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Matrix purpose in scenario planning: Implications of congruence with scenario project purpose

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ABSTRACT

This research seeks to improve success of scenario planning by showing the effects of congruence between the scenario planning purpose of the sponsoring organization, here called the scenario project purpose, and purpose created as product of (intuitive-logics) scenario matrix choices, here called scenario matrix purpose. Congruence between project purpose and matrix purpose is shown to facilitate scenario relevance to and use by the organization. Lack of congruence has the opposite effect. In this, the paper isolates a particular source of scenario formulation error, and so advances understanding of conditions that contribute to scenario project success. The findings are derived and illustrated from research into 13 scenario projects.

1. Introduction

Scenario planning has since the 1960s grown to become a small but significant part of business and organizational foresight processes. Its overall applicability to enterprise foresight is well-established (Mietzner & Reger, 2005) yet adoption and use of scenario planning has been checkered at best, prone to failure (Hodgkinson & Wright, 2002). The method has faced criticism by managers, particularly in that it returns results that are not applicable to real-world decision-making processes, for example in framing future views as "all-good" vs. "all-bad," with correspondingly too-crude implications for decision-making, or in advancing scenarios heavily imbued with social or ideological values which their organizations are not constituted to advance. Due to these, among various, "dysfunctions" of the scenario process (MacKay & McKiernan, 2010), scenario planning's potentially rich management decision-making gains become clouded, leading to uneven experiences with the method (O'Brien & Meadows, 2013; Rowland and Spaniol, 2017), which can lead to non-adoption or adoption as "window dressing" while future-strategic decisions are determined elsewhere, including via conventional forecasting processes. The problem therefore exists that, despite general consensus as to the validity of the scenario approach in managing new or uncertain environments, deep questions remain with regard to uneven success in application.

This study makes intervention into this problem, setting out to clarify from among the myriad of scenario planning approaches (Bradfield, Wright, Burt, Cairns, & Van Der Heijden, 2005; Chermack, 2018; Masini & Vasquez, 2000), how apparently different project cases contain an underlying, implied or intrinsic purpose in the scenario set, which is a function of the scenario matrix architecture (see section 4.1). This opens up the question of whether such purpose aligns with the larger purposes of the organization (or network of organizations) in its scenario project activities, here called scenario project purpose. The research proceeded by way of original case-based structured interviews with originators of scenario projects, seeking to identify the matrix purpose in each case, comparing this with the scenario project purpose, and drawing implications from presence or absence of congruence between these, particularly for overall success of the project as defined below. The results show how congruence is associated with relevance and

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usefulness of the scenario project to the client organization, while non-congruence has the opposite effect. The study therein finds explanation, in part, of scenario planning success or failure in the presence of congruence between scenario matrix purpose and scenario project purpose. In this, it identifies an indicator of poor or incomplete scenario planning practice, and how to avoid it.

The paper is organized as follows: the theoretical background with respect to the research question is discussed in Section 2; and research project choices and setup is explained in Section 3. Findings are presented in Section 4, including various clarifications and implications of these. Section 5 concludes with theoretical and management implications.

2. Theoretical background

The question of purpose, or uses, or benefits of scenario planning is considerably dealt with in the literature, and a wide variety have been identified, including: presenting a background for the design and selection of strategies (Burt & Chermack, 2008; Cornelius, Van De Putte, & Romani, 2005; Wright & Goodwin, 2009); enhancing the strategic conversation (van der Heijden, 1996); contributing to organizational learning (Burt & Chermack, 2008; De Geus, 1988); stretching mental models, defamiliarizing familiar situations, challenging conventional thinking inside the organization (Cornelius et al., 2005; Wack, 1985; Chermack & Coons, 2015a, 2015b); advancing sensemaking (Wright, 2003); an input to processes such as strategy, innovation and transition management (Wilkinson, Kupers, & Mangalagiu, 2013; Wilkinson, Kupers, & Mangalagiu, 2013); engendering respect for different worldviews (Ramirez & Wilkinson, 2014); building new social capital (Lang & Ramírez, 2017); and engaging target groups and enabling collaboration to address a “wicked” problem, (Rhisiart, Störmer, & Daheim, 2017). Bradfield et al. (2005)) observe four areas of use: making sense of a particular puzzling situation; strategy development; anticipation; and adaptive organizational learning. Varum and Melo (2010) argue there is a consensus on three scenario benefits, namely an “improvement of the learning process, improvement of the decision-making process, and identification of new issues and problems.” Wright, Bradfield, and Cairns, 2013; Wright, Bradfield, & Cairns, 2013) distil three primary purposes, these being: Enhancing understanding of causal processes, connections and logical sequences underlying events; challenging conventional thinking: to reframe perceptions and change the mindsets of those within organizations; and improving decision making: to inform strategy development.

Understanding that success in scenario planning cannot be decoupled from the question of purpose, and in view of the many varied purposes ascribed to scenario planning above, the research project here required making choices about which part of the spectrum of purposes to prioritize, and to justify such choice. In full view of the variety postulated above, the perspectives of Wack; Van der Heijden; Cornelius et al.; Chermack & Coons; and Wright et al., as cited—that is, understanding the purpose of scenarios as informing and improving strategic choices, illuminating and informing decisions under future uncertainty—were chosen as the benchmark for scenario success in organizational use. In other words, success for the purpose of this study is held to have occurred if at any point during scenario workshop, or scenario construction, or subsequently, the scenario process usefully added to the organization’s follow-on strategic thinking or decision-making process. In this it is acknowledged that some purposes ascribed to scenario planning are pushed to the margins, but it is also judged that what remains captures an essential and primary purpose very commonly held, not least among those who commission and pay for scenario projects. In this regard, the interpretation also subscribes to the “scenario-based strategizing” perspective (Lehr, Lorenz, Willert, & Rohrbeck, 2017) and also endorses the view that scenario planning and strategy formation should be further integrated (Godet, 2000; Tapinos, 2012; Wack, 1985; Wright, Cairns, & Bradfield, 2013).

Evaluating scenario success in use by the parties for whom they were created is by no means a perfect measure, not least in that a scenario set useful in this way may nevertheless become marginalized in management decision-making due to other factors. This may be due to organizational dynamics, or industry events (for example, where an M&A resets all agendas), or changed external conditions (dramatically in the case of UN Food & Agriculture Organization scenario set in this study, where all possibility of client use of the scenarios was upended by the “Arab Spring”). Also, as Burt, Mackay, van der Heijden, and Verheijdt, (2017) have argued, the extent of participant readiness to continue to engage in the scenario process will influence the effectiveness of the project in ongoing use. Conceptualization of success in relevance to decision-making also risks an assumption of linearity, that is, that the scenario method is seen to have sequential phases: “development” and then “use”. The linearity assumption is interrogated by Rowland and Spaniol (2017) who make the case for an iterative understanding of scenario development and use. No assumption of linearity is made in this study.

3. Research project

The research proceeded by way of 13 case-based semi-structured interviews with scenario workshop facilitators, or sponsors of scenario interventions, each referencing an actual scenario project, see Table A1 and B1. Projects were chosen and interview subjects recruited based on broad search of practitioner reports so as to achieve a rich and a diverse sample, as follows:

- Location. The projects chosen for interview cover a broad spectrum of North American, European, African, Asian, and Australian work in the field.
- Industry or sector. The projects reflect a wide spread of industries and sectors, including food, tourism, biotechnology, logistics, information technology, libraries, and finance, among others.
- Client type. The projects represent a spread of corporate, non-profit, agency, association, think tank and government work.

It is noted that in various cases the sponsoring organization for example *Bord Bia*, *Columbia Basin Trust, Public Library Network, Association of Research Libraries,* and *Trade Knowledge Network* are in fact meta-organizations, an organization of organizations,

(Ahrne & Brunsson, 2008). This has implications for how decisions are made or influence permeates, discussed in regard to the findings below, but the fact of a meta-organization in these cases did not affect respondents' clarity in being able to speak for and represent the purpose of the meta-organization, in response to Question 1 (Table C1).

The projects under study were particularly and only concerned with the 2 × 2 matrix "intuitive logics" (Bradfield et al., 2005) scenario construction method. While the author recognizes the various criticisms of this method (Curry & Schultz, 2009; MacKay, Stoyanova, Mackay, & Stoyanova, 2017; Ramirez & Wilkinson, 2014; Wright, Cairns et al., 2013), the 2 × 2 approach is a widely practiced scenario construction method in the field (Postma & Liebl, 2005; Ramirez & Wilkinson, 2014; Varum & Melo, 2010). The applicability of the research findings to projects that use other scenario construction methods is to be further researched.

Once a scenario project was identified for closer study, there followed the question of who to ask to represent it in interview. Given that the questions addressed the connection between the scenario project as it was developed and used, and the organizational backdrop to this, there were two categories of qualified specialist respondent: the external or internal facilitator who ran the project in association with the commissioning organization, or a representative of the organization if such person had been closely involved in the process. Both types of respondent are represented in the interview set. The questions, and rationale for each one, are presented in Table C1.

4. Findings

In the interviews, all respondents were easily and clearly able to represent the organization purpose (in answer to Q1), and particular scenario planning engagement purpose (Q2). Despite this clarity, it is recognized that interviewees may not have brought forth all purposes associated with the organization or its scenario planning intervention in a relatively brief interview format, and there may be variance between their answer and what a full and complete examination of the organization's mission and planning purposes might reveal. For the purposes of study, based on specialist interview and project source documents, interviewees' answers were taken as reliable and representative. Further, in no cases was there a noticeable disparity or incongruity between answers to Q1 and Q2—there was no case where the scenario planning engagement purpose was noticeably at odds with the overall organizational purpose. For this reason, the answers to these two questions are represented here with one construct, which is referred to as the scenario project purpose, which covers both the background organization purpose and its purpose in the scenario engagement.

Interviewees all stated in answer to Question 2, as expected, and as anticipated above, that their particular scenario project originated to fulfil a compound purpose rather than one simple purpose, including such elements as: provoking a sense of what might possibly occur; illuminating "the issues"; identifying important trends; combining probabilities in ways not thought of previously; making sense of complexity; stimulating discussion about the challenges ahead; facilitating group discussion of things not commonly addressed; promoting decision robustness and innovative intent; facilitating and creating common ground among stakeholders; and pushing thinking from short-term to long-term.

However, it also became apparent in answers to Question 4 that the scenario projects fell into two different camps in terms of expected influence over external macro-forces. *Public Library Network NSW; UPS; Bord Bia; Conservation International; Association of Research Libraries*, and *WEF* scenarios provide narratives about the evolution of external forces which the organization was seen to have, and expected to have, very minimal influence over. By contrast, those of *Arctic Council; Columbia Basin Trust; Office of the Presidency; Cofisa; Nautilus Institute; UN FAO;* and *Trade Knowledge Network* provided narratives where the organization was seen to have reasonably significant influence the relevant external macro-forces.

Taking examples from the first set of cases, the scenario project of *Bord Bia* (Irish Food Board) Anticipating Tomorrow: Shaping the Future of the Irish Food and Drink Market Towards 2020, is represented by the 2 × 2 matrix axes of (a) uncertainty "motivation for eating" and (b) "attitudes towards consumption." (Fig. D1) It is apparent that the outcomes represented by either of these axes are not within the purview of *Bord Bia* nor its members, these being food and agriculture companies across Ireland. Neither the scenario participants, nor their companies, were perceived to be able to significantly influence the forces the axes represented. In other words, as represented in interview, the matrix uncertainties were effectively "exogenous" to them. The scenario purpose we may deduce s therefore is primarily that of guiding scenario users to anticipate various outcome situations they could not significantly influence, to be better able to prepare for and manage their adaptation to them. In follow-on use of the scenarios, the facilitators (*The Henley Centre*) took them forward into workshops with *Bord Bia* member companies (taking the scenarios to, for example, a porridge factory) asking: "What happens to your company in this world?" or "What are the strategic opportunities for you in this world?"; in other words, helping to ready the factory to optimally adapt and align itself to future outcomes beyond its control.

A second example, the *Association of Research Libraries (ARL US)* 2030 scenarios, is represented by the matrix: (a) constraints on individual researchers, and (b) research enterprise aggregation. (Fig. D2). Constraints on researchers and level of research enterprise aggregation are, similarly, not variables ARL or its members may expect to significantly influence. The interviewee (see Table B1) stressed that the purpose was to create scenarios that were different to each other, without consideration to which of them might be preferred, in order to "think about different ways things could turn out," that is to inform adaptation to future eventualities beyond the ARL's control.

In contrast to these cases, the scenario projects of *Arctic Council; Columbia Basin Trust; Office of the Presidency; Cofisa; Nautilus Institute; UN FAO;* and *Trade Knowledge Network* each provide narratives about the evolution of external uncertainties where the organization is considered to have prospects for a noticeable degree of influence over external forces, and where ability to intervene and change the outcomes implied by these variables is in fact aspired to. In these cases, the activity of establishing better vs. worse outcomes, and getting users to align towards a preferred one, thereby begins a course towards influencing external forces so as to steer outcomes towards this outcome.

For example, the *Arctic Council's* Future of Arctic Marine Navigation 2 × 2 matrix axes are, (a) stability of governance, and (b) demand for resources and trade. (Fig. D3) The *Arctic Council* is "the leading intergovernmental forum promoting cooperation, coordination and interaction among the Arctic States, Arctic indigenous communities and other Arctic inhabitants on common Arctic issues" (arctic-council.org). With reference to this group, the axis of demand for resources and trade is exogenous—clearly the health of the world economy and attractiveness of global prices for materials and services is beyond the influence of Arctic Council members. However, outcomes along the "governance" axis were, according to the interviewee, reasonably considered to be within their meta-organizational collective agreement and influence. This is to say, it was perceived that, as a group, the relevant delegate communities have the power to steer away from ad-hoc governance, towards a rule-based system among themselves. The axis implies a variable outcome that is at least in part endogenous. The *Arctic Saga* scenario is presented as the most desirable scenario, representing good choices on the governance axis (and "good luck" on the resources & trade axis.) The good governance choice that will help bring about *Arctic Saga* is clearly advocated. All other scenarios lead to unequivocally worse outcomes, as described by their scenario names, and *Polar Lows* is the most dystopian future, being the product of both bad governance choices and bad luck on the resources-and-trade axis. The contending *Arctic Sag*a vs. *Polar Lows* scenarios are therein not two among various alternative ways the external environment may evolve. They are a single counter-posed story of good vs. bad outcomes which together functioned to illuminate future implications of choices available to Council delegate communities, and so guide decisions towards influencing the endogenous uncertainty towards the better governance.

Another example is *Columbia Basin Trust's* Shaping Our Future Together scenarios, structured by the axes (a) ability to create sustainable regional systems, and (b) response to challenging economic conditions. (Fig. D4) The *Columbia Basin Trust* (ourtrust.org) is a member-organization representing a broad base of economic and societal stakeholders in the British Columbia region. Via this scenario set, it presented its member base with a preferred-outcome scenario, *Blooming BEST Basin*, vs. less ideal outcomes, and a worst outcome, *Paradise Lost*. *BEST* functions as an advocated blueprint for endogenous choices and actions available on both axes, so as to bring this outcome into being. In other words, according to the interviewee, the Trust considered that its members had the power to make the *BEST* future occur, via creating sustainable regional systems and in responding proactively to economic change. By doing this it perceived its member organizations to have significant influence over the variables the axes represented, that is, that the axes were endogenous to them (including the wider sphere of alliances and resources the member-group could leverage.)

In this way, what is apparent in all of the cases studied, in response to Question 4, is the presence of one of two alternative assumptions with regard to influence over external macro-forces, as represented by the axes chosen: (1) external forces are viewed as mostly exogenous to the scenario agency, or (2) forces are viewed, at least in part, as endogenous to it. In the former cases, scenarios are useful primarily in illuminating alternative future outcomes to guide decision-makers to optimal choices for their organization whatever scenario emerges; in the latter, scenarios are useful primarily in illuminating better vs. worse outcomes, advocating the better, and guiding users to make choices to influence the endogenous force(s) to achieve it.

Thus far, the findings closely reflect a common understanding in the literature, whereby analysts make distinction between scenario projects that create strategic readiness via exploration of options or "wind-tunneling" proposed strategies (Schoemaker, 1995; van der Heijden, Bradfield, Burt, Crains, & Wright, 2002; De Smedt, Borch, & Fuller, 2013; Lehr et al., 2017;), and those that seek to bring about a visionary, aspirational, desired or preferred objective, a purpose that most commonly goes by the term "normative scenarios" (Börjeson, Höjer, Dreborg, Ekvall, & Finnveden, 2006; Godet & Roubelat, 1996a, 1996b; Gordon, 2011; Kahane, 1992, 2013; Ogilvy, 1992, 2002). This purpose duality is also described by Galer (2004), and summed up by Van Notten, Rotmans, van Asselt, and Rothman, (2003) who say, scenarios:

> "can be broadly subdivided into so-called macro, global, archetypal, framework, external, or contextual scenarios on the one hand; and focused, decision, internal, or transactional scenarios on the other… Whether an issue addresses the contextual or transactional environment is determined by whether the institution can directly influence the issue under study."

Godet and Roubelat (1996a,1996b), and Durance and Godet (2010) similarly pit normative scenarios in contrast to scenarios of "exploratory" type, where exploratory starts from past and present trends pointing to likely futures, while normative is built on desired or feared futures. The authors elaborate the concept of "la prospective" as a mechanism to illuminate and enable the future-influencing actions required to arrive at the desired future. Kahane (1999) refers to "adaptive" scenarios whose purpose is to help the organization adapt to its changes. These stand in contrast to scenarios that seek to, in his term, "influence destiny."

4.1. Presence of scenario matrix purpose

It is observed in the research, comparing the matrixes actually formed in each of the 13 projects to the interviewee responses given to Question 1 and 2, that the purpose of the scenario sets implied by their matrix construction does not naturally follow from, nor necessarily align with the organization scenario project purpose. This relied on the primary observation that a scenario set purpose, independent of organizational or scenario project purpose, is in itself implied by the 2 × 2 matrix. In the 13 project matrixes studied, it is observed that such matrix purpose is produced by axis choices, as follows: where the scenario set is based on a matrix with at least one axis that has an good vs. bad outcome polarity (one outcome direction implies a distinctly better future than the opposite direction implies) for all stakeholder groups in general, not just the particular organization; *and* that uncertainty is understood to be, or expected to be influenceable by (endogenous to) scenario users, either directly, or via the wider scope of influence they can muster, then normatively oriented scenarios (ref. above) purpose is implied in the constitution of the matrix. If this condition is absent, that is, both axes are outcome value-neutral and-or exogenous to realistic influence, then exploratory, adaptive scenario purpose is implied by the matrix.

For example, in the case of Future Of Arctic Marine Navigation, it is the "governance" axis which has both generalized good vs. bad value attributes (stable, rules-based vs. unstable, ad-hoc) these being perceived, as reported in interview, to be influence-able by Arctic Council member-organizations and the individuals who populate them (they could choose to move towards a stable, rules-based governance system). The criteria described above are met, and a normatively-oriented purpose is implied by the scenario matrix. By contrast, taking the case of *Bord Bia's* The Future of the Irish Food and Drink Market, where the axes of uncertainty are "motivation for eating" and "attitudes towards consumption," neither has a generalized good vs. bad element, and neither is perceived to be significantly influenceable by a national food board or its member clients. The scenario matrix therein implies exploratory scenarios: it produces effectively uninfluenceable alternative environments in which members can explore options and test strategies.

Across the 13 projects studied there exists similarly an implied adaptive or normative orientation present in the scenario matrix itself, determined by the axes chosen, as explained above. Further it is apparent from the projects studied that the matrix purpose exists notwithstanding the original intentions of the scenario makers. The implications of this insight are foundational. While it is commonly and correctly held that scenario project purpose and client intent informs the choice of axes (it is expected that the axes function to advance and ultimately realize the scenario project purpose, or the wider organizational purpose), if the matrix also has its own implied purpose, the door is opened to the possibility that such purpose may not necessarily be aligned with, and indeed may be in conflict with, the organization's scenario project purpose. In other words, implied purpose may in some cases be non-congruent with scenario project purpose. Presence or absence of such congruence explains, in part, scenario planning success or failure, as discussed in the following sections.

4.2. Observations of scenario success and failure

Applying the results of Question 6, that is, whether the project furthered the purpose of the project participants, or the sponsor, returns an important picture. By this measure, according to the interviewees for each project (Table B1), the successful projects were reported as being those of *Arctic Council, Conservation International-CSIRO; Association of Research Libraries; Bord Bia,* and *UPS*. Projects reported to be less or completely unsuccessful by this measure were *Office of the Presidency; Cofisa; Nautilus Institute; Trade Knowledge Network, World Economic Forum; FAO;* and *Public Library Network NSW*.

Taking specific examples, as reported by the interview subjects, the *Arctic Council's* Future of Arctic Marine Navigation guided council members (in member organizations) to make good choices on the endogenous Governance axis; and Shaping Our Future Together helped guide *Columbia Basin Trust* communities work towards better outcomes by influencing both endogenous axes portrayed in the scenario set. These scenario projects were reported to have been relevant and useful in furthering the aims of their commissioning organizations. It is apparent that in these cases the scenario project purpose was normative (advocating the emergence of preferred scenarios *Arctic Saga* or *Best Basin*) and the scenario matrix purpose was congruent to this, in terms of the mechanism described in 4.1 above. Also, the possibility of such normative influence was credible, that is, the leverage the participants collectively had at their disposal could plausibly have influence with regard the outcome of the external uncertainty. There was a tenable way to take the scenarios forward into follow-on use.

Considering examples of successes of adaptive type, the *Association of Research Libraries* 2030 Scenarios, structured by exogenous axes, were used by librarians in perceiving and preparing for potential new industry externalities beyond ARL's control, suggesting ways its systems and offerings may need adapting to remain current and competitive. Similarly, *Bord Bia's* scenarios were used in follow-on workshops to stimulate Irish food and agriculture firms prepare themselves to operate in new food-chain and food-consumption environments the emergence of which they had very little control over. In such cases, the scenario projects were also reported to have been relevant in furthering the aims of their commissioning organizations. It is apparent that in these cases the scenario project purpose was exploratory and adaptive ("how do we shape ourselves to survive and thrive in view of macro-externalities we don't much control?"), and the scenario matrix purpose in each case was congruent to this.

Turning to cases that reported little or no follow-on use of the scenarios, examining *Cofisa's* Biotechnology Scenarios for Southern Africa, we see the matrix: (a) Urban focus vs. Rural focus, and (b) Knowledge economy vs. Neo-industrialization (Fig. D5). *Cofisa* is an acronym, Collaboration Finland and South Africa, and the project was a joint venture between the South African Government Department of Science & Technology and the Finnish Ministry of Foreign Affairs. The scenarios describe outcomes for biotechnology industries in the rural Eastern Cape region, putting forward *Rurbal Balance* (knowledge economy thrives in rural communities) as a normative, preferred outcome.

According to the interviewee (Table B1), this project failed to further the aim of its commissioning organizations, nor see follow-on use. It is apparent in this case that while the scenario project purpose was normative (advocating the emergence of a rural knowledge economy, *Rurbal Balance*), the scenario matrix purpose was not congruent with this. While it did describe a better future vis-a-vis the status quo, it did not provide at least one matrix axis that was credibly within the influence of the scenario makers or their wider stakeholder community. While the sponsors and workshop participants had a normative project purpose (to define and bring *Rurbal Balance* into reality), there was no credible prospect that they, or any of the wider stakeholders implied, including the South African government itself, could the macro-externalities as represented in the scenario matrix. Urbanization is an overwhelming exogenous force in this region, as it is most places in the world, and the project stakeholders involved had similarly negligible say over the mix of industrial vs. knowledge economy, and in fact negligible influence on economic activity of any kind. (The region has an unemployment rate of more than 50 percent and a high-school dropout rate of 75 percent, and the only de-facto industry is motor car assembly.[1]) In sum, the scenario set is built on axes that are effectively exogenous to the participants' influence, well beyond their realm of control. This means there were no choices or actions available to scenario agents or users to shift outcomes

along either axis towards the normatively outcome (while the matrix axes would work well for use in exploring possibilities and creating strategies to advance the Eastern Cape region whichever scenario emerged). The scenario purpose was normative but the matrix purpose was adaptive. The scenario project stalled in use.

Considering an adaptive-format case, scenarios done by the *Public Library Network*, New South Wales use the matrix, Impact of ICT: (a) General vs. Niche, and (b) Chaotic vs. Ordered (Fig. D6), in terms Question 6, the interviewee reported: "I'm sorry to say that nothing happened after the session. The 150 people who were involved in the project came away having had a good time."

Explanation for this is found in the interviewee further clarifying the process, as follows:

> "We like to start with a 'preferred future' (vision) that the organization would like to see. This tells us what are the events that need to happen for that future to come about. In this particular case, however, there was not enough funding to do the vision part. We just did phase two. But the point of phase two, the point of the of scenarios as a whole, was telling us what are the things we need to do to intervene in the external environment to get us somewhere we prefer."

In other words, the scenario participants were seeking to identify and achieve a preferred future for their librarianship community, rather than adapt optimally to whatever new environment emerged. That is, the project purpose was normative. However, due to financial limitations and resulting process choices, these participants were set into an adaptive scenario matrix (axes being effectively exogenous to their influence). The users' purpose was normative, but the scenario matrix purpose was adaptive. The scenarios stalled in use.[2]

For the 13 scenario projects studied, the table of matrix purpose, project purpose, and reported success-in-use, as defined in section 2 above, is as follows:

Commissioning organization	Scenario project	Scenario matrix purpose	Scenario project purpose	Congruence of purposes	Reported Success in use
Columbia Basin Trust	*Shaping Our Future Together*	Normative	Normative	Yes	Yes
Arctic Council	*Arctic Marine Navigation in 2050*	Normative	Normative	Yes	Yes
Association of Research Libraries	*The ARL 2030 Scenarios*	Adaptive	Adaptive	Yes	Yes
Trade Knowledge Network	*Trade and Agriculture in Southern Africa*	Normative	Normative	Yes	Yes
Office of the Presidency	*South Africa Scenarios 2014*	Adaptive	Normative	No	No
Conservation International / CSIRO	*Exploring Ecotourism in Milne Bay-Papua New Guinea*	Adaptive	Adaptive	Yes	Yes
Public Library Network, New South Wales	*The Bookends Scenarios*	Adaptive	Normative	No	No
Nautilus Institute	*North Korean Nuclear Crisis*	Normative	Adaptive	No	No
Cofisa: Collaboration Finland-South Africa	*Biotechnology Scenarios for the Eastern Cape*	Adaptive	Normative	No	No
Bord Bia (Irish Food Board)	*The Future of the Irish Food & Drink Market 2020*	Adaptive	Adaptive	Yes	Yes
United Parcel Service (UPS)	*Migration to Open Source Systems*	Adaptive	Adaptive	Yes	Yes
UN Food & Agriculture Organization (FAO)	*Food for Thought: Discovering Common Ground*	Normative	Normative	Yes	No
World Economic Forum	*Future of the Global Financial System*	Normative	Normative	Yes	Yes

In all cases where there was congruence of implied scenario purpose and scenario project purpose, there was success in use, as defined (with one exception: *UN FAO*, where the "Arab Spring" altogether overwhelmed the implementation of scenarios.) In all cases where this congruence did not exist, scenario success as defined above was absent. Such congruence of purpose is therefore proposed as an indicator of whether a project will be successful as defined—understanding this is a necessary but not sufficient condition—and non-congruence is a predictor of failure. Across the study, non-congruence was caused by one or both of (a) failure of scenario makers to recognize implied matrix purpose, or (b) misapprehension (overestimation) of influence over externalities, meaning that axes that effectively exogenous were mistakenly considered to be endogenous, and therefore used in creating normative scenario matrices.

4.3. Resolving apparent contradictions of purpose

Thus far the study has found, in line with the literature cited, that scenario project purpose may be adaptive or normative, and that this may or may not be congruent with scenario matrix purpose. The findings indicate that where these are not congruent the scenario project does not succeed, in terms of success as defined. In order to refine this argument, it is necessary to address common experience that organizations often have and enact both adaptive and normative strategies to achieve their goals. While the categories of scenario project purpose reflected here, and widely observed by analysts, as cited, are logically at odds with one another: seeking to optimally align with an effectively uninfluenceable external forces vs. seeking to normatively shape such externalities, are

[1] https://businesstech.co.za/ Viewed January 6, 2017.

[2] After five years of non-activity the project was revived, including reexamining its primary purpose. www.sl.nsw.gov.au/sites/default/files/building_bookends_scenarios.pdf

contradictory, in reality organizational strategies that follow from these purposes may overlap and be pursued simultaneously, in that adapters will also try to influence externalities where possible, and norm-advocators will adapt themselves even as they seek to influence external forces. This is analyzed below.

4.3.1. Preference for legacy conditions

It is observed in the cases researched here that all scenario users sought to bring about a "better future" for their organization, but the path to the preferred future was different: in scenario projects classed as adaptive, for example that of *Bord Bia*, the organization sought a better future on behalf of its members by helping them become ready to optimally adapt to changing macro-conditions they could not influence; while the *Arctic Council*, for example, sought to achieve a better future for its members by persuading stakeholders to come together to influence the external environment (in its case, the governance environment.) However, it is apparent that an adaptive-mode scenario matrix may return one scenario that is manifestly a better, preferred outcome for the client organization. That is, a situation may well arise (despite methodological choices towards adaptive scenarios, see 4.1 above) where an organization using scenarios to explore and optimally adapt to a spread of scenarios, perceives one of them as "preferred". For example, the *Bord Bia* scenario *Round the Table: Local & Ethical* would be a preferred future for local, small-scale farmers. Similarly, *In the Lab: Performance & Achievement* is likely to be the preferred future for an agribusiness with research capabilities. In the *UPS* scenarios (Fig. D7), of the four scenarios, *Why Bother?* Was, according to the interviewee, strongly preferred by *UPS* management in that it represented no requirement to change service models or offerings within the logistics industry where it is an established leader. That is, *Why Bother?* was the scenario for which *UPS* was already strongest for and which required least change to succeed in, and which therefore provided easiest path to continued success.

Manifestation of preference is to be expected, even in adaptive scenario use, because all organizations enter the scenario process with pre-established areas of competence or advantage, that is, legacy competencies. What we have here is scenario preference based o*n found congruence with existing or past advantage.* In such cases there is no wider industry or sector concurrence around this preference, because not all players have the same legacy competencies. Nor is there any implication that the scenario-making organization, or any organization, can significantly influence macro-externalities to achieve the preferred scenario outcome. In fact, adaptive scenario project purpose (as defined in 4.1 above; and addressed in answer to Question 2, see Table C1) is specifically designed to challenge an organization to think how it might best act were the outcome situation to be other than what it would have preferred.

4.3.2. Circumstantial influence

In similar vein, the research reveals situations where influence over externalities exists and is enacted, but which does not countermand the overall purpose of adaptive scenarios. For example, in the *Bord Bia* scenarios, expectation of influence over macro-externalities in fact varied among different members of the agricultural association's network, based on their different profiles: while small food companies perceived themselves to be completely at the mercy of outside forces, large entities, for example *Tesco Ireland*, felt they could have at least some shaping or lobbying influence over external macro-forces (including those specifically structuring the scenario matrix: *Attitudes towards Consumption* and *Motivation for Eating*.) Similarly, *UPS* acknowledged in interview that by virtue of its size and industry power, it could well have influence in external areas, including over the *Cost of Ownership* (of open source systems) uncertainty axis in its scenario matrix, via its power to negotiate price breaks when buying equipment or professional services.

In cases where an organization finds itself with some circumstantial influence over external macro-forces (for example in enacting supply chain preferences, or lobbying regulators, or buying out competitors), it may be expected to exert this influence to shape externalities towards outcomes it prefers. However, it remains apparent in all of the cases classed here as adaptive, that the fundamental purpose of the scenarios was to spur the organization to avoid reliance on this influence which was recognized to be relatively weak in the face of overwhelmingly powerful external forces of change. Weak influence of this type in adaptive scenario formation is therefore also a "found condition," not to be confused with the influence implied in normative scenarios, where a very great deal of influence is assumed (or is hoped for, or expected to be created and harnessed via networks of outreach and leverage) and the preferred scenario is built to motivate and channel this influence.

This position is also specifically in line with a complexity-based view of the external environment (2013b, Wilkinson et al., 2013a) which incorporates perspectives from complexity science into (intuitive logics) scenarios, and sees a more fluid relationship between the macro environment and organizational influence than is commonly perceived. Complex systems are understood to be made up of interdependent elements all of which enact agency and therein contribute to overall outcomes; this view therefore sees even weakly empowered organizations as having greater agency than that of mere adaptation. Moreover, while one entity may have minimal discernable influence over externalities, such influence may muster further power through the cumulative, collective actions of many agents. In similar vein, Vecchiato (2012) posits relaxation of the assumption that "key elements of the business environment are exogenous to the organization's own efforts," proposing an endogeneity view whereby organizations are understood to be influencing and reciprocally influenced by macro-conditions in attempting to shape external elements.

5. Theoretical and management implications

The fruits of this research may be understood as an addition to the literature that aims to improve understanding of the role and purpose of scenarios and conditions for their successful use, including the subset of work which addresses itself to augmenting the 2 × 2 intuitive logics model (Derbyshire & Wright, 2017; Wilkinson, 2009; Wright, Cairns et al., 2013). The findings identify a particular form of poorly applied or badly managed scenario process, this being one where congruence of scenario matrix purpose and scenario project purpose is not adequately attended to. The case examples show the success implications of congruence between matrix purpose and scenario project purpose, and what can go wrong if the scenario process is remiss in this particular way.

The analysis drawn here also corroborates and adds to Ramirez and Wilkinson (2014):

> "The choice of [scenario] method cannot be decided independently of considerations about who the scenarios are for (the 'user') and how exactly the scenarios will help the user create value… fudging either will contribute to disappointment and, quite possibly, engagement failure. The challenge of identifying client(s) and purpose and use is, in our experience, often overlooked in the choice of scenario building method."

It is proposed that recognizing client purpose as described in this study, and ensuring scenario matrix purpose is congruent with this, provides a new and significant way to assess whether such directions to attend to user and purpose have been adequately carried out.

Further, the research findings suggest two preparatory stages are required when setting up the scenario project, to achieve purpose congruence. The first is a "project purpose audit," to investigate an organization's purpose in undertaking the scenario project, not only in general terms (seeking to surface "the issues," make sense of complexity, stimulate discussions, advance understanding, illuminate challenges and opportunities, etc.) but specifically in terms of how it sees itself with regard to influencing external forces relevant to the terrain of the scenario project, and whether such is, or to what meaningful extent it is, in fact a part of the organization's planning purpose. This will illuminate choosing a scenario matrix purpose format that matches this purpose.

Moreover, it is one thing for an organization to aspire to influence external forces, another to be able to achieve this. If the purpose audit returns normative purpose, the further consideration becomes: does the scenario-building agency in fact have enough influence, or ability to broadly leverage enough influence, over the relevant external forces to justify holding such purpose? If its scope of influence is small, or if the relevant external forces are overwhelming (the organization perceives them as endogenous when in fact they are not) then proceeding with normative scenarios creates a path to action that cannot be fulfilled. The implication is a need for a second preparatory step in setting up a scenario project: an audit of the organization's capacity to influence the relevant external forces, or of the limits of such capacity. Such an assessment, a "capacity-constraint audit," would lead the scenario-building organization to understand how strong or weak its influence over externalities in fact is, and where particularly that influence lies. (Vecchiato (2012) refers to this mechanism as "control" where control "measures the level of influence an organization can have on the components of its environment.")

Together these two audit steps will help scenario makers avoid bad practice by guiding choice of a scenario matrix orientation congruent with scenario project purpose, and vetting its real capacity to influence the external environment where this is aspired to. On this basis, the organization will be empowered to make a valid scenario matrix choice: normative if its purpose is to influence externalities within its chosen domain, and its capacity to do this is sound, and adaptive in all other situations. This will orient the scenario output to be more successful in being congruent with the organizational future planning purpose it serves and the capacity of the organization to implement it.

Appendix A

Table A1
Scenario projects selected for study.

Commissioning Organization	Title of Scenario Set	Scenarios Location	Principal Sector Addressed	Client Type
Columbia Basin Trust	*Shaping Our Future Together*	British Columbia, Canada	Environment	Agency
Arctic Council	*Arctic Marine Navigation in 2050*	Arctic region	Trade & Industry	Association
Association of Research Libraries	*The ARL 2030 Scenarios*	Washington DC, USA	Research libraries	Association
Trade Knowledge Network	*Trade and Agriculture in Southern Africa*	Zimbabwe	Trade	Network
Office of the Presidency	*South Africa Scenarios 2014*	South Africa	National development	Government
Conservation International / CSIRO	*Exploring Ecotourism in Milne Bay-Papua New Guinea*	Papua New Guinea	Tourism	Agency / Research
Public Library Network, New South Wales	*The Bookends Scenarios*	New South Wales, Australia	Public libraries	Network
Nautilus Institute	*North Korean Nuclear Crisis*	North Korea	International Relations	Think tank
Cofisa: Collaboration Finland-South Africa	*Biotechnology Scenarios for the Eastern Cape*	Eastern Cape, South Africa	Biotechnology	Agency / Government
Bord Bia (Irish Food Board)	*The Future of the Irish Food & Drink Market 2020*	Ireland	Food & Agriculture	Trade association
United Parcel Service (UPS)	*Migration to Open Source Systems*	United States	Software & Logistics	Corporation
UN Food & Agriculture Organization (FAO)	*Food for Thought: Discovering Common Ground*	Egypt	Food & Agriculture	Development
World Economic Forum	*Future of the Global Financial System*	International	Finance	Think tank

Appendix B

Table B1
Interview Schedule.

Columbia Basin Trust Date of Interview: March 12, 2012	**Interviewee:** Juliet Fox, Future IQ Partners / Innovative Leadership, Minneapolis: Lead Facilitator of the project.
Columbia Basin Trust Date of Interview: June 13, 2012	**Interviewee:** Juliet Fox, Future IQ Partners / Innovative Leadership, Minneapolis: Lead Facilitator of the project
The Future of Arctic Marine Navigation Date of Interview: March 13, 2012	**Interviewee:** Dr. Eric Smith, Senior Practitioner, Global Business Network (a Member of the Monitor Group), San Francisco: Lead facilitator of the project.
Association of Research Libraries (U.S.) Date of Interview: March 15, 2012	**Interviewee:** Karla Streib, (ex) Assistant Director for Transforming Research Libraries, Association of Research Libraries, Washington D.C.: Client Representative for the project.
Trade and Agriculture in Date of Interview: March 16, 2012	**Interviewee:** Tanja Hichert, Institute for Futures Research, Cape Town. Co-lead Facilitator for the project.
South Africa Presidency Scenarios 2014 Date of Interview: March 19, 2012	**Interviewee:** Dr. Harry Dugmore, Rhodes University, Grahamstown: Coordinator and Lead Facilitator of the project.
Ecotourism in Milne Bay, Papua New Guinea Date of Interview: March 21, 2012	**Interviewee:** Dr. Erin Bohensky, Research Scientist, Ecosystem Sciences Social & Economic Science Programme, CSIRO, Cairns, Australia. Co-lead Facilitator of the project.
Public Library Network, New South Wales Date of Interview: March 23, 2012	**Interviewee:** Oliver Freeman, Director, Neville Freeman Agency, Sydney: Lead Facilitator of the project.
North Korean Nuclear Crisis Date of Interview: March 26, 2012	**Interviewee:** Doug Randall, Managing Partner, Monitor 360, San Francisco: Lead Facilitator of the project.
Biotechnology Scenarios for the Eastern Cape Date of Interview: March 28, 2012	**Interviewee:** Dr. Bob Day, Founder and Co-Director, Non-Zero-Sum Development, Pretoria. Lead Facilitator of the project.
Irish Food Board: Bord Bia Date of Interview: April 27, 2012	**Interviewee:** Rachel Lloyd, (ex) Associate Director, Henley Centre Headlight Vision, London: Lead Facilitator of the Project.
United Parcel Service: Migration to Open Source Systems Date of Interview: April 30, 2012	**Interviewee:** Edward M. Rogers, Global Strategy Manager, UPS Corporate Strategy Group, Atlanta: Convenor and Client Liaison for the project.
Agricultural Produce in the Nile Basin Date of Interview: April 30, 2012	**Interviewee:** Dr. Peter Schütte, Schütte & Company, Amsterdam. Lead Facilitator of the project.
World Economic Forum: Future of the Global Financial System Date of Interview: June 13, 2012	**Interviewee:** Nicholas Davis, Associate Director and Deputy-Head of Strategic Foresight, World Economic Forum, Geneva. Lead Facilitator of the project.

The schedule below records the primary and significant follow-up interviews (where applicable) that were conducted by the researcher, following scenario project document study and selection. Various ongoing short post-interview calls for additions and clarifications are not recorded.

Appendix C

Table C1
Interview questions.

Question	Rationale
1. Who was the commissioning organization (or sponsor) of the project, and what is that organization's core mission or key purpose?	Question 1 probed the pre-existing and continuing purpose of the commissioning organization, and its purpose in adopting foresight or planning, allowing reflections on the congruence between this and the purpose sought in the scenario project.
2. What was the aim or purpose of this particular scenario project? Why was a scenario approach chosen?	Question 2 sought elaboration of the answer to the first question, to further investigate why, according to the interviewee, a scenario approach, particularly, had been chosen and what purpose it was expected or hoped it would fulfil.
3. Other than the facilitators, who participated while the scenarios were in either (a) the preparation or (b) the construction phase?	Question 3 determined who (other than facilitators) participated directly in the project, which prepared consideration of Question 4.
4. The scenarios built around two vectors of uncertainty, which provide a matrix structure for scenarios development. In this case, the axes are [named by the interviewer, as per specific case under study]. To what extent were the real-world outcomes of these uncertainties perceived to be under the control or influence of the participants, or the commissioning organization (either in themselves or via broader networks of influence and persuasion)?	Question 4 assessed how much influence over the external environment the working group or organization representatives perceived themselves to have (either in themselves or via wider vectors of influence they could muster) by asking to what extent the scenario outcomes were perceived to be under the control or influence of the participants: did they expect to be able to influence outcomes as represented by the axes, or did they think the primary drivers of uncertainty in their future were beyond their influence?
5. With reference to the matrix, it appears that one [alternatively, two; alternatively, none] of the scenarios [named by the interviewer] describes a distinctly better outcome for the organization, or for the sector, or for the world at large. (a) Was this the aim? (b) If so, what did this imply for the purpose of the scenarios, or the constraint conditions of the organization in its context, as perceived at the time?	Question 5 focused on the 2x2 uncertainty matrix itself, and reflected to the interviewee the researcher's perception of the presence or absence of "good vs. bad" scenario outcomes for verification; and continued to ask whether this was intended, or integrated into the overall purpose and use of the scenarios.
6. Once the scenarios were constructed, how were they put to use (or not)? How did the project further the purpose of the project participants, or the sponsor (or not)?	Question 6 determined whether the scenario project had been put to use in practice, orto what extent follow-on use of the scenarios (beyond their construction and initial dissemination) had been present or absent, with a view to eliciting the interviewee's impression of ongoing value of the work to the client organization.

Appendix D

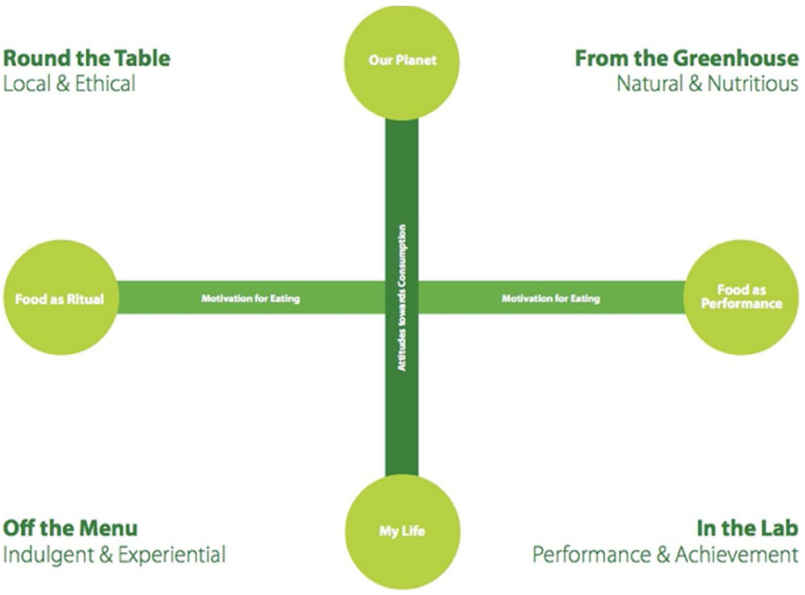

Fig. D1. Anticipating Tomorrow: Shaping the Future of the Irish Food and Drink Market Towards 2020. Source: Henley Centre Headlight Vision (2007). p.22.

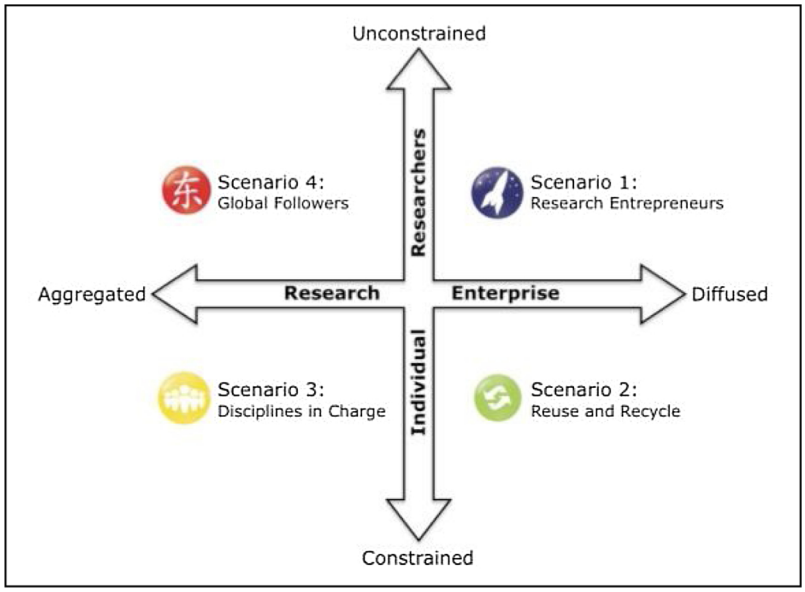

Fig. D2. The ARL 2030 Scenarios: A User's Guide for Research Libraries. Source: Association of Research Libraries. (2010). p.13.

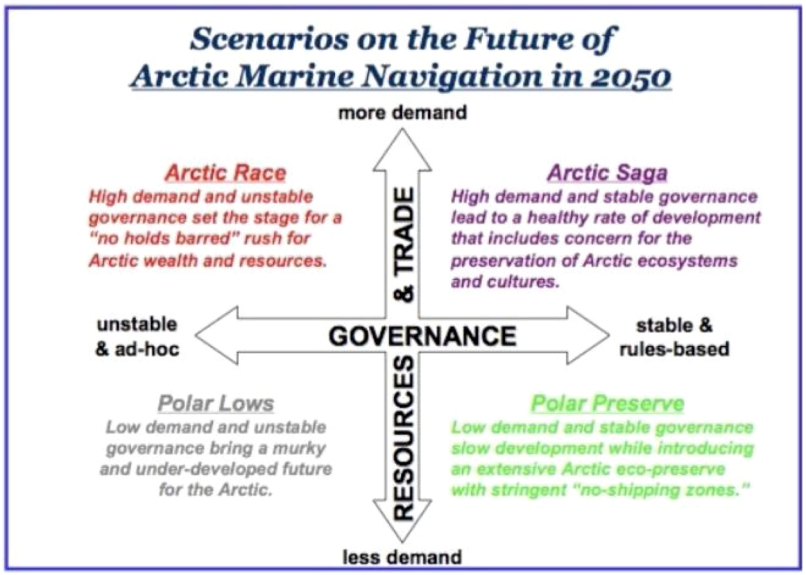

Fig. D3. Arctic Marine Navigation to 2050. Source: Arctic Marine Shipping Assessment of the Arctic Council's Protection of the Arctic Marine Environment Working Group (2008). The Future of Arctic Marine Navigation in Mid-Century: Scenario Narratives Report. p.5.

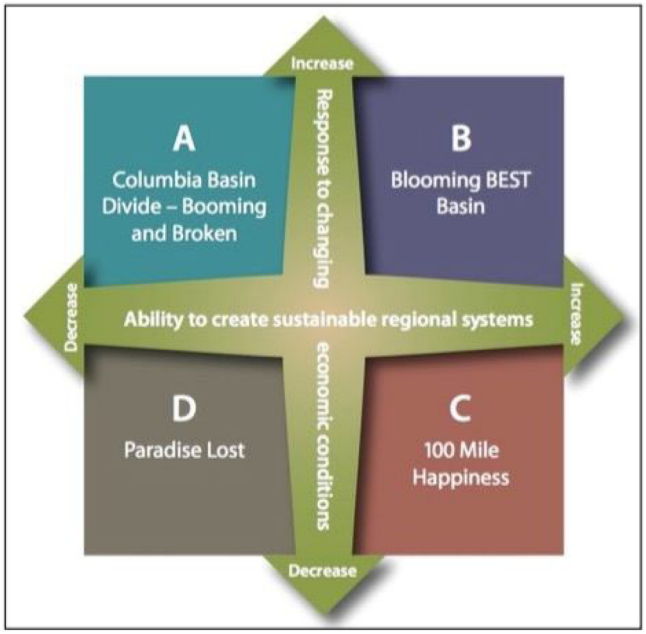

Fig. D4. Columbia Basin Trust – Shaping Our Future Together. Source: Columbia Basin Trust (2010). Shaping our Future Together: 2010 Columbia Basin Symposium, Scenario Planning Summary Report. p.10.

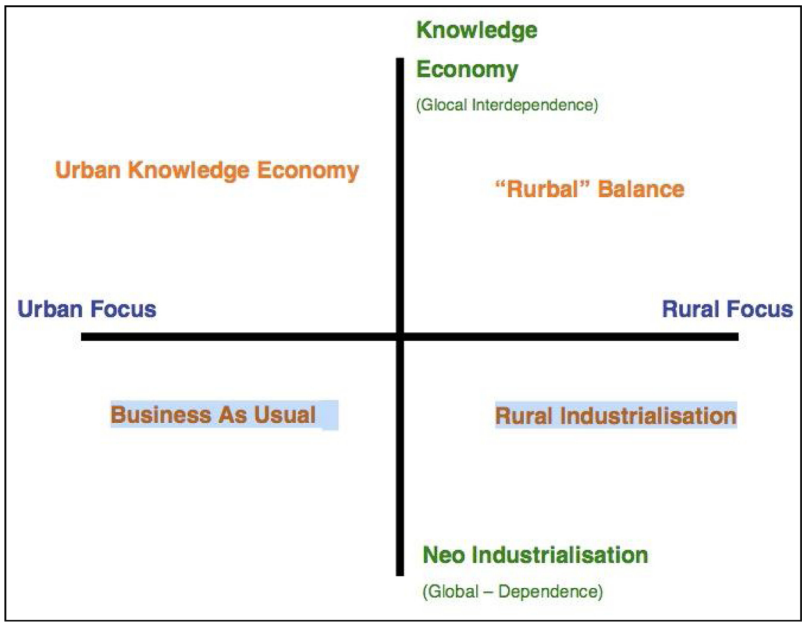

Fig. D5. Three Biotechnology-Related Scenarios for the Eastern Cape. Source: Non-Zero-Sum Development. (2009). p.1.

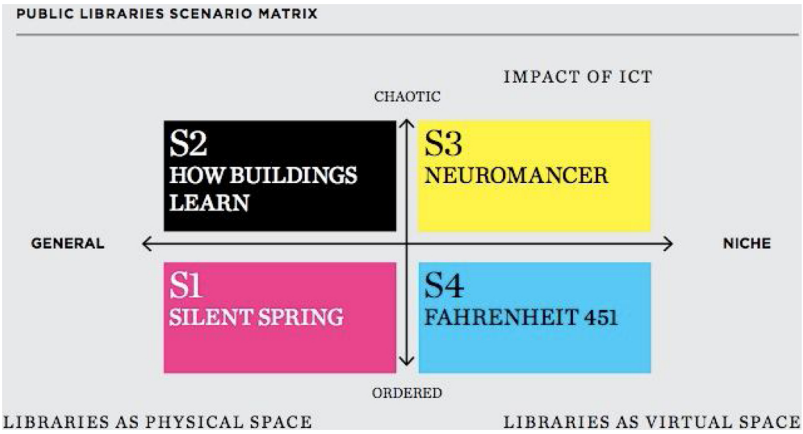

Fig. D6. Neville Freeman Agency. (2009) The Bookends Scenarios: Alternative Futures for the Public Library Network in NSW in 2030. p.2.

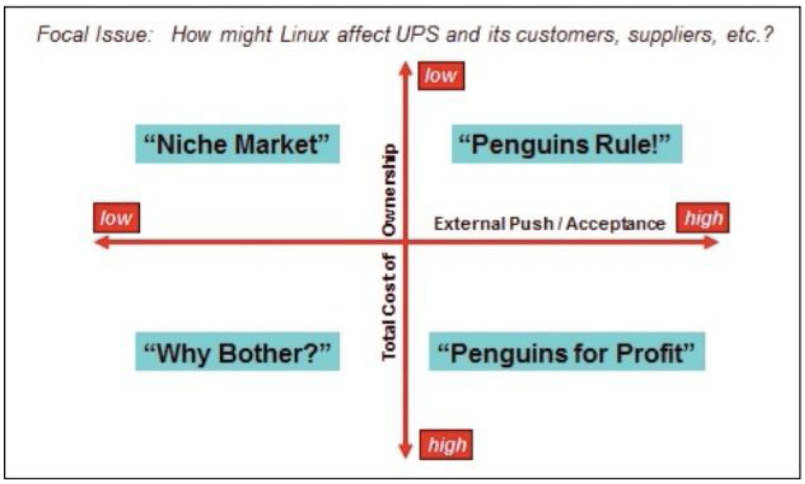

Fig. D7. UPS - Migration to Open Source Systems. Source: Edward M. Rogers, Global Strategy Manager, UPS Corporate Strategy Group.

Appendix E

Scenario document sources:

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