

**A Nomenclature and Classification System
for Antecedents of Public Policy Innovation
Trailblazing and Adoption Derived from a
Systematic Literature Review
– III**

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ABSTRACT

Terminologies and a classification system for antecedents of trailblazing and adoption of public policy innovation are developed from a systematic literature review (SLR) of 87 peer-reviewed publications. They presented an incoherent picture because there were so many antecedents. Consistency is brought to the antecedents by identifying similar antecedents and developing a nomenclature and classification system for them. At the level of 594 antecedents and 508 unique antecedents, they were not very similar, but grouped antecedents (28), factors (5) and clusters (3) were uncovered. They are named and organized into a hierarchical classification system, based on number of mentions in the literature. The classification system may be broadly applicable, including over time and should help scholars study public policy, innovation, transfer and relationships among them. While the literature assumed its antecedents were applicable to all groups, this was not tested for sub-groups.

Key words: Public policy innovation, antecedent nomenclature, antecedent classification system, systematic literature review

Introduction

Antecedents are determinants/variables influencing adoption of public sector innovation. They occur before each stage of adoption and influence the stages (Glor, 2014). We treat adoption as different from diffusion: it is the act of adopting not the spread. This paper explores whether a terminology and classification system for antecedents of trailblazing and adoption of public policy innovation can be developed from a systematic literature review (SLR). If so, they may be useful for public policy innovation and diffusion and facilitate exploration of relationships among them. While public policy innovation has not been addressed a great deal in the public policy literature, it has been in the innovation and public administration literature. This paper argues that these phenomena are related and that the antecedents identified could be relevant to them all.

Policy innovation has been addressed as innovation diffusion in economics (for example [e.g.] Schumpeter, 1942); sociology and communications (Rogers, 1995); political science and public administration (Bloch, 2011; Bekkers, Tummers, Stuijzand and Voorberg, 2013; Arundel, Bloch and Ferguson, 2019); public policy (Berry and Berry, 2018) and trailblazing (Glor, 1997; 2014b). Often scholars seem unaware, however of work in other literatures.

Study of trailblazing requires knowledge of the stages of adoption. Innovation stages have been referenced in several literatures but in different ways. Rogers (1995) identified five stages of innovation adoption—innovation (invention), early adoption, early majority, late majority and laggard adoption (Rogers, 1995: 252-280). The inventors and early adopters are the most innovative and the trailblazers. Rogers' adoption stages are ordinal, ranked and require ordinal data; the stage time periods are different for different innovations; nonetheless, adoption is also cumulative. Here, the five stages are compressed into two: trailblazing (invention, early adoption) and dissemination/diffusion (used interchangeably) (early majority, late majority, laggard stages). The term adoption describes all five stages. While most scholars focus on diffusion by individual organizations, this paper addresses trailblazing and adoption within a population or community. A *government's population* is a group of governments with similar mandates; e.g. USA state governments; European Union members, South Pacific countries. A *government's community* is the group of governments to which the government compares itself and/or with which it works on an issue, e.g. Saskatchewan's community for its five income security innovations, 1971-82 was the Government of Canada (GoC) and progressive Canadian provincial and American state governments (Glor, 1997). An *innovation's community* is the groups and individuals interested in a particular issue (e.g. inequality, taxes). A *policy innovation's community* could be, e.g. an interest group, political/organizational supporters and portions of the public needing/promoting the innovation (Binnema, Michels and 't Hart, 2020); professional communities and/or networks. Sometimes, when governments announce the adoption of innovations, they refer to their ranking in these populations and communities to help legitimize the adoption. Trailblazing is defined empirically here, as the first, second and third adoptions; e.g. five Nordic governments invented (first) 20 – 30 percent of innovations identified in a survey of public servants (Bloch and Bugge, 2013); the Saskatchewan government 1971-82 trailblazed 126 policy innovations in its population of USA and Canadian governments and in the innovations' community of progressive sub-national states (Poel, 1976; Glor, 1997). Some policy innovation literature has identified the order in which innovations were adopted; e.g. Collier and Messick, 1975; Poel, 1976; Glor, 1997, 2018: 7; Colvin, 2006. Saskatchewan 1971-82, e.g. could be considered an innovative government because it trailblazed 126 policy innovations in 11 years.

When authors define innovation instead as new to the organization adopting it (e.g. Schumpeter, 1942; Bekkers, Tummers, Stuijzand and Voorberg, 2013), this is diffusion. Order of adoption is not usually considered in the diffusion literature, only whether an innovation was adopted (yes/no) and the data is nominal. Nominal data only requires a nomenclature, not a classification system. Pressure may be exerted on governments to adopt innovations by: surveying whether the innovation has been adopted (yet); encouraging politicians and public servants to be "innovative," with the implication that this is positive, progressive/necessary; and providing ways to measure and rank innovativeness through these measures (e.g. OECD/Eurostat, 2018). This literature does not identify which governments trailblazed. Some research identifies the some of the order of diffusions (e.g. first: Colvin, 2006; Bloch and Bugge, 2013).

The potential. If a common nomenclature and classification system could be developed for antecedents of policy innovation and adoption, regularities in several fields might be better recognized and unnecessary differences reduced (e.g. policy transfer, dissemination). Fields might then learn more effectively from each other. Using data from a SLR of antecedents of public policy innovation and adoption, this paper attempts to develop a nomenclature and classification system for them. SLRs are considered a powerful way to summarize findings in literature. The paper then discusses the potential for using this nomenclature and classification system in the public policy field. The study of antecedents of public policy innovation adoption has a language problem: many different names have been used for them, they are often undefined, and no author has previously explored the uniqueness and meaning of the antecedents overall. A ***nomenclature*** would use consistent terms to describe antecedents and would facilitate comparisons. A ***classification*** would catalogue them according to shared qualities or characteristics; it requires categorization.

The SLR discovered 87 publications that addressed antecedents of trailblazing or adoption of public policy innovation and identified many antecedents—594, of which only 86 terms repeated. The 508 unique antecedents are too many to grasp or manipulate. Using the SLR data, an attempt is made to create a vocabulary for antecedents of trailblazing and adoption of public policy innovation, to create a clearer picture of influences and types of influences reflected in the literature. A nomenclature and classification system would likely to be of interest to both scholars and practitioners of public policy innovation.

Literature on policy innovation trailblazing and adoption in a government, population or community was considered. Following economic definitions, innovation is often defined in the public (government) sector (government departments and corporations) as new to the organization adopting it. ***Trailblazing*** is new, implemented public policies adopted for the first, second or third time in a government's or innovation's community or population and is an improvement (Glor, 1997: 3-4). To put *new* in perspective, the study of innovation in five Nordic governments found 20 – 30 per cent the innovations were first (Bloch and Bugge, 2013); in the 126 Saskatchewan policy innovations, public servants and elected officials identified 115 as first, 9 as second and 2 as third to be introduced in its population (Glor, 1997). The term *adoption* is used here when the author used it and the publication did not distinguish its stages, thus presumably including some trailblazing. Every history of diffusion includes a few trailblazers. The literature on policy diffusion/dissemination was not examined unless trailblazers were identified. The trailblazing literature must have, at minimum have identified the first adoption (e.g. Bloch and Bugge, 2013; Colvin, 2006).

Innovation Typologies. Some innovation typologies are already in use, based on *theories*, *types of innovation delivered* (e.g. services), stages of the innovation implementation process (e.g. approval, implementation), context (e.g. large/small organization, good/poor economy) and stages of innovation adoption (e.g. invention, early adoption). The term stage has been used to study two of them but how the term stage is being used has sometimes been confused, between stages of the implementation process and adoption stages. Nomenclatures and classification

could be organized accordingly. The nomenclature and classification developed here considers theories, stage of adoption, and antecedent level but not type or process stages.

Theories. Both circumstances (antecedents, functionalist theory) and will (politics, motivation, non-functionalist theory) are important (Glor, 2002). Influences have been studied, guided by structuralist/functionalist and interpretive/constructivist theories. Burrell and Morgan (1979) and Gioia and Pitre (1990) identified four paradigms (theories) for study of organizations: interpretive, humanist, structuralist and functionalist. Interpretive theory considers case studies in depth and develops theories inductively from them. Humanist theory studies people; describes, critiques, and seeks to change. Structuralist theory identifies sources of domination and persuades in order to guide practices. It focuses on domination, alienation, macro forces and emancipation and includes institutional theory. Functionalist theory searches for regularities, tests in order to predict, controls and maintains the status quo. Functionalist theoretical interests are relationships, causation and generalization; theory-building occurs through causal analysis. This presents a problem for the study of antecedents of innovation, since the typical theory employed—functionalist—does not encourage change. Burrell and Morgan's theories helped create a conceptual framework for studying impacts of innovation on organizations, populations and communities. They can also be used as a framework for researching the impact of antecedents (Glor, 2014b, 2018). Pollitt (2002: 481-2) divided organizational theories into two, functionalist and non-functionalist. Functionalist theories, emphasizing efficiency, environmental fit and a focus on results, include institutional economics (principal agent including New Public Management and property rights [privatization, corporatization, contracting-out, performance pay] and contingency theories (logic of efficiency, adaptation to environments through learning). Pollitt called non-functionalist theory social constructivist or interpretive/hermeneutic, strongly shaped by a logic of appropriateness. Constructivist theories emphasize institutional path dependency, legitimacy, symbolism and fashion, and argue the evolution of organizations cannot be explained solely by functional factors or utility maximization. Interpretive theory analyzes phenomena. In this paper Pollitt's two types of theory are used: structuralist and functionalist theories are functionalist, interpretive and humanist theories non-functionalist. Theory was rarely discussed, however, in the antecedent literature reviewed.

Type of innovation delivered. SLRs are standard practice for clinical studies. Some frameworks and definitions, though no protocols have been developed for SLRs in the field of public sector innovation studies (e.g. Bloch, 2011; Bekkers, Tummers, Stuijzand and Voorberg, 2013; Glor, 2014b; Arundel, Bloch and Ferguson, 2019). The Oslo Manual 2018 (OECD/Eurostat, 2018), previously used for guiding business innovation surveys, claimed for the first time to include the economic aspects of non-profit, public sector and individual household innovation. The Manual's focus is diffusion of innovation in a company or organization. Only empirical references were used, all from the pilot OECD-sponsored Measuring Public Innovation in the Nordic Countries (MEPIN) project (Gault, 2018; Windrum, 2008; Bloch and Bugge, 2013). All use a taxonomy based on what the public sector delivers—service, service delivery, administrative and organizational, conceptual, policy, and systemic innovation (Windrum, 2008: 8; Buchheim, Krieger and Arndt, 2020). The measures are economic (Gault, 2020). Basically, the original private sector definitions were extended to the other sectors, with the addition of policy. Standards have not been published.

Implementation process stages literature has considered antecedents, often at the point when a decision to adopt is taken. Non-functionalist approaches have explored social, political and historical antecedents in some detail; functionalist approaches have considered potential causes of innovation and often several innovations. Empirical literature mostly studied diffusion in USA states (e. g. Berry and Berry, 1992) or among several governments (e. g. Glor, 1997), but studied a limited number of antecedents at a time. Interpretive and humanist literature often studied one or a few case studies and a few more antecedents (Glor, 2021c). Both approaches revealed the importance of antecedents. Their work isolated antecedents across many situations and theories and identified many antecedents.

Rogers (1995) described the stages of the innovation implementation process. Based on his, Glor (1998) described them as readiness, negotiating approval, effective implementation, focus on results, learning and innovation and organizational fate (Glor, 2011). The process stages approach fell out of favour with some policy scholars for a time; e.g. Sabatier (2007, 2014) criticized it and dropped the 1999 chapter on process stages from his 2007 edition of *Theories of the Policy Process*. A process stages approach has recently been rejuvenated in somewhat different form, including as part of the multiple streams and first and second order mechanisms approaches in policy studies (e. g. Capano and Howlett, 2020: ch. 3, 6, 8, 9).

Stages of innovation adoption in a government. Literature reviews of antecedents of public sector innovation have been done on broader topics than the one reported here. Bekkers et al (2013); Bekkers, Tummers and Voorberg (2013); and de Vries, Bekkers & Tummers (2016) (the LIPSE¹ scholars) reviewed antecedents of all stages of policy adoption—mostly diffusion but presumably also some trailblazing. A consistent group of “factors” influence social innovation (public sector, non-profit and for-profit sectors delivering social innovation): their highest level included innovation environment, the process and whether the innovation diffused.

Stages of innovation adoption in a population/community also create a typology. Rogers’ (1995) five stages of adoption are compressed here into two: trailblazing (invention, early adoption) and diffusion (early majority, late majority, laggards). This paper then develops a nomenclature and classification system for antecedents of trailblazing and adoption, based on those found in a SLR of trailblazing and adoption Papers on adoption identified their work as adoption and did not identify it specifically as diffusion.

Antecedent levels. The innovation literature uses antecedent problematically—merging more than one logical level; e.g. Bloch & Bugge (2013) identified “lack of funding” and Mohr (1969) identified “strength of obstacles against” as antecedents but the first is more specific than the second, which is at a higher logical level. Merging different logical levels (levels of generality, nesting) means the antecedents identified in the literature cannot be compared directly. To remedy this problem, unique antecedents are organized into levels.

The literature. The approaches used in the literature are not always identified but they are revealed by the antecedents considered important. By finding antecedents in the literature;

¹ Project Learning from Innovation in Public Sector Environments, LIPSE.

analyzing them into grouped antecedents, factors and clusters; and following a logical, rational process, what scholars consider to be important antecedents of trailblazing and adoption of public sector innovation is inductively revealed. Historically antecedents have been identified in a substantial amount of public policy innovation literature.

The literature identifies many antecedents, often using the terms antecedent and factor interchangeably to describe phenomena occurring before an innovation is introduced and thought to influence trailblazing and adoption but it does not do so systematically. The terms used by authors for antecedents are not always very informative. The term barriers, e.g. is vague. While it and other antecedents allow classification of the type of phenomenon, they create little understanding of the circumstances, what occurred or how the antecedents influenced trailblazing and adoption. Bowker and Star (2000), using an interpretive approach, recommended much more thorough explorations of issues in order to classify them. Nonetheless, antecedents are of different kinds. This paper assembles and analyzes the antecedents into categories.

Antecedents and classification. Some literature groups antecedents, e.g. using such terms as environment/context/ institutions/political culture/organizational culture but they are usually presented individually and not organized or categorized. The factor context was mentioned frequently. It includes such antecedents as history, previous crises and the time period during which an innovation was considered. Societal conditions and social context could be important but were little studied as influencing adoption, more as influencing trailblazing. Berry and Berry (1990), e. g. described one of their two hypotheses about state lottery diffusion as the cluster economic, social and political characteristics of the jurisdiction (U.S.A. state), but almost all considered “internal” determinants of innovation.² The institutional context was also considered important, especially by the institutionalists and neo-institutionalists. While the institutional environment should be examined, institutions also help construct the broader environment for policy innovations. The grouped antecedent barriers/obstacles/pull and demands/push/drivers were also mentioned generically (push and pull were not used consistently). Citizen collaboration/participation, was mentioned frequently, with a focus on citizens’ and users’ roles.³ Using data from the SLR, a nomenclature (body/system of names) is created and classified into independent individual antecedents, grouped antecedents, factors and clusters, thought to influence the dependent variable of policy innovation trailblazing and adoption.

Critics of the antecedents/variables approach, such as historical institutionalists (e.g. Hacker, 1998, non-functionalists) have suggested that policies are not best studied through variables. They saw measures of variables as one-shot (at one point in time), and thought issues influencing policies should instead be examined over time. They suggested variables miss the history of issues and organizations. Study of antecedents is not all, however, one-shot (e.g. Glor and Ewart, 2016; Glor, 2017a, b; 2018, 2019). Despite the need to study the history of antecedents, the stages of the innovation process occur at specific points in time and are affected by the antecedents extant at that time: Stages and antecedents should remain of interest. Glor’s

² The grouped antecedent societal conditions/social context was sometimes identified as a factor in the literature.

³ Chen, Walker and Sawhney (2016: Table 2) created a classification system for public innovations, based on focus and locus. Focus included strategy, capacity and operation; locus included intra- and inter-organizational innovation. Policy innovation was seen as strategic and inter-organizational.

(2017a) instrument, e.g. dealt with the time problem by taking two snapshots of antecedents, at the time of trailblazing and again at the time of fate, and addressed some issues that changed over time, such as political and social antecedents. Moreover, text discussed historical issues. Time need not be lost when studying antecedents.

Practitioners and scholars have identified so many antecedents of trailblazing and adoption of public policy innovation that the sundry antecedents do not paint a clear picture—antecedents need a nomenclature and a classification system for this reason as well. Analyzing the 594 antecedents into a nomenclature and classification system should allow clearer picture of what authors consider key antecedents and apt comparisons.

This paper develops a nomenclature and classification system as follows. *First*, this introduction discussed the theoretical bases of the literature collected; the ways the term stage, antecedent and other key terms have been used; distinctions made and the current state of terminology and classification for policy innovation. *Second*, the paper's methodology is outlined. *Third*, results are outlined, necessary questions are answered, and a nomenclature and classification system are developed. *Fourth*, the results are discussed and interpreted, followed fifth by *conclusions*.

Methodology

This section discusses sources of data, SLR search strategies, more definitions, challenges, process for grouping the antecedents and validation.

Sources of data. The data was collected in a SLR of antecedents of trailblazing and adoption of public policy innovation. Literature mentioned antecedents of trailblazing of public policy innovation or included all types of adoption as one phenomenon and therefore presumably included some trailblazing, as well as diffusion/dissemination (Glor, 2021b). It included quantitative and qualitative literature.

Search strategies. The search for literature was conducted in three phases. In phase 1, the known public policy innovation literature was reviewed for antecedents and references likely to include antecedents of trailblazing or adoption of policy innovation. Probable literature was read. In phase 2, a SLR was conducted by searching JSTOR, ResearchGate, Google Scholar, Microsoft Academic, ICIImago's 10 highest-ranked public administration journals, *Canadian Public Policy* and *Canadian Public Administration*, but only a few new articles were found. In phase 3 a few additional articles were traced as the paper was researched further. More search details are available in Glor (2021a). The search criteria were (1) articles, reports, chapters, books, (2) public sector, including government, state agencies and state-owned enterprises; (3) policy (including programs), (4) innovation trailblazing/adoption and (5) antecedents identified. An item was only retained in the review if it met the eligibility criteria.

The SLR identified 594 antecedents in 87 publications discussing antecedents of trailblazing or adoption, usually undefined. Trailblazing was studied in 21 documents, adoption

in 66. Using that data, I analyzed the antecedents and developed a nomenclature and classification system, using the authors' terminology. Antecedents were classified into domains—unique and grouped antecedents, factors, clusters; ranked by number of mentions. Factors were compared by what proportion of mentions they represented within and across clusters. Antecedents were mentioned much more in some clusters than others. From the analysis and groupings, a nomenclature and classification system were formed. Six research questions were addressed in doing so—they are common questions asked when considering and attempting to name and classify phenomena (biological classification is best known). The public policy literature sometimes treats antecedents as specific to the phenomena under study; only by aggregating phenomena at a more general level can they be compared to other related/different phenomena (Glor, 2018, 2019). The lowest level of a classification is most specific, the highest most general.

More Definitions. See Glossary.

Challenges. Bowker and Star (2000) identified three main challenges in creating a classification scheme—comparability, visibility and control. Creating comparability is a purpose of this classification system. Visibility is clearly a problem; e.g. *The Innovation Journal*, which has published the most articles on public sector innovation was often missed in literature reviews. Control is exercised by those developing, approving and using a classification system. Additional challenges are discussed in Glor (2021a: 10-11). The main challenge addressed here is to clearly distinguish the types of antecedents: Most authors did not draw distinctions among them. Most problematically, antecedents were not all at the same logical level and antecedents were often grouped in the literature (e.g. motivation to innovate, process for developing a political platform). The current effort attempts to classify what the authors said, not to reclassify them according to a pre-defined scheme.

Analysis process. The antecedents were analyzed manually by the author⁴ into unique and grouped antecedents, factors and clusters; they were analyzed three times—at each stage of the research. This is *internal evaluation*.

Validation. The antecedents were also evaluated *externally*. External evaluation takes two forms: (1) direct approaches such as comparing the clustering to an existing "ground truth" classification (not possible as this is original work) and "manual" evaluation by a human expert, (2) indirect evaluation by evaluating the utility of the clustering for its intended application; e.g. analyses, coding surveys (https://en.wikipedia.org/wiki/Cluster_analysis). Manual evaluation was done by a human expert, myself. Validity was improved by finding a large number of publications and by having an external evaluator attempt to replicate the classification. The external evaluator only had access to the antecedent words: he successfully replicated the classification methodology but not the classification system.⁵

⁴ The author is an expert in public policy innovation antecedents, having worked extensively on developing and implementing, researching and publishing on public policy innovations for many years.

⁵ Many thanks to David Barrows for performing this time-consuming external evaluation.

Results

This section answers necessary questions and presents the results.

Table 1: Ranked Grouped Antecedents, Factors and Clusters Ranked Vertically by Number and Percentage of Mentions in a SLR of Public Policy Innovation Trailblazing and Adoption*

External Cluster No. & % of Antecedents	Political Cluster No. & % of Antecedents	Internal Cluster No. & % of Antecedents
Governance environment/context-32 External environment/Context-25 Institutions-17 Influence of other governments-6 Factor external context T=80 46.8%	Politics-24 Ideology-17 Political Support-10 Drivers/demands-6 Factor political drivers/demands T=57 47.9%	Innovation Process-70 Structure-42 Factor policy/process T=112 36.8%
Citizen pressure-50, 29.2% Factor people T=50, 29.2%	Political culture-28 (The) Political-6 Factor political context T=34, 28.6%	Problem, creativity, ideas-50 Demand/drivers/push-32 Enhance capacity to innovate-13 Factor drivers T=95, 31.3%
National/state innovation policy-17 Factor policy T=17, 9.9%	Political Actors/People-22 Factor people T=22, 18.5%	Other people-21 People only-16 People/employees/staff/individual characteristics-3 Factor people T=40, 13.2%
Demands/push/drivers//external support/good economy-13 Factor drivers T=13, 7.6%	Political Barriers/obstacles-3 Factor obstacles T=3, 2.5%	Barriers/pull/obstacles-29 Factor obstacles T=29, 9.5%
Barriers/obstacles/pull-11 Factor obstacles T=11, 6.4%	Platform inclusive, included in political platform-3 Factor process for building political platform T=3, 2.5%	Organizational culture/climate-25 Internal only-3 Factor internal context T=28, 9.2%
Other 0	Other 0	Other 0
171 99.9%	119 100%	304 100%
No. of grouped antecedents: 8	9	10 T=28

Notes: Percentages for factors are of the grouped antecedent totals. The last row is column totals. No.=number. Total Antecedents=594, 508 unique antecedents. *An attempt was made to find all trailblazing literature; adoption literature is limited to literature that does not indicate it is about diffusion. Adoption is nominal, adoption data ordinal.

Q. 1: Are consistent groups of antecedents of trailblazing and adoption of public policy innovation found in the literature?

The SLR found many kinds of antecedents, at different levels of generality. Across the literature, the terminology used was not clearly distinguished. Authors mentioned what I consider to be groupings of antecedents, factors and clusters many times. The literature sometimes also used the term factors for what we call antecedents. To the extent possible, terms used in the literature were generally used. To answer Q. 1: Consistent groups of antecedents of public policy innovation were not identified in the literature.

Q. 2: Can consistent groups be created?

Some authors generalized their antecedents considerably, e.g. calling them drivers rather than identifying particular drivers. Because the 508 unique antecedents/grouped antecedents were too many to address individually, these amorphous findings were analyzed systematically into grouped antecedents. To answer Q. 2: It was possible to create consistent groups.

Q. 3: Can a nomenclature be created? Can the antecedents be categorized?

What is a nomenclature? The objective of a nomenclature is to minimize within-group variance and maximize between-group variance. The nomenclature was created following Larsen (2003), who offered two approaches: (1) A content analysis is conducted of the terms used in the literature, including the step of multidimensional scaling. In this quantitative approach, within each concept, proximity to a focal concept is identified and all other related and opposite concepts are measured in comparison with it, using cluster analysis. In creating a nomenclature for factors underlying success of organizational information systems, Larsen focused on internal cluster and only considered quantitative literature. The current study of trailblazing and adoption and its published data includes both quantitative and qualitative literature and so does not lend itself to Larsen's first approach. (2) The analyst searches for similarities in the antecedents identified and for overlaps in antecedents identified in different publications. The second approach was followed.

The analysis. The analysis of *unique antecedents* (508) produced a 2-column, 6-page, single-spaced table that included all the antecedents, identified the number of times each unique term was used, and allocated them to grouped antecedents and clusters (available on request). Sometimes the literature used the same terminology for antecedents a number of times, in other cases I judged what was related/similar terminology. The original authors' intentions were considered. When more appropriate, I summarized the literature using their terminologies (e.g. citizen pressure/role). This new nomenclature grouped them (Table 1) into a vertically logical hierarchy of 508 unique antecedents; 28 grouped antecedents; 5 factors; and 3 clusters.

Categories. The unique antecedents were analyzed into the nomenclature of 28 related *grouped antecedents*, using terminology from the literature or that I developed. *Factors* categorize grouped antecedents and apply to all three clusters. Examples were analyzed for each cluster, to assure the classification system worked. Within external cluster a collaborative governance example was analyzed; within political cluster, a US lotteries example; within internal cluster, an NPM and a health sector case study.

The grouped antecedents were analyzed into *five factors* applicable to all clusters, named context, policy/process, obstacles, drivers and people. Factors were named similarly across the clusters because similarities were found in factors across the clusters (Table 2). Larsen calls the results of this analysis concepts, not variables, to emphasize that concepts no longer have operationalizations connected to them. In Table 1 factors are ranked from most to least mentioned within each cluster; in Table 2, percentages are calculated across clusters.

Table 2: Factors by Grouped Antecedents and Three Clusters Derived from a Systematic Literature Review of Antecedents of Trailblazing and Adoption of Public Policy Innovation

Factors	Clusters			Factor Total # mentions, %
	External No. & % of Antecedents	Political No. & % of Antecedents	Internal No. & % of Antecedents	No. & % of Antecedents
Context	Governance environment/ context-32 External environment/ context-25 Institutions-17 Influence of other governments-6 Factor external context T=80, 56.3%	Political culture-28 (The) Political-6 Factor political context T=34, 23.9%	Organizational culture/climate- 25 Internal only-3 Factor internal context T=28, 19.7%	142 23.9%
Across				99.9%
Drivers	Demands/push/ drivers//external support/good economy-13 Factor drivers T=13, 7.9%	Politics-24 Ideology-17 Political Support-10 Drivers/demands-6 Factor political drivers/ demands T=57, 34.5%	Problem, creativity, ideas-50 Demand/drivers/push-32 Enhance capacity to innovate- 13 Factor drivers T=95, 57.6%	165 27.8%
Across				100.0%
Obstacles	Barriers/obstacles/pull-11 Factor obstacles T=11, 25.6%	Political Barriers/obstacles- 3 Factor obstacles T=3, 7.0%	Barriers/pull/obstacles-29 Factor obstacles T=29, 67.4%	43 7.2%
Across				100.0%
Policy/ Process	National/state innovation policy-17 Factor policy T=17, 12.9%	Platform inclusive, included in political platform-3 Factor process for bldg. political platform T=3, 2.3%	Innovation Process-70 Structure-42 Factor policy/process T=112, 84.8%	132 22.2%
Across				100.0%
People	Citizen pressure-50, 29.2%	Political Actors/People-22 Factor people T=22, 19.6%	Other people-21 People only-16 People/employees/staff/individu al characteristics-3 Factor people T=40, 35.7%,	112 18.9%
Across				99.9%
Other	0	0	0	0
Total an- tecedents	171 100.1%	119 100.0%	304 100.0%	594 100.1%
Across	28.8%	20.0%	51.2%	100.0

Notes: Horizontal lines separate the factors; T=total; antecedents include a few duplicates; some percentages add to more than 100, due to rounding.

To create hierarchical, related categories, the antecedents were categorized at four levels, from most specific to most general: (1) unique antecedents (e.g. civics education); (2) grouped antecedents (e.g. governance environment); (3) factors (e.g. drivers, people); (4) clusters (external, political, internal). Table 1 reflects the analysis; identifies the categories and ranks them by: numbers of mentions; factors (horizontal table lines and clusters (vertical table lines). It was possible to analyze the 508 unique antecedents into categories (Table 1). The single nomenclature principle used for them was that they were influences on trailblazing and adoption

of policy innovation. To answer Q. 3, it was possible to categorize the antecedents and grouped antecedents.

While each factor played a role in every cluster, importance of the factors (most antecedents) was different across clusters. Some were similar (Table 3). People were consistently ranked in the middle and obstacles consistently low in importance in the literature; people and obstacles never ranked most important factor. Two factors ranked first—context and internal process. Context, policy/process and drivers ranked differently among the clusters. Context was an important factor in two clusters but very low in the third. Drivers ranked quite high for political and internal cluster but quite low for external cluster: the need for an innovation did not seem to be felt in terms of drivers and obstacles. These rankings provide some support for the theory that there are clusters, because they score differently (Table 2). Internal cluster embodied the most grouped antecedents, political the least, Political cluster represented 20 percent of the unique antecedents, external 28.8 percent, internal 51.2.

Table 3: Ranking of Percentage of Clusters by Factor for Trailblazing and Adoption

Factor:	Rank within External Cluster	Rank within Political Cluster	Rank within Internal Cluster
1. Context	1	1	4
2. People	2	3	3
3. Drivers	5	2	2
4. Policy/process	3	5	1
5. Obstacles	4	4	5

1=highest

The 28 grouped antecedents were analyzed into factors and clusters successfully. The same terminology could be used for the factors across the three clusters, with the exception of policy/process—which includes two different phenomena, policy and process. They were combined because the processes are performing functions similar to policy within internal and political clusters (guiding them), are setting the rules and have grouped antecedents in common. While internal processes were often governed by administrative policies, this was not expressed in the antecedents or the literature. To answer Q. 3: A nomenclature for antecedents of policy innovation was created; the unique antecedents were categorized into factors and clusters. Creating a nomenclature is an accomplishment. Can a classification system also be created?

Q. 4: What methodology and rules should be used to develop a classification system?

Whether the distinctions among the categories are sufficiently clear to create an effective classification system depends in part on the information published by the original authors, who used a variety of descriptors. Ones that seemed similar were grouped here, e.g. political culture and the political.

An appropriate methodology and criteria were needed. Two basic types of classification systems are used. A *monothetic system* pertains to or is based on a single basic idea or principle. It is based on the presence of all of a set of attributes. It has been described as Aristotelean

(binary, present/not present) or a comparison to prototypes that has a single set of necessary and sufficient conditions. This describes dissemination but not the other phenomena. A *polythetic system* has many but not all properties in common. In biology it is a taxon where constituent organisms share a large number of characteristics (<https://en.wiktionary.org/>). The polythetic approach fits study of adoption stages and their antecedents.

In cognitive science, Bowker and Star (2000: 60-64) described a type of polythetic system as *prototype theory*. Wikipedia defines it, as they did, as a mode of graded categorization, where some members of a conceptual category are more central than others. Prototype theory suggests that observers have a broad picture of the antecedent groups in mind and are able to extend that picture by metaphor and analogy when deciding if something counts in one of the categories. Although I(we) have defined trailblazing in an empirical way, many adoption authors reviewed did not. This challenge may help to explain why they do not define innovation and also why they use the term “adoption,” which is binary. For this literature, prototype theory had to be used to define each category in the classification system. Number of mentions of an antecedent is treated as indicative of its centrality (importance).

Antecedents that are at boundaries are called boundary objects by Bowker and Star and others. Based on their number of mentions, grouped antecedents such as political barriers/obstacles and their factor obstacles would be considered of peripheral importance in the literature. No articles referred to antecedents as boundary objects, however, nor were any articles found on the antecedents of e.g. PPP but this could be a topic for future study.

Rogers (1995) identified three principles of (criteria for) categorization: exhaustive, mutually exclusive and derived from a single classificatory principle. Bowker and Star identified this as monothetic. *Exhaustive* means all the possible antecedents are included (Bowker and Star’s “complete”). This paper includes all the antecedents found in a thoroughgoing search but we do not know whether all published antecedents were found. Encouragingly, the second and third searches found few new references. All antecedents were classified: 598 antecedents are probably a sufficiently large number to form the basis for a classification system. The purpose of a SLR is to be complete and we are confident we came close. *Mutually exclusive* was achieved in this SLR but the antecedents were rarely defined or analyzed. A single classificatory system is not required in a polythetic system.

Bowker and Star defined classification as a spatial, temporal or spatio-temporal segmentation of the world and a classification system as a set of metaphorical or literal boxes into which things can be put. They used the terms single categories or single classes of categories. Only five antecedents (0.8 percent of the antecedents) identified here fit more than one category. Bowker and Star acknowledged most classification systems have some.

Nomenclature and classification are often confused. A nomenclature is the body or system of names in a particular field. Data is nominal. A classification requires and uses a stable system of classification, based on classificatory principles. In the literature, antecedents of trailblazing and adoption of policy innovation did not have an agreed-upon nomenclature or classification system, probably a reason authors identified so many antecedents and used so many terms for

them. Pragmatically, Bowker and Star acknowledged: anything consistently called a classification system and treated as one is one. Antecedents, unique antecedents, grouped antecedents, factors and clusters are called and treated as a classification system here.

The criteria (rules) used for the classification system are (1) exhaustive (the search for antecedents found a large number of antecedents; three searches were conducted—the second and third found few new items); (2) mutually exclusive: only five of 594 antecedents were categorized in more than one grouped antecedent, “other” was not needed; (3) derived from a single set of 28 grouped antecedents, five factor and three cluster boxes. To answer Q. 4: Rules were identified, a polythetic system seemed appropriate and further analysis might occur through a prototype system. Criteria were identified.

Q. 5: Can the antecedents be classified into a hierarchical classification system? If so, what should be included in the categories?

Although authors were not consistent with each other, it was possible to categorize and rank their antecedents into a hierarchy of unique antecedents, grouped antecedents, factors and clusters and a consistent classification system. It has also been possible to classify other aspects of innovation, such as: type of innovation (policy, public administration); type of organization (department, state corporation, administrative tribunal); adoption stage (trailblazing, diffusion, fate); innovation process; innovation in sectors (public, non-profit, private sector). Scholars have, however, sometimes had trouble using these classifications. This classification worked. The grouped antecedents and how the factors were derived are provided in Table 1; comparable factors by cluster in Table 2. Listed vertically, factors are context, policy/process, drivers, obstacles and people. Listed horizontally, the clusters are external, political and internal. These concepts may help understanding of trailblazing and adoption of policy innovation. Unique antecedents are Level 1; grouped antecedents Level 2, indicated by boxes; factors Level 3, marked by horizontal lines; clusters Level 4, marked by vertical lines. Individual factors are ranked within clusters by importance, defined as most frequently mentioned in Table 1. In the literature, authors sometimes used the same or similar language for antecedents, grouped antecedents and factors.

Numbers of grouped antecedents within factors were not comparable, however because so many more antecedents were identified for internal cluster than for the others. Based on numbers, every factor was most important in internal cluster. Consequently, instead of numbers, factor percentages within its cluster were calculated vertically (Table 2) and compared across clusters. External context and people (citizens) were the most important factors in external cluster; drivers and context in political cluster; process and drivers in internal cluster (Table 1).⁶ An unexamined question is whether the least important factors might be boundary objects. While the factors context and drivers were most important based on their ranks within two clusters, only drivers ranked high (high=ranks 1 and 2, Table 3) in internal cluster. Likewise, process was much more important in the internal cluster than process in political or policy in external cluster. Factors ranked differently across clusters. Only people (medium) and obstacles (low) ranked relatively consistently. This is evidence for factors and clusters being different from each other.

⁶ This allows factors with few mentions within a cluster to reveal their importance to the cluster.

Clusters, Level 4, the highest level of the classification, are large and general groupings and only three in number. Inclusion of a political cluster is somewhat unusual and has been treated inconsistently in the literature. Berry and Berry (2018) included politics as part of their internal cluster (the jurisdiction) but the LIPSE scholars included it in their innovation environment (external) cluster. Berry and Berry (2018) used the terms internal and external, but defined them differently. We define internal as internal to the government and include political as a separate cluster because of its importance to policy. Table 4 follows a unique antecedent—political risk avoidance—through the classification levels.

The internal cluster had more antecedents (304) than external (171) and political (119). If necessary, political cluster could be considered part of the external environment; if it was, there would be 290 external antecedents and 304 internal antecedents, similar numbers. Berry and Berry (2018), including politics with internal to a jurisdiction, found innovation diffusion was influenced by both internal and external clusters (they used “factors”) but they did not explore trailblazing, only diffusion. While our combined external-political and internal cluster totals are not greatly different, because our paper is about public policy, the political cluster needs to be recognizable, in case it is more important than in diffusion, and so was kept separate. The counts imply that authors considered internal antecedent factors to be the most important in trailblazing of policy innovations.⁷ While implementation of policies is an essential stage, the external and political clusters determine which policy innovations get implemented.

Table 4: Classification Hierarchy, An Example

Name of Level	Sub-Level	Number at Level
<i>Antecedent</i>	Political risk-avoidance (also listed under internal cluster)	594
<i>Unique antecedent (level 1)</i>	Willingness to take risks/risk-taking/ risk/accepts failure/political risk-avoidance	508
<i>Grouped antecedent (level 2)</i>	Political Actors/People	28
<i>Factor (level 3)</i>	People	5
<i>Cluster (level 4)</i>	Political	3

It was possible to allocate the antecedents to different hierarchical levels and all of the antecedents were successfully allocated. Factors were consistent across clusters and all were allocated to clusters. This is evidence for this being an antecedent classification system and we therefore treat it as one. To answer Q. 5: the antecedents form a hierarchical classification system and the antecedents could be categorized into it.

Discussion

⁷ There is also an innovation process literature that identifies antecedents (e.g. Walker, 2013).

This section discusses classification systems, consequences of the findings, types of data and weaknesses.

Classification systems. The innovation literature has considered dissemination two ways, as the order of adoption across governments and whether an innovation has been adopted within a government. Perhaps the hierarchy of antecedents developed here could be extended to other stages of public sector innovation (diffusion, fate), possibly to other types of innovation and to the public policy literature but only if the newness of innovation is not emphasized. For the first time in 2018, the Oslo Manual held that it “provides a common framework for measuring innovation in a more inclusive manner across the economy, in government, in non-profit organisations and in households” (OECD/Eurostat, 2018: 4). It claims to have developed a general innovation classification system, although it only classifies what is delivered (e.g. Koch and Haukness, 2005) and it is very much more developed for the private than other sectors. Gault (2020) and Arundel, Bloch and Ferguson (2019) explain the thinking in the *Oslo Manual 2018*. They treat the newly-introduced nonprofit, public and household sectors as economic categories, assert that the existing framework and concepts apply to the three new sectors, reject the need for improvement as part of innovation and assert the need for measurement. All but one of their categories came from the original versions of the Oslo Manual for business. It includes services, service delivery, administrative or organizational (which may be the same as process), and conceptual innovation. Policy, they note requires different information. The content of the Manual presents the social environment only as related to the firm and suggests measuring many of the internal cluster items identified in this study. Despite limited attention in the Oslo Manual, external, social and political environments are crucial elements for understanding all sectors, including economic. Nonetheless, the OECD and Eurostat work is a start. Collecting information on the economic environment helps policy makers understand other environments but it is an incomplete approach.

Asserting that the “general” private sector definition applies to all sectors, the business definitions, nomenclature and classification system were generalized to apply to the other sectors. Arundel, Bloch and Ferguson (2019) analyzed how to assess narrow public sector innovation. They did not assess the risks involved in colonizing non-profit and public sector classification systems with private sector nomenclatures and classification systems, which are still preoccupied with economic factors. As Bowker and Star (2000: 258) pointed out, the decision to opt into a classification system has great political and ethical import and what is lost is soon forgotten. The risks might include over-emphasis on internal cluster found in the literature, loss of focus on a public mandate and loss of information below the top levels. A focus on diffusion encourages mimesis and suggests innovation diffusion become an unexamined “good” without ethics or social concerns.

The decision to opt into an economic classification system such as the Oslo Manual to classify and measure public sector innovation would have the effect of placing the private sector above the public sector, of losing specificities and, for the history of public policy innovations and sectors, loss of memory. Arundel, Bloch and Ferguson (2019) suggest only case studies can

be more inclusive. In a way, as Bowker and Star suggested this admits their classification system is a tool for forgetting. In a rapidly changing and complex field, overarching classification schemes have problems, especially: (1) if every possibly relevant piece of information was stored in the scheme, it would be entirely unwieldy; (2) any classificatory decisions made now might block off valuable future developments (Bowker and Star, 2000: 69). Because classification of nonprofit and public sector innovations, including policy innovations, are so underdeveloped, they should be given time to develop, not folded into a “general,” higher-level, economically-based system.

Consequences. Antecedents of trailblazing of policy innovation have largely been written out of the recent innovation literature as a topic. In literature that addresses diffusion of innovation as one thing, trailblazing cannot be identified. This same problem is found in other classification systems—other things cannot be found either. While Bowker and Star (1999) recommended the culture of the authors be identified, we saw no literature on antecedents that identified it. Likewise, the economic classification system has been rather imperial in claiming an economic definition as appropriate for all kinds of innovation (Gault, 2020). Bowker and Star, on the other hand, recommended authors always consider social and cultural aspects, which economic approaches ignore.

Authors treat dissemination of innovation nominally (yes/no), which writes trailblazing out of the innovation literature and evades the challenges of studying trailblazing, which include higher costs. They ignore origins, history and time. While these scholars are making an important contribution, there is still much left to learn about trailblazing of innovation. Rogers’ original meanings for adoption have been used here, and should continue to be used, so that trailblazing and adoption can be distinguished from diffusion. All research on diffusion should identify at least the first few adopters.

Bowker and Star identified three design criteria for classification systems: 1) Recognize it is a balancing act. 2) Render voice retrievable: keep the voice of classifiers and their constituents present to maintain maximum political flexibility. 3) Be sensitive to exclusions. First, a balancing act requires researchers to consider multiple constituencies. To do so, they should incorporate ambiguity, according to Bowker and Star. The terms used in the literature are often ambiguous but this is probably not what Bowker and Star meant. Second, their criteria 1 and 2 keep visibility; at the same time, they recognize that visibility is not an unmitigated good. Classification systems and standards acquire inertia when they become part of an invisible infrastructure, where the public is de facto excluded from policy participation. An ability to be able to change the classification with changing natural, contextual, political and organizational imperatives is key. Bowker and Star described flexible classifications as ones “whose users are aware of their political and organizational dimensions and which explicitly retain traces of their construction.” If this could be achieved, it might help with the problem of lack of comparability created when new definitions are introduced; e.g. when Statistics Canada introduced a revised definition of GDP, it did not relate the new statistics to the old, and deleted earlier data from the internet. Hopefully, this paper, availability of the grouped antecedents and allocations should help for this classification. Bowker and Star also argued for always including a category of “other”. While one was not needed here, as shown in Table 1, it was included to make that clear.

Third, Bowker and Star emphasized the need to consider exclusions. Some of the exclusions/omissions we noticed in the literature were the lack of attention to the role of interest groups; social, cultural and income security issues; the political aspect; and the majority of the population. Who determined inclusion/exclusion of antecedents was never indicated (we did so). While no paper considered the role of interest groups and lobbyists, two mentioned interests: Aagaard (2012) acknowledged how time-consuming balancing of interests is in building consensus-thinking; Sorensen and Vabo (2020) highlighted the plurality of individual views and interests in society. There was also no information on: actors not included; ethical issues; the balance between economic, social and cultural innovations/antecedents; and residual categories.

Like other classifications, this analysis has the potential to become a powerful technology (Bowker and Star, 1999), with the classifications “naturalizing” (legitimizing), then becoming increasingly irreversible and invisible. *Oslo Manual 2018* risks this. This would be unfortunate, as the descriptions of the world in the literature and the classification system, especially the factors, are limited and problematic in their vagueness. They do not describe all of the important antecedents. As a result, the classification system needs further work before it can be used.

Types of data. Trailblazing requires ordinal data and a classification system. It is harder to collect than dissemination data, which is nominal. Both Rogers’ adoption and trailblazing data is ordinal, the second of four hierarchical levels of measurement: nominal, ordinal, interval, ratio. Although the data produced by the SLR is not interval or ratio, the trailblazing data could be analyzed, based on percentage of mentions within factors and clusters (Table 2).

Weaknesses. Traditional approach. While the antecedents identified in the literature describe the environment existing before approval of an innovation, they reflect the traditional approaches of political science, public policy and innovation. They do not make clear why unique policies emerged. Comparison of trailblazing and adoption antecedents is, however, somewhat enlightening: trailblazing, more than adoption, highlighted external environment, drivers, ideology, political support, drivers, problem, etc. and structure. Adoption, more than trailblazing, highlighted governance environment, policy, politics, political actors and innovation process. Adoption highlights traditional public administration concerns somewhat more than trailblazing (Glor, 2021c: Table 5).

The missing majority. The literature was assessed for whether women and identity groups had been included/excluded. While none of the papers indicated it was excluding any groups, the subject was never discussed. No studies specifically identified antecedents relevant to women: women are the majority of the population and might experience some different antecedents compared to men, who published most of the literature. Only one article addressed an identity group: a study of 21 antecedents of trailblazing and diffusion in USA states of a sexual orientation nondiscrimination law, 1979-2000 (Colvin, 2006). One article—1.1 percent of publications reviewed—addressed an identity group. Identity groups are a much higher percentage of the population than that. There are challenges reaching indigenous, racialized, lesbian, gay, bisexual, and transgender (LGBT) populations to do research that addresses them or assures they are included. I was told by indigenous people in Western Canada, where the majority of Canadian indigenous people live, that they had been endlessly studied but that no

benefit had come to them as a result. Little of that research has been published. This suggests identity groups may be underrepresented in the literature and therefore substantially excluded from the data found. If identity groups had been accurately represented in the research, some grouped antecedents may have scored differently—perhaps external environment, citizen pressure, barriers—possibly changing them as a proportion of mentions. In the published research, obstacles were not an important grouped antecedent, but they may be for these populations. If women and identity groups are underrepresented in the literature, this would have created an identity bias. An alternate way of looking at this issue is to ask: Who does this classification system represent? If women and minority groups are underrepresented, it would presumably overrepresent antecedents of importance to white men, the main authors of the literature. More research on antecedents of importance to women and minority groups needs to be conducted and published (an important issue)⁸ to determine whether this bias exists and to overcome it. This could also be an aspect in the dominance of economic issues in measurement. This nomenclature and classification system represents the literature but it may not represent the world of innovation.

Conclusion

A SLR of antecedents of trailblazing of public policy innovation found 87 publications that met the criteria and 594 antecedents. These were analyzed into a nomenclature and classification system of 508 unique antecedents, 28 grouped antecedents, 5 factors and 3 clusters. Factors were applicable to all three clusters, with the possible exception of the elements of the policy/process factor but policy and process were both structural and played similar roles in their clusters. The important factors in the different clusters were not identical but somewhat similar: only four of five factors were important, according to number of mentions within clusters; obstacles were unimportant (Table 2). This is a surprising finding. The authors were mostly scholars; for practitioners, this may be more important. This topic deserves more research.

The antecedents found in the SLR allowed a nomenclature and classification system to be created. The nomenclature identified antecedents and the classification distinguished them. Both the nomenclature and the classification system worked but important questions have not yet been considered: What gets covered/not covered in the literature—what is missing? What stories can be told with the categories created—and not told? Divergent perspectives are represented in different classification systems. They simultaneously represent (1) the world “out there”; (2) the organizational context of their application; (3) the political and social roots and implications of that context. What categories are available and not available? In terms of topics, what are the roles of under-represented antecedents, such as interest groups; the political, social and cultural;

⁸ e.g.s.: Searching for literature on antecedents related to women and minority groups, we noted that the women’s and minority sub-sections of the largest public administration organization, the American Society for Public Administration did not have their own journals, unlike most other sections. The woman keynote speaker at the 2018 Canadian Political Science Association conference had never had a paper accepted by its journal (it has since).

equality issues and identity groups? Who determined what was included and excluded (as recommended by the PRISMA Checklist for a Systematic Literature Review or Meta-analysis)?

The SLR, the nomenclature and classification system revealed some possible weaknesses and future research in the policy innovation antecedent literature:

(1) Many more internal antecedents were studied than external or political. For trailblazing of policy innovation, internal antecedents that influenced implementation of the innovation were of most interest in the policy literature, perhaps because the information was more accessible. These were surprising findings. In this study the political was treated separately from the external and internal clusters as it was considered especially important for public policy innovation. While external and political clusters individually had fewer antecedents than internal cluster, it is not really possible to say what this reflects—some possibilities include: there is less interest in these clusters, they are harder to study, they have often not been separated before, there is greater consensus about the antecedents of the internal cluster. Scholars should explore external and political antecedents of policy innovation and the centrality of concepts more.

(2) The OECD has asserted that its classification system for “innovation” is generally applicable, as outlined in the *Oslo Manual 2018*, based on what is delivered, and claims it is appropriately transferred from business to include the whole private, non-profit, public and household sectors. In doing so, it added only one category of concern to do a classification—policy. It is not mentioned, but it is addressing dissemination. Because classification of nonprofit and public sector innovations including policy innovations is so underdeveloped, there are important risks folding it into the Manual’s economic and quantitative measures. Classification of nonprofit, public and household innovation should be given time to develop before consideration is given (if ever) to folding them into a higher-level, economically-focused, quantitative classification system. Doing so could have the effect of losing important knowledge about the mandate of the public and non-profit services and the uniqueness of their innovations. Dissemination only records nominal data, which ignores trailblazing’s requirement for ordinal data and makes trailblazing impossible to assess.

(3) No support was offered for the implicit assumption in the adoption and diffusion literature that the same antecedents influence all stages of innovation equally but that issue was never addressed directly. Given that different factors were most important to different clusters of antecedents of trailblazing, different factors may also be important to other stages of the adoption process. Glor (2018, 2019) found for fate, e.g. that different factors were important for innovations and organizations that survived/did not. With enough evidence, the antecedents identified here could potentially be compared to the antecedents of both adoption/diffusion and fate of policy innovation.

(4) The literature may be biased toward study of internal cluster (implementation). The antecedents were mostly identified by and therefore may be of most relevance to white men. They were not identified by or for and therefore may not be of similar relevance to women and minority groups, who are the majority of the population. More representative research should be pursued. Classification of public policy innovations, trailblazing and all types of stages of

adoption should be explored further. Public and nonprofit sector innovation research is so underdeveloped and under-conceptualized that they should be given time to develop further before being folded into any other classification system, as *Oslo Manual 2018* has attempted. If they are, they could, e.g. remain underdeveloped and some antecedents of relevance to majorities could continue to remain invisible.

(5) Other possible future research could examine the contents of these categories in more detail, to understand better why the literature emphasized these categories, not others. Boundary objects and antecedents of innovations in state corporations, PPP and administrative agencies should also be studied more. There is likewise potential to do quantitative analysis on this data but caveats about measuring innovation comparatively raised by Kattel et al (2014: 36) should be kept in mind for this research too: “(A)ll problems prevalent in performance and productivity measurements are compounded by conceptual confusion...and most of all, the lack of evolutionary dynamics in most public sector innovation conceptualizations means that what is measured based on these concepts is almost by definition relatively worthless to the organizations, policies makers and to citizens....(D)ifficulties increase almost exponentially when we move from organizations (e.g. agencies, departments, hospitals) to larger units (sectors, countries).” Another possible next step for this research on antecedents would be to do a central versus peripheral analysis of the grouped antecedents and to consider why they are central/peripheral.

Data accessibility: The analysis of the unique antecedents into grouped antecedents and clusters is available on request.

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