Factors (Antecedents) Influencing Creation and Fate of Innovations and their Organizations – III

Eleanor D. Glor

Editor-in-Chief
The Innovation Journal:
The Public Sector Innovation Journal

Factors (Antecedents) Influencing Creation and Fate of Innovations and their Organizations – III[1]

Eleanor D. Glor[2]

ABSTRACT

Despite recommendations for more quantitative analyses of public sector innovation factors (Glor, 2014a; de Vries, Bekker and Tummers, 2016), there has been limited examination of them. This paper identifies and explores six factors (ideology, politics, the economy, external support, resources, effects) that influenced the introduction and survival or termination of the first time these public sector innovations and their five organizations (I&O) were introduced in North America. It assesses their key antecedent factors before creation (Time 1) and the same factors again at the time of their fate 15 to 44 years later (Time 2). They were assessed with a new measurement instrument examining the six factors (Glor, 2017a). The tool has 1267 statements (items) and 555 pairs of data, with scoring distributed on a five-point Likert scale. Three expert raters completed the instrument (Glor, 2017b). Based on mean scores, the most important factors in Time 1 (creation of I&O) were found to be the economy, resources, effects and external support and in Time 2 (survival/termination) ideology and politics. This methodology could potentially be used to study the remaining 154 Government of Saskatchewan (GoS) population's innovations and that of other populations.

Key words: Public sector innovation, innovation measurement tool, innovation factors, innovation antecedents, Saskatchewan

Introduction[3]

While managers and personnel in most organizations have been strongly encouraged to innovate since the 1980s (e.g. Peters and Waterman, 1982; Drucker, 1985), limited work has been published on the factors key to the successful creation or adoption, implementation and achievement of desired effects of innovations. In the public sector, it has been suggested that the factors involved in the dissemination of innovation are political, economic and social factors (Berry and Berry, 2013). In terms of the adoption of innovations, it has been suggested, slightly differently, that the major antecedents of innovation are external and internal (de Vries, Bekker and Tummers, 2015: 147; Berry and Berry, 2013). For organizations, it has been suggested that employees, survival and other factors are important (Glor, 2014a). This paper focuses on the factors influencing the invention/adoption and survival/termination of I&O. The innovations are policy/program innovations, while the organizations are the administrative units delivering the

---

[3] The following abbreviations are used in the paper: GoC=Government of Canada; Government of Saskatchewan=GoS; SS=Department of Social Services; FIP=Family Income Plan; SIP=Senior Citizens' Benefits Program; ESP=Employment Support Program; WCB=Saskatchewan Workers' Compensation Board.

innovations.[4] An instrument developed for the purpose (Glor, 2017a) quantifies the factors. The paper identifies the most important factors influencing the creation/adoption and fate of the sub-population (all) of the income security innovations introduced by the GoS, 1971-82.

Innovation refers to "the conception and implementation of significant new services, ideas or ways of doing things as government policy in order to improve or reform them and involves taking risks". Focusing on early adoption of innovations, it is defined quantitatively as the first, second or third time an innovation is introduced in its government community (Glor, 1997: 4). This definition is quite different from that of Walker (1969) and Rogers and Kim (1985), who limited their definitions to the first part of this definition, as anything perceived by organizations as new. Walker defined innovation as "a program or policy which is new to the states adopting it, no matter how old the program may be or how many other states may have adopted it". Glor added the qualifications taking risks, invention and early adoption. While Rogers (1995) and Walker (1969) were interested in dissemination, the interest in this paper is invention and early adoption, the factors that lead to it and influence its fate. A *government community* is the group to which the government compares itself and/or with which it works. The GoS's community was the other Canadian provinces, the Government of Canada (GoC) and American state and federal governments. This is a more stringent definition than, for example, that of Osborne (1998) for "total innovation"—innovations new to the innovating organization and offering a new service to a new group. Berry and Berry (2013) suggested that definitions focused on the first few adopters were used more before 1990 and that the focus has been primarily on dissemination since then. This date is around the time the New Public Management began to be introduced and suggests governments' foci since then may not have been innovation but rather dissemination of NPM on a broader basis. Changing the definition of innovation may have facilitated this. The dissemination literature has assumed each adoption is an innovation. While those who study dissemination are making an important contribution, this paper proposes that there is still much to learn about the phenomenon of innovation by focussing on the group of governments inventing and adopting innovations early and on the fate of their innovations. This paper studies five inventions (first) and early adopters (tied for first) in Canada or the USA. The approach has the potential to inform understanding of the risks of innovating and the fate of inventions and early adoptions. *Organization* refers to a group of persons united for a purpose; in this case, a unit organized to deliver an innovation (new income security program).

Factors Identified in the Literature
Factors explaining innovation adoption have been studied in the innovation, innovation dissemination, organizational change, organizational demography and complexity literatures.

Policy/program innovations. Collier and Messick (1975) studied the first social security program adoptions among the 59 countries with formal political autonomy at the time of adoption, Brown et al. (1979) studied 147 agricultural cooperatives in Sierra Leone, Tolbert and Zucker (1983) civil service reform in 167 cities, and Glor (1997, 2002) 159 GoS innovations. While both practitioners and scholars assume that the purpose of innovation is to improve organizational performance (Borins, 2014: Chapter 2, 22), none has considered the survival of innovations as a performance issue.

---

[4] Their expenditures could be traced in the GoS budget Estimates and Public Accounts (actual expenditures).

Innovation dissemination. Gray (1973: 1174), Berry and Berry (2013: 1) and Glor (2015) have observed that innovation researchers typically do not study invention of policies, or early adopters, but dissemination of policies. *Dissemination* has been studied two ways—the earliness of adoption (e.g. Walker, 1969; Glor, 1997, 2002) and the comprehensiveness of adoption (dissemination) (Berry and Berry, 2013). Glor (1997, 2002) used the same definition of innovation as is used in this paper. Berry and Berry used and recommended the dissemination approach: even laggard governments were considered innovative. While study of dissemination would allow comparison of the years in which an innovation was adopted by different governments, and rankings, this has not typically been done: Glor (1997, 2002) may be the only researcher to take this approach. In the dissemination approach, whether an innovation is adopted is the interest, not when.

Factors in Adoption. Berry and Berry (2013) summarized the external and internal factors affecting adoption as identified in the policy dissemination literature. They identified studied external factors, internal factors and developed a unified model. Study of *external factors* initially developed two diffusion models—influenced by national interaction and regional diffusion. The national model posits that the federal government is the most important factor in policy dissemination. The regional diffusion model posits that geographic proximity of other adopting governments is the prime determinant in adoption and suggests some jurisdictions are leaders and others laggards. The unified model proposes both factors are important: national diffusion factors have influence throughout the country equally and regional factors influence states next to the state being studied. National factors were found to be more important than regional influence (Lieberman and Shaw, 2000). Because Canada is more decentralized than the USA in the social policy domain and has a number of large provinces, this issue needs to be examined for Saskatchewan (Sask.). For the GoS, the next-door provinces are Manitoba and Alberta and national policy, especially national funding, had an important influence.

Berry and Berry recommended a unified model, addressing both internal determinants and external diffusion (2013: 2). Both are studied here. Berry and Berry defined *internal factors* as the political, economic and social characteristics of the *jurisdiction* (2013: 12). Internal factors are defined in this study as factors internal to the government: I&O resources and effects. In his reviews of literature on innovation in local governments, Walker (2003, 2007) concluded internal antecedents mattered more than external factors in administrative innovations. Both external and internal factors are explored for policy innovations and administrative organizations here. This paper also defines external factors differently than they did: external factors are extant in the innovation's environment—ideology, politics, the economy and external support.

Administrative innovations. Walker (2003, 2007) concluded *internal antecedents* were more important than external antecedents for administrative innovations; for management of innovation, role of teams and teamwork, pilots and experiments, projects, and project management (2003: 93). Borins (1998) studied the factors influencing the finalist innovations nominated for innovation awards. James Iain Gow (2014, 2018) commented:

> Borins is no doubt right that bottom-up innovations are more numerous than top-down central ones, but this requires important qualifiers. Most of the bottom-up innovations that he identified were managerial…dealing with efficiency, savings and service to clients (Hughes et al., 2013: 13–14). On the other hand, the European Innobarometer found that

the single most important driver of innovation was …changes in legislation and regulations and budget restrictions (European Commission, 2011) (Gow, 2018: 444).

Organizational change. There are two main types of organizational change literature, identifying selection and adaptation mechanisms (Barnett and Carroll, 1995). Selection mechanisms suggest organizations' fates are a function of such factors as resources, politics, organizational age and size, and environmental and ecological processes (Baum, 1996). An adaptation approach suggests innovation is an *adaptation mechanism* that reduces organizational mortality. The measure of survival is mortality and the approach studies all or close to all organizations in an organizational population.[5]

Complexity. Torugsa and Arundel (2016) studied factors associated with complexity and how complexity affected innovation outcomes in the most significant innovation in the work groups of 4,369 Australian government employees. They defined complex innovation as incorporating more than one type of innovation and found positive correlation with the variety of beneficial outcomes (called effects here).

What has been studied. Most study of innovation has been occupied with case studies of innovation, their comparisons, public sector entrepreneurship and innovative organizations (Borins, 2014: Chapter 2: 2-3). Borins noted researchers typically study only one type; Knill and Lenschow (2001), Glor, 2014 a, b, 2015) suggested expanding the range of issues studied.

The instrument used to assess the factors influencing the creation and fate of ten I&O draws on these literatures and studies six that may influence the fates of the I&O studied. The paper identifies how the influences changed from the period of creation to mortality/survival. It explores the six explanatory factors for ten income security I&O. It (1) provides a framework for studying the issues; (2) presents the results of completion of the assessment tool by three expert raters; (3) reports and discusses the results; 4) identifies key independent factors influencing the creation of the I&O in Time 1; (5) identifies key factors influencing their fate in Time 2; (6) compares the influence of the independent factors at the time of creation and survival/ termination; (7) determines whether the factors of influence were different when I&O survived/terminated; and (8) discusses how this approach could be used in other studies.

The Study

Research Framework. Most research frameworks employ one theoretical paradigm, such as institutionalism, rational choice, complexity or contingency theory. Knill and Lenschow (2001) argued that scope of change studied, the theoretical schools chosen, and whether the conceptual schools are structure or agency-based create key differences among studies of change. They suggested that needless contention arose in the literature because authors used only one approach and scope and did not relate their work appropriately to that of other schools studying other levels. Glor (2014 a, b, 2015) suggested expanding the scope of theoretical schools referenced because study of the fate of I&O is so new. She recommended (2014 a, b) using

---

[5] A considerable number of studies in the literature consider a full population (e.g. Kuipers et al., 2018). Glor (2013) identified eight public sector population studies, such as all German (Adam et al., 2008) and American (Carpenter & Lewis 2004) federal agencies, and identified a mortality rate for normal organizational populations.

elements from four theoretical paradigms—interpretive, humanist, functional and structural (based on Burrell and Morgan, 1979).

Based on these schools, Glor (2014a) developed a framework for studying the fate of I&O that recommended studying case studies, effects on people, causal factors and the demography of I&O. This study employs these four approaches. Glor's research framework (2014a, b) and Glor and Rivera's (2015) proposal for research are used to frame the paper. The four approaches are interpretive, humanist, functionalist and structural. An *interpretive approach* considers case studies where there is a plausible link between an organization innovating and surviving/disappearing, preferably matched with case studies of normal organizations (qualitative comparative analysis) (Strauss and Corbin, 1998). A normal organization is one that is not an extreme organization, for example, one whose mortality occurs much earlier or much later than that of most organizations in its population. A *humanist approach* focuses on employees, e.g. managers (Damanpour and Schneider, 2006, 2009), employees who implemented the innovations, how the innovations and organizations affected them and how they affected the innovations and organizations. A *functionalist* approach, the most researched, explores the factors correlating highly with increased innovation and organizational mortality. A *structural* approach focuses on the fate of structures—measured by founding and mortality rates (Glor, 2014a). A multi-theory approach permits consideration of case studies and effects on people, functions, and structures. Most studies have employed only one or two approaches: Considering more issues should create better understanding.

Issues Addressed. The *null hypotheses* identified for this research are as follows: (1) The mean scores of the factors were the same when considering all statements to which at least two of the three raters responded at Time 1 (Blakeney government) and Time 2 (Devine government) (2) the mean scores of the factors were the same in Time 1 and Time 2.

Hypotheses. Two hypotheses are examined: (1) Six global factors influenced the creation of ten I&O: ideology, politics, external support, the economy, resources and effects of the I&O; (2) the same six factors influenced the fate of the I&O.

In keeping with Glor's (2014a) framework, this paper considers ten case studies (interpretive approach) and the independent factors influencing the dependent variable of I&O fate (functional approach). These cases are all of the income security I&O introduced by the GoS, 1971-82, hence, a sub-population.

Questions. The paper addresses these questions:
1) Could the instrument distinguish factors influencing creation and fate of I&O?
2) Which factors were most important in influencing the creation in Time 1 and the fate in Time 2 of these I&O?
3) Were the factor scores different for I&O that survived/were terminated?

This paper identifies the important explanatory factors for the creation and survival/termination of the income security I&O. It: (1) provides a framework for studying the issues; (2) uses a new instrument; (3) reports and discusses the results; 4) identifies key independent factors influencing the creation and fate of the I&O; (5) compares the influence of the independent factors at the time of creation to their influence at the time of

survival/termination; and (5) discusses the instrument's use in other contexts.

Case Studies. The innovations have been identified for the GoS, 1971-82: 159 policy, program and administrative innovations (Glor, 1997: Table 1; 2002:142-3), including the five innovations studied here, using the same definition of innovation. This research did not, however, systematically identify the determinants nor the fate of the innovations. To develop a data base of factor information for the 159 innovations may be impossible; hence five innovations and their five organizations are studied as a pilot. Can the factor information be found? This study tests the approach on ten cases.

The innovations were highly innovative income redistribution programs in the Canadian and American context (Glor, 1997): the need to subsidize these target groups and the principles involved became staples of the federal welfare state in Canada 25 years later, but four of five were dismantled during the 1980s in Sask. Sask. was the first government in North America to establish innovations of the type of the Family Income Plan (FIP), Seniors Income Support Program (SIP), Employment Support Program (ESP) and Workers Compensation Board (WCB) and tied with Manitoba for first to introduce cost-shared generously-subsidized day care. The principle guiding the Blakeney innovations was that only income rather than income and assets should determine eligibility. The approach acknowledged the large drops in income in Sask. caused by its boom-bust economy, driven by weather and markets for primary products (such as coal, potash, uranium, oil and gas). The principle was that farmers, those employed in primary industries, and others should not be required to sell their assets to qualify for short-term income support. Federally subsidized social assistance and the federal Guaranteed Income Supplement (GIS) program[6] for destitute seniors tested assets. The federal Old Age Security program (OAS) did not but does now.

The *five innovations* were (1) A day care subsidy for low and low-middle income parents. Federal cost-sharing was secured, thus allowing a major expansion of day care. Previously only very low income parents on welfare (social assistance) were subsidized; (2) FIP, a subsidy for the working poor with children; (3) SIP, an income subsidy for very low income seniors (especially women who had never worked outside the home); (4) ESP, the first provincial voluntary participation program providing the long-term unemployed and "unemployables" with short-term work and personal support, thus reintroducing them to the work force and helping them become eligible for federal Unemployment Insurance; and (5) the first conversion of an employer-sponsored WCB from a pure insurance scheme (providing lump-sum payments for loss of life and limb) into a combined insurance and long-term income replacement scheme. This approach was subsequently adopted by all ten provinces and many USA states (Sask. WCB, 1980, 1997). The WCB had a substantial unfunded liability when this innovation was introduced, which was dealt with. The portion of the injured workers' income that qualified for the provincial Social Assistance Plan (SAP) (welfare) was paid by the Department of Social Services (Social Services) and was cost-shared by the federal government.[7] WCB was of substantial benefit to both Sask. employers and injured workers unable to work. Concerning administration of these innovations, all but ESP were preceded by formal investigations, reports on the issues and federal signals of

---

[6] Glor (1997) reported Sask. as first for day care cost-sharing but Manitoba was first, a couple of months earlier, during the same year. Data is reported yearly, so they were tied for first. Source: Ron Hikel.
[7] The structural history of these innovations was collected by Mary Gianoli (1995: 441-471).

willingness to cost-share. Four of the innovations were delivered by Social Services and the fifth by an administrative tribunal, the WCB, although part of the WCB innovation was delivered by Social Services. In this paper the ***organizations*** supporting these innovations are also called Day Care, FIP, SIP, ESP and WCB (FIP and SIP administrations later merged). I&O event histories are outlined in Glor and Ewart (2016, tables 2, 4) for the innovations and organizations. During the 1980s, the next, neoliberal government abolished the eight Social Services I&O. If factor information could be found on I&O, this would suggest that other departmental innovations might be traced as well. More information on these case studies can be found in Glor and Ewart (2016).

Using accessible documents (annual reports, budget *Estimates, Public Accounts*), personal knowledge,[8] and creating descriptive statistics, this retrospective study identifies factors contributing to the creation and to the fate of the ten income security I&O. These I&O were chosen from the 159 Blakeney government innovations ***because*** (1) they were highly innovative; (2) they encompassed a sub-population (all of the government's income security innovations); (3) the Department of Social Services innovations were controversial in the eyes of the next, Devine government, so it could be determined whether or not information remained sufficiently transparent (the Devine government passed legislation that made reorganizations more opaque, and refused to answer most questions in the Legislature and by media about reorganizations); (4) this government and two of its successors were well documented in published works; (5) the author was familiar with these innovations;[9] and (6) the population of 159 innovations had been identified for this government (Glor, 1997, 2002): the other 154 might also be studied if the methodology was appropriate and the information available.

Methodology and Measures. Information on the innovations was found primarily in Glor (1997, 2002) and Harding (1995), on the organizations in the *Budgetary Estimates*, *Public Accounts* and through research, including informants. The case studies were not a sample, but a full sub-population of the income security innovations introduced by the GoS and their organizations.

Andrews, Boyne and Walker (2011: 7) summarized what is needed for an *ideal quantitative research design* ("innovation" has been inserted as the topic). It requires models that have a lag between the independent and dependent variables to ensure that the measures precede their hypothetical performance effects. Internal and external controls are required to address possible confounding effects due to management, organization, and the environment. Longitudinal data address these central characteristics of causation, but also permit consideration of longer term effects of innovation, particularly when studies are trying to identify lingering effects of changes. They also permit study of causal direction—does innovation result in changes in performance or vice versa? In the GoS, for example, the day care organization, delivering a different program, was reorganized before the innovation was introduced. When data sets are built, they need to be able to test the interactions between variables required to tease out relationships. Researchers must collect clear and accurate measures of their variables, and have sufficient external constraints in the data sets to capture the circumstances in which organizations

---

[8] Only recent documents are available online. Earlier documents are rarely available outside Regina.
[9] Having worked as Social Services Budget Analyst in the Department of Finance; done a special project on the WCB while there; and having worked on the WCB conversion while in Executive Council.

operate and that contribute to or constrain innovation. Good internal and external measures of management and organizational context may also be needed. Berry and Berry (1990, 1992, 2013); Wright, Erikson and McIver (1987); Lieberman and Shaw (2000); Arsneault (2000); and Boehmke (2009) found both internal and external factors were important in determining whether innovations were adopted. Glor (2015) concluded researchers should address different dimensions of impacts, because gain in one dimension (e.g. efficiency) may be realized by sacrificing another (e.g. equity or equality). Both external and internal data was collected.

Measures. A literature search, informants, experience and Glor's hypotheses informed factors that could have influenced the creation and fate of I&O. From them, an instrument was developed (Glor, 2017a) to measure the factors. *The instrument* consists of four questionnaires addressing innovations and organizations (Glor, 2017b). It explores the following six factors.

Ideology was the strength of the party in power's ideology and the strength of the public's support for the ideology as measured by the consistency of the federal and provincial election results during the 1970s and 1980s. Wright, Erikson and McIver (1987) found public opinion surveys were the best measure of dominant ideology, but surveys were not available for Sask. Berry et al (1998) used results of federal elections compared to results of state elections as a measure of ideology, supplemented by other measures. Five measures were used, e.g. raters were asked to agree or disagree with the statements: "How ideological were the two governments on these innovations?" "The NDP/Tory governments strictly followed their ideologies introducing/terminating/retaining these income security innovations." "The organization's approach integrated well with the dominant ideology in the province."

Politics was measured by (1) the effect of federal government ideology on provincial governments; (2) how long governments were in power; (3) the ratio of time in power between the innovating and the next governments (three elections versus two but in years the neoliberals were only in power one year less than the earlier social democratic party (NDP); (4) whether the federal government had promised specific federal funding (while it was a minority government) or federal funding was not available; and (5) the importance of a change of government. The ratio of years in power is important because it indicates how long and proportionately how long the governments had to implement their policies.

External Support was measured by support for the innovation by the political party in power, the governing party's election platform, and adoption of the innovation by other government(s). The *economy* was measured by economic growth rate and unemployment rate and government debt.

Resources were measured as: *financial resources* (balanced/deficit budget, size of debt, competition with other priorities, existence of windfall revenues, funding provided, and whether resources were retained); *administrative support* (whether innovations were small, new positions and infrastructure were funded, and the organization had recently changed, prior to introduction of the innovation); *whether the innovation was fully implemented* (the I&O were fully and quickly funded, retained funding, were fully and quickly staffed and implemented, and how long the government was in power); and *employee support* (whether managers and/or working level employees supported the innovation, whether personnel were well treated, whether they were competing for funding with other programs).

Four *effects* were measured by whether: (1) the program model was efficacious[10] and augmented the incomes of the poor; (2) the innovations reduced poverty, yet respected the public's desire not to see the system cheated and not to attract the poor from other provinces;[11] (3) the innovations fulfilled their goals; and (4) they were respectful of clients.

For policy creation, the *innovations' communities* were officials in other provinces, especially other geographically close NDP provinces (Manitoba and briefly British Columbia); Sask. non-profit organizations; academic supporters and critics; Cabinet and members of the legislature; and other English-speaking social democratic country officials (e.g. U.K., New Zealand). The *government's community* for these innovations was members of the NDP and its supporters, elected officials in some other Canadian provinces, the federal Liberal government (briefly, while a minority government supported by the federal NDP), and progressive American governments. During the mid-1970s, New Jersey; Gary, Iowa; Seattle-Denver, all of USA; and Dauphin, Manitoba, Canada had guaranteed income experiments (Osborne, 1985: 12), but neither Alberta nor Sask. introduced one, so the regional diffusion model is not supported. For policy fate, the government's community was neoconservative Republican U.S. government representatives and their staff, some of whom advised the Sask. Conservative government.

Three expert raters completed the instrument by ranking 1271 statements exploring factors judged to have influenced the fate of the I&O, on a five-point Likert scale.[12] A score above 3.0 indicates that the element was an influence, 4.0 and above a strong influence; 3.0 is neutral; below 3.0 less and less influence. Both the raters and the instrument were reliable and the instrument valid (content and construct validity) (Glor, 2017b). Creation, survival/ mortality are defined by their appearance in and disappearance from the Budget *Estimates* and *Public Accounts*. Factors influencing the creation and fate of I&O explored in this paper.

Results and Discussion

The questions outlined earlier are addressed. The eight Social Services I&O were terminated during the 1980s; the two WCB I&O were retained, and survive to this day.

Question 1: Could the instrument distinguish factors influencing creation and fate of I&O?
I&O were analyzed in the instrument for essentially the same factors. Question 1 considers the factors by themselves. All data were paired for times 1 and 2, and only data for which information was available in both time periods was used. There were a total of 555 pairs to analyze. An initial question needed to be answered: Were the responses to the statements sufficiently different so that I&O had to be analyzed separately (5 innovations, 5 organizations) or could they be analyzed together (10 I&O), thus providing more pairs to analyze and making it

---

[10] Kramer (1981, p. 265) identified four characteristic vulnerabilities in nonprofit organizations: formalization or institutionalization, goal deflection, minority rule, and *ineffectuality.*

[11] American literature (Berry and Berry, 2013) has shown this does not occur, but what about in Sask? Not attracting the poor from other jurisdictions was measured by whether there was an increase in the unemployment rate, acted as a disincentive to work, reduced work disincentives, redistributed income, expanded eligibility, kept up with the cost of living, information was available, and changed recently before introduction of the innovation.

[12] They responded to most statements with the following choices: Strongly disagree=1, disagree=2, neither disagree nor agree=3, agree=4, strongly agree=5.

possible to analyze more issues? This analysis is conducted with an independent samples Welch's (unequal variances) t-test and a paired t-test in Appendix I. The responses for I&O were sufficiently similar that they could be analyzed together.

Factors Analyzed as a Unity. The data for the factors was combined and tested with paired samples Wilcoxon test and one-way ANOVA. Because t-tests are often problematic for Likert scales, many analysts use a non-parametric test instead. A *paired samples Wilcoxon rank sum test* with continuity correction found the scores of the factors as a whole in times 1 and 2 were not significantly different. This is because some factor scores increased while others declined and suggests the factors should be examined individually.

data: DifMeanTms by SurvTm2   W = 20616, p-value = 0.3842
alternative hypothesis: true location shift is not equal to 0

When factors were tested using *one-way ANOVA*, the data was found not to be the same, significant at the zero level, suggesting the data for individual factors needs to be considered.
> AnovaModel <- aov(DifMeanTms ~ Factor, data=Dataset)
> summary(AnovaModel)

```
            Df Sum Sq Mean Sq F value Pr(>F)
Factor       5  949.2  189.83   59.87 <2e-16 ***
Residuals  549 1740.7    3.17
Significance codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Descriptions and Statistical Analyses of Factors for I&O (Combined), Times 1 and 2. The statements in the instrument were grouped into six factors, which were analyzed using descriptive statistics and a paired t-test, to determine whether these factors were influences on survival in Time 2. Descriptive statistics are provided in Table 1. The numbers of pairs informing the factors were different from factor to factor. Appendix II examines whether this is having an effect. It is. Despite the numbers of pairs (550), the number of I&O examined was only 10. The fixed effects coefficients (Appendix II) take account of that. The coefficient for numbers of pairs is not very high. In both Time 1 and 2, mean scores of factors were different and different factors had the higher scores in times 1 and 2.

The mean score of one factor (the economy) changed more than three Likert points (75 per cent) from Time 1 to 2. Five of six factors scored mean differences of more than one Likert point (the one exception was external support, though its change was also quite high). A change of one Likert point (25%) was arbitrarily identified as an important difference. An attempt was made to confirm it as an important difference by seeing whether the changes were statistically significantly different, using a *paired t-test*.[13] It found the true difference in the means of the factors combined was not equal to 0: they were different. A paired t-test was conducted on the data for each of the factors to determine whether the scores for the factors were significantly different, comparing times 1 and 2. All changes in the factor mean scores from Time 1 to 2 were statistically significant (p-value less than .05) except for external support (Table 2); it changed a mean of 0.58 Likert point and had fewer degrees of freedom than the other factors.

---

[13] *The paired samples t-test* determines whether the mean difference between two sets of observations is zero; that is, they are the same. A t-test requires two independent groups (measured twice), resulting in pairs of observations, either ordinal or continuous, but they need not be normally distributed (can be nonparametric). The t-value measures the size of the difference relative to the variation in the sample data

Table 1: Descriptive Statistics for Factors, Times 1 and 2, I&O Combined

	Ideology	Politics	The Economy	Resources	External Support	Effects
No. Pairs	57	99	40	172	19	168
Mean Score Tm 1	3.178421	3.134680	4.862500	4.267500	3.815789	3.826190
SD	1.3404128	1.4344406	0.3394471	1.0099998	1.1572300	0.7837487
Mean Score Tm 2	4.377193	4.281178	1.525000	2.401163	3.157895	2.458333
SD Tm 2	0.9967837	1.2862110	0.9333562	1.6028479	1.3022697	1.5644025
Mean Difference	1.198772	1.146498	-3.3375000	-1.8159884	-0.8157895	-1.1654762
SD	2.019006	1.465650	1.117389	2.090442	1.842481	1.632082
Rank of Mean Difference	3	5	1	2	6	4

Tm1=Time 1; Tm2=Time 2.
Mean Difference was calculated by R Commander per statement and summed (555 pairs).

Table 2: Did the Mean Factor Scores Change Significantly between Time 1 and Time 2? Paired Samples T-test

Factor	Ideology	Politics	Economy	Resources	External Support	Effects
t	-4.7408	-8.317	18.482	12.256	1.3105	11.998
df	56	98	38	171	17	166
p-value	0.00001504 Significant	5.32e-13 Significant	2.2e-16 Significant	< 2.2e-16 Significant	0.2074 Not	< 2.2e-16 Significant
Alternative hypothesis	true difference in means is not equal to 0	true difference in means is not equal to 0	true difference in means is not equal to 0	true difference in means is not equal to 0	true difference in means is not equal to 0	true difference in means is not equal to 0
95% confidence level	-1.6341624 -0.6633376	-1.4200579 - 0.872938	2.979644 3.712664	1.565749 2.166926	-0.3557619 1.5224286	1.139612 1.588531
Mean of differences	-1.14875	-1.146498	3.346154	1.866337	0.5833333	1.364072

Tested with Database 46r – Factors (e.g. iIdeology, politics).were each tested separately.
The mean in Time 1 was compared with the mean in Time 2.

The instrument was able to distinguish factors influencing the creation and fate of I&O.

Question 2: Which factors were most important in influencing the creation in Time 1 and the fate in Time 2 of I&O?

This question takes the perspective of someone predicting the creation of and fate of I&O

without knowing what their actual fate was. The question is answered several ways[14]: ranking importance (scores), calculating change and ranking regression coefficients.

Table 3: Ranking of Factor Means Treated as Most and Least Important Factors in Fate of I&O, Combined, by Rater, Times 1 and 2

Factor	Ideology	Politics	The Economy	External Support	Resources	Effects
Time 1:						
Rater 1	6	5	1	4	2	3
Rater 2	6	4	1	3	2	5
Rater 3	4	5	1	3	2	6
Mean	6	5	1	4	2	3
Time 2:						
Rater 1	2	1	6	3	4	5
Rater 2*	No answer	No answer	No answer	No answer	No answer	No answer
Rater 3	1	2	6	3	4	5
Mean	2	1	6	3	4	5

* Rater 2 responded to too few statements in Time 2 to warrant consideration.
1= most important factor, 6 = least important factor

First, what did each of the *individual raters* think were the most important influences? Table 3 ranks their opinions of the importance of factors in times 1 and 2 (1= most important, 6= least important), based on how high they scored the factors. In Time 1, Rater 1 considered the economy the most important factor, followed by resources and effects. Rater 2 considered the economy, resources, and external support most important. Rater 3 ranked the factors the same way as Rater 2. In Time 2, Rater 1 ranked politics, ideology and external support as the most important joint factors in survival or termination. Rater 2 did not respond to enough statements to score the results. Rater 3 ranked ideology, politics and external support as the most important factors. The raters were consistent in which factors they thought important in Time 1: the economy, resources, effects/external support. Rater 3 ranked ideology and effects a bit differently. Other research has found that the economy and ideology/politics were unimportant to adoption of innovations; here the economy is very important but ideology is not here either. The assessments among raters were very similar in Time 2 as well, when ideology and politics became the most important factors. External support ranked similarly in times 1 and 2.

A *second* way to define the most important factors influencing the fate of the I&O is to combine the rankings of all three raters, and treat the *factor means* in times 1 and 2 as the measures. The factors in the two times with the highest mean scores would then be the most important factors (Table 1). Using this approach, in Time 1, when I&O were created, the most important factors, ranked, were the economy and I&O resources, followed by effects and external

---

[14] Focusing on the factors ignores whether I&O survived or were terminated. This will be addressed in Question 3.

support (the latter two tied). The least important factors were politics and ideology. In Time 2, when eight of ten I&O were terminated, the most important factors in fate were ideology and politics. External support was third: its score remained positive but was only 3.157895, close to neutral. The least important factors were resources, effects and the economy. The most and least important factors were completely different when I&O were created and terminated/retained. In this study, a score of -1.0 to -1.999 is considered very low, 2.0 to 2.999 low, 3.0 neutral, 3.01 to 3.4 somewhat, 3.5 to 3.999 substantially important, 4.0 to 5.0 very highly important/influential.

A *third* way to measure the most important factors is to use the *difference in factor means* between Time 1 and Time 2, that is, the change in the measures, with the highest differences (largest changes) considered to be the most important indicators in Time 2. This approach (tables 3, 4) identifies the economy as the most important factor, followed by resources, effects, ideology and politics, the factors with differences of more than 1.0 Likert scale score between times 1 and 2. Only external support changed less than 1.0 score.

Rational factors for new policy design (Howlett, 2004)—here the economy, resources, effects and external support—had high scores in Time 1 and low scores in Time 2. Ideology and politics had the lowest scores in Time 1: All factors scored positively (above 3.0), ideology and politics just barely. The terminations in Time 2 were most influenced by ideology and politics, with very high scores (4.377193 and 4.281178), respectively. External support was the third most important factor in Time 2, but its score in Time 2 was actually lower than its score in Time 1 and quite close to neutral (3.0).

The factor for which the mean declined the most (-3.3375000) was the economy, much more than any other factor, although during the 1980s the economy was poor initially but improved over the decade. The next largest changes were in resources (-1.8159884) and effects (-1.1654762). The factors that increased their scores the most in Time 2 were politics (+1.0249495) and ideology (+1.198772), which both increased from close to neutral to a mean of over 4.28. The factor that changed the least was external support: while both governments initially had federal government support and usually financial support, this declined during both provincial governments. Other types of external support included, for example, support of provincial pressure groups. The probability that the factors considered all together were not significantly different from zero in both times 1 and 2 was zero (one-way ANOVA).

A *fourth* way to calculate the most important factors is to rank regression coefficients of survival in Time 2, comparing factors to each other and the mean scores at times 1 and 2. The data is treated as continuous. Regression describes the statistical relationship between one or more predictor variables and the response variable. The p-value for each factor tests the null hypothesis that the coefficient is equal to zero (no effect). A low p-value (< 0.05) indicates the null hypothesis can be rejected. In other words, a predictor that has a low p-value is likely to be a meaningful addition to a model because changes in the predictor's value are related to changes in the response variable. Conversely, a larger (insignificant) p-value suggests that changes in the predictor are not associated with changes in the response (http://blog.minitab.com/blog/adventures-in-statistics-2/how-to-interpret-regression-analysis-results-p-values-and-coefficients).

Table 4a: Logistic Regressions (Generalized Linear Models, GLM)

	Mean Time 2
Dataset	C:/Users/Public/Glor_46s aEffcts.xlsx
Formula	SurvTm2 ~ Factor + MeanTm1. + meanTm2 + No.pairs, +　family=binomial(logit
Deviance Residuals	Min -0.7118, 1Q -0.6696, Median -0.5851, 3Q -0.4909, Max 2.0897
Null deviance	508.09 on 554　degrees of freedom
Residual deviance	501.32 on 547　degrees of freedom
AIC	517.32

Dispersion parameter for binomial family taken to be 1

To rank regression coefficients, certain conditions must be met. The variables must be of comparable size. In the current research, factors are measured on the same Likert five-point scale, producing variables of comparable size. Negative scores are low, positive scores are high. The most important problem arises if the factors are not significantly different from zero. Non-significance is treated as zero or the reader is informed of non-significance.

Table 4b: Ranking of Logistic Regression Coefficients (GLM) for Factors Influencing Survival in Time 2, Innovations and Organizations, from Highest to Lowest Coefficient

	Factor	Coefficients Ranked Log odds	Standard Error	Z value	Pr(>|z|)
	Intercept	-1.27450	0.47488	-2.684	0.00728 **
Highest	Economy	-0.05405	0.46193	-0.117	0.90684
	External Support	-0.38645	0.65919	-0.586	0.55770
	Ideology	-0.41724	0.44795	-0.931	0.35162
	Politics	-0.17986	0.36302	-0.495	0.62028
Lowest	Resources	-0.72067	0.30696	-2.348	0.01889 *
	MeanTm2	0.01634	0.08098	0.202	0.84007
	MeanTm1.	-0.01702	0.11032	-0.154	0.87738
	No. pairs	NA	NA	NA	NA

Effects were the intercept to which the other factors were compared. Used means Time 1, 2. Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Number of Fisher Scoring iterations: 4
```
> exp(coef(GLM.16))  # Exponentiated coefficients ("odds ratios")
(Intercept)       Factor[T.Ec]      Factor[T.Exts]     Factor[T.Ideol]
0.2795705            0.9473801           0.6794634           0.6588603
Factor[T.Pol] Factor[T.resources]   MeanTm1.      MeanTm2    No.pairs
0.8353850            0.4864242        .9831238    1.0164773         NA
```
Another potential problem in using regression coefficients is lack of homogeneity in the data (Beck, Bruderl and Woywode, 2017). To test for these problems, the results of a fixed-effects regression, which controls for unobserved heterogeneity, was compared to the results for

simple logistic regression (GLM), whose use is proposed. A fixed-effect coefficient also checks for homogeneity. This comparison is done in Appendix II. The analysis shows that there is not too much homogeneity or too much heterogeneity, and therefore demonstrates that logistic regression can be used to rank the importance of the factors. Predictor variables are nearly always associated: each regression coefficient represents the *additional* effect of adding that variable to the model, *if the effects of all other variables in the model are already accounted for.* The latter condition is met if all the variables in the model have been considered, as they have been here. They are not all shown. As an example of the analyses done, Table 4b ranks the factors by logistic regression coefficient to predict the factor means in Time 2, with effects as the intercept. All of the factors were run as the intercept, respectively, and many were statistically significant, but they are not of much interest. Because there were differences in the numbers of statements for each factor, the number of pairs was also run as a factor. This was having some impact but not having an important impact. The coefficients are negative because eight of ten I&O in this database were terminated. In Table 4b, among the six factors, the best predictor of survival in Time 2 was resources, but it also had the largest number of pairs. The factor resources led to more likely survival of I&O, compared to the other factors. The rankings are similar to those in the earlier analyses, so this approach did not add much to the existing analysis.

The logistic regression analysis looked at changes over time in the strength of factor influences on survival of I&O. It found the factor "resources" led to more likely survival of I&O. The other factors were not, however, significant contributors. A GLM did not therefore add a lot to the analysis.

The most important factors influencing creation and survival/termination of I&O in Time 1 were the economy, resources, effects and external support; in Time 2 ideology and politics.

Question 3: Were the factor scores different for I&O that survived/were terminated?

The approaches to defining the most important factors in the survival/termination of I&O so far did not distinguish scores for I&O that survived/were terminated. Question 3 does so, asking the empirical question: Were the factor measures different when I&O had different fates? It compares the factor scores of I&O that survived/were terminated as groups, and examines their changes from Time 1 to 2. Two measures were used: means and paired t-test.

Table 5a: Comparison of Mean Scores of Surviving and Terminated I&O

	Time 1	Time 2	Difference
Mean of I&O Surviving in Time 2	3.765458	3.045751	-0.719707
Mean I&O Terminated in Time 2	3.863484	2.894770	-0.968714
Difference surviving minus terminated	-0.098026	-0.150981	

A *first* approach compares the sum of the means in Time 1 of I&O that survived/terminated in Time 2 (Table 5a). The mean scores were very similar in Time 1. The mean factor

scores of I&O that survived in Time 2 declined, but not by as much as the mean scores of I&O that were terminated in Time 2. The mean scores of I&O that survived remained above 3.0. Factor scores for I&O that were terminated declined almost 1.0 mean score, to below 3.0. The differences in Time 2 scores are not large but the scores for surviving I&O remained above 3.0 and were slightly higher than those of I&O terminated. In Time 1, I&O that were terminated in Time 2 had the higher scores; in Time 2, the mean scores of I&O that were terminated declined the most and became the lowest. Having mean scores above or below 3.0 appears to be an important cut-off. Four scores went down in Time 2 but two went up (ideology, politics).

Table 5b: Means and Differences of Means in Times 1 and 2 for I&O that Survived/ Terminated

Factors	Ideology	Politics	External Support	Economy	Resources	Effects
Survived:						
Time 1: Factor Means in Time 1 of 2 I&O that Survived in Time 2: WCBs						
Mean	3.050080	3.175614	3.833333	4.750000	4.325000	3.816774
Rank	6	5	3	1	2	4
Score Difference from 3.0	-0.111111	0.175674	0.833333	1.74	1.325	0.76
Rank difference from 3.0	6	5	3	1	2	4
Time 2: Factor Means in Time 2 of 2 I&O that Survived in Time 2: WCBs						
Mean	3.850000	4.140175	4.000000	2.125000	2.600000	2.580645
Rank	3	1	2	6	4	5
Dif. from 3.0	0.850000	1.140175	1.0	-0.875000	-0.4	-0.4219355
Rank Dif. fr. 3.0	4	1	2	3	6	5
Surv. Dif. of Means Tm2-1	0.79992	0.964561	0.166667	-2.625000	-1.725000	-1.236129
Rank Dif. of Means	5	4	6	1	2	3
Terminated:						
Time 1: Factor Means in Time 1 of 8 I&O Terminated in Time 2						
Mean	3.205745	3.124958	3.812500	4.890625	4.259934	3.828321
Rank	5	6	4	1	2	3
Dif. from 3.0	0.178421	0.124958	0.812500	1.890625	1.259934	0.828321
Rank Dif. from 3.0	5	6	4	1	2	3
Time 2: Factor Means in Time 2 of 8 I&O Terminated in Time 2						
Mean	4.489362	4.314667	3.000000	1.375000	2.375000	2.430657
Rank	1	2	3	6	5	4
Dif. from 3.0	1.489362	1.314667	0	-1.6225	-0.625000	-0.569343
Rank Dif. from 3.0	2	3	6	1	4	5
Dif. of Means	1.283617283617	1.189709	-0.812500	-3.515625	-1.884934	-1.397664
Rank of Dif.	4	5	6	1	2	3

Calculated by R. Summaries use 46r, Time 1 and 2 means separately. 3.0=neutral

A *second* approach compares survived/terminated I&O as groups to themselves in the different time periods. Table 5b compares the mean scores, ranks them, and calculates the differences in mean scores for each factor between times 1 and 2, by survived and terminated I&O. In *Time 1*, the mean factor scores for I&O that *survived* were similar to the mean scores of those that were terminated, except for ideology. It was lowest for I&O that survived. The ideology score in Time 1 was just above neutral but in Time 2 it was quite high. For I&O that survived in Time 2, the biggest changes (declines) from times 1 to 2 were in the score for the economy, with a change of -2.625000, followed by resources and effects. Two factors increased their influence, ideology and politics, equally. They became substantially more of an influence, especially politics. The factor with the least change was external support. Politics and external support were the only factors that changed less than one Likert point, but the change in politics was very close to one point. One Likert point, a 25 per cent change, was arbitrarily chosen as the cut-off point for an important difference. Two other factors changed substantially in a positive direction: ideology and politics. They became stronger influences and important factors. External support increased slightly. Except for external support, the scores of all of the other factors for surviving I&O changed quite substantially between times 1 and 2. The economy, resources and effects all declined more than one Likert point.

Mean factor scores for I&O *terminated* in *Time 2* changed even more than those that survived. The biggest changes for terminated I&O were declines in the scores for the economy (-3.365625 of a possible 4), followed by resources (-1.87) and effects (-1.38), changes larger than one Likert point. External support declined substantially (-0.66). Scores increased for only two factors, ideology and politics, equally. All of the factors for terminated I&O experienced important changes in Time 2, except for external support. The dissemination literature finding is confirmed that ideology and politics are not important in creation of innovations but this first study of the factors influencing the fate of I&O found them important in both survival and termination.

The factor mean scores in Time 1 for I&O that survived in Time 2 were all above 3.0. Ideology and politics had the lowest scores. They were not important factors in Time 1. In Time 2, the mean factor scores for I&O that survived scored above 4.0 for politics and external support, and just below 4.0 for ideology. Factors scoring below neutral (3.0), i.e. negative influences, included the economy, effects and resources. The economy, resources and effects changed the most for both surviving and terminated I&O.

A *third* approach to studying factors for I&O that survived/terminated compares the scores of I&O that survived to those that did not, as groups. In Table 5c, the factor means, ranks and differences in score factors of survived/terminated I&O are presented for times 1 and 2. The factor score differences between surviving and terminated I&O are also calculated. In *Time 1,* the differences in scores of I&O that later survived/terminated were small and similar.[15] In Time 1, the scores for I&O that were terminated in Time 2 were slightly different for ideology; the other scores were very similar. All factor mean scores of terminated I&O went down except for ideology and politics, which went up. Scores for ideology went up somewhat and for politics slightly. External support changed the most. The other scores for terminated I&O all went down:

---

[15] There was a time gap in their creation, in that I&O that were abolished were created earlier, during the early 1970s, while the ones that survived were created in 1980.

external support became a neutral factor and resources, effects and the economy scored negatively, below 3.0. They became detriments to survival. In *Time 2*, I&O that survived had high scores for politics and external support (4.0, 4.1) and quite high for ideology (3.9). Scores for the economy, resources and effects were below 3.0. The difference in scores between surviving and terminated I&O was a full Likert point for external support. Their rankings also changed completely. For both surviving and terminated I&O, politics and ideology became the most important factors. The rankings of the factors in Time 2 for surviving and terminated I&O are quite similar, except for ideology, which was more important for the terminated I&O.

Table 5c: Mean Scores for Factors, Times 1 and 2, Comparing I&O that Survived and Those that Were Terminated During Same Time Periods

Factors	Ideology	Politics	External Support	Economy	Resour-ces	Effects
Time 1 Mean of Factors for 2 I&O that Survived in Time 2: WCB						
Mean	2.888889	3.175614	3.833333	4.750000	4.325000	3.760000
Rank	**5**	**4**	**3**	**1**	**2**	**3**
Time 1 Mean of Factors for 8 I&O Terminated in Time 2						
Mean	3.2342085	3.124958	3.812500	4.890625	4.260959	3.841765
Rank	**4**	**5**	**3**	**1**	**2**	**3**
Difference Time 1	**0.3453195**	**-0.050656**	**-0.020833**	**0.140625**	**-0.064041**	**0.0817647**
Time 2 Mean of Factors for 2 I&O that Survived in Time 2: 2 WCB						
Mean	3.888889	4.140175	4.000000	2.125000	2.600000	2.578125
Rank	3	1	2	6	4	5
Time 2 Mean of Factors for 8 I&O Terminated in Time 2						
Mean	4.468750	4.314667	3.000000	1.375000	2.369650	2.430147
Rank	1	2	3	6	5	4
Difference Time 2	0.579861	0.174492	-1.000000	-0.750000	-0.230350	-0.147978

Note: Factors were ranked the same if their mean scores were less than 0.1 different.

External support had the highest score (was the most important factor) for the I&O that survived in Time 2, reflecting the support of business and Conservatives for retaining the WCB I&O. WCB is mostly funded by employers. Business was a core supporter for the Conservatives, who were in power.[16] Nonetheless, external support had an important political aspect to it: scores for ideology and politics for I&O that survived were lower than for the I&O that were terminated. Ideology and politics had the highest scores (were the most important factors) for terminated I&O in Time 2.

There is very little difference in the factor scores in Time 1 of I&O that later either survived or disappeared. The factors and their scores at Time 1 supported creation of all ten I&O and supported them equally. In Time 2, their scores were different. The scores for every I&O went down in Time 2, even the I&O that survived (Tables   5b, c) but the scores were higher for

---

[16] There were charges of corruption against the Conservative government, and several of its members later went to jail for it, but I am not aware of any such claims in relation to this innovation.

surviving I&O for four factors and lower for two (ideology and politics). An examination of these changes, using the paired t-test produced the following results. The t-test revealed significant mean changes from Time 1 to Time 2.
data: DifMeanTms and SurvTm2.

$t = -11.419$, df = 554, p-value < 2.2e-16

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval: -1.263566 -0.892650

sample estimates: mean of the differences -1.078108

In Time 1, Time 2, and comparing the difference in means between times 1 and 2, one-way ANOVA found factor results were significantly different from each other at the zero level, but that they not significantly different for I&O that survived and were terminated in either time period. In Time 2 ANOVA found factor results were significantly different from each other at the zero level, but again the factor scores for surviving and terminated I&O were not significantly different. This was caused by factor scores moving both up and down.

A *fourth* approach to prediction of fate with factors compares the rankings of the factor means in times 1 and 2. The patterns of rankings of the importance of factors were not completely different for surviving and terminated I&O. In Time 1, I&O that had different fates had very similar rankings of (Table 5c). In Time 2, for surviving I&O, r rankings remained the same. For terminated I&O, rankings changed completely, from the most important factors being the economy, resources and effects to being ideology (4.468750) and politics (4.314667). Increases in scores for politics and ideology in Time 2 made them the most important factors in survival of I&O, while even bigger declines in scores for the economy, resources and effects made them the most important factors in termination. Factor scores of terminated I&O changed more than ones that survived. The factor scores were not different in Time 1 for I&O that later survived/terminated but scores were different in Time 2 and were most different between times 1 and 2. The politics and ideology of governments changed.

Conclusion

This research is based on results of three raters assessing factors influencing fate of ten income security innovations and organizations (I&O) of the GoS, 1971-82. The scores for factors influencing I&O were similar enough that their results could be combined. An examination of changes revealed the same pattern. A number of different approaches to studying the most important factors influencing the fate of ten I&O were tested in this paper (Appendix III).

The instrument distinguished factors thought by experts to influence the fate of I&O (Q. 1). In times 1 and 2, factor mean scores were different and some factors had higher/lower scores in Time 1 or 2 (Table 1). The instrument demonstrated that factors important in Time 1 were different from ones were important in Time 2 (Q. 2). The three raters agreed that the most important factors during the period when I&O were created were the economy, I&O resources, and external support/effects (tied). In Time 2, the most important factors influencing fate of I&O, were ideology and politics. Factors important in Time 1 (the 1970s, Blakeney government) were the opposite of the ones important in Time 2 (the 1980s, Devine government).

Analysis of six factors important to the creation, survival/termination of I&O found:

- Ideology and politics were not important in Time 1. In Time 2 they were very important, and they were the factors scoring highest. Ideology and politics were very important during the Devine (neoliberal) government but not as important during the NDP (social democratic) Blakeney government.
- In Time 1, the strongly growing economy, small increases in taxes, an increase in the price of oil and other resources and the additional government resources created thereby were used to fund the I&O. The innovations were created from new revenues, not through reallocation of existing revenues.
- In Time 2, ideology and politics, responses to the poor economy, large reductions in taxes and new expensive programs consumed government resources and put the government in deep deficit and debt.
- I&O whose factor scores changed the least from Time 1 to 2 survived.
- In Time 1, the highest scored and ranked factors were the economy, resources and effects, in that order. In Time 2, the highest scored factors were ideology and politics.
- Four of six factors had a lower score in Time 2—the economy, resources, effects and external support.
- The factors that changed their scores the most from Time 1 to 2 were the economy, resources, and effects.
- This research confirms the finding in the innovation dissemination literature that ideology and politics are not important in *creation/adoption* of innovations but, in this first study of survival and termination of I&O, ideology and politics were important in *termination*.
- Analysis of the factors by survived/terminated I&O found the factors were significantly different from each other in both times 1 and 2 at the zero level.

Comparing Results for Factors Combined and Separated by Survival/Termination.
While the ten I&O researched were unbalanced between surviving and terminated (2 vs. 8) and therefore the terminated I&O influenced the global means more, the research asked whether the factors by themselves predicted I&O fate. Predictions by definition cannot take account of fate of I&O because they are predicting that fate. Fortunately, information on fate was available and predictions can be compared to actual fate. Table 3 showed that the factor means were different in times 1 and 2 (more than one Likert point). ANOVA found the probability the factor scores were not significantly different from each other in times 1 and 2 was zero. When the factor results were separated for surviving and terminated I&O, the results were the same.

Implications. The Department of Social Services income security innovations of the GoS did not survive the next government. The Workers' Compensation Board innovation did, to the present (2018). Since the 1970s, there has been little progress in providing income security to the poor and services have been unstable. The Blakeney government had hoped to introduce one additional income security program, a universal sickness and accident insurance program, but it was not introduced since blancing its budget was its top priority. The day care, family income and seniors' income plans remained in name after the Blakeney government but their progressive principles disappeared—income security programs returned to being very limited programs serving the "deserving" poor. Most income security innovation was lost. It will be harder to bring these programs back in the future, as demonstrated by subsequent NDP governments: the province has not had new revenues to work with, businesses and residents resist taxes, and the

resources of the province belong to the people of the province in name only.

The current research suggests that *factors* important to these ten income security I&O included politics and ideology, state of the economy, external support, resources and effects. Several other studies found the economy was not important, but it was in Sask., with its boom-bust economy. The NDP government maintained a balanced budget and linked its taxes on resources to the market, easing off when the market was poor and taxing more heavily when companies were highly profitable (Burton, 1997). Glor's (2014) and Glor and Rivera's (2015) approach had not been tested empirically previously, but was tested successfully here.

Future research on the important factors influencing the fate of I&O should consider the external factors of ideology and politics separately from the external factors of the economy and external support because, in Time 2, ideology and politics increased while the other two external factors and the two internal factors remained the same or declined. The differences between the factors for I&O that survived/terminated in Time 2 were not great, but the changes from times 1 to 2 for terminated I&O were.[17]

This study determined the amount of time required to conduct the research (about three years) and where information could be found, thus establishing that further research could be undertaken and how. Work on the fate of other Sask. innovations could be done, but would be a larger research project. Preliminary work has been completed, that: (1) created a framework for studying the factors affecting innovations; (2) identified theories and hypotheses for examination; and (3) demonstrated, that the data needed could be collected. Future research should determine whether information can be secured for crown corporations, as the NDP government used them to support economic development. Such research should also (1) identify the politics of the innovations, (2) study innovations from each political domain, and (3) study ones that were not ideologically loaded as well as ones that were. As many as possible of the remaining 154 innovations should be studied. Such a study would be the first on the innovations of an innovation population (a government). It should be possible to conduct the next stages more efficiently.[18] Further research will need to determine whether the sources of information should be restricted to budgetary programs that appear in budget estimates, annual and performance reports and public accounts or need to be expanded to sources such as media, speeches and other grey literature. Importantly, this research could look at the demography of I&O and help to answer "what happens to I&O?" To attribute innovation mortality to specific factors required understanding the motivations of elected officials and public servants. Motivation is not easy to determine in retrospect but the Blakeney and Devine governments are well documented. Having identified the antecedent factors for creation and fate of ten I&O, it may now be possible to study other I&O. Other researchers could examine the factors influencing the fate of I&O of other governments, thus permitting comparison of the factors across populations and to normal organizations.[19]

---

[17] ANOVA in R Commander will not analyze the difference in means in combination with survival and factors.

[18] The authors discovered that the estimates, annual reports and public accounts of the Blakeney government contain most of the information required. Those of the Devine government lack information on human resources that the research framework sought.

[19] Glor (2013) examined the literature for factors and mortality rates of organizational populations and established baseline mortality rates for private, non-profit and public sector organizations.

About the Author:

   Eleanor D. Glor worked as a public servant in the Canadian public sector at four levels of government and has written about public sector innovation for publication since the 1980s. She ran the Innovation Salon, a meeting on public sector innovation, from 1995-2005 and is the publisher and founding editor of *The Innovation Journal: The Public Sector Innovation Journal.* She is Fellow, McLaughlin College, York University, Toronto, Canada. Most recently she published Studying Factors Affecting Creation and Fate of Innovations and their Organizations – II: Verification of Raters and the Instrument, *The Innovation Journal: The Public Sector Innovation Journal,* 22(3) 2017 and Studying Factors Affecting Creation and Fate of Innovations and their Organizations – I: A New Instrument," *The Innovation Journal: The Public Sector Innovation Journal*, 22(2), 2017, article 1, What Happens to Innovations and Their Organizations (with Garry Ewart); and "Innovation and Organizational Survival Research" a chapter with Mario A. Rivera, in James D. Ward (Ed.), *Leadership and Change in Public Sector Organizations: Beyond Reform.* She edited a book of articles from *The Innovation Journal*, entitled *Leading edge research in public sector innovation: Structure, dynamics, values and outcomes*, 2018, Bern, Switzerland: Peter Lang. Eleanor can be reached at: glor@magma.ca

References:

Andrews, Rhys, George A. Boyne, Richard M. Walker. 2011. Dimensions of Publicness and

Organizational Performance: A Review of the Evidence. *Journal of Public Administration Research and Theory*, 21 (Supplement 3): i301–i319.

Arsneault, Shelly. 2000. Welfare Policy Innovation and Diffusion: Section 111 Waivers and the Federal System. *State and Local Government Review*, 32(1): 49-60.

Barnett, W. P. & G. R. Carroll. 1995. Modeling Internal Organizational Change. *Annual Review of Sociology*, 2: 217-36.

Baum, J. A. C. 1996." Organizational Ecology." Pp. 77-114 in Stewart R. Clegg, Cynthia Hardy & Walter R. Nord, *Handbook of Organization Studies.* London, Thousand Oaks, CA, New Delhi: Sage Publications

Beck, Nikolaus, Josef Brüderl and Michael Woywode. 2002. "The Causes and Consequences of Organizational Change: How to Deal with Unobserved Heterogeneity." Paper presented to the 20th European Group for Organization Studies (EGOS) annual conference, Barcelona, Spain, June.

Beck, Nikolaus, Josef Brüderl and Michael Woywode. 2017. Momentum or Deceleration? Theoretical and Methodological Reflections on the Analysis of Organizational Change. *Academy of Management Journal*, 51(3): 413–35.

Berry, Frances Stokes & William D. Berry. 2013. Innovation and Diffusion Models in Policy Research. Chapter in Paul Sabatier (Ed.), *Theories of the Policy Process.* Boulder, Colorado: Westview

Berry, William D., Evan J. Ringquist, Richard C. Fording & Russell L. Hanson. 1998. Measuring Citizen and Government Ideology in the American States, 1960-93. *American Journal of Political Science*, 42(1): 327-48.

Boehmke, Frederick J. 2009. Policy Emulation or Policy Convergence? Potential Ambiguities in the Dyadic Event History Approach to State Policy Emulation. *The Journal of Politics*, 71(3): 1125-40.

Borins, Sandford F. 1998. *Innovating with Integrity: How Local Heroes Are Transforming American Government*. Washington, DC: Georgetown University Press.

Borins, Sandford F. 2014. *The Persistence of Innovation in Government*. Washington, D. C.: Brookings Institution Press.

Brown, L. R. Schneider, M. Harvey & B. Ridell. 1979. Innovation Diffusion and Development in a Third World Setting: The Cooperative Movement in Sierra Leone. *Social Science Quarterly*, 60(2): 249-68.

Burrell, G. & G. Morgan. 1979. *Sociological paradigms and organizational analysis.* London, UK: Heinemann

Burton, John. 1997. "Chapter 3: Resource Rent and Taxation—Application of New Principles and Approaches in Saskatchewan." Pp. 59-77 in Eleanor D. Glor (Ed.), *Policy Innovation in the Saskatchewan Public Sector, 1971-82.* Toronto, CA: Captus Press.

Collier, David & Richard E. Messick. 1975. Prerequisites Versus Diffusion: Testing Explanations of Social Security Adoption. *American Political Science Review*, 69(4): 1299-315.

Damanpour, F. & M. Schneider. 2006. Phases of the Adoption of Innovation in Organizations: Effects of Environment, Organization and Top Managers. *British Journal of Management*, 17(4): 215-36.

Damanpour, F. & M. Schneider. 2009. Characteristics of Innovation and Innovation Adoption in Public Organizations: Assessing the Role of Managers. *JPART,* 19(4): 495-522.

de Vries, H., V. Bekker & L. Tummers. 2016. Innovation in the Public Sector: A Systematic Review and Future Research Agenda. *Public Administration*, 94(1): 146–166. doi: 10.1111/padm.12209

Drucker, Peter. 1985. *Innovation and Entrepreneurship*. New York, NY: Harper & Row

Glor, Eleanor D. (Ed.). 1997. *Policy Innovation in the Saskatchewan Public Sector, 1971-82.* Toronto, CA: Captus Press

Glor, Eleanor D. (Ed.). 2002. *Is Innovation a Question of Will or Circumstance? An Exploration of the Innovation Process Through the Lens of the Blakeney Government in Saskatchewan, 1971-82*, 2nd edition. *The Innovation Journal: The Public Sector Innovation Journal.* Collected October 2, 2018 at: http://www.innovation.cc/books.htm

Glor, Eleanor D. 2013. Do innovative organisations survive longer than non-innovative organisations? Initial evidence from an empirical study of normal organizations. *The Innovation Journal*: *The Public Sector Innovation Journal*, 18(3), article 1. Collected August 12, 2018 at: http://www.innovation.cc/volumes-issues/vol18-no3.htm

Glor, Eleanor D. 2014a. Studying the Impact of Innovation on Organizations, Organizational Populations and Organizational Communities: A Framework for Research. *The Innovation Journal: The Public Sector Innovation Journal*, 19(3): article 1. Collected October 2, 2018 at: http://www.innovation.cc/volumes-issues/vol19-no3.htm

Glor, Eleanor D. 2014b. Proposal for Comparative Research on the Fate of Innovative Public Sector Organizations, a paper presented to the International Research Society for Public Management, April 9-11, 2014, Ottawa, Canada.

Glor, Eleanor D. 2015. *Building Theory of Organizational Innovation, Change, Fitness and Survival*. Ottawa, CA: The Innovation Journal: The Public Sector Innovation Journal, 20(2): article 1. Accessed October 2, 2018 at: http://www.innovation.cc/books.htm

Glor, Eleanor D. 2017a. Studying Factors Affecting Creation and Fate of Innovations and their Organizations – I: A New Instrument. *The Innovation Journal: The Public Sector Innovation Journal*, 22(2), 2017, article 1. Collected October 2, 2018 at: http://www.innovation.cc/volumes-issues/vol22-no2.htm

Glor, Eleanor D. 2017b. Studying Factors Affecting Creation and Fate of Innovations and their Organizations – II: Verification of Raters and the Instrument. *The Innovation Journal: The Public Sector Innovation Journal*, 22(3), 2017, article 1. Collected October 1, 2018 at: http://www.innovation.cc/all-issues.htm

Glor, Eleanor D. & Garry Ewart. 2016. What Happens to Innovations and Their Organizations? Piloting an Approach to Research. *The Innovation Journal: The Public Sector Innovation Journal*, 21(3), article 1. Collected October 2, 2018 at: http://www.innovation.cc/volumes-issues/vol21-no3.htm

Glor, Eleanor D. & Mario Rivera. 2015. Proposal for Research on the Fate of Innovative Public Sector Organizations, Populations and Communities: A Research Synthesis and Prospectus. *The Innovation Journal: The Public Sector Innovation Journal*, 20(2): article 3. Collected October 2, 2018 at: http://www.innovation.cc/volumes-issues/vol20-no2.htm

Gow, James Iain. 2018. "Public Sector Innovation Theory Revisited." Pp. 429-55 in Eleanor D. Glor (Ed.). *Leading-edge Research in Public Sector Innovation.* Oxford, Bern, New York, etc.: Peter Lang. Originally published as Iain Gow. 2014. Public Sector Innovation Theory Revisited, *The Innovation Journal*: *The Public Sector Innovation Journal*, 19(2), article 1. Collected October 1, 2018 at: http://www.innovation.cc/volumes-issues/vol19-no2.htm

Gray, Virginia. 1973. Innovations in the States: A Diffusion Study. *American Political Science Review*, 67 (Dec): 1174-85.

Harding, Jim (Ed.) 1995. *Social Policy and Social Justice: The NDP Government in Saskatchewan during the Blakeney Years.* Waterloo, CA: Wilfred Laurier University Press

Howlett, Michael. 2004. Beyond Good and Evil in Policy Implementation: Instrument Mixes, Implementation Styles, and Second Generation Theories of Policy Instrument Choice. *Policy and Society* (known as *Policy, Organisation and Society*, 1981 – 2002), 23(2): 1-17.

Hum, D. P. J. 1985a. "Chapter Seven: The Working Poor, the Canada Assistance Plan, and Provincial Responses in Income Supplementation." Pp. 120-38 in Jacqueline S. Ismael (Ed.), *Canadian Social Welfare Policy: Federal and Provincial Dimensions*. Toronto, CA: The Institute of Public Administration of Canada.

Hum, D. P. J. 1985b. "Social Security Reform during the 1970s." Pp. 29-47, Chapter 3 in Jacqueline S. Ismael (Ed.), *Canadian Social Welfare Policy: Federal and Provincial Dimensions*. Toronto, CA: The Institute of Public Administration of Canada.

Harding, Jim. 1995. *Social Policy and Social Justice: The NDP Government in Saskatchewan during the Blakeney Years.* Waterloo, Canada: Wilfrid Laurier University Press.

Karch, Andrew. 2007. Emerging Issues and Future Directions in State Policy Diffusion Research. *State Politics and Policy Quarterly*, 7(1)(Spring): 54-80.

Kingston, William. 2017. *How Capitalism Destroyed Itself: Technology Displaced by Financial Innovation.* Cheltenham, UK, Northampton, MA: Edward Elgar Publishing.

Kottner, Jan, Mohamed M. Shoukri, Herlev Hospital & David L. Streiner. 2011. Guidelines for Reporting Reliability and Agreement Studies (GRRAS) were proposed. *Journal of clinical epidemiology*, 64 (January): 96-106. DOI: 10.10116/J.JELINEPI.2010.03.002

Knill, Christoph & Andrea Lenschow. 2001. Linking Different Perspectives on Institutional Change. *Comparative Political Studies*, 34(2) (March): 187-215.

Kramer, Ralph M. 1981. Voluntary Agencies in the Welfare State. Berkeley, CA: University of California Press.

Kuipers, Sanneke & Kutsal Yesilkagit & Brendan Carroll. 2018. Coming to Terms with Termination of Public Organizations. *Public Organization Review*, 18(2) (June): 263–278.

DOI 10.1007/s11115-017-0376-4

Lieberman, Robert C. & Greg M. Shaw. 2000. Looking Inward, Looking Outward: The Politics of State Welfare Innovation under Devolution. *Political Research Quarterly*, 53(2): 215-40.

Osborne, John E. 1985. The Evolution of the Canada Assistance Plan. Appendix to the Nielsen Task Force report on the Canada Assistance Plan. Collected October 2, 2018 at: http://www.canadiansocialresearch.net/capjack.htm

Osborne, Stephen. 1998. *Voluntary Organizations and Innovations in Public Services*. London, UK: Routledge

Peters, T. J. & R. H. Waterman. 1982. *In Search of Excellenc*e. New York, NY: Warner Books.

Rogers, Everett M. 1995. *Diffusion of Innovations. 4*[th] *Edition.* New York, NY: The Free Press.

Rogers, Everett M. & J. I. Kim. 1985. Diffusion of Innovations in Public Organizations. Pp. 85-108 in Richard L. Merritt and Anna J. Merritt (eds.). *Innovation in the Public Sector.* Beverley Hills, CA: Sage Publications.

Saskatchewan Workers' Compensation Board (WCB). 1980. *Saskatchewan Workers' Compensation Board: Annual Report for the Calendar Year: 1980.* Regina, CA: Saskatchewan Workers' Compensation Board.

Saskatchewan Workers' Compensation Board. 1997. *The Story of Workers' Compensation in Saskatchewan*. Regina, CA: Workers' Compensation Board

Strauss, A. & J. Corbin. 1998. Basics of Qualitative Research: Techniques and Procedures for Dveloping Grounded Theory. Thousand Oaks, CA: Sage

Tolbert, Pamela and Lynne Zucker. 1983. Institutional Sources of Change in the Formal Structure of Organizations: The Diffusion of Civil Service Reform, 1880-1935. *Administrative Science Quarterly*, 28*: 22-39.*

Torugsa, Nuttaneeya (Ann) & Anthony Arundel. 2016. Complexity of innovation in the public sector: a workgroup level analysis of related factors and outcomes. *Public Management Review*, 18(3): 392-416.

Walker, Jack L. 1969. The Diffusion of Innovations among the American States. *American Political Science Review*, 63(3): 880-99.

Walker, Richard M. 2003. Evidence on the Management of Public Services Innovation. *Public Money and Management,* 23(2) (April): 93-102.

Walker, Richard M. 2007. An Empirical Evaluation of Innovation Types and Organizational and Environmental Characteristics: Towards a Configuration Framework. *Journal of Public Administration Research and Theory*, 18(4) (October): 591-615.

Wright, Gerald C., Robert S. Erikson & John P. McIver. 1987. Public Opinion and Policy Liberalism in the American States. *American Journal of Political Science*, 31(4) (August): 980-1001.

Appendix I: Can the Data for Innovations and Organizations (I&O) be Combined?

There were 555 pairs, 320 for innovations and 234 for organizations, distributed among the factors as indicated in tables I1a, b and c, below. Whether the scores for I&O were sufficiently different for it to matter was assessed with a Welch's independent samples (correlated pairs, dependent samples) t-test. The *t* score is a ratio between the difference between two groups and the difference within the groups. The larger the t score, the more difference there is between groups. The smaller the t score, the more similarity there is between groups. A *t* score of 5, for example, means that the groups are five times as different *from* each other as they are *within* each other. The bigger the t-value, the more likely it is that the results are repeatable. The p-value is the probability that the results from the sample data occurred by chance.

Table I-1a: Factor Pair Frequencies

	Totals: Factors						Totals: Rows
	Economy	*Effects*	*External Support*	*Ideology*	*Politics*	*Resources*	
Innovations	15	130	14	25	65	71	320
Organizations	25	38	5	32	34	101	235
Total Column Pair Count	40	168	19	57	99	172	555

Table I-1b: Factors: Vertical Pair Percentages

	Total Percent: Innovations vs. Organizations						
	Ideology	*Politics*	*Economy*	*External Support*	*Effects*	*Resources*	*Total*
Innovations	43.9	65.7	37.5	73.7	77.4	40.8	57.66
Organizations	56.1	34.3	62.5	26.3	22.6	59.2	42.34
Total Column Pair %	100	100	100	100	100	100	100 May 16

Table I-1c: Factor Pair Percentages across Factors

	Total Percent: Innovations vs. Organizations						
	Ideology	*Politics*	*Economy*	*External Support*	*Resources*	*Effects*	*Total*
Innovations	7.8	20.3	4.7	4.4	22.2	40.6	100.0
Organizations	13.5	14.3	10.5	2.1	43.5	16.0	99.9

As indicated in Table I-2a, when I&O scores were compared with each other in Time 1 and 2, using an independent samples t-test (Welch's Two Sample t-test), the following results were achieved. As indicated in Table I-2b, when I&O scores are compared between Time 1 and 2, the mean of differences between times 1 and 2 is 0.9524583 for innovations and 0.8944255 for organizations, a difference of 0.0580328 of a Likert scale, a small difference. The mean of

Table I-2a: Comparison of I&O Means at Time 1 and Time 2, Welch Two Sample t-test

	t	df	p-value	Alternative Hypothesis	95 % confidence interval	Sample estimates: mean of differences Tm 1
I&O Means Compared Tm 1	3.6517	485.99	0.0002888	True difference in means is not equal to 0	0.1689196 to 0.5624452	Mean org 4.058255 Mean Innovn 3.692573
I&O Means Compared Tm 2	2.8701	466.02	0.00429	true difference in means is not equal to 0	0.1336125 to 0.7138179	Mean org 3.163830 Mean innovn 2.740115

differences between data for I&O combined between times 1 and 2 is 0.9278859, very similar to the individual differences for I&O. Like them, the mean of the differences of the scores for I&O is an increase of just under "1" Likert scale score from Time 1 to 2. The differences are not significant.

Table I-2b: Paired Samples T-test of I&O Means, Times 1 and 2

	t	df	p-value	Alternative Hypothesis	95 % confidence interval	Sample estimates: mean of differen-ces Tm 1 to 2
Innovations	8.9357	319	< 2.2e-16	True difference in means is not equal to 0	0.7427495 to 1.1621672	0.9524583
Organizations	5.4651	234	0.0000001182	True difference in means is not equal to 0	0.5719863 to 1.2168647	0.8944255
Innovations + Organizations	10.027	554	2.2e-16	True difference in means is not equal to 0	0.7461105 to 1.1096612	0.9278859

The scores for I&O at Time 1, Time 2 (Table I-2a), and between Time 1 and Time 2 (Table I-2b) were insufficiently different for it to matter: the t-tests for I&O were fairly similar and they behaved similarly from Time 1 to 2. The statements for I&O can therefore reasonably be combined. This is done in the paper. Their combined statistics are outlined in the text of the paper, Table I-1.

Appendix II: Do Logistic and Fixed Effects Regressions Produce Different Results?

Questions to answer:
1. *Is the difference in numbers of statements among the factors making a difference?*
2. *Can regression coefficients be used to rank importance of factors (Assumption of normality)?Comparison of result for logistic regression and fixed coefficient.*
3. *Does the data have too much unobserved heterogeneity and therefore lack homogeneity?*

In this appendix, tests are conducted to address these three potential problems: too little data (too few pairs) for some factors, the assumption of independence (fixed effects test for dependence), and the possibility of lack of homogeneity.

1. *Differences in numbers of statements*
In logistic regression, goodness-of-fit measures rely on sufficiently large samples. Too little data can inhibit a finding of significance—in the current study, too few pairs. Table II-1 compares the regression analyses for the importance of factors in Time 2—only two I&O survived—taking account of the number of pairs and not doing so, compared to the intercept Effects. There was quite a difference in the number of pairs informing each factor (Table II-1a).

Regressions that adjusted for the number of pairs produced more significant results: the difference in scores between times 1 and 2 were significantly different at the .05 level when pairs were included and only one (resources) was significant when pairs were excluded.

Table II-1: Analysis of Impact of Number of Pairs: Influences of Factors on Survival of Innovations and Organizations, Factors Compared to Factor Effects and Difference of Means, Including and Excluding Number of Pairs for Each Factor, Logistic and Fixed Effects Regressions

	Coefficients		Standard Error		z		*Pr(>|z|)*	
	With No. pairs:	Without No. pairs:	With No. Pairs	Without No. Pairs	With No. pairs:	Without No. pairs:	With No. pairs:	Without No. pairs:
Intercept	8.52550	-1.26325	12.94748	0.20168	2.203	-6.264	0.0276 *	3.76e-10 ***
Factors Compared to Intercept:								
Economy	-22.71425	-0.01806	9.92627	0.46059	-2.288	-0.039	0.0221 *	0.9687
External Support	-26.80586	-0.38608	11.51857	0.65724	-2.327	-0.587	0.0200 *	0.5569
Ideology	-20.12292	-0.44107	8.59202	0.43186	-2.342	-1.021	0.0192 *	0.3071
Politics	-12.44201	-0.20734	5.38160	0.34753	-2.312	-0.597	0.0208 *	0.5508
Resources	NA	-0.70926	NA	0.30571	NA	-2.320	NA	0.0203 *
DifMeans Tms	0.03156	0.03156	0.06516	0.06516	0.484	0.484	0.6281	0.6281
No. of pairs	NA	NA	NA	NA	NA	NA	NA	NA

Note: Result for DifMeansTms with and without number of pairs is identical in the two analyses.
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

The results for logistic regression and fixed effects regressions were compared. The results are more accurate when the other factors are compared to the effects regression line. This analysis found that there were some differences in the results when the data was controlled for number of pairs e.g. ideology had a negative coefficient compared to effects, and all factors were significant. Because there was a regression line, the significance of the factors could be examined. All factors had significant results in the fixed effects analysis.

2. *Assumption of Independence: Can regression coefficients be used to rank importance of factors?*

Logistic regression assumes the model is correct. Regression coefficients can be used to rank the importance of the factors if the factor scores are significantly different in times 1 and 2. It does not produce nice residuals but can be used to rank importance if the data is normally distributed and significant, as in Table II-1. If the data is not statistically significant, as in Table II-2, the contribution of non-significant factors may be zero.

Table II-2 compares the results for logistic regression and fixed coefficients, using resources as the intercept. Using GLM, one factor (effects) was significant at the .05 level (logistic regression comparing the factors to the slope of resources). Only the difference in the means in the two times was significant using a fixed coefficient. The results for GLM and fixed coefficient, were not dramatically different. GLM treats the factors separately, while fixed (mixed) effects uses the over and over.

Table II-2: Regression Results for Factors: Comparison of Logistic Regression (GLM) and Fixed Effect Logit Models

Model Term	Coefficients		Standard Error		GLM		Fixed Coeff.	
	Logistic Regression	Fixed-Effect	GLM	Fixed Coeff.	Z value	Pr(>|z|)	T	Sig.
Intercept	-1.88080	8.241	0.30142	4.5731	-6.240	4.38e-10 ***	1.802	**0.072**
Slopes:								
Economy	0.70282	0.757	0.47372	4.3277	1.484	0.1379	0.175	0.861
Effects	0.65463	-3.943	0.31833	2.2163	2.056	0.0397 *	-1.779	0.076
External Support	0.27179	-0.857	0.68115	4.7403	0.399	0.6899	-0.181	0.857
Ideology	0.25520	-1.959	0.46893	3.2007	0.544	0.5863	-0.612	0.541
Politics	0.45711	-2.915	0.39842	4.1970	1.147	0.2512	-0.671	0.503
Resources	0	0[b]	0	0	0	0	0	0
Innovations		-0.995		5.7647				0.863
Organizations	-0.14938	0[b]	0.24827		0.539	0.5474	-0.173	
Intercept Org								
Dif. Mean of Times	0.03528	1.385	0.06542	0.5939	-0.602	0.5897	2.333	0.020

The factors are compared to the Intercept. The Intercept is negative because most of the innovations and organizations did not survive.

The Z values indicate there is no important difference between the intercept and the other factors.

Notes: DifMeansTms is identical in the two analyses. It is not significant because some factor scores go up, others down in Time 2.

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

3. *Test for possible lack of homogeneity (=observed and unobserved heterogeneirty)*

Beck, Bruderl and Woywode (2002) argued that the causes and consequences of organizational change can be misunderstood if unobserved heterogeneity is not taken into account. They were able to correct successfully for unobserved heterogeneity using a fixed effect logit model. In the three databases they reviewed, significance was quite different, using standard logit models and fixed effect logit models (and R^2).[20] A number of the factors in their databases changed the direction of their effects.[21]

The current study therefore tested the significance of its data using both a generalized (logistic) linear regression model and a fixed effect logit model and checked for residual and random effects (Table II-3a, b). Fixed coefficients were calculated for each of the factors, along with random and residual effect co-variances. The differences were not significant and there was not much dependency. It was therefore appropriate to use regular (generalized logistic regression (GLM) by itself. Based on these results, the logistic regression (GLM) coefficients can be used to rank the importance of the factors. Table II-2 and II-3 in the text provide this analysis.

Table II-3a: Factors: Comparison of Logistic and Fixed Effect (Mixed Effects, Mixed Model, Multilevel) Regression Models

Model Term	Logistic Regression Coefficient	Fixed Coefficients	Std. Error GLM	Std. Error Fixed Coeff.	Z value GLM	Pr(>|z|) GLM	T Fixed Coeff.	Sig. Fixed Coeff.
Intercept	-1.88080	8.241	0.30142	4.5731	-6.240	4.38e-10 ***	1.802	0.072
Slopes:								
Economy	0.70282	0.757	0.47372	4.3277	1.484	0.1379	0.175	0.861
Effects	0.65463	-3.943	0.31833	2.2163	2.056	0.0397 *	-1.779	0.076
External Support	0.27179	-0.857	0.68115	4.7403	0.399	0.6899	-0.181	0.857
Ideology	0.25520	-1.959	0.46893	3.2007	0.544	0.5863	-0.612	0.541
Politics	0.45711	-2.915	0.39842	4.1970	1.147	0.2512	-0.671	0.503
Resources	Base=0	0ᵇ						
Innovations		-0.995		5.7647				0.863
Organizations	-0.14938	0ᵇ	0.24827		0.539	0.5474	-0.173	
Intercept Org								
Dif.MeansTms	0.03528	1.385	0.06542	0.5939	-0.602	0.5897	2.333	0.020

The factors are compared to the Intercept. The intercept is negative because most of the I&O did not survive.
The Z values indicate there is no important difference between the intercept and the other factors.
Notes: DifMeansTms is identical in the two analyses.
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

---

[20] R-squared is a measure of how close the data are to the fitted regression line. It is also known as the coefficient of determination, or the coefficient of multiple determination for multiple regression. ... 100% indicates that the model explains all the variability of the response data around its mean. http://blog.minitab.com/blog/adventures-in-statistics-2/regression-analysis-how-do-i-interpret-r-squared-and-assess-the-goodness-of-fit

[21] This did not happen in tables II-1 and II-2, above. It did happen in Table II-3a, using organization as the intercept, for effects, external support, ideology and politics.

A GLM analysis assesses random effects, while a fixed effects regression uses fixed effects but takes multilevel measures. They are therefore measuring somewhat different things. In the GLM analysis, the intercept and effects are significant but in the fixed coefficient analysis the only significant factor is the difference of the means between times 1 and 2. This difference is not significant in the GLM analysis. This suggests that when the fixed effects analysis took repeated measures on the same ten entities (I&O), I&O were no longer independent of each other, that the GLM was measuring essentially the same thing. The GLM had assumed they were independent. It is thus preferable to go with the results of the fixed model. In the fixed effects analysis, the significant factors were ideology, politics and the mean in Time 1 (Table II-3b).

Table II-3b: Fixed Coefficients Analysis[a]

Model Term	Co-efficient	Std. Error	t	Sig.	95% Confidence Interval Lower	Upper	Exponentiated Co-efficient	95% Confidence Interval for Exp. Coefficient Lower	Upper
Intercept	10.110	5.7279	1.765	0.078	-1.141	21.362	24599	0.320	###########[22]
Economy	0.258	4.1794	0.062	0.951	-7.951	8.468	1.295	0.000	4760
Effects	-4.686	2.5662	-1.826	0.068	-9.727	0.355	0.009	5.966 E-05	1.426
External Support	-0.953	5.7896	-0.165	0.869	-12.326	10.419	0.385	4.435 E-06	33505
Ideology	-3.205	2.9348	-1.092	0.275	-8.970	2.560	0.041	0.000	12.935
Politics	-4.755	4.6007	-1.034	0.302	-13.792	4.282	0.009	1.023 E-06	72.409
Resources	0[b]								
inn_org= innovn	-0.948	5.8275	-0.163	0.871	-12.395	10.499	0.388	4.141 E-06	36292
inn_org= org	0[b]								
Mean Time1	-1.754	0.7898	-2.221	0.027	-3.306	-0.203	0.173	0.037	0.816
Mean Time 2	1.566	0.8373	1.870	0.062	-0.079	3.211	4.788	0.924	24.799

Probability distribution: Binomial Link function: Logit
a. Target: SurvTm2'
b. This coefficient is set to zero because it is redundant.

---

[22] 189,371,8667.35901.

Appendix III: Comparison of Rankings of Most Important Factors, *Using* Different Approaches, Times 1, 2

Question/Approach	Time	Ideology	Politics	External Support	The Economy	I&O Resources	Effects	Criterion
1. Is the instrument able to distinguish factors influencing the creation and fate of I&O? Mean scores of factors are different and some factors had higher/lower scores in times 1 or 2 (text, Table 1).								
2. More/ less important factors, Times 1 and 2								
First	**Rater 1:** Time 1 Time 2	 - 2	 - 1	 3 3	 1 -	 2 -	 3 -	Rankings by 3 raters
	Rater 2: Time 1 Time 2			 3 -	 1 -	 2 -		Time 2 Rater 2 could not be scored
	Rater 3: Time 1 Time 2	 - 1	 - 2	 3 3	 1 -	 2 -	 - -	The same in Time 1. Top 3 the same in Time 2. Top 2 reversed in time 1 & 2.
Second	**Time 1** **Time 2**	- 1	- 2	3 3	1 -	2 -	3 -	Mean: Highest factor means in times 1 & 2. Top 2 dif, times 1 and 2.
Third		4	5		1	2	3	Largest *changes* in means, Time 1-2: more than 1.0 Likert score.
Fourth		3	4	1	2			*Amount of change* from times 1 to 2, logit regression analyses.
	Time 1 Time 2	- 1	- 2	- -	1 -	2 -	3 -	Largest number of high factor scores.
	Time 1 Time 2	- -	3 -	- -	2 -	- -	1 -	Rank the factors by *regression coefficient* GLM.
Summary	Time 1 Time 2	- 1	- 2	- -	1 -	2 -	3 -	

Question/Approach	Time	Ideology	Politics	External Support	The Economy	I&O Resources	Effects	Criterion
3. Did the factors distinguish between I&O that survived and those that were terminated?								
First	Grouped factor ranks cannot be calculated.							
Second	*Time 1:* Surv'd Tm2	6	5	3	1	2	4	Compare mean factor scores, I&O that survived/ terminated times 1 & 2, rank factors.
	Terminated Tm2	5	6	4	1	2	3	
	Time 2: Surv'd	3	1	2	6	4	5	
	Terminated	1	2	3	6	5	4	
Third	Survived	4	5	6	1	2	3	Magnitude of change from Time 1 to 2 for surviving/ terminated: lg, small change.
	Terminated	4	5	6	1	2	3	
	Large change=1-3 Small change=4-6							
Fourth	*Time 1:* Surv Tm 2	6	5	3	1	2	4	Compare factor means above/ below 3.0.
	Terminated Tm2	4	3	2	1	5	6	
	Time 2: Surv'd	3	1	2	6	5	4	
	Terminated	2	3	6	1	4	5	
Fifth	*Time 1:* Surv'd Tm 2	6	5	3	1	2	4	Most important = mean of ranks for factors for I&O survived/ terminated (above).
	Terminated Tm2	4.5	4.67	3	1	3.5	4.5	
	Time 2: Surv'd	3	1	2	6	4.5	4.5	
	Terminated	1.5	2.5	4.5	1	4.5	4.5	
Summary, Q. 3.	*Time 1: Survived*			3	1	2	4	
	Terminated				1	2	3	
	Time 2: Survived	3	1	2				
	Terminated	1.5	2.5		1			

1=most important, 6-least important