Between life and death: organizational change in central state bureaucracies in cross-national comparison

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Abstract
Identifying and explaining change in the structure of central state bureaucracies and the determinants of survival of individual public organizations are two closely related areas of research in public administration. We aim to bridge the gap between these two main
strands of studies of organizational change by presenting a novel approach to collecting event history data for public organizations. We have developed this framework as part of the Structure and Organisation of Governments Project, which aims to map entire central state bureaucracies in three Western European countries. Our approach is flexible enough to describe macro-trends in public sector organization populations and to explain these trends by analysing the event histories of the organizations they comprise. In addition to presenting our framework and how we applied it to create this data set, we also present some initial cross-national comparisons of the distribution of the event types recorded, highlighting initial findings and promising avenues for further research.

Points for practitioners

We present here a novel approach for representing the structural changes that organizations and sub-departments experience over time that can apply to any hierarchical organization (public or private). Applying the approach illuminates the historical development of organizations and their parts, and allows cross-national comparisons of events and trends across organizations. Our comparison of ministerial organizations in France, Germany and the Netherlands from 1980 to 2013 shows that trends in the size of bureaucracies mask considerable structural changes within.

Keywords
administration in transition, administrative organization and structures, central administration, civil service, public administration

Introduction

The structure of government both reflects government priorities and shapes executive decision-making, so understanding how governmental structures change illuminates core concerns of public administration (Hammond, 1986; Mortensen and Green-Pedersen, 2015; Tosun, 2018). In developed countries and beyond, trends in public management and changes to political–administrative relations, executive leadership and policy priorities have given rise to adapting bureaucratic structures. Aggregate patterns of structural changes necessarily involve the creation, modification and termination of individual public organizations and their subunits, with serious implications for the tasks carried out by changed administrative entities. Few scholars include both the macro- and micro-levels when examining public sector organizational change, a combination that reveals both gradual change processes and major government reforms (Adam et al., 2007). Fewer engage in cross-national comparisons over a relatively long period of time (Lim, forthcoming). Instead, two disparate strands dominate the literature on the structural change of the state (Kuipers et al., 2018).
Some scholars of public administration examine patterns of organizational change in the public sector by describing macro-level changes in the number and types of public organizations (Bertels and Schulze-Gabrechten, forthcoming; Hajnal, 2012; MacCarthaigh, 2012; Nakrošis and Budraitis, 2012; Rolland and Roness, 2011; Sarapuu, 2012). They show how population size changes as individual organizations are created, eliminated, split or merged. Longitudinal population figures are accompanied by descriptions of the distribution of events that public organizations experience and that lead to the changes in population size. Mapping exercises of this kind may include ministerial organizations and their subdivisions, agencies and similar non-ministerial organizations, or combine them. They vary in their classification of public organizations or in their typology of event types. Yet, they provide an exhaustive mapping of the public sector over long periods. This focus on macro-trends, however, leaves little room for theory-driven testing of explanations for the patterns observed.

Other studies examine organizational change at the micro-level by looking at the determinants of organizational survival and termination (Askim et al., 2020; Bertelli and Sinclair, 2018; Boin et al., 2010, 2017; Carpenter and Lewis, 2004; Götz et al., 2018; Greasley and Hanretty, 2016; James et al., 2016; Kuipers et al., forthcoming; Lewis, 2002, 2004; Lim, forthcoming; MacCarthaigh, 2014; O’Leary, 2015; Park, 2013; Sieberer et al., forthcoming; van Witteloostuijn et al., 2018). They look at organizational survival to better understand the politics of bureaucratic organization or to understand the survival of public organizations as an object of investigation in its own right. To test their explanations, researchers use data sets on the whole or partial event histories of individual public organizations. Typically, they focus on a part of the public sector, often agencies, and do not aim to map the population of public organizations and their patterns over time. These studies are more ambitious in their explanatory intent than macro-level descriptive ones. Yet, the generalizability of their findings to other parts of the public sector remains problematic.

This article aims to bridge the gap by presenting a novel approach to collecting event history data for public organizations. Our approach describes the characteristics of organizational entities and links entities across time as they undergo transitions that create, eliminate or otherwise change them. We present a mutually exclusive and exhaustive typology of these transitions. We have developed this framework as part of the Structure and Organisation of Governments Project (SOG-PRO), which aims to map entire central state bureaucracies in three Western European countries. Our framework is flexible not only with respect to the kinds of events that it describes, but also with respect to the kinds of public sector organizations that it may be applied to, ranging from national central ministries and agencies, to public foundations and state-owned companies, as well as to supranational and international organizations. By allowing hierarchical relationships among organizational entities and their subunits, it can represent the vertical and horizontal divisions of classic Weberian bureaucracies (Bertels and Schulze-Gabrechten, forthcoming).
The article begins by locating SOG-PRO in the literature on structural transformations of the public sector. We then introduce the principles used to understand and classify organizational event histories, before describing an application in France, Germany and the Netherlands over time and its initial comparative findings.

**Structural transformations in the public sector**

Since the pioneering work of Kaufman (1976), scholars have described the transformation of central state bureaucracies (Bertelli and Sinclair, 2018; Bevan, 2013; Boin et al., 2010, 2017; Corbett and Howard, 2017; Glor, 2011; Götz et al., 2018; Greasley and Hanretty, 2016; Hajnal, 2012; Ma and Christensen, 2020; MacCarthaigh, 2014; Moldogaziev et al., 2019; Mortensen and Green-Pedersen, 2015; Nakrösis and Budraitis, 2012; O’Leary, 2015; Park, 2013; Rolland and Roness, 2012; Sarapuu, 2012; Shockley, 2012; van Witteloostuijn et al., 2018). This early work has inspired conceptual and empirical advancements in our understanding of how administrative systems evolve. At the same time, it has left a long-lasting ‘minimalist’ conceptual legacy rooted in a biological understanding of organizational change in terms of birth, survival and death (see Kuipers et al., 2018). Early classifications (see Hannan and Freeman, 1989) recognize that organizational units may experience change events like absorptions, mergers and splits. Nevertheless, Hannan and Freeman determined on a case-by-case basis whether a unit experienced a termination during these more complex events. This allowed them to incorporate such events while still maintaining the basic dichotomy of birth or death.

The dichotomy of birth or death persisted until Peters and Hogwood (1988: 132) complemented these with ‘succession’ and ‘maintenance’. ‘Succession’ refers to the ‘replacement of an organization by a “new” one directed at the same problem or clientele’ and they list six different subtypes: linear succession, consolidation, splitting, partial termination, non-linear succession and complex succession (Peters and Hogwood, 1988: 132). Since then, classifications admit the possibility of post-creation events other than termination. The succession events, though, still serve mainly as a foil to the termination experienced by other units. Peters and Hogwood (1988: 132) define ‘maintenance’ as ‘the continuation of an existing organization with the same task definition and structure’, a definition that also indicates the continuation of an organizational entity but suggests no specific (sub)type of change event at all; as such, it is treated as a non-event.

To facilitate cross-national comparisons, Rolland and Roness (2011) kept the three main event types of birth, death and survival (maintenance) and complemented these with five ‘organizational change processes’ (mergers, absorptions, splits, secessions and complex reorganizations). Units involved in these five change processes either continued to exist or were terminated as a result of these processes. For all units that ceased to exist, that is, are not maintained (in their language), Rolland and Roness (2011: 405–406) stress that ‘old units are
permanently terminated and no longer visible after the change’. Additionally, units that absorb others do not experience events in this scheme, leaving out important stages of their event histories. Before now, no classification existed of fundamental change event types that goes beyond the dichotomy of birth and death, or rather the presumed inevitability of organizational termination.

Still, a classification of organizational change events limited to birth, survival and death allows for the aggregate mapping of the transformation of the central state (Hajnal, 2012; Hood et al., 1985; Ma and Christensen, 2020; MacCarthaigh, 2012; Nakrošis and Budraitis, 2012; Nethercote, 2000; Rolland and Roness, 2011, 2012; Sarapuu, 2012; Wettenhall, 1976). Drawing on databases of diverse organizational units from ministries to agencies, scholars have shown the proliferation of organizational forms and their growth over time as compared to the traditional structures of ministerial departments. In Ireland, the number of ministerial departments remained relatively constant from 1923 to 2010. For both Estonia and Lithuania, an initially large number of ministerial departments decreased soon after independence as a result of mergers and reorganizations. In Norway, Rolland and Roness (2011) note the existence of ministerial units and their sub-units within their database but focus on independent organizations falling outside of ministries. These mapping projects represent important contributions for understanding structural change in European states: however, their reluctance to dive into ministerial department hierarchies and the change events that subunits experience may paint a picture of organizational stability that masks considerable structural change underneath.

Many studies on organizational survival, often based on the theory of the politics of structural choice, provide descriptive statistics or even regression and event history analyses (for a detailed overview of existing studies, see Kuipers et al., 2018; Lim, forthcoming). Similar explanatory factors for organizational survival (including organizational age, legislative base, function and political and economic environment) were explored on populations of public organizations in the US (Boin et al., 2010, 2017; Carpenter and Lewis, 2004; Lewis, 2002, 2004), the UK (Bertelli and Sinclair, 2018; Greasley and Hanretty, 2016; James et al., 2016; O’Leary, 2015), Germany (Götz et al., 2018; Knill et al., 2008), Ireland (MacCarthaigh, 2014) and South Korea (Park, 2013). Most of these studies focus on agencies rather than on ministries, with notable exceptions being studies on Ireland (MacCarthaigh, 2014), Canada (Glor, 2011) and Denmark (Mortensen and Green-Pedersen, 2015). None of these extends the analysis to subunits within ministerial departments.

**Organizational phases linked in time**

This gap in the literature called for a flexible framework for collecting data about organizational entities across time that enables the study of both organizational populations in the aggregate and the event histories of specific organizations and their constituent parts. Our approach builds upon the pioneering work of the
aforementioned mapping projects and survival studies, and addresses two of their shortcomings. First, so far, event types are missing that discern change events to organizational entities that result not in their termination or the creation of another entity, but rather in the continuation of that very organizational unit with altered features. Second, we need a concept that connects previous, existing and succeeding organizational entities in order to follow the ‘event history’ of individual units. This allows us to map their interconnectedness with other units. Therefore, our approach builds on the notion of ‘organizational identity’, understood as the composition of responsibilities and competencies expressed in the entity’s formal denomination, and allows for the continuity of such identities as organizations experience transitions (Adam et al., 2007: 227; Boin et al., 2010: 390; Lewis, 2002: 92). Existing organizations or organizational units that keep most of their tasks (and hence their ‘identity’) are not ‘dead’, but continue to exist and simply experience a transition from one state to another as their relevant features change. This approach allows us to follow the full change history of these organizations, while, at the same time, still allowing a stricter understanding of termination if desired.

We use the term ‘entity’ because the approach allows for the observation of individual organizations (e.g. agencies) and parts of organizations, such as directorates and other units within central ministries. In doing so, our approach allows for the hierarchical nesting of lower-level entities within ‘parent’ entities. The framework is flexible as it enables us to follow the population of entities from one point in time to another as entities enter the population, merge with other entities, split into several entities, leave the population (e.g. through their termination) and experience various changes. Each change event links an entity with its predecessors or successors (if they exist). In this way, a ‘genealogy’ emerges of a set of entities that are linked by change events. Overall populations change as individual entities experience any of these events. A flexible framework for collecting data about organizational entities across time must thus allow all such events. Table 1 (available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558) summarizes our approach and indicates (in italics) the novel features of our approach compared to existing schemes (e.g. Götz et al., 2018; Hajnal, 2012; Hardiman and Scott, 2012; James et al., 2016; Lewis, 2002; MacCarthaigh, 2012; Nakrosis and Budraitis, 2012; Rolland and Roness, 2012; Sarapuu, 2012; van Witteloostuijn et al., 2018).

Table 1 (available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558) summarizes our approach and indicates (in italics) the novel features of our approach compared to existing schemes (e.g. Götz et al., 2018; Hajnal, 2012; Hardiman and Scott, 2012; James et al., 2016; Lewis, 2002; MacCarthaigh, 2012; Nakrosis and Budraitis, 2012; Rolland and Roness, 2012; Sarapuu, 2012; van Witteloostuijn et al., 2018).

Population of organizational units within public bureaucracies

A framework for understanding stability and change in organizational populations must account for their most basic characteristic: size. The size of a population, however, masks obvious sources of instability. Hence, a framework for understanding stability and change in organizational populations must discern the different types of events that indicate transitions in addition to those that lead to population size change. Such a framework will also record the event histories of all
members of the population, allowing for both population mapping and event history analysis. Like previous mapping projects such as the Norwegian State Administration Database, our approach covers all observed events. However, it is not limited to population snapshots taken at the start and end of the observation period (cf. Kaufman, 1976; Shanks et al., 1996), which creates a bias towards durable agencies and other entities (Lewis, 2002).

We conceive of events that mark transitions from one state to the next as relational concepts that link zero or more organizational entities that exist before the transition with zero or more organizational entities that exist after the transition. We refer to the states in between starting and ending events as organizational phases. Such a conception allows us to account for all events that may affect the size of a population. Additionally, we can identify other sources of instability and change in organizational populations that go beyond size changes.

A few types of transition events will illustrate their relational nature and, at the same time, provide a basic categorization that is mutually exclusive and exhaustive with respect to the types of relational transitions (though, as we shall see, not exhaustive with respect to possible events). Two such types are familiar to studies of organizational populations that employ a biological metaphor. Since the earliest interest in the survival of public organizations, scholars have been keen to identify instances of organizational ‘death’ or termination, while maintaining an awareness that governments continually create new organizations. In our categorization (see Table 2, available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558), a ‘pure’ termination event ends an organizational phase when that event results in no successor(s). A ‘pure’ creation event, by contrast, begins an organizational phase when that event has no predecessor(s). In both cases, there is no successor (or predecessor) with the tasks and competencies of the terminated or created entity, that is, there is no identity continuity.

Pure creation and termination events pertain to a single organizational entity, and correspond to the ‘birth’ and ‘death’ of organizations that result in changes to living populations. Populations of organizational entities change in other ways too, however, as numerous entities merge into one (and the population declines) or one entity splits into many (and the population grows). These events implicate either multiple predecessors (a merger or absorption) or multiple successors (a split or secession). A merger or absorption is a transition event that ends several organizational phases (the predecessors, or the entities being merged) and begins a single phase (the newly merged, successor entity). A split or secession is an event that ends a single predecessor phase and begins several successor phases.

The terms ‘merger’ and ‘split’ used here imply some kind of equality among the multiple phases that go into, or the multiple phases that result from, such events; however, the reality of bureaucratic reorganization does not always involve such balance. From our perspective, the absorption of one organizational entity by another fits into the same basic category as a merger because multiple organizational phases end and a single phase begins. The entity that is absorbed obviously ends but a significant or at least potentially significant event has occurred in the
event history of the absorbing entity and it is hence no longer the same entity. An absorption can be distinguished from a merger when the successor clearly resembles one (and only one) predecessor more than the other entity or entities involved in the transition (we operationalize this resemblance in the next section). There is thus continuity of the organizational identity from the absorbing entity to the new entity created but no such continuity for the absorbed entity or entities. Secessions and splits together form another category. A secession can be distinguished from a split when one (and only one) successor clearly resembles the predecessor, with the other(s) having seceded from the original whose organizational identity continues in a new phase. When an entity splits, its organizational identity does not continue in any of the succeeding entities. Thus, absorptions and secessions involve identity-preserving continuity for one of the transitioning entities while mergers and splits do not; in all cases, the new entities that result are not considered the same as the original transitioning entities.¹

As an example of a split, in 1998 at the German Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, the unit Bureau of the Minister directly subordinate to the minister split into two entities named ‘Head of the Bureau of the Minister’ and ‘Speeches’. While both units had the same predecessor, neither more obviously resembled the predecessor unit. There was thus no continuity of the identity of the original unit to either successor. Another German example from the Federal Ministry of Defence illustrates a ‘secession’. A task force seceded from the Organizational Staff unit in 2010. The organizational identity of the original unit continued in the newly created sub-directorate Central Matters because the latter contained more than half of the organizational subunits that existed in the former while only a small part was transferred to the newly created Task Force Reform of the Bundeswehr.

Transition events may implicate multiple organizational phases in ways that are more complex than single mergers and splits. In our framework, a reorganization is a transition event in which multiple predecessors end and multiple successors begin as parts of organizations are exchanged across two or more entities. The number of predecessors may be larger than, smaller than or equal to the number of successors as parts of entities are redistributed across the event. As in the case of mergers/absorptions and splits/secessions, each predecessor may have exactly one successor that most clearly resembles it, allowing for continuity between predecessors and successors across a reorganization.

For instance, the Dutch Ministry of Economic Affairs absorbed the Ministry of Agriculture in 2010 when the latter became a directorate-general (DG) in the former. Within this Ministry of Economic Affairs, many reorganization events with some elements of continuity had taken place since the 1980s. For example, in 1993, the DG Services, SMEs and Economic Order reorganized together with the DG Industry and Regional Policy into the DG Economic Structure and the DG Industry and Services. Instead of categorizing these two DGs as creations and thereby ‘new’ entities, we understand them as resulting from a reorganization of previously existing entities. This allows us to trace their provenance and history.
Finally, transition events may implicate a single organizational entity as that entity experiences minor changes to its tasks and competencies or changes to other characteristics while keeping these intact. These do not result in changes to the number of entities. For such transitions, an entity always retains its identity while other characteristics that the researcher regards as relevant change. These can include other potential sources of instability in organizational populations that are of substantive interest or significant attributes of entities that may change while tasks and competencies remain fixed. Each observation in our framework is an organizational phase bounded in time and any characteristics we use to describe an organizational entity (its name, level within the hierarchy, organizational type, etc.) are held constant within that phase. Changes within organizations to these characteristics are always registered using one-to-one transitions. Our approach allows for any such events (see more later).2

Taken together, the number of predecessors (phases that end as a result of a transition event) and the number of successors (phases that begin as a result of a transition event) define our event types. The number of predecessors may be zero (for pure creation), one (for pure termination, one-to-one transitions and splits) or two or more (for mergers and complex reorganizations); the number of successors may be zero (for pure termination), one (for pure creation, one-to-one transitions and mergers) or two or more (for splits and complex reorganizations). For each ideal type, it is possible to devise more specific types that detail the nature of the transition. In the data collection section, we describe the specific creation, termination and one-to-one transition subtypes used in SOG-PRO.

Hierarchical links

Given the importance of hierarchical order in the classic Weberian bureaucracy (Weber, 1946), a flexible framework for mapping the population of public organizations through their collective event histories must allow for the inclusion of organizational subunits and hierarchical relationships. We treat organizational subunits as we do any other entity, that is, as a phase bounded in time between transition events. To ensure cross-national comparability, we rely on generic location in the hierarchy (level) rather than country-specific names (direction, unit, etc.) to distinguish types of entity by hierarchical order. Entities with no superior organization (ministerial departments) are at the highest level in the hierarchy (level zero). Units one level below this highest level have a single superior organization at level zero; these are ‘level minus one’ units. This principle can be extended indefinitely until all organizational entities of interest are included (see Table 2, available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558)

Data collection

To illustrate the flexibility of our approach to complex hierarchical organizational structures, we apply this framework to the central state bureaucracies of France,
Germany and the Netherlands between 1980 and 2013. This period allows us to observe long-term developments within the public sector, including various administrative reforms linked to New Public Management (NPM) and post-NPM. Our sources are countries’ state almanacs, directories and organizational charts comprising the names of organizational entities, their positions in the hierarchy and the approximate (or, when possible, exact) dates that transitions occur. To apply this framework, one needs only the names of organizational entities, transition dates and, for multi-level organizations, an entity’s level in the hierarchy and the name of its parent entity. Data collection proceeds by assigning unique IDs to each entity, identifying transition types (including continuity) and relating entities to their predecessors, successors and parents using these IDs.

Virtually any hierarchical organization, including any organizational subunits, can be mapped with our approach. Regarding the entities that form our data set, we include ministerial departments and their organizational subunits at one and two levels below. As our aim is to map central state bureaucracies, we also exclude organizational (sub)units that perform operational and implementation matters (following the distinction by Gulick (1937)), like museums and universities. Similarly, if an organizational entity has separate territorial units (e.g. national police boards that are organized regionally), we do not code each separately.

We identify changes between the annual (or more frequent) reports of organizational structures based on the names and hierarchical positions of units. Differences in the denomination and/or hierarchical position of units indicate transition. In addition to all the transitions that involve changes to the number of units, we include as one-to-one transitions changes in entity name, hierarchical level and parent entity. To identify the continuity of organizational identity, we analyse the names of units and, if they exist, those of their subordinate units. We consider an entity’s identity to continue if more than 50% of its name and/or its subunits are similar to its predecessor.

To ensure a coherent application of the comparative joint coding scheme across coders and countries, all country teams participated in activities strengthening inter-coder reliability, including face-to-face meetings and Skype sessions across country teams. Both typical and unusual cases from all three countries were discussed to enhance the joint understanding and application of the coding rules.

Organizational phases and their transitions in three countries, 1980–2013

Figure 1 (available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558) shows the overall change in the population of ministerial units for each country. The upper solid line (with the scale on the left side and dotted trend line) shows the population of all organizational entities and the lower line (with the scale on the right) shows the number of ministries. The relative
position of the upper line for each panel allows for cross-national comparison of the size of these states’ bureaucracies in terms of the number of organizational entities.

In all three countries, the number of ministries slightly decreases, while trends in the overall population of entities vary. The number of units increases in Germany but decreases in the Dutch and French central bureaucracies. German intraministerial structures grow over time, resulting in larger ministries. The population of internal ministerial units peaks during the 1990s, resulting from both an increase in the number of ministries in the 1990s and the establishment of structures that supported the partial move of German federal ministries from Bonn to Berlin, completed by 1998. The Dutch case shows a small increase in the population of internal units in the mid-2000s. During this same period, the population of French ministerial units experiences its sharpest decline. This more pronounced decline in the population of French units can be linked to NPM reforms implemented from 2007 onwards, such as the Révision générale des politiques publiques (General Revision of Public Policies (RGPP)), inspired by the ‘expenditure reviews’ carried out in previous decades in Canada and the UK. Initially, the objective was to reduce public spending that was considered excessive by reviewing various government policies. However, the scope of RGPP quickly shifted towards efficiency and speed, reducing the number of civil servants, and changes in public human resources management (Bezes, 2010).

While population figures provide important insights into the overall size of bureaucracies, they provide only an incomplete picture of the extent and frequency of structural change. As argued earlier, populations may remain stable while considerable changes occur to organizational units. Table 3 (available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558) presents the frequency of each structural change transition type across time for each country. France has the largest number of transitions of any kind, and twice as many as the Netherlands. Although France has a larger bureaucracy than the Netherlands, the difference in the frequency of transitions between the two countries is not proportional to the difference in population size. The number of transitions in Germany is midway between the French and Dutch figures.

Turning to the different transition types, Table 3 shows that maintenance or one-to-one transitions are the modal category for each country. Events in which existing organizational units experience change(s) in their constituting variables while keeping their organizational identity are the most frequent types of change. In other classification systems, these events would have been either overlooked, not differentiated (but assigned to the broad category of maintenance events) or even perceived as terminations and creations. In four of the six categories, France and the Netherlands show remarkable similarity in relative frequencies – with the higher frequency of merger/absorptions in the Netherlands and the higher frequency of reorganizations in France being the exceptions. For Germany, transitions that include predecessors and thereby some continuity (maintenance, split/cession, merge/absorption and reorganization) constitute a majority of all transitions.
while in France and the Netherlands, creations and terminations form the majority, accounting for 58.6% and 57.9%, respectively, of all transitions. The relative share of ‘splits’ (one-to-many transitions) is more than twice as high in the German case compared to both the Dutch and the French cases, suggesting an increasing differentiation of the existing internal structure of German ministries over time.

Figure 2 (available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558) shows the annual number of transitions for each type for all three countries over time. In all three cases, the numbers of transitions show a few clear peaks or low points. Change activity in Germany increases beginning in the 1990s, including and likely resulting from the growth in the population of organizational entities described earlier. For France, there is a slight overall decline in the extent of structural changes from 1980 to 2013, as well as in the period from the mid-1990s to the mid-2000s. Interestingly, the Netherlands shows an increase in structural change while its overall population of entities declines, as indicated earlier. Together, these observations support the argument that population figures mask important and substantial structural changes to central state bureaucracies.

Our approach to mapping central state bureaucracies allows for insights into both aggregate populations and structural changes, as well as for the analysis of the event histories of individual organizational entities. The latter lies outside the scope of this article but Tables 4 and 5 (available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558) provide some basic characteristics of the lifespans of organizational entities. Table 4 shows key summaries of the lifespans of entities in the three countries, separated by level in the organizational hierarchy. For Germany and the Netherlands, the average lifespans of units one level below the ministry are longer than those of units two levels below the ministry; however, for France, the opposite is true. German units have shorter lifespans on average than Dutch ones. At one level below the ministry, German and French units have similar lifespans; however, at one level lower, French units have a longer average lifespan. When comparing the minimum lifespans, it is important to keep in mind that the German data sources provide more precise timings for transitions, and it is thus unsurprising that the shortest lifespans are observed there. No maximum lifespans are reported in Table 4 because for each level in each country, one or more units experienced no transitions of any kind for the entire duration under investigation and continue to exist. Table 5 (available online at https://journals.sagepub.com/doi/suppl/10.1177/0020852320964558) contains additional information about censoring: left-censored entities are those that already exist at the start of the observation period and right-censored entities are those that still exist at the end of the period.

Further research

This novel framework for describing structural changes in hierarchical organizations helps to bridge the gap between comprehensive mapping projects and event history
analyses. The design allows for cross-national comparisons of the central state bureaucracies of France, Germany and the Netherlands from 1980 to 2013. To conclude, we discuss some promising avenues for future research that the framework may facilitate. First, our framework can be linked to other mapping projects. For instance, the SOG-PRO data can be linked to existing data sets on structural changes in bureaucracies, allowing broader cross-national comparisons. Our approach can also be applied to map other hierarchical organizations over time, including sub-national administrations, supranational bureaucracies like the European Commission and the administrations of international organizations. By mapping a large variety of such organizations in a similar way, it will be possible to detect common trends in very different contexts and to explain cross-national and cross-organizational differences in structural change beyond these three country cases.

Second, mapping organizational change in this way can be used to analyse how reforms like NPM or post-NPM, political factors such as partisan ideology (Fleischer et al., 2018), or policy agendas influence the formal structure of central bureaucracies. By linking organizational change data to existing cross-national data sets collected over long time periods – such as the Parliaments and Governments Database (ParlGov) and the Comparative Agendas Project (CAP) – the framework can provide new insights into the determinants of structural change from a variety of political, administrative and external sources. The approach can also inform the literature on government reform and reorganization (e.g. Bach and Jann, 2010; Roness, 2001) to explore the effects of large-scale reforms on the trajectories of individual organizational entities and trends in structural change.

Finally, data on structural change generated from the SOG-PRO framework may also act as an independent variable. Various effects of the (changes in the) structure of central bureaucracies could be explored, including the influence of bureaucratic structures on policy outputs and outcomes, organizational performance, and the attitudes and actions of civil servants. Political and administrative actors initiate structural changes for a variety of reasons. Linking information about structural changes to data concerning their intended consequences would allow policymakers to assess the effectiveness of such changes. Moreover, policymakers will more easily identify sources of instability and structural changes that have been (re)adjusted in the past to avoid repeating failed experiments.

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**Notes**
1. The flexibility of the approach allows the researcher to combine entities that transition with continuity for a particular application should the situation demand a higher threshold for regarding entities as ‘new’.
2. The researcher can later combine any entities linked by one-to-one transitions should the researcher deem changes to particular variables irrelevant for a particular application or to allow for compatibility with other applications of the framework that use different one-to-one transitions.
3. The project codebook provides additional details and is available upon request from the authors.
4. We choose the end year of 2013 for comparability; individual country teams continually update their data sets.
5. For a detailed list of sources, see: [http://www.sog-pro.eu/sog-pro.html](http://www.sog-pro.eu/sog-pro.html)
6. For this article, we exclude defence ministries.

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