 47.10 | Bound | 0 | Yes |
| NL | 1360.82 | 75.70 | 4.80 | 8.39 | 19.85 | 60.47 | Bound | 0 | Yes |
| NZ | 635.47 | 56.43 | 4.60 | 6.13 | 20.37 | 86.90 | In-kind | 2 | Yes |
| NO | 1745.09 | 52.17 | 4.63 | 8.63 | 20.27 | 66.37 | Bound | 3 | No |
| PL | 97.86 | 12.20 | 0.87 | 4.03 | 18.10 | 16.07 | Unbound | 1 | No |
| SK | 9.48 | 52.07 | 3.93 | 1.17 | 17.08 | 18.77 | Bound | 0 | Yes |
| SI | 266.88 | 50.67 | 4.93 | 4.11 | 19.67 | 31.03 | Unbound | 1 | Yes |
| ES | 294.38 | 44.47 | 1.83 | 18.54 | 21.30 | 40.03 | Bound | 3 | Yes |
| SE | 1381.24 | 65.53 | 4.50 | 7.29 | 20.25 | 63.33 | In-kind | 4 | No |
| CH | 1461.08 | 65.90 | 5.90 | 33.53 | 21.17 | 63.83 | Unbound | 1 | Yes |
| UK | 747.22 | 47.60 | 4.22 | 33.42 | 19.90 | 52.70 | Bound | 2 | Yes |
| US | 491.26 | 35.83 | 2.50 | 26.36 | 19.28 | 78.16 | Bound | 3 | Yes |
| *TM* | 709.89 | 47.73 | 3.88 | 15.84 | 19.77 | 46.11 | - | 1.64 | - |

Sources: OECD health data (extracted on 10.12.2018) &MISSOC 2018 (European observatory on health systems and policies 2018), European commission 2018; Own Coding Scheme; TM = Total mean

Table 6: Means of quantitative indicators in LTC typology over (N=9) methodological clusters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Cluster composition | AU, BE, CH, LU, NL | CZ, LV, PL | DK, IE, NO, SE | EE | DE, FI | ES, FR, IL, UK, US | JP, KR | NZ | SI, IK |
| Cluster Size | 5 | 3 | 4 | 1 | 2 | 5 | 2 | 1 | 2 |
| EXPND | 1092.46 | 161.82 | 1369.15 | 106.22 | 811.33 | 494.85 | 603.97 | 635.46 | 138.18 |
| BEDS | 69.45 | 21.76 | 53.21 | 45.6 | 56.33 | 40.39 | 24.28 | 56.43 | 51.37 |
| RCPTIN | 5.95 | 1.18 | 4.16 | 5 | 4.4 | 2.93 | 2.63 | 4.6 | 4.43 |
| PEXPND | 15.48 | 5.77 | 10.49 | 34.56 | 23.94 | 25.82 | 18.17 | 6.13 | 2.64 |
| CASH | 1.6 | 1.67 | 0.25 | 0 | 2 | 1.2 | 0 | 0 | 1.5 |
| LEX 65+ | 20.50 | 17.49 | 19.93 | 18.05 | 19.84 | 20.52 | 21.08 | 20.37 | 18.38 |
| SPH | 60.02 | 16.08 | 63.43 | 15.87 | 42.73 | 53.48 | 22.68 | 86.9 | 24.9 |
| CIDX | 0.6 | 1 | 3 | 4 | 1 | 2 | 2 | 2 | 0.5 |
| MTAB | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |

Sources: OECD health data (extracted on 10.12.2018) & MISSOC 2018 (European observatory on health systems and policies 2018), European commission 2018; Own Coding Scheme

CUT CONTENT

Table 7: Means of quantitative indicators in LTC typology over (N=5) theory-based clusters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 |
| Cluster composition | AU, BE, FR, IL, LU, NL, NZ, ES, CH, UK, US | CZ, LV, PL | DK, IE, JP, KR, NO, SE | EE | FI, DE |
| Cluster Size | 11 | 3 | 6 | 1 | 2 |
| EXPND | 779.27 | 161.82 | 1114.09 | 106.22 | 811.33 |
| BEDS | 55.06 | 21.76 | 45.57 | 45.6 | 56.33 |
| RCPTIN | 4.45 | 1.18 | 3.65 | 5 | 4.4 |
| PEXPND | 19.33 | 5.77 | 13.05 | 34.56 | 23.94 |
| CASH | 1.27 | 1.67 | 0.17 | 0 | 2 |
| LEX 65+ | 20.5 | 17.49 | 20.31 | 18.05 | 19.84 |
| SPH | 59.49 | 16.08 | 49.84 | 15.87 | 42.73 |
| CIDX | 1.36 | 1 | 2.67 | 4 | 1 |
| MTAB | 1 | 0 | 0 | 1 | 0 |

Sources: OECD health data (extracted on 10.12.2018) & MISSOC 2018 (European observatory on health systems and policies 2018), European commission 2018; Own Coding Scheme

Table 5: Overview of Cluster Labels and Characteristics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 |
| Cluster composition | AU, BE, FR, IL, LU, NL, NZ, ES, CH, UK, US | CZ, LV, PL | DK, IE, JP, KR, NO, SE | EE | FI, DE |
| Supply  EXPD  BEDS  RCPTIN | Medium  Med.-High  Med.-High | Low  Low  Low | High  Medium Medium | Low  Medium  High | Medium Med.-High  Med.-High |
| Public-Private Mix | Med.-High  Medium | Low  Med.-High | Medium  Low | High  Low | Med.-High  High |
| Pefrormance | Med.-High  Med.-High | Low  Low | Med.-High  Medium | Low  Low | Medium  Medium |
| Access Regulation |  | Low  Low |  | High  High | Low  Low |

1. The ties of Estonia to France and the US are rounded values of 0,66. As we us unreounded values for Figure 1, the lines appear light grey, not full grey. As Estonia only has ties to these two countires of the five countries of cluster 7, according to the rules set out in the Data and Methods section it is condiered a partial member of this cluster. [↑](#footnote-ref-1)