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Technological Forecasting & Social Change



Does the intuitive logics method – and its recent enhancements – produce “effective” scenarios?

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ABSTRACT

In this paper, we synthesize the extant literature to establish the common objectives of scenario interventions within organizations and contextualize the well-established, but basic, “intuitive logics” scenario development methodology. We next consider if the basic intuitive logics method achieves these objectives. Then, we consider recent augmentations of the intuitive logics method and evaluate whether these augmentations enhance the basic method’s capabilities. We find that there is a strong case for arguing that these scenario methods are designed to address two of the three objectives that we identified from the literature, namely: (i) *enhancing understanding*: of the causal processes, connections and logical sequences underlying events – thus uncovering how a future state of the world may unfold, and (ii) *challenging conventional thinking* in order to reframe perceptions and change the mindsets of those within organizations. However, other than in the augmentation in which multi-attribute value analysis is applied, none of the recent developments that we detail address directly the third objective that we distil from the literature: (iii) *improving decision making*: to inform strategy development. On this basis, we conclude that the ubiquitous term “scenario planning” is a misnomer and propose that other “scenario” terminologies might usefully be adopted that more precisely indicate the process and objectives of scenario interventions.

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1. Introduction

In this paper, we synthesize the extant literature to establish the common objectives of scenario interventions within organizations and contextualize the well-established, but basic, “intuitive logics” scenario development methodology. We next consider if the basic intuitive logics method achieves these objectives. Then, we consider recent augmentations of the intuitive logics method and evaluate whether these augmentations enhance the basic method’s capabilities. We conclude that the intuitive logics method and its augmentations provide tools for addressing two key objectives, namely: to better understand how the future may unfold in different ways in order to inform strategic planning, and; to challenge conventional wisdom and reframe perceptions through changing mindsets. From this, we propose that scenarios can provide information, ideas and stimuli to support a third objective; better decision making and strategic planning. However, scenario methods do not in themselves incorporate methods and tools for making fully-informed decisions and, thereby, formulating strategies and plans. They merely

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inform the process, if utilized appropriately and successfully. On this basis, we pose the challenge that the ubiquitous term “scenario planning” is a misnomer and propose that other “scenario” terminologies might usefully be adopted in its place.

2. The multiplicity of scenario methods

The first comprehensive model for the development of scenarios to be published in a journal was that provided by Zentner in 1975 [1]. Numerous descriptions of prototypical models for generating scenarios models have since been published, ranging from the simple to elaborate, highly structured, recipe-type techniques, conveying the impression that there is a set of well-established homogeneous techniques available for constructing scenarios from which one can choose, depending on the underlying objective of undertaking the scenario work. This impression is false, however, in that many of the techniques discussed in the literature are poorly defined, have no theoretical justification and, according to Varum and Melo [2], they contradict each other, are impractical and have not been adequately tested. Scenario development has become “a Swiss pocket knife of multiple users, or a magic wand that is often waved by inexperienced and unskilled consultants and professionals” [3, page 49]. Most of the techniques discussed are highly prescriptive in nature and Whaley’s [4] observation, reportedly based on 40 years of experience, is that while the practitioner literature refers to process and gives “the impression of expertise”, the “hard facts of what is done to create the scenarios, what data is processed and how” is not usually discussed (p. 310). At the same time, many of the articles suggest that scenario development is a relatively simple and straightforward task. However, as Grinyer [5, page 32] notes, “the apparent simplicity belies, however, the considerable skills required by its practitioners”. Support for this comes from van Asselt et al. [6, page 11] who indicate that most of the accounts of the process in the literature are relatively short descriptions of the main steps, consequently “choices, considerations, discussions, struggles, compromises, unproductive steps, flaws, practical adjustments, experiments, difficulties, challenges and local solutions are concealed”.

The consequence of the above is that few techniques in futures studies have given rise to so much confusion as scenarios [7]. This confusion is explained by the fact that the lack of a solid conceptual foundation underpinning scenario techniques is a consequence of the fact that: firstly, their application to planning in the business context is a relatively new phenomenon, and therefore there has been insufficient time to develop a sound conceptual foundation; and secondly, the growth in popularity of scenarios has happened for practical reasons not theoretical ones, with the result that methodologies used to construct scenarios have not been well-defined as the focus has been on using them rather than empirically validating them [8,9]. Nonetheless, Malaska et al. [10] submit that it is unlikely that there will ever be a commonly accepted, uniform system of developing scenarios because of the intuitive nature of the process, coupled with the fact that the users of scenario techniques will invariably adapt methodologies to suit their needs.

3. The purpose and anticipated benefits of scenario thinking interventions in organizations

There are claims that scenario planning is effective in changing mental models but there is a paucity of systematic research with respect to the cognitive and behavioral implications of scenario development. The scenario-specific research that has been conducted is focused predominantly on the cognitions and behavior of individuals – often students – in contrived laboratory settings rather than investigating scenario-related issues in a real-world organizational context. While there is anecdotal evidence in the literature as to the ability of scenarios to “affect decision makers’ view of reality” the issue of “precisely how this happens and can be consistently achieved is still a mystery” [11, p. 291].

In terms of what scenarios supposedly achieve, some 15 years ago de Geus stated that scenario planning “remains surrounded by vagueness and an air of mystery. People are unsure whether it is a process for reaching better decisions; a way to know the future better; or a combination of both” [12]. As Burt and van der Heidjen [13] note, most of the literature assumes as a starting point that there is an existing need for the scenarios and an expected outcome benefit, which has previously been articulated and agreed to by the relevant parties. This state-of-play may now be changing as, according to Chermack, “scenario planning professionals are just beginning to consider the importance of defining what they do and explicitly stating what they intend to achieve by doing it” [14].

Van der Heijden [15] argues that there is a confusing assortment of reasons as to why one should engage in scenarios. He advocates the importance of clearly identifying the purpose of undertaking scenario work – in order to make the appropriate selection of scenario methodology. Van der Heijden argues that “purpose” can be divided along two dimensions; the first dimension is to establish the extent of the scenario work i.e. whether the scenario work is to be a one-off project, or part of an on-going scenario-based planning process. The second dimension is that of the primary aim of the scenario work, this being either to raise questions, or to answer them – and thus aid decision making.

The combination of these two dimensions results in four purposes of scenario work, namely:

- *Sense-making*: a one-off ‘exploratory question-raising scenario project’;
- *Developing strategy*: a one-off ‘decision-making scenario project’;
- *Anticipation*: an ‘on-going exploratory scenario activity’; and
- *Action-based organizational learning*: an ‘on-going decision-making activity’.

Van der Heijden continues by suggesting that these four purposes represent a hierarchy of interconnected aims serving the ultimate goal of “strategic success” in which organizational learning is the “overarching broad organisational skill” achieved when the scenario work is an on-going decision-making activity [15, page 162].

The (mainly practitioner-based) literature contains many testimonials as to the use and organizational benefits of scenarios, which we group under the following headings:

3.1. Enhanced perception

Scenario techniques reportedly enhance corporate and individual perception as they provide a framework for managers to understand and evaluate trends and events as they happen [16], and managers involved in scenario exercises supposedly become better observers of the business environment, more attuned to discerning changes [17]. Porter [18] suggests that scenarios help managers to make explicit their implicit assumptions about the future, and to think beyond the confines of conventional wisdom. This, combined with the fact that scenarios often challenge conventional wisdom and complacency by shifting the “perceptual anchors” from which people view the future, reduces the likelihood of managers and organizations making big mistakes in the future and/or of being caught unaware [19,20].

3.2. A structure for dealing with uncertainty

Scenarios provide a structure for thinking aimed at attacking complexity by allowing managers to deal more openly and explicitly with acknowledged uncertainty [21,16], to arrive at a deeper understanding of what is significant, and to identify what needs to be dealt with – and what is transient and can be ignored [11,22]. Bunn and Salo [23] suggest that, by emphasizing that there are a range of possible futures rather than a single-point future, scenarios reduce the bias for underestimating uncertainties. This is echoed by Docherty and McKiernan [24] who state that “the greatest contribution of scenario planning lies in its active engagement of actors in its process and its power to enable them to think about complexity and uncertainty in external contexts, and then how they might shape the external environment to their own strategic ends” (p. 10).

3.3. Integration of corporate planning functions

Scenario techniques provide a good middle ground between relying on informal and intuitive techniques, and being bound by the methodological constraints of more formal, quantitative techniques. As a result, a greater variety of information and wider company participation can be incorporated into the forecasting and planning process when scenario planning is used [16]. Other authors [25,26] add that scenarios are also able to combine topical intelligence and structure seemingly disparate environmental factors into a useful framework for decision making in a way that no other planning models can.

3.4. A communications tool

According to Allen [21], the communications qualities of scenarios are overwhelming as they provide a rational and non-threatening framework for discussion, even with those outside of the organization [27]. Durand and Godet [28] state that scenarios are also an effective means of rallying employees and communicating strategy across the organization. Bezhold [29] suggests that the scenarios can be used as a marketing and educational campaign throughout the organization. Ringland [25] adds that, by sharing its scenarios with the outside world, an organization can provide the context for dialog with its stakeholders – enabling it to influence its external environment. An added benefit [30] is that the collegiality which usually emerges in a scenario planning exercise does not evaporate once the scenario exercise is complete. Van der Heijden [15,31] reports that Royal Dutch Shell's scenarios emerged as a powerful management tool by which senior management was able to influence decision-making at all levels throughout the organization, without becoming directly involved in the process or minutiae of the subsequent, scenario-based, evaluation of decisions. This was achieved by making the scenarios the context for key strategic decisions – thus uniting the geographically dispersed, disparate, and decentralized business units in developing a common strategy [28].

3.5. Organizational learning

Although scenario planning was initially understood as a tool for “thinking the unthinkable” [32], a body of literature has subsequently developed around the value of scenarios in terms of individual and organizational learning [11]. This is because scenario exercises ostensibly provide a politically-safe team learning environment and a rich learning process that stimulates creativity [11,15,33–37]. As models of future business environments, scenarios provide a vehicle for pseudo-experimentation in terms of formulating strategic options and then examining the consequences of these options in a range of future environments [15,30,31,38]. By having to articulate their assumptions in a scenario exercise, managers can identify inconsistencies in their own thinking and that of their colleagues in a non-threatening environment [25,37]. At the same time, the necessity in scenario work to undertake detailed analysis of environmental driving forces and their causal relationships, forces individuals to examine their perceptions, stretch their mental models and to develop a shared view of uncertainty [15,31]. All of the foregoing leads to an increased confidence in decision-making [16] and moves the organization towards becoming, what has been termed, a “learning organization” [15].

Based upon our consideration of the above purposes and benefits of the use of scenario methods, we distil from the literature three main objectives of the application of scenario approaches, as follows:

- 1) *Enhancing understanding*: of the causal processes, connections and logical sequences underlying events – thus uncovering how a future state of the world may unfold;
- 2) *Challenging conventional thinking*: to reframe perceptions and change the mindsets of those within organizations; and
- 3) *Improving decision making*: to inform strategy development.

Support for this conclusion also comes from the work of Varum and Melo who, after undertaking a comprehensive bibliometric analysis of the literature on scenario planning, argued that there is a consensus in the literature on three benefits of using scenarios, namely an “improvement of the learning process, improvement of the decision-making process, and identification of new issues and problems” [2, page.362].

Our three objectives are interlinked in that: firstly, understanding the connections, causal processes and logical sequences which determine how events may unfold to create different futures, will challenge conventional thinking and will also prove of benefit in improving organizational decision making and strategy; secondly, challenging conventional thinking, reframing perceptions and changing mind-sets should result in collective organizational learning; and, thirdly, collective organization learning should enhance organizational decision making and strategy – which in turn should enhance collective organizational learning.

4. Scenario development using the basic “intuitive logics” methodology

We next set out the various stages of the basic scenario process. This model follows the approach developed over many decades by a number of writers [e.g., 31,39] and organizations (e.g. Global Business Networks (GBN; SRI International). It relies upon the application of “intuitive logics” [40], and is focused on the development of multiple scenarios that explore the “limits of possibility” for the future, rather than on the development of singular, “normative” scenarios of some ideal future.

A major focus is on how the future might evolve from today’s point in time to the horizon year of the scenario – say 15 to 20 years hence. The intuitive logics approach to scenario thinking analyzes the relationships between:

- the critical uncertainties (as they resolve themselves);
- important predetermined trends (such as demographics); and
- the behavior of actors who have a stake in the particular future (who tend to act to preserve and enhance their own interests).

The intuitive logics approach embraces and integrates consideration of the full set of political, economic, social, technological, ecological and legal (PESTEL) factors that will shape the future. These are wide in range, variable in their interactions, unpredictable in their outcomes, but can be explored and understood by the application of the approach [40].

Application of the approach enables:

- Identification of the driving forces of the future that are present in the broad business environment and will impact an “issue of concern” – often the viability of a focal organization and its offering into the market place;
- Consideration of the range of possible and plausible outcomes of each of these forces; and
- Understanding of how the forces interact with each other in terms of cause and effect, and chronological order;

The following is a list of the main stages of the basic intuitive logics scenario process:

Stage 1: *Setting the agenda* – defining the issue of concern and process, and setting the scenario timescale

Stage 2: *Determining the driving forces* – working, first, individually, and then as a group

Stage 3: *Clustering the driving forces* – group discussion to develop, test and name the clusters

Stage 4: *Defining the cluster outcomes* – defining two extreme, but yet highly plausible – and hence, possible – outcomes for each of the clusters over the scenario timescale

Stage 5: *Impact/uncertainty matrix* – determining the key scenario factors, A and B – i.e., those which have both the most impact on the issue of concern and also the highest degree of uncertainty as to their resolution as outcomes.

Stage 6: *Framing the scenarios* – defining the extreme outcomes of the key factors, A1/A2 and B1/B2

Stage 7: *Scoping the scenarios* – building the set of broad descriptors for four scenarios

Stage 8: *Developing the scenarios* – working in sub-groups to develop scenario storylines, including key events, their chronological structure, and the “who and why” of what happens.

The basic intuitive logics approach to scenario development is thus precisely focused on our first objective: understanding the causal process of how a future state may evolve. What is not clear, however, is the degree to which the standard method achieves our second objective – that of challenging conventional thinking, reframing perceptions, and changing the mindsets of those within organizations. Having individuals, or groups of individuals, imagining the occurrence of a sequence of events makes the focal sequence appear more likely to occur than the normative probability computed for the intersection of these individually-evaluated events would imply. For example, a “highly plausible” scenario may have, say, twenty components that each have, say, a subjective likelihood of occurrence of 0.9. Thus, although the computed intersection probability is low, at about 0.12, the holistic subjective probability of the intersection of events may be much higher. Tversky and Kahneman [41] labeled this a bias due to the operation of the “simulation heuristic”. As such, by itself, the act of constructing scenarios may produce increased, but inappropriate, confidence in the likelihood of occurrence of a single scenario. However, the development and use of multiple scenarios provide plausible, but *different*, chains of causality. As such, consideration of these contrasting scenarios provides a means of broadening participants’ views of what is plausible – while recognizing that none of the scenarios will occur in actuality.

The construction of four scenarios that are a result of an application of the basic intuitive logics methodology thus provides one potential way to alleviate over-confidence in the unfolding of a single, focal scenario. However, Healey and Hodgkinson [42] noted that the increased plausibility of the four focal scenarios may exacerbate another problematic issue: if the components of a scenario

are derived from the current mental models of the decision-makers, then these mental models will be strengthened by the operation of the simulation heuristic. As O'Brien [43] argued, in practice, scenario participants tend to regularly emphasize economic factors – such as exchange rates, interest rates and the focal country's economic activity – as uncertainties that are subsequently given prominence in the scenarios that participants constructed. Also, recent and current media-emphasized concerns (e.g. acts of terrorism) tend also to replicate themselves in constructed scenarios through the operation of the availability bias. O'Brien labeled these practice-recognized issues as “future myopia”. There is nothing within the basic method of constructing scenarios using intuitive logics that helps the scenario team engage in a broader look at the nature of the future.

How do practitioners overcome the availability bias in scenario construction? One way, in practice, is to have “remarkable people” involved in the development process. By remarkable people, is meant those individuals who hold a mixture of expertise and viewpoints on issues that the scenario team has identified as either pre-determined trends or critical uncertainties within the scenarios. Additionally, these individuals should be chosen to be both capable and willing to offer challenge to the organization's business-as-usual thinking.

With regard to our third objective, of improving decision making and strategy development, the basic method is often supplemented by the use of an options/scenario matrix. Here, a strategic option is evaluated against each scenario in turn and a qualitative judgment of performance is made, often on a scale from three crosses to three ticks – with three crosses meaning the poorest outcome and three ticks meaning the best outcome.

In summary, the basic intuitive logics method scores well on our first objective of understanding causal processes but falls short on our second and third objectives – challenging conventional thinking and improving decision making. We next turn to describe recent augmentations of the basic intuitive logics method and, after each, make a fresh evaluation of an augmentation's likely success in achieving each of our three objectives.

5. Recent augmentations of the basic intuitive logics method: descriptions and evaluations

5.1. Multi-attribute value analysis for the evaluation of strategic options against scenarios

We have described how an organization's strategies can be evaluated against the constructed scenarios of four plausible futures. The process of evaluation has been relatively informal – a simple allocation of ticks and crosses to give a rough sense of the performance of a particular strategy against a particular scenario. Can we do better than this? It would seem preferable to take into account all important attributes in an overall evaluation of the performance of a particular strategy against a particular scenario – such as improvement in market share, short-term profitability, etc. – one of which may be perceived as more important than the others, and also to trade off how well a strategic option does on one of the attributes against how well it does on the other. This *compensatory* approach is the essence of the decision analysis approach to strategy evaluation against scenarios.

As we have described, in standard scenario practice, evaluation of strategies against the decision-maker's strategic objectives is relatively informal. As we have discussed, when a number of objectives are involved, there are dangers in this informal process. Strategy evaluation may be incomplete or distorted because, unconsciously, undue attention is paid to particular objectives, at the expense of others. One way of formalizing the process of strategy evaluation draws closely on the work of Goodwin and Wright [44,45], who first developed a systematic method to aid the process of evaluating strategies. The use of the technique can bring considerable advantages to scenario planning.

The main stages of the approach are:

- Stage 1: Formulate scenarios;
- Stage 2: Formulate the objectives that you wish to achieve in your strategic actions;
- Stage 3: Design alternative strategies;
- Stage 4: For each objective, rank each strategy against each scenario from the best to the worst;
- Stage 5: For each objective, rank all strategy–scenario combinations from best to worst;
- Stage 6: Compute the sum-of-ranks for each strategy and provisionally select the best performing strategy.

The rankings used in our analysis [48] are based on rough-and-ready judgments. Also, in a group of decision-makers there are likely to be differences in opinions or minority views. For these reasons, it can often be useful in practice to investigate the effect of changes in these values on the overall evaluations of particular strategies. Often, the relative performance of strategies is robust to changes in these judgmental inputs. Exploring differences in opinions about relative rankings can lead to the easy resolution of disputes between members of a management team, who, for example, may find that the same strategy is always superior, even though members of the team disagree about some of the constituent rankings. This augmentation of the intuitive logics methods thus aids achievement of our third objective: improving decision making.

5.2. Creating “best” and “worst” resolutions of each driving force – as a pre-condition to creating resolutions of clusters of driving forces

Following identification and recording of the driving forces – at stage 2 of the basic process, outlined above – and as the group discusses and agrees a shared meaning for each, scenario team members are next asked to discuss and record extreme outcomes for each individual driving force – as an additional stage to the basic methodology. While each driving force is seen to be impacting upon the focal issue and to have an influence on the way its future turns out, the nature of its outcome is likely to vary

across different future scenarios. At this point, it is possible to consider the range of these outcomes, in terms of possibility and plausibility. The “limits of the possible” for each driving force are termed “extreme outcomes”.

As with cluster outcomes, driving force extreme outcomes are not necessarily defined as at the limits of some continuum – for example, “good/bad”. While they may be defined in linear terms, such as good/better, bad/worse, conservative/radical, natural/artificial, and so on, they may also diverge into very different spheres of influence – at one extreme, producing behavioral change in one group of stakeholders; at the other, a financial impact on another. The only rule is that the extremes should be defined creatively to test the limits of thinking, but without breaching the boundaries of possibility and plausibility within the project time horizon.

While it offers a potentially more in-depth analysis of the focal issue, adoption of this more in-depth scenario analysis will be a matter of consideration of the complexity of the issue, the knowledge of the participants, and the time and resources available. However, debating and agreeing the extreme outcomes for individual driving forces is a time-consuming exercise and is not one that is effective within a “short, sharp” scenario project, or one that is largely exploratory. This augmented approach is most appropriately utilized where a scenario project is run over an extended period and through multiple iterations, whereby the debate on individual driving forces is underpinned by a detailed knowledge of their nature, context and boundaries, and is informed by any necessary research to enable and support such detailed consideration [48]. This augmentation of the intuitive logics methods thus aids achievement of our first objective: understanding underlying events and how they unfold.

5.3. Role-thinking and role-playing stakeholder reactions to unfolding scenario storylines

Can more be done to challenge conventional thinking and create heterogeneity of viewpoints? An augmentation to the standard approach is to ask participants to consider, in detail, the interests of the stakeholders that have been identified earlier in the scenario development process. One way of achieving this is through the use of role-playing. Green and Armstrong [46] documented the insights that can be generated by role-playing. Green and Armstrong's focus was on “forecasting” the actual decisions made in real, but historic, conflict situations, with participants instructed to indicate “which decision you think that each party in the situation would prefer to be made and how likely is it that each party's decision will actually occur”. An example conflict situation was that of angry nurses increasing their pay demand and threatening further strike action after specialist nurses and junior doctors received a large pay increase. When university students were required to become engaged with the conflict situations – by “role-playing” or simulating the interactions between participants in the conflicts – the predictive accuracy of the role players' in-role decisions reached 90%. In the role-playing simulation, each student was assigned a single role, and the role-players interacted with each other in a similar way to actors on a stage.

Somehow, role-playing brought out the best from the university students – in that their simulations of conflict situations resulted in resolutions of the conflicts that were close to real-life resolutions. Green and Armstrong's students could not be expected to have strong technical or domain knowledge about each, or all, of the conflict situations. Intuitively, an understanding/enactment of stakeholder motivations/behavior seems more fundamental to predicting/resolving the actual outcomes of conflicts than either technical or domain knowledge. Intuitively, it would seem that one's own experiences of the past resolution of conflicts – perhaps as recalled or previously experienced, and including personal as well as non-personal conflicts – would be a strong guide to the prediction/resolution of the outcomes of conflicts. Thus, it seems intuitively reasonable that only when individuals are enmeshed in role-play simulations will the relevance of this experience become obvious – since Green and Armstrong's conflicts will, initially, have been seen as outside the domain of this experience at a superficial, face-content level. Green and Armstrong's study speaks to the benefits of heterogeneity in groups to aid scenario development, and of the value of using role-playing to create artificial heterogeneity when this does not exist.

As we have discussed, the scenario method explores the complex relationship between social, economic, technological, environmental and political factors from multiple perspectives; enables sense-making of their interactions; and provides a vehicle for the development of plausible futures that may impact on the focal organization. The basic scenario approach entails some consideration of stakeholder values and actions to add realism to already-constructed scenarios but, in practice, this may be limited to those stakeholders that are directly involved in the exercise. For example, van der Heijden et al. [31, page 219] state that stakeholder analysis is an optional addition to the “mix” of ingredients; as “a tool to be used in parallel with the scenario process, as and when members of the scenario team find it useful”. Stakeholders, according to the “narrow” definition, include the focal organization's competitors, customers, regulators, and so on – that is, those with direct financial, executive or regulatory interests in an unfolding scenario.

Wright and Goodwin [47] have argued for a more intense focus on stakeholder analysis within the scenario development process, as the likely actions of stakeholders to enhance and preserve their own interests in a particular unfolding scenario are thought through. These authors emphasize the need to consider Maslow's hierarchy of needs in order to understand the likely reactions of particular stakeholder groupings to the unfolding sequence of events within a particular scenario storyline. Wright and Cairns [48] developed an of the basic intuitive logics method to incorporate the following stages:

- Stage 1: Construct provisional scenarios out of the critical uncertainties and pre-determined elements; identify the stakeholders;
- Stage 2: Assign each stakeholder role to an individual who comes from outside the original scenario team;
- Stage 3: Ask each stakeholder to state how they would react, in role, to an unfolding event in a the scenario storyline;
- Stage 4: Share this information with other stakeholders and add it to the enhanced scenario storyline; then share these enhanced storylines with all stakeholders;
- Stage 5: Repeat Stages 3 and 4 until the participants are exhausted with the task.

This augmentation of the intuitive logics methods thus aids achievement of our second objective: challenging conventional thinking, reframing perceptions and changing mindsets.

5.4. Critical scenario method (CSM)

In application of the basic scenario method, the scenario team's consideration of stakeholders who are not central to the scenario storyline may be limited, or non-existent. In application of role-playing the actions and reactions of powerful stakeholders, detailed in Section 5.3, above, who can shape the course of unfolding events are considered in detail. However, what of the powerless who may be impacted by unfolding events and the actions of the powerful within a particular scenario? Adopting a "broad" stakeholder view [49], leads to consideration of those stakeholders that lack direct links to the focal organization, but who can either affect or be affected by its strategies, policies, programs and activities, whether now or in the future. The "broad" range of stakeholders is: "(a)ny identifiable group or individual who can affect the achievement of an organization's objectives or who is *affected* by the achievement of an organization's objectives" [49, page 91] (emphasis added).

In developing "critical scenario method", Cairns et al. [50] advocate the interrogation of the scenario stories from the perspective of the full range of involved and affected actors. They achieve this through application of the "value-rational" question framework for phonetic inquiry developed by Danish academic, Bent Flyvbjerg [51]. This framework focuses on critical inquiry into the ways in which the future might unfold for the various stakeholders. In application within CSM, it is used to interrogate each scenario as follows:

- In which direction does it lead from the present;
- Whether or not the outcomes are desirable;
- What if anything we should do about the outcomes; and, most pertinently,
- Who gains and who loses from unfolding events and under what power structures.

CSM makes explicit the instrumental role of stakeholders in determining why one scenario may unfold rather than another. In each of the scenarios, winners achieve their outcomes by exercise of power to maintain or enhance their interests. For the winners, the outcomes are likely desirable, but CSM raises questions as to whether winning is achieved at the expense of others. From a perspective of "corporate social responsibility" (CSR), powerful stakeholders should usefully consider what we (rather, they) should do about such a situation.

CSM focuses thinking on those stakeholders who are not directly involved, who may not be immediately recognized, but who may be deeply affected by the actions of key actors, both now and in the future. It involves consideration of moral/ethical issues, the nature and impact of power relationships, and of who are "winners" and "losers" under particular future scenario conditions. The aim of CSM is to enable decision-makers to make more informed judgments about the impact of their decisions, in the hope that they will be prompted to think of their own role in terms of what constitutes a mode of critically-informed "responsible management", rather than a model of mere "compliance management".

Augmented stakeholder analysis can be usefully implemented either near the beginning of scenario development, as a new and additional stage, or towards the end. It can also be incorporated at both stages, if desired. Where it is conducted early in the process, it can be used to assist in the stage of "problem seeking" – defining the critical uncertainty more clearly:

- Who are the key players (those with both power over and interest in the situation)?
- What concerns them?
- How do these concerns relate to other stakeholders?

Employed at the end of the process, it can be used as a tool for interrogating the logic of developed scenarios:

- Who has high levels of power and interest in each?
- How would they exercise this power?
- How would they react to the unfolding of events within a particular scenario?

At any stage in the scenario process, stakeholder analysis can also be employed in order to promote the form of engagement through role play that we discussed earlier:

- Can I put myself in the shoes of this stakeholder?
- Can I empathize with her/his/their concerns and priorities?
- Does this give me a new understanding of my own perspective, my beliefs and my values?

The introduction of stakeholder analysis as an integral part of the scenario process is intended to ensure that thinking within a project is not confined to – or constrained by – consideration of the interests of only those with direct involvement. The "broad" stakeholder approach takes our thinking beyond only those who can directly impact the situation and those who will be immediately affected. It challenges us to consider third parties and beyond: those who may lie at the end of a long chain of cause and effect, and of whom we may not even be aware at the outset; and those who may be impacted in the future by decisions that are taken in the present. This augmentation of the intuitive logics methods thus aids achievement of our second objective: challenging conventional thinking, reframing perceptions and changing mindsets.

5.5. Backwards logics method

The empirical evidence suggests that scenario development processes will be affected by cognitive processes. For example, Jungermann and Thuring [40] maintain that using forward or backward inference will produce qualitatively and quantitatively different scenarios. Forward inferences are concerned with natural, cognitively easier “downhill thinking” and, as such, this is the basis of the conventional intuitive logics approach to scenario development. Here:

- The scenarios will be developed on the basis of the causal links of elements in sequential order; and
- The scenarios will be plausible but not very surprising because they will be developed around familiar causal models rooted in the past and are likely to include short-run dramatic elements of high causal significance, but underestimate the likelihood of events produced by slow moving developments.

By contrast, Wright and Goodwin [47] maintain that using a backwards logic focusing on the objectives of the organization and their plausibility, overcomes the problems inherent in forward causal thinking by promoting the identification of drivers which will have the largest impact on the range of plausibility of the objectives. Thus, the focus of the backwards logics augmentation of the intuitive logics methods requires diagnostic causal thinking. The process starts by developing a view of the end-state of an unfolding scenario and then works backwards to determine what will have happened to cause the occurrence of a particular end-state.

Wright and Goodwin thus provide an augmentation of the intuitive logics method of scenario construction as the sole way of constructing our set of scenarios. Recall that the basic steps of the intuitive logics methodology include brainstorming the generation of critical uncertainties and pre-determined driving forces that will have varying degrees of impact on the focal issue – often, the viability of the focal organization. Recall, also, that the two scenario dimensions are selected from those cluster headings that are judged by scenario team members to be situated in the high-impact low-predictability quadrant of the impact/uncertainty matrix. Earlier, we described how each of the relatively independent, high-impact/high-uncertainty clusters is resolved into one of two plausible sets of outcomes and we also advocated that each of the two resolutions within a cluster should, in simple terms, be either negative or positive. But does this step-by-step process produce a sufficiently wide range of plausibility in the subsequent four scenarios?

The standard approach first requires that the scenario team members identify predetermined elements and critical uncertainties. These elements are then categorized under the PESTEL headings, then “cross-disciplinary” clusters are constructed between elements, such that causal impacts of one element on another are identified by arrows of influence. In this way, causally-linked clusters of elements are generated and named that are, to a large degree, independent of one another. The next step is to identify those cluster headings whose content is of:

- high impact on the focal issue of concern (usually the viability of the host or focal organization); and
- high uncertainty.

In the basic intuitive logics approach, the two cluster headings that combine the greatest impact and uncertainty over that the nature of the impact are selected as the scenario dimensions utilized to produce four detailed scenarios – developed with a common, temporal, starting point, but ending in the four diverse, yet plausible, causally-unfolded end-states.

Note that, in general, the two clusters that result from the application of the intuitive logics approach to scenario construction will each contain a mix of pre-determined elements and what are perceived as *critical* uncertainties that are causally linked. Generally, four scenarios are constructed that are derived from the resolution of events within each cluster into two major outcomes, with each of the outcomes of the first cluster then being combined with each of the outcomes of the second cluster. Thus, the resolution of the contents of the two high-impact/high-uncertainty clusters drives the development of the storylines of the four resultant scenarios. The development of the four storylines will, in practice, also utilize other uncertainties and pre-determined elements that have been generated by scenario workshop participants, but which are seen by these participants to have less impact on the focal issue of concern. It follows that each of the four resultant scenarios will be separable from the other three, and also more extreme than the other three in some ways. Since each scenario represents an intersection of resolved uncertainties, each detailed scenario will, logically, have an infinitesimal likelihood of actual occurrence. It also follows that the interactions of resolved uncertainties that are identified by participants, but which are not part of the two high-impact clusters, may have led to the development of quite different scenarios, if they were, instead, taken as the focal uncertainties that drive the construction of the scenarios.

Wright and Goodwin's [47] backwards logics method provides a way of broadening the range of scenarios as yet to be developed, while, at the same time, retaining the essential focus on causality within the process of scenario construction. Instead of developing scenarios on the basis of the contents of the two high-impact/low-predictability clusters that are identified on the impact/predictability matrix, the scenario team should, instead, focus on plausible changes to the organization's achievement of its objectives, ranging from under-achievement to over-achievement, or from poor achievement to excellent achievement. We next summarize Wright and Cairns' [48] practical step-by-step means by which to implement Wright and Goodwin's method:

Step 1 Identify the objectives that the organization wishes to achieve through its activities. For example, for profit-seeking organizations, objectives that may be commonly held might be:

- improved market share;
- improved short-term profitability;
- improved cash-flow;

- improved long-term profitability;
- improved return on investments.

For non-profit-seeking organizations, commonly-held objectives might include:

- enhanced public awareness of issues;
- greater access to the political arena;
- long-term commitment to action.

Step 2 Imagine the range of extreme, but still plausible, achievement of each of the objectives of importance to the organization. The extremes should be high and low, under- and over-achievement, poor and good performance, and so on.

Step 3 List the factors that could cause these changes in levels of achievement of the organization's key objectives. For example, an extremely negative cash flow could be caused by public concern over the safety of one of the organization's key products or services that results in a step-change downwards in sales of the product or service. Conversely, an extremely positive cash flow could be caused by public concern about a competitor's product or service. A line of questioning should be enacted that identifies the causal chain that results in the extreme achievement, or non-achievement, of a particular key objective.

Step 4 Investigate if the achievement and non-achievement of a particular key objective could now, with reconsideration, be plausibly made more extreme than that identified at Step 2. If so, Step 3 should be repeated for the more-extreme achievement of the organization's objectives. If not, the scenario team should be encouraged to write down explicit reasons as to why this is viewed to be the case.

This augmentation of the intuitive logics methods thus aids achievement of our first objective: understanding underlying events and how they unfold. It also aids achievement of our second objective: challenging conventional thinking, reframing perceptions and changing mindsets. This increased challenge may, perhaps, result in better decision making/strategy development.

5.6. Use of dialectical inquiry and devil's advocacy to critique scenarios that are in-development

Challenge to the scenario storylines can be made more focused, and it is to methods that can help achieve this focus that we now turn. Schweiger et al. [52] discuss two methods that systematically introduce *conflict* and *debate* in a management team by using two sub-groups that role-play. In *dialectical inquiry*, the sub-groups develop alternative strategies or decisions, and then later come together to debate the assumptions and recommendations of the alternative positions on an issue. In *devil's advocacy*, one sub-group offers a proposal for a strategy or decision. Next, the other sub-group plays devil's advocate, critically probing all elements and recommendations in the first sub-group's proposal. Both methods encourage the group members to:

- generate alternative courses of action; and
- minimize any group-based tendency towards early agreement.

Schweiger et al. argue that without such structured critique members tend not to voice critical thoughts – in order to preserve group harmony. Schweiger et al. [53] compared dialectical inquiry and devil's advocacy to a non-adversarial approach to decision making, where decisions were simply discussed with the aim of achieving a consensus amongst group members. Questionnaire ratings by group participants revealed that the two conflict-based approaches were rated higher in terms of producing better recommendations and better questioning of assumptions. Formalizing and legitimizing conflict by use of role-playing improves perceptions of the quality of the final outcome of group decision-making.

We turn now to discuss the implications of these findings on group decision-making for scenario development. In practice, scenario development sometimes involves a scenario team composed of representatives from multiple agencies – that is, the scenario team is initially formed from a heterogeneous constituency. Cairns et al. [54] developed scenarios for the use of ICT by citizens in their future interaction with local government. The scenario team incorporated representatives from an organization who had views on the attitudes/preferences of senior citizens, representatives from small and large businesses who were geographically located in the local government area, representatives from information communication technology companies, and so on. At the time, Cairns et al. argued that the process of scenario planning can provide a non-adversarial common viewpoint to unite what may, initially, be fragmented groupings. Subsequently Wright and Cairns [48] argued that the fragmentation should, instead, be conserved – at least, until the point when any action response to the constructed set of scenarios is debated (see Goodwin and Wright [55]). In that way, also, debate and challenge will be enhanced.

In the more usual scenario development activity, conducted within a single organization, the conventional process results in the initial development of four skeleton scenarios that are then each fleshed-out by one of four sub-groups. However, since differences in worldviews between these sub-groups are likely to be small, Wright and Cairns recommend that, once a particular scenario is fully-developed, it should then be given an adversarial critique by one or more of the other sub-groups. In this way, also, the systematic introduction of conflict and challenge is likely to enhance the quality of the finally-developed scenarios.

The following, step-by-step, method was developed by Wright and Cairns [48] to introduce useful conflict and dissent into the scenario development process:

- Stage 1: Construct provisional scenarios out of the critical uncertainties and pre-determined elements;
- Stage 2: Divide the scenario team into four sub-groups and ask each to develop one of the four skeleton scenarios in detail. Members of the sub-groups should have, if possible, quite different perspectives on the issue of concern that was the basis for

the overall scenario exercise. We recommend that each sub-group should be differentiated from the others in terms of the spread of heterogeneity – although, in practice, the allocation of individuals to groups must be a pragmatic process;

- Stage 3: Develop the scenario storylines using the enhanced stakeholder analysis method detailed earlier;
- Stage 4: Ask each of the four sub-groups to present their developed scenario to all sub-groups in a plenary session;
- Stage 5: Ask each of the four sub-groups to prepare either:
 - a critique of each of the three other scenarios, or
 - alternative developments within the storylines of each of the three other scenarios;
- Stage 6: Reconvene the scenario team to hear the critiques or alternative developments;
- Stage 7: Ask each of the four original sub-groups to reconsider and revise the scenario storylines developed at Stage 3;
- As an optional eighth stage, it may be possible to engage non-participant representatives from the affected stakeholder groupings (that have been identified earlier in the scenario development process) to read and also provide critiques of the storylines.

In this application, use of dialectical inquiry and devil's advocacy methods will allow the developing scenario storylines to be critically evaluated and challenged. In these ways, the overall quality of the scenarios will be enhanced; the final scenarios will be more detailed, and the causal relationships in the scenario storylines will be made more realistic and compelling. This augmentation of the intuitive logics methods thus aids achievement of our first objective: understanding underlying events and how they unfold. It also aids achievement of our second objective: challenging conventional thinking, reframing perceptions and changing mindsets. This increased challenge may also, perhaps, result in better decision making/strategy development.

6. Discussion

Reviewing the basic intuitive logics scenario method and the various augmentations that we identify, we can see that there is a strong case for arguing that scenario methods are designed to address two of the three objectives that we identified from the literature, namely:

- 1) *Enhancing understanding*: of the causal processes, connections and logical sequences underlying events – thus uncovering how a future state of the world may unfold, and;
- 2) *Challenging conventional thinking*: to reframe perceptions and change the mindsets of those within organizations.

However, other than in the augmentation in which multi-attribute value analysis is applied, none of the methods that we survey address directly the third objective that we distil from the literature, namely:

- 3) *Improving decision making*: to inform strategy development.

We note at this point that the augmentation of using multi-attribute value analysis is an “add on” after initial scenario development and strategy formulation has been undertaken. It is not, as in the examples of role-play and critical scenario method, an augmentation that embeds new or additional analytic tools within the basic scenario method. This leads us to question whether scenario methods in any form and in themselves have any causal connection with improved decision making to inform strategy development. Or, do they merely offer a potential stimulus towards better decision making?

There is little in the literature as regards retrospective examination and evaluation of the effectiveness of scenario interventions within organizations, Hulme and Dessai [56] note that determining the success criteria of scenarios depends on the advocated use of scenarios, namely (i) scenarios as a predictive tool or (ii) scenarios as an intuition-enhancing process. In the case of scenarios as an intuition-enhancing process, evaluation criteria focus attention on whether or not the scenarios resulted in the occurrence of better decisions (in the case of decision-focused scenarios) or how effectively they enabled participation and mutual learning (in the case of scenarios undertaken as an organizational learning process).

In the case of decision-focused scenarios, they submit that evaluation can only be based on a counterfactual scenario, i.e., what would have happened if the enacted decisions had not incorporated modifications stemming from the scenarios. Equally, however, one cannot rule out the possibility that alternative group-based interventions in the same environment could have produced equally satisfactory decisions, or that alternative decisions could have achieved better results than those decisions that were prompted by the scenario analysis.

Varum and Melo [2] note that there is little in the literature on the impact of scenarios on organizational performance. In fact, there are currently only two articles in the literature, which we are aware of, which attempt to relate the effects of scenario interventions on subsequent organizational performance. The first by Phelps et al. [57], was an exploratory study of two UK firms, one in the water industry and the second in the IT/Consultancy industry. The preliminary conclusion of the study was that there does appear to be a link between scenario planning and improved financial performance. However the study was based on only two companies that were simply indicative and Harries [58] has criticized the methodology of the study on several fronts. Following on from the work of Phelps et al. [57], Visser and Chermack [59] undertook a qualitative inquiry of nine executives/senior managers from seven national and/or multinational companies to examine the link between organizational performance and scenario planning. The results, based again on a small sample, were also inconclusive – in that while there appeared to be a perception that scenario interventions in organizations are useful and do contribute to organizational performance, none of the organizational respondents utilized a formally-based assessment to determine the (degree of) success.

It follows that if improved decision making and organizational learning are indeed key outcomes of scenario interventions in organizations, then it is essential that tools be developed to measure subsequent changes in organizational performance. Such measurement tools would benefit practitioners and enhance the credibility of the literature [11].

Following from the above discussion, a second issue that emerges is that of access to both developed scenarios and organizations undertaking scenario work. Although there are many scenario reports available in the public domain, Harries [58] suggests that there is likely much more scenario activity that is not publicly reported because companies are reluctant to reveal their internal strategic processes, on the basis that this may be regarded as being potentially detrimental to their competitive advantage. At the same time, publicly available scenario accounts generally report success with scenario techniques, again understandable as few organizations are prepared to publicly reveal the failure of one of their business processes. The result, Harries suggests, is that publicly available “success” reports represent a biased sample.

In summary, while there has been some relatively recent activity in attempting to evaluate scenario interventions in organizations, the area has been largely neglected in the literature and there remain currently no widely accepted and applied criteria for evaluating any of our three objectives of scenario interventions that we have derived. While there are theoretical and practical issues associated with measuring the achievement of the three objectives within a scenario intervention, it is axiomatic that in the absence of such measurement, scenario interventions will inevitably have low credibility, especially in the scientific and academic communities. As Burt and Chermack [11] note, while there is anecdotal evidence in the literature as to the ability of scenarios to “affect decision makers’ view of reality” the issue of “precisely how this happens and can be consistently achieved is still a mystery” [11, page .291].

7. Postscript

Like us, Tapinos [60] has examined the literature on “scenario planning”, and he points to the distinction between scenario development and strategy development. He suggests that the term scenario planning should be clearly delineated in order to include both of these developmental phases as discrete stages [60, page 340]. Tapinos goes on to identify what he perceives as a key weakness of scenario methods as comprehensive strategic planning tools, that they do not incorporate consideration of “internal scenarios” – potential changes within the organizational context in response to external scenario changes.

We would concur with Tapinos, that scenario methods do not take account of internal organizational uncertainties and changes and that scenario and strategy development are two distinct activities. However, while Tapinos integrates them within the umbrella term “scenario planning”, we challenge the very usefulness of this ubiquitous term. Strategy development can take place in many different ways and be informed by a vast array of data, information and opinion. One need only look at Mintzberg et al.’s [61] “Strategy Safari” to appreciate the range of strategy development tools, not all of which draw upon or are informed by scenario analysis.

If we consider that scenarios are but one tool in the strategic analysis “tool box” – one that is powerful but that does not enable the whole process of strategy development – then perhaps we should avoid granting them special status under the grand title of scenario planning. Does this title in itself not open scenarios up to criticism for overstating their potential?

Based upon our analysis of the literature and identification of both the strengths and limitations of scenarios, we conclude that we should adopt a new, clearer and differentiated set of scenario terminologies that make clear what scenarios can achieve and what users are engaging in at each stage. These are:

Scenario method(s) – as the encapsulating term for a range of methods for constructing scenarios;

Scenario analysis – the process of application of selected scenario methods by individuals and organizations; and,

Scenario thinking – a mode of thinking that is grounded in seeing multiple futures, with different possibilities and options for action towards different outcomes.

Adoption of these terminologies relieves scenarios of the responsibility of having a direct and instrumental impact on creating better decisions and, thereby, more effective strategies and plans. The effectiveness of scenarios as tools for supporting better decisions and strategies can only be assessed in hindsight, looking back from whatever future has unfolded. However, even where there is long-term and longitudinal data that purports to show instrumental impact of scenarios on effective decision making and strategizing, there can be no definitive proof of such causality. As Flyvbjerg [51] has pointed out, based on such retrospective, in-depth analysis, what counts as rationality can most often be shown to be post-hoc rationalization – based upon the views of whoever is powerful – at that point-in-time. Nevertheless, it appears to be intuitively true that use of scenarios provides a means of making the best use of information at the time of usage. For example, Linstone [62,63] has argued that complex systems are typically seen through single perspectives – i.e., technical, organizational, and personal – whereas scenarios, when developed by a heterogeneous scenario team, provide a process to enhance thinking via multiple perspectives.

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