Exploring Individual Differences in Scenario Planning Workshops: A cognitive style framework

Abstract

In recent years, scenario planning has enjoyed wide acceptance among practitioners and academics as a decision support aid in the strategy formulation process. Although different approaches to scenario planning are possible, most of them are usually deployed in a group workshop format and led by a facilitator. This work setting for scenario planning activity has led managerial cognition scholars to argue that the cognitive diversity of the workshop participants is likely to be a critical determinant of the effectiveness of scenario planning interventions. The purpose of this paper is thus to explore this proposition further, by articulating a theoretical framework to inform the investigation of the role of cognitive style in scenario planning interventions. Specifically, the framework highlights the potential impact of individual differences in ways of perceiving and judging on participants' observed behaviours within the scenario planning workshops. The paper ends with a discussion of the implications of our framework for research and practice of scenario planning workshops.

Keywords: scenario planning, cognitive style, group decision making, workshops.

1. Introduction

Over the past few decades, scenario planning has enjoyed increasing acceptance among practitioners and academics as a tool for supporting strategy formulation in organisations [see, for example, 1] In simple terms, a scenario-driven strategy process involves building a set of challenging but plausible futures that are used as 'wind tunnels' [2] to test whether the organisation's strategies can withstand the turbulence of an uncertain environment. In this way, the desired outcome of a scenario-driven strategy process is a 'robust' strategy. Additional benefits attributed to the use of scenario planning in strategy making include learning and change in managers' mental models [e.g. 3]

Although different versions of scenario planning are available to the would-be user [see reviews by 4, 5, 6], most of them are typically deployed within a workshop setting [7], used by a group specially formed to carry out the task of formulating the strategy, and led by an internal or external facilitator [2, 8-11].

Given that a scenario planning workshop comprises essentially a set of group-based activities, it seems obvious that the selection of workshop participants, together with the design of the different facilitated activities, will be crucial determinants of the effectiveness of scenario planning processes and outcomes. Within this context, managerial cognition scholars have argued that the cognitive diversity of the group can play a significant influence on the potential success of scenario planning interventions [see, for example, 12].

In this paper we provide a further examination to the notion of cognitive diversity in scenario workshops, by drawing upon psychological theory and research on individual differences in preferred ways of acquiring and processing information. Specifically, we will argue below that these differences represent a major contributing factor to the processes and outcomes of scenario planning workshops. In line with recent calls for gaining an increased understanding of the cognitive significance of strategy practitioners' behaviours [13, 14], we hope to contribute to shed further light on the possible ways in which scenario planning users approach the strategy workshop task.

In the remainder of the paper, we briefly review different approaches to scenario planning drawn from the literature and take a closer look at the different stages of a

generic model of a scenario planning workshop. We then review the concept of 'cognitive style', which is used here to refer to individual differences in the acquisition and processing of information. Next we examine the contributory role that these different tendencies would play within each of the scenario planning workshop stages elaborated earlier. Our examination enables us to then articulate a set of testable propositions about the impact of cognitive style on the effectiveness of scenario planning workshops. Finally, we discuss the potential implications of our proposal for the research and practice of scenario planning workshops.

2. Scenario planning and scenario planning workshops

In a recent review, Bradfield *et al* [5] discuss the origins of scenario planning, from visionary thinkers such as Plato and Thomas More, to the 20th century work of organisations such as the Rand Corporation and Shell. Building upon the work by Huss and Honton [4] they identify three main scenario planning schools: intuitive logics [e.g. 3], trend impact analysis [e.g. 15] and cross-impact analysis [e.g. 16]. A summary of the three schools is provided in Table 1 (below). In brief, in the *intuitive logics school* internally consistent scenarios are developed from a logical perspective, although they are not tied to any mathematical algorithm. The *trend impact analysis school* combines traditional forecasting methods (such as time series and econometrics) with more qualitative approaches, and has at its core the assessment of the importance and probability of occurrence of key impacting events. Finally, in the *cross-impact analysis school*, a distribution of scenarios based on their likelihood of

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occurrence and level of consistency is generated from analysis, leading to the identification of readily apparent scenarios from the distribution.

PLACE TABLE 1 ABOUT HERE

Other scholars have distinguished scenario planning approaches in terms of their design dimensions. For example, van Notten et al [17] propose a typology based on three overarching themes, each representing a key design aspect of a scenario planning intervention: purpose (i.e. the why?), content (i.e. the what?), and process (i.e. the how?). With respect to *purpose*, Burt and van der Heijden [18] argue that organisations move along two axes in terms of scenario projects. First, they move from projects serving specific content needs (one-off problem-solving) to more general ongoing process aims promoting longer term organisational survival. Second, they move from projects undertaken to open up an organisational mind (exploratory) to projects seeking closure on decisions (action-oriented). Coates [19] also discusses the issue of clarity of purpose for a set of scenarios, for instance whether a scenario is intended to be a forecast or not, and suggests that "the purpose of the scenario is at a meta-level, since the scenario usually does not speak for itself in terms of its purpose" (p. 115). For Schoemaker [20], scenario planning represents an effective way of making the link between an organisation's strategic vision and its core capabilities, as the creation of scenarios will highlight the unpredictable futures in which the organisation may have to operate, and hence how it will have to leverage its core capabilities for maximum advantage.

Turning to the issue of *content*, van Notten et al (2003) distinguish between simple and complex scenarios. They suggest that some of the characteristics of *complex* scenarios might include interconnected and interwoven themes; a tangled web of problems that transcends numerous disciplines; the presence of significant uncertainties; and the multiplicity of legitimate perspectives on the problem situation. An example of a complex set of scenarios can be found in work carried out by Royal Dutch/Shell [21]. These scenarios are driven by a complex set of themes including globalisation, security, social cohesion and market efficiencies. The scenario literature now contains examples of scenario projects addressing a range of complex problem situations, including the future of quality in Europe [22, 23], the future of the countryside in England and Wales [24], sustainability [25, 26] and international economic integration [27].

Finally, we consider the issue of *process*. As already stated, three main schools have been identified in the scenario literature. Table 1 compares these schools in terms of their required process steps, as practiced by the Stanford Research Institute (intuitive logics), The Futures Group (trend-impact analysis), and the Center for Future Research and Batelle Columbus Division (cross-impact analysis).

2.1. Scenario planning workshops

Our reading of the scenario literature suggests that perhaps the 'intuitive logics' school has permeated much more among the academic and practitioners communities. In this paper we therefore take the intuitive logics school as representative of the

mainstream approach to scenario planning. In general, many differences can be observed between the various scenario approaches embedded in the intuitive logics tradition [e.g. 2, 3, 8, 20, 28, 29-31]. Nevertheless, all approaches, when deployed in a workshop format, show some basic structure in the process steps required as noted by O'Brien [32]. These include the generation and reduction of key uncertainty factors; the generating of scenario themes; and the generation and evaluation of strategic options.

A useful way of understanding these generic process steps is to place them within the context of two phases of broad group activity. The first phase can be thought of as involving *task oriented* group activities, such as collecting, sharing and structuring of key uncertainties, facts, values and beliefs, and generating and testing potential strategies. The second phase is essentially *discursive* and involving significant negotiation and debate about different interpretations of cause-and-effect relationships under different plausible scenarios, the perceived impacts of scenarios, and the robustness and political feasibility of proposed strategies. In the discursive mode, scenarios are used both as a dialectic and a 'cognitive device' to support 'strategic conversations' [2] among workshop participants. A summary of the phases and associated group activities contained in a generic scenario planning workshop is shown in Table 2.

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It is worth noting that order of phases and group activities displayed in Table 2 represents only an ideal linear sequence. In practice, it is possible for the different activities to be deployed contingently or in a non-linear fashion, which makes it possible for the participants to cycle between the phases during a single scenario workshop or over several workshops. Nevertheless, the ideal sequence and the distinction of phases will enable us to identify the contributory role that the different information processing tendencies of participants, referred to hereafter as their 'cognitive style', play during a scenario planning workshop.

3. Cognitive style

Cognition refers to the activities of thinking, knowing, and processing information. Cognitive style refers to the possibility that different people may carry out these processes differently, perhaps idiosyncratically. In a comprehensive literature review of cognitive styles in the context of modern psychology, Kozhevnikov [33] asserted that in the field of industrial and organisational psychology, cognitive style is considered a fundamental factor determining both individual and organisational behaviour. However, researching the psychology of cognitive style has been criticised for confused and overlapping definitions and for a myriad of different instruments [34]. In an effort to resolve the first of these issues, a recent study was undertaken to establish consensus amongst an expert international style researcher community. Outcomes of the study resulted in the following definition:

Cognitive styles refer to individual differences in peoples preferred way of processing (perceiving, organizing and analysing) information using cognitive brain-based mechanisms and structures. They are assumed to be relatively stable and possibly innate. Whilst cognitive styles can influence a person's behaviour, other processing strategies may at times be employed depending on task demands – this is because they are only preferences [35, p3].

The second problem facing researchers interested in the application of cognitive styles is the plethora of constructs and instruments that are available [36]. These have proliferated over recent decades to the extent that similar terms are sometimes used for different constructs, for example 'analysis' [37] and 'analytic' [38], or similar constructs go by different names, such as, 'intuitive' [39] and 'experiential' [40]. These problems are further exacerbated by the fact that a variety of instruments for measuring cognitive style have evolved from a diverse range of disciplines such as reading performance [41, 42]; creativity [43]; styles of learning [44]; space orientation [45]. In an earlier review of the literature, Armstrong [46] identified 54 different dimensions on which cognitive style has been differentiated but few of these were appropriate for use in a business and management context.

A more recent review of the role of cognitive styles in business and management research [47] concluded that styles research should be 'rigorous in its deployment of valid and reliable methods of assessment, operate within a unifying conceptual model, and be practically relevant' (p.14). Six instruments were identified and reviewed as being potentially appropriate for business and management research. These included:

Myers Briggs Type Indicator (MBTI) [48]; Kirton Adaption Innovation inventory (KAI) [49]; Cognitive Style Index (CSI) [37]; Rational Experiential Inventory (REI) [50]; Linear Non-linear Thinking Styles Preferences inventory (LNTSP) [51]; and the Cognitive Styles Indicator (CoSI) [52]. Of these, the REI, LNTSP, and CoSI have been identified as being at an early stage of use and development [36]. The three most promising and commonly used instruments for assessing cognitive styles in business and management research were identified as being the MBTI, the KAI, and the CSI. It is important to note that the KAI and the CSI have a unitary structure whilst the MBTI has a complex structure. This distinction is important because Armstrong, Cools and Sadler-Smith [47] identified a trend away from the uni-factorial conceptualisation of style towards multidimensional concepts. This is an ongoing theoretical debate which we will now briefly review.

The considerable array of dimensions on which cognitive style has been differentiated include: 'field dependence-field independence' [53]; 'reflective-impulsive' [41]; 'serialist-holist' [54]; 'converger-diverger' [55]; 'simultaneous-successive' [56]; 'wholist-analytic' [57]; to name but a few. Although certain authors [e.g. 58] argue that the multiplicity of constructs reflects the sheer complexity of cognition, others [e.g. 59, 60-62] have suggested that they are merely different conceptions of a super-ordinate dimension, the poles of which are commonly labelled Intuitive-Analytic [e.g. 63, 64, 65]. Allinson and Hayes [37] adopted this theoretical position and labelled their unitary (bi-polar) scale the intuition—analysis dimension. Intuition is defined as 'immediate judgement based on feeling', and analysis as, 'judgement based on mental reasoning' (p.122). They developed this scale specifically for use in large scale

organisation studies. However, despite demonstrating high internal consistency and test-retest reliability, recent studies by Hodgkinson and colleagues using both exploratory and confirmatory factor analytic procedures [66-68] have questioned the unitary structure of the CSI. On the basis of empirical evidence and dual processing theories [69] these authors have suggested that analysis and intuition are more likely to be separate styles of information processing. In other words, cognitive style is complex rather than unitary. However, recent attempts to replicate the findings of Hodgkinson and colleagues found support for Allinson and Hayes [37] original unitary dimension [70]. Further research is therefore needed before this debate can be fully resolved. It is on this basis that the MBTI has been chosen to inform the remainder of this article. It is also worthy of note that Armstrong, Cools and Sadler-Smith's [47] 40-year review of research on cognitive styles in the context of business and management revealed that the MBTI was used more than any other instrument. In the remainder of this article, we present an alternative to previous work that has attempted to draw on individual differences psychology to advance badly needed theory pertaining to scenario planning. We refer here to Hodgkinson and Clarke's [13] article that explores a dual process theory of cognitive styles and Hodgkinson and Healey's [12] article that explores the Five Factor Model of personality as design propositions for scenario planning.

Development of the MBTI was strongly influenced by Jung's [71] theory of psychological types, which is often associated with personality. Whilst this might seem to stretch the definition of cognitive style, this theory is in fact one of the most widely known in the area of cognitive style research [72-77]. The MBTI has been

used extensively as an indicator of cognitive style in both organizational practice and research [75]. Furthermore, due to its pre-eminence many developers of their own cognitive style instruments have sought to correlate them against the MBTI to demonstrate convergent validity. Examples include: Taggart & Valenzi [78] who made use of all four dimensions of the MBTI when developing their HIP metaphor; Agor [79] who made extensive reference to the MBTI when developing his theories concerning left-brain, right-brain and integrated types in management settings; and Allinson & Hayes [37] who used all four dimensions of the MBTI to demonstrate construct validity of their Cognitive Style Index. In their major review of the properties of the MBTI Gardner and Martinko [80] found internal consistencies above .75 for all four scales. Whilst test-retest reliabilities for dichotomous type scores yield lower reliabilities [81] test retest reliabilities for continuous scores "usually exceed .70 and often surpass .80" [80]. Mixed findings were reported as regards the factorial validity although on balance, authors have found that MBTI validation studies yielded generally positive results [82-86]. According to Tzeng et al. [86], their factor analysis "yielded clear simple factors being matched almost perfectly with the theoretical scales of the MBTI" (p255). The evidence for criterion-related validity has also been reported as being "extensive" revealing "differences in type proportions across occupations that are consistent with type theory" [80, p.49]. A broadening of the scope of management research into type theory using the MBTI was also recommended by these authors.

Central to Jung's theory of psychological types [72] are four basic functions that direct conscious mental activity. These are sensation, intuition, thinking, and feeling

and individuals differ as to which of the four functions they choose in preference to the others. The four functions correspond to the means by which consciousness obtains its orientation to experience, sensation telling us that something exists, thinking telling us what it is, feeling telling us whether it is agreeable or not, and intuition telling us whence it comes and where it is going. Thinking/Feeling preferences (rational functions) and Sensing/Intuition preferences (non-rational) are represented by the Judgement and Perception dimensions respectively of the MBTI. Perceptual processes refer to how the individual becomes aware of people, objects, facts and ideas. Both stimulus selection and information gathering are part of the perceptual processes, which emphasise input either through the physical senses (i.e. sensing) or by means of insight (i.e. intuiting). Whereas the former involves gathering discrete, concrete information from the observable environment, the latter encompasses the surfacing of information in a creative and holistic way. Judgemental processes, on the other hand, represent the process of making a decision, including problem formulation, alternative generation, evaluation and choice. Judgement processes emphasise making logical connections (i.e. thinking) or relying on the merits and values of the situation (i.e. feeling). The thinking function uses conventional deductive logic in decision making, whereas the feeling function accentuates values and allows conflict and paradox in decision making. If we combine the perceptual and judgemental dimensions in Jung's model, four 'decision styles' then arise [87]: sensation-thinking, sensation-feeling, intuition-thinking, and intuition-feeling (to be further discussed in the next section).

Scenario workshops are atypical events that require from participants the 'suspension of disbelief' and the conduct of novel and loosely-structured tasks that are at odds with the familiarity of everyday work routines. Hodgkinson and Healey [12] liken scenario workshops to 'weak situations', namely, situations that provide few dispositional cues to participants regarding appropriate behaviours, and in which behaviours are strongly influenced by personality styles [88]. Although several writers have acknowledged the importance of the role that cognitive style plays in strategic decision making [e.g. 11, 13, 89, 90-94], neither researchers nor practitioners have specifically addressed the contributory role of the perceptual and judgmental dimensions in the conduct of scenario planning workshops. To address this gap, we articulate a theoretical framework that highlights the role of these cognitive style dimensions within the generic scenario planning workshop process model introduced earlier.

4. Exploring cognitive style in scenario planning workshops

As already stated, scenario planning workshops are essentially a strategic decision making tool. They are used to help a senior management team explore multiple plausible futures for the organisation, and identify and choose feasible robust strategy. Therefore, our examination of cognitive style within this context must take into account a conceptualisation of style that considers modes of information gathering (i.e. perceptual) *and* evaluation (i.e. judgmental). The Jungian theory of psychological types briefly introduced above meets this requirement and will be adopted in the

discussion that follows[1]. The Jungian model, as operationalised by the Myers-Briggs Indicator (MBTI) [95], has been widely researched in studies of strategic decision making [e.g. 75, 96, 97-99], and seems to be well understood and accepted by managers [77, 80].

As already introduced in the previous section, four styles can be derived from combining the perception and judging dimensions of the Jungian model: sensing-thinking (STs) types, sensing-feeling (SFs) types, intuition-thinking (NTs) types, and intuition-feeling (NFs) types. Jung viewed these styles as dominant, not absolute modes of expression. Therefore, although individuals may exhibit all types of behaviours when engaged in perceiving and judging, most have preferred styles that they use more often, particularly in ill-structured situations [100]. Below we summarise researchers' observations about each style preference [89, 93, 94, 96, 98, 101-104], which are summarised in Table 3.

PLACE TABLE 3 ABOUT HERE

STs stress systematic problem solving and decision-making with hard data. They put considerable emphasis and concentration on specifics and factual details of problems or choices. STs place high importance on tasks and structured information, and use logical, step-by-step processes to reason from causes to effects. They favour standard

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[1] The original Jungian model postulated three bipolar dimensions: two related to information processing (i.e. perceptual and judgmental) and one related to attitudes (i.e. extroversion/introversion). Myers *et al* [48] added later an extra fourth attitudinal dimension (judging/perceiving) to help differentiate how people deal with the external world. For the purposes of this paper, we only focus on the mental functions dimensions.

operating procedures to solve problems. When encountering doubts or opposition during problem solving or decision making, they rarely re-analyse their positions. STs tend to focus on short-term problems, or concentrate on the problems of today, if not of yesterday. They strive for complete control, certainty and specificity. When making choices, STs prefer to use evaluation criteria based on a limited set of realistic objectives, usually reflecting narrow economic concerns, and press for realistic and well-defined implementation plans.

NTs, like STs, stress systematic problem solving and decision making, but they tend to ignore specific, detailed information of problems or choices. Instead, they put significant emphasis on broad, global information and issues. They enjoy structuring complex problems and reducing them to simpler ones by studying patterns in data. They are broad conceptualisers and problem formulators, and their formulations typically undertake bolder leaps into the unknown. NTs can be impersonal and idealistic, and may ignore sceptics. They emphasize long-range plans and new possibilities. However, they often seem more interested in planning than in implementation. They stress the need for innovation, risk taking and discovery. When making choices, while STs are concerned with a narrow set of well-defined or precise microeconomic issues or criteria, NTs are concerned with a narrow set of ill-defined or abstract macroeconomic issues and criteria.

NFs stress judgement and experience in problem solving and decision making, often portraying their personal views as facts. They rely on gestalt, intuitive perceptions and maintain few decision-making rules. Like NTs, NFs spend little effort getting to know

specifics (sometimes they show an extreme disdain towards getting down to specifics). Also like NTs, NFs pay attention to long-term planning and enjoy working in ill-structured problems and choices that require innovative concepts and theories. Unlike NTs, however, their structuring of these problems and choices typically involves global human and social issues. They stress the need for organic growth and adaptation. When making choices, NFs sometimes test their hunches; at other times they just state their preferences. When evaluation criteria are explicitly stated, they show concern with attending to human and social concerns.

Finally, SFs stress people's opinions in decision-making. Like STs, they rely on specifics and focus on short term problems. However, STs are more interested in details and facts about people than about things. NFs share a concern for problems that have human implications. Unlike NFs, however, SFs are concerned with individuals in particular rather than people in general. They are concerned with making people get along in more harmonious manners. Consequently, SFs strive to attempt to reconcile individual differences by concentrating on affective parts of interpersonal communication in order to improve it. When making choices, SFs are concerned with harmony and thus favour those choices that a consensual majority endorse.

We contend that, irrespective of their specific design, all scenario workshops will differ fundamentally in character, depending upon the overall cognitive style mix present in the workshop. First, because of their attention to specifics, we hypothesise that the contribution of STs and SFs to procedural scenario workshop activities (e.g.

setting the scene, surfacing strategic options) is likely to help generate high levels of detailed information, as well as add precision to contributions made by NTs and NFs. Similarly, for discursive scenario workshop activities (e.g. choosing uncertainty factors or scenario themes), we contend that STs are likely to press for realistic and well-articulated foci, themes or options, whereas SFs are likely to press for foci, themes of options they perceive would be endorsed by the consensual majority. Consequently, their contributions may slow up the scenario workshop proceedings considerably. On the other hand, because of their concern for the short-term, we hypothesise that STs and SFs will find the more divergent scenario workshop activities (e.g. generating uncertainty factors, building scenarios) particularly challenging, for they require thinking in significantly longer time frames than is preferred. Accordingly, if pushed too hard, STs and SFs might experience varying levels of frustration and annoyance with these activities, which can seriously affect the scenario workshop outcomes.

Conversely, and due to their concern for new possibilities and long-term plans, we hypothesise that NTs and NFs are likely to feel comfortable and enjoy these types of workshop activities. Furthermore, both are likely to help provide a comprehensive set of information inputs to the process, as well as identify categories or themes within which the contributions made by STs and SFs can be located. As to the more discursive scenario workshop activities, NTs are likely to press for comprehensive but well articulated foci, scenarios or options, whereas NFs are likely to press for foci, scenarios or options that stress global human and social dimensions.

To summarise, different styles in information gathering and evaluation among scenario workshop participants are potentially central to our understanding of scenario interventions because differences in cognitive style determine participants' efficiency in completing the different scenario planning activities and their willingness or otherwise to engage in them. Hence, workshop participants and scenario planning approaches are matched to a greater or lesser extent, and the task demands imposed by scenario planning activities are such that major mismatches between these activities and the cognitive styles of workshop participants will produce less than positive outcomes.

Table 4 below summarises our theoretical framework of the role of different Jungian cognitive styles within scenario planning workshops. In the next section, we discuss the implications of our framework for the research and practice of scenario workshops.

PLACE TABLE 4 ABOUT HERE

5. Implications for research and practice

Our framework has important implications for advancing the research and practice of scenario planning workshops. Based on the hypothetical influences of the four styles of information gathering and evaluation on the generic stages of a scenario planning workshop, as outlined in Table 4, we offer below a number of research propositions

regarding the influence of cognitive-based group composition on scenario workshop outcomes.

5.1. Implications for research

Firstly, as suggested by our framework, scenario planning workshops will be favoured by different types of individual. A future avenue for research is thus to assess whether or not forcing individuals whose preferred cognitive styles are not aligned with scenario planning workshop activities (e.g. STs and SFs) will prove eventually too demanding for the individuals concerned, taking them outside their comfort zone, or whether this might be beneficial for scenario workshop outcomes. Recently, Hough and Ogilvie [75] reported a clear fit between the Jungian cognitive style and strategic decision-making performance reporting, for example, that NT executives used intuition to make cognitive leaps based on objective information and crafted more decisions of higher quality. Conversely, SF executives took time to seek socially acceptable decisions, made the lowest number of decisions, and made decisions of lowest perceived effectiveness. Previous research suggests that group behaviour falls into two major categories [105, 106] . The first concerns social-emotional activities of the group members, and the second, task-related activities of the group. Social-emotional oriented processes occurring in groups are concerned with group solidarity and attraction between members and task-oriented processes with goal attainment [107, 108]. In group settings, it has also been observed that when the context of decision making is relatively unstructured and organic (rather than structured and mechanistic) homogenous intuitive groups outperform homogenous analytic groups

on both socio-emotional and task oriented acts [109, 110]. This leads us to the following proposition:

Proposition 1: Homogeneous intuitive groups (NTs and NFs), rather than homogeneous sensing groups (STs and SFs) will be more effective in scenario workshops with regard to positively engaging in both social-emotional and task-oriented processes.

In a review of the literature on work-group diversity, Williams and O'Reilly [111] identified two main traditions as being the social categorisation perspective and the information/decision making perspective. The former holds that similarities and differences are used as a basis for categorising self and others into either in-groups (homogenous) or out-groups (heterogeneous). People tend to favour in-groups over out-groups [112] and are more positively inclined toward its members because they are more similar than dissimilar to self. This leads to higher levels of member commitment [113] and cohesion [114] especially when there is a high degree of consonance with task [110]. This leads us to our second proposition:

Proposition 2: Homogeneous intuitive groups (NTs and NFs) will experience higher commitment, cohesion, and overall satisfaction with scenario workshops.

Accepting that it may not always be possible to assemble homogenous teams leads us to consider ways of managing heterogeneity in the context of scenario planning groups. Indeed, some have argued that innovation takes place when different ideas,

perceptions, and ways of processing and judging information collide [115]. The problem for managers who value groups of employees with a variety of cognitive styles is how to manage them. According to Messick [116], cognitive styles imply a general orientation and are spontaneously applied without conscious consideration or choice across a wide variety of situations. Strategies on the other hand, are reflective of decision choices exercised among alternative approaches that vary as a function of a particular situation, and may be amenable to change through training.

Although not implied by our framework, it is worth noting that there is other work suggesting that individuals might be able to override their stylistic preferences by 'switching cognitive gears' [117] in order to address the problem at hand [e.g. 60, 118]. This phrase calls attention to the fact that cognitive functioning involves the capacity to shift between cognitive modes, from automatic processing to conscious engagement and back again. Consider, for example, the work of O'Brien [32], which provides a reflective account of teaching scenario planning to MBA students in a top British university. She shows how the scenario work conducted by students exhibited several common pitfalls including limited and predictable scenario factors, a focus on current (rather than future) issues, and unimaginative scenario presentations. These pitfalls were subsequently avoided by making changes to the scenario method itself. Whilst we should not underestimate the significance of the impact caused by the method's improvement on the scenario tasks [see also 119], we would like to offer an alternative explanation. The most common cognitive style present among MBAs is ST which, as argued above, does not represent a good fit with scenario planning activities. Thus, it may be plausible that O'Brien's findings indicate an increased

ability by the students to switch cognitive gears while using the new scenario method. This work thus raises the possibility that one's cognitive style preferences for perceiving (i.e. sensing or intuition) and judging (i.e. thinking or feeling) could be overcome through increased awareness and formal training. Therefore,

Proposition 3: Individuals trained in switching cognitive gears, rather than those who are non-trained, will be more effective in scenario workshops.

Closely related to the concept of switching cognitive gears is Kirton's [120] idea of coping behaviour. When working in a cognitive climate that is incongruous with one's dominant cognitive style, Kirton suggests that it is "possible for individuals not only to learn to use a variety of specialised problem-solving and learning strategies that are consonant with their general cognitive styles, but also learn to shift to less congenial strategies that are more effective for a particular task" (p5). This leads us to our third proposition:

Proposition 4: Coping behaviour is a necessary intervening concept between stable preferred cognitive style and actual, needed behaviour of a heterogeneous group.

These learned behaviours and strategies that are not far from one's preferred style, and continue to pay dividends, may become part of a natural repertoire of the practitioner. However, coping behaviour is defined as "a departure from preferred style by the minimum amount for the least time needed" (ibid, p6). Small amounts of coping behaviour over short periods of time are normal and entail easily bearable

costs [121]. The problem arises when the level of coping needed is far from one's style and must be kept up over a long period of time. This is likely to occur when individuals find themselves as part of a group whose mean cognitive style score differs markedly from their own. In these circumstances, members closer to the group mean can bridge between the core orientation group and those located far away from the group mode [120]. This leads us to our fourth and fifth propositions:

Proposition 5: A bridger can act as a mediator in facilitating recognition of the ideas and work patterns of those who might not otherwise be accepted by the group owing to the relative extremity of their cognitive styles. Through self-awareness training bridgers will be able to respond both cognitively and behaviourally to a variety of situations in adroit ways,

Proposition 6: The management of heterogeneous groups will be more effective if training is provided to enable cognitively diverse people to acknowledge their differences and respect the cognitive styles of others in the interest of creative conflict, idea generation, idea implementation, and innovation.

Our framework also has important methodological implications for the conduct of research on scenario planning workshops. Arguably, one the most important implication is to be able to relate the data generated by coding individuals' contributions within strategy workshops to their cognitive styles. This will require a clear operationalisation of scenario workshop processes and outcomes, as well as a robust instrument to measure cognitive style. For example, individual contributions

could be classified by their task or relational orientations, allowing group processes to be compared against normative models of decision making or conflict management, respectively [122]. Similarly, resulting scenarios could be rated against standard quality criteria such as 'coherence', 'plausibility', 'internal consistency', and 'logical underpinnings' [5, 123]. As to measuring cognitive style, the primary psychometric instrument to measure the Jungian cognitive styles is the Myers-Briggs Type Indicator (MBTI) [95] whose psychometric properties were discussed earlier in this article.

Such an operationalisation and measurement will allow for comparative analyses across a variety of different types and stages of scenario workshop approaches, and is likely to provide a particularly powerful means for advancing our understanding of the impact of scenario planning interventions. Obviously, access to scenario workshop data is required. An alternative data source might come from scenario workshops in which students practice scenario planning, such as those studied by O'Brien. Clearly working with data from 'real' scenario workshops would be preferred, but simulated workshop data with students offer certain advantages regarding repeatability and controllability that a 'real' data set do not offer.

5.2. Implications for practice

If the above matching propositions were to be confirmed our framework would suggest that the design of scenario planning interventions would have to include only those individuals whose cognitive style preferences are aligned with the particular scenario activities, with a view to maximise the intended benefits of scenario

workshops. Cognitive style profiling would then be a prerequisite for adapting facilitation techniques and process designs to the cognitive-based composition of the scenario workshop group. However, if profiling is not possible in practice, knowledge and understanding of cognitive style and its impact will help the facilitator in managing the underlying cognitive, behavioural and emotional processes observed at work during scenario activities.

For example, when dealing with a scenario workshop group comprising a majority of STs or SFs, facilitators should introduce techniques directed toward fostering innovative thinking in order to generate challenging and plausible scenarios and creative strategies for dealing with the contingencies so envisioned. Since STs and SFs may cope poorly when dealing with the divergent thinking activities required in scenario workshops, facilitators need to be mindful of individuals potentially disengaging from the scenario process. To encourage greater involvement, facilitators should emphasize the shared fate of the group [124-126] by, for instance, drawing attention to the group's previous collaborations or collective successes and accentuating the fact that threats are common to all group members. An emphasis on the common shared goals of the group [126-128] by, for example, highlighting group members' interdependencies using problem structuring methods [129, 130] is another means to encourage greater involvement.

On the other hand, despite their apparent fit with scenario planning workshops suggested by the propositions articulated earlier, a scenario workshop group comprised by a majority of NTs and NFs would require the facilitator to stimulate

group members to challenge one another's contributions. Since NTs and NFs pay attention to broad issues at the expense of detail or specifics, facilitators need to be aware that individuals' assumptions about the organisation's future go unchallenged. Again, the use of problem structuring methods [131, 132] such as devil's advocacy [133] or SAST [134, 135] could be helpful in this aspect.

When the scenario workshop comprises individuals with significant differences in cognitive style but with no style dominating, the facilitator should be aware of the inherent conflict that may arise due to the cognitive heterogeneity of the scenario group and avoid escalation to dysfunctional levels. Research on conflict has demonstrated that membership heterogeneity can lead to potentially disruptive and interpersonal conflict [136-139], which can lead to group decision making biases [128]. Emphasizing the shared fate and common goals of the scenario group are again important means for reducing the likelihood of dysfunctional conflict.

Finally, it is generally recognised that there is a facilitator effect in most decision support workshops, because such events are not disengaged processes [140, 141]. Such an effect can be due to a facilitator's own cognitive style. Because cognitive style influences our perceptions of nearly everything, we tend to identify with the positions of others similar to us in cognitive style and may find fault with the positions of those different from us in cognitive style. To guard against these potential biases, scenario workshop facilitators need to understand the characteristics of their preferred cognitive styles in order to offer unbiased assistance to the scenario workshop group.

6. Conclusions

Despite their widespread use, scenario planning workshops remain an under researched phenomenon. The dearth of empirical studies that examine them are written primarily by their practising advocates in the form of suggested intervention designs based on little more than anecdotal evidence, which makes them unsuitable for the purposes of systematically evaluating the impact of scenario planning, and developing an evidence-based approach to scenario intervention design. Furthermore, the limited research that exists also lacks a theoretical basis for understanding the factors that enable or constrain the intended benefits of scenario workshops. In this paper we have offered one such framework, based on the differences in individual preferences for perceiving and judging information, or cognitive style.

Our framework pays attention to recent calls for gaining an increased understanding of the cognitive significance of strategy practitioners' behaviours [13, 14], and we hope it has contributed to shed further light on the possible ways in which scenario planning users approach the strategy workshop task. The research propositions and implications for practice implied by our framework should be empirically tested in the field and the laboratory. However, they are mainly intended to serve as a useful starting point for future research on scenario planning workshops, and thus are not final and will need further refinement.

To conclude, it is frequently claimed that scenario planning workshops result in changed mental models, learning and the development of robust strategies [2, 11]. Our framework has suggested that the extent to which these workshops outcomes are achieved in practice is likely to be influenced by the cognitive style of the workshop participants. We hope that the framework will prompt scenario planning researchers to conduct various potentially useful empirical comparisons: of different cognitive-based group membership, of different scenario workshop methods, and of different facilitator strategies, all with a view to develop evidence-based best practice guidelines for teaching and training. Overall, a focus on cognitive style can contribute to 'unpack' the richness and complexity of scenario workshops while, at the same time, systematically and rigorously testing their practical impact.

Table 1: A process comparison of three scenario planning schools and their methods
– adapted from Huss and Honton (1987) and Bradford et al (2005)

Scenario Planning School	Intuitive Logics	Trend-Impact	Cross-Impact Analysis	
Generic Scenario Generation Steps	**SRI**	**The Futures Group**	**Center for Future Research**	**Batelle Columbus Division**
			INTERAX	*BASICS*
The topic	1 Analyzing the decisions and strategic concerns	1 Identify key scenario drivers 2 Create scenario space	1 Define the issue and time period of analysis	1 Define and structure the topic
Key decisions	2 Identifying the key decision factors		2 Identify the key factors	
Trend extrapolation		3 Collect time series data 4 Prepare naïve extrapolation	3 Project the key indicators	
Influencing factors	3 Identifying the key environmental factors	5 Establish list of impacting events	4 Identify the key impacting event	2 Identify areas of influence
Analysis of factors	4 Analyzing the environmental factors	6 Establish probabilities of events occurring over time	5 Develop event probability distribution	3 Define descriptors; write essays; assign initial probabilities
Cross-impact			6 Estimate cross impacts 7 Complete cross impact analysis	4a Complete cross impact matrix
Initial scenarios	5 Defining scenario logics	7 Modify extrapolation	8 Run the model	4b Run the program 5 Select scenarios for further study
Sensitivity analysis				6 Introduce uncertain events; conduct sensitivity analysis
Detailed scenarios	6 Elaborating the scenarios	8 Write narratives		7a Prepare forecasts
Implications	7 Analyzing implications for key decision factors 8 Analyzing implications for			7b Study implications

	key decisions and strategies			

Table 2: Phases and associated group activities of a generic scenario planning workshop model

PHASE	GROUP ACTIVITY
PROCEDURAL	• Setting the scene. • Generating uncertainty factors.
DISCURSIVE	• Choosing key uncertainty factors. • Choosing scenario 'themes'
PROCEDURAL	• Generating details of (chosen) scenario themes. • Generating (and evaluating) strategic options.
DISCURSIVE	• Choosing 'candidate' strategic options for further evaluation.

Table 3: Characteristics of Jungian cognitive styles

Dimension	ST	NT	NF	SF
Information processing	– Focus on hard, specifics and factual details of problems or choices – Place high importance on structured information. – Focus on short-term issues.	– Ignore specific, detailed information of problems or choices. – Focus on broad, global conceptual issues.	– Ignore specific, detailed information of problems or choices. – Stress judgement and experience, often portraying their personal views as facts – Focus on global human and social issues	– Focus on people-based specifics and people-based factual details of problems or choices – Focus on specific (i.e. an individual's) human issues. – Focus on short-term issues.
Problem solving and decision making	– Use logical, step-by-step processes to reason from causes to effects – Favour standard operating procedures – Rarely reanalyse positions when challenged – Concerned with a limited set of realistic objectives, usually reflecting narrow economic concerns. – Press for realistic and well-defined implementation plans.	– Enjoy structuring complex problems and reducing them to simpler ones by studying patterns in data. – Formulations typically undertake bolder leaps into the unknown. – Concerned with a narrow set of ill-defined or abstract macroeconomic dimensions. – Press for long-range plans and new possibilities (but seem more interested in planning than implementation).	– Enjoy working in ill-structured problems and choices that require innovative concepts and theories. – Rely on intuitive perceptions or hunches, and maintain few decision-making rules. – Concerned with evaluation criteria addressing human and social dimensions. – Press for ling-term plans	– Rely on consensus as a decision rule – Concerned with evaluation criteria that facilitates harmony and thus favour those choices that a consensual majority endorse.

Table 4: Contribution of different cognitive styles to scenario workshop activities

Scenario activity	ST	NT	NF	SF
Setting the scene	Provide specific issues and factual details about current situation based on hard data	Provide general theoretical or abstract aspects of the situation.	Provide general human and social aspects of the situation	Provide specific details about current situation based on people data
Generating uncertainty factors	Limited contribution but can help on providing precision to broad uncertainty factors.	Surface and structure a comprehensive and general set of broad uncertainty factors and themes.	Surface and structure a comprehensive and general set of human and social-related uncertainty factors and themes.	Limited contribution but can help in bringing precision to human and social-related uncertainty factors.
Reducing and selecting key uncertainty factors; choosing scenario 'themes'	Press for realistic and well defined focus.	Press for comprehensive and well defined focus	Press for idealistic focus based on broad human/social dimensions.	Press for focus that consensual majority will endorse.
Generating details of (chosen) scenario themes; generating (and broadly evaluating) candidate strategic options.	Limited contribution but can help in adding precision to built scenarios or strategic options.	Provide the input required to flesh out the scenarios, as well as surface and structure a set of creative strategic options.	Provide the input required to flesh out the scenarios, as well as surface and structure a set of creative strategic options, particularly those that address human or social dimensions.	Limited contribution but can help in adding precision to built scenarios or strategic options, particularly those related to people.
Choosing 'candidate' strategic options for further evaluation	Press for realistic and well-defined strategic options	Press for comprehensive but well-defined strategic options	Press for idealistic strategic options intended to achieve the 'common good'.	Press for strategic options endorsed by a consensual majority

Please cite as:

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Please cite as:

Franco, L.A., Meadows, M. & Armstrong, S.J. (2013). Exploring individual differences in scenario planning workshop: A cognitive style framework, *Technological Forecasting and Social Change*, 80(4): 723-734.

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