



Scenario planning with a sociological eye: Augmenting the intuitive logics approach to understanding the Future of Scotland and the UK



Professor R. Bradley MacKay^{a,*}, Dr. Veselina Stoyanova^b

^a The Gateway, North Haugh, School of Management, University of St Andrews, St Andrews, Scotland KY16 9RJ, UK

^b Strathclyde Business School, University of Strathclyde, 199 Cathedral Street, Glasgow, Scotland G4 0QU, UK

ARTICLE INFO

Article history:

Received 9 March 2016

Received in revised form 12 August 2016

Accepted 22 August 2016

Available online 9 September 2016

Keywords:

Intuitive logics
Scenario planning
Causality
Actors
Structures
Temporality
Public policy

ABSTRACT

This paper draws on a social theory-informed understanding of causality to illustrate how notions of agent–structure interactions can enhance the intuitive logics (IL) approach to scenario planning. It incorporates concepts such as the ‘subjective’ predispositions of agency, ‘objective’ structures of social systems, activity dependence, unintended consequences of action and event-time temporality in the IL method to augment causal analysis in the scenario development process. The paper illustrates the social theory-informed IL framework through its application to a scenario exercise undertaken in the lead-up to the Scottish referendum on independence from the United Kingdom on September 18th, 2014. The central thesis of the paper is that agent–structure interactions underpin the unfolding of futures in social systems by both constraining and enabling the range of possible futures that can emerge

© 2016 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Scenario planning has become a widely used method for generating strategic insights in the public, private and non-for-profit sectors in recent years (Durance and Godet, 2010; Gunn and Williams, 2007; Wright et al., 2013). Its widespread use in strategic planning processes can be attributed to the increasing complexity, interconnectedness and uncertainty that characterizes business and policy-making environments. While a range of approaches to scenario planning exist, the intuitive logics (IL) approach and its derivatives has been identified as the most commonly adopted method (Bradfield et al., 2005; Postma and Liebl, 2005; van Notten et al., 2003; Varum and Melo, 2010). The IL approach rests on the premise that by developing a range of plausible stories about how the future could evolve (e.g. Van der Heijden, 2005; Schoemaker, 1993; Schwartz, 1991; Wack, 1985a,b), they can improve perception by challenging assumptions and changing mindsets, and lead to better strategic decisions through an enhanced understanding of how the future might unfold (Tapinos, 2011; O'Brien and Meadows, 2013; Wright et al., 2013). Its success as a strategic planning tool can be attributed, at least in part, to accounts of its successful use by Royal/Dutch Shell (RDS), the global oil and gas giant, in navigating the oil and

gas shocks of the 1970s and 1980s (e.g. Wack, 1985a,b; Schwartz, 1991; Schoemaker, 1993; Van der Heijden, 2005).

Despite its increasing popularity as an approach for making sense of an uncertain future and for strategic decision-making support, scholars have sought to augment its capabilities and effectiveness (Derbyshire and Wright, in press). This has been partly in response to criticisms that scenarios might not always have the sort of impact on changing mindsets or influencing strategic decision-making that advocates of scenario planning purport (e.g. Hodgkinson and Wright, 2002; MacKay and McKiernan, 2010; O'Brien and Meadows, 2013). Some scholars have, for instance, postulated that the ‘cause–effect’ nature of the IL approach is overly deterministic and can fail to prepare individuals and/or organizations for surprising futures (e.g. Burt, 2007; Derbyshire and Wright, 2014, in press). Linear cause-effect approaches to IL privilege the direct agency, or efficacy of one process (the cause) with another process (the effect). This is most evident in the identification and separation of forces shaping the future into those that are ‘predetermined’ from those that are ‘uncertain’ and the widespread use of influence diagrams in IL scenario approaches (e.g. van der Heijden, 2005; Van der Heijden et al., 2002; Wack, 1985a,b). In social systems, we argue in this paper, analyzing causally complex patterns through agent–structure interactions is a more theoretically robust method for understanding complex causal patterns underpinning the emerging future. We base our argument on the premise that a reason for RDS’ success in the 1970s and 1980s in using the method was a profound, if tacit understanding of the socio-

* Corresponding author.

E-mail addresses: Brad.Mackay@st-andrews.ac.uk (R.B. MacKay), veselina.stoyanova@strath.ac.uk (V. Stoyanova).

political dynamics between agents and structures underpinning the economics of the global oil and gas industry.

Despite the underlying social structures of economic systems (e.g. Bourdieu, 2005), there remains a paucity of social theory-informed methodological and theoretical development in the scenario planning field. To address this gap, we draw on a scenario exercise as an illustration of how developing scenarios with a “sociological eye” (cf. Whittington, 2007) can augment notions of causality in the IL method. By “sociological eye” we mean to build on work that has the aim of enhancing IL methods in scenario analysis by incorporating sensibilities from social theory (e.g. MacKay and Tambeau, 2013) and Platonic notions of efficient, final, formal and material causality (Derbyshire and Wright, *in press*). The scenario exercise itself was part of a wider program of research into the “Future of the UK and Scotland” by almost 40 academics from different disciplines in the lead-up to Scotland’s referendum on independence from the United Kingdom (UK) on September 18th, 2014. The study was funded by the UK’s largest funding body for university research, the Economic and Social Research Council (ESRC).

1.1. Research aims, objectives, purpose

Our paper has two primary aims and objectives that align with the overall purpose of augmenting notions of causality in the IL approach to scenario planning (e.g. Wright et al., 2015). First, we aim to draw on social theory, and particularly social theory that reconciles agent–structure interactions (e.g. Archer, 1995; Bourdieu, 1977; Giddens, 1979, 1984, 1993) with the objective of further developing the critical theoretical axioms underpinning the method. Second, we aim to couple sensibilities incorporated from social theory with notions of causality with the objective of improving scenario planning IL methods. Taken together, our aims and objectives seek to also address the paucity of work in IL approaches to scenario planning that are informed by social theory, particularly in the context of public-policy scenarios that deal with widespread societal change.

1.2. Research questions

In this paper, the primary research question we seek to address is, *how can an understanding of future uncertainties informed by social theory augment notions of causality in the intuitive logics approach to scenario planning?* In addressing this research question, we also seek to grapple with two secondary research questions including: *how notions of agency–structure interactions can usefully enhance causal assessments in the intuitive logics method?*; and, *how can different notions of the temporalization of causality be incorporated into the intuitive logics approach to scenario development?*

1.3. Research contributions

This article makes several contributions to the scenario planning field. First, it augments the IL approach to scenario planning by demonstrating that the development of causality in alternative futures with a “sociological eye” can lead to a more grounded understanding of socio-political constraints and potentialities of the range of alternative futures possible. Second, in doing so, it seeks to extend a nascent line of inquiry into the social theory axioms underpinning scenarios (e.g. Hughes, 2013; MacKay and Tambeau, 2013). And third, it also extends the small literature on scenario planning directed towards public understanding and policy-making by placing agent–structure interactions at the center of scenario analysis (cf. Cairns et al., 2016; Hughes, 2013).

1.4. Paper structure

The article begins with an overview of scenario planning generally, and the IL method specifically. To illustrate the approach, it gives a

brief overview of its development, focusing particularly on its use by RDS. The article then turns to causality in the IL literature, and elaborates on a number of concepts in social theory, such as notions of agency, objective structures, activity dependence, unintended consequences, and temporality to augment the IL approach through a systematic interrogation of causation. To illustrate how the concepts can be used, it draws on a recent scenario intervention in the run-up to the Scottish referendum on independence from the UK on the 18th of September 2014. Finally, it ends with a discussion of how such augmentations can help to develop the IL approach to scenario planning.

2. Conceptual overview

In this section, we begin by addressing what scenarios are, before turning to a brief history of the IL approach to scenario planning as developed at RDS. After reviewing recent critiques of the use of causality in IL approaches to scenario planning, the section turns to a number of concepts drawn from social theory that, we argue, can be used for augmenting notions of causality in IL approaches to scenario planning. Our particular focus is on scenario development as it pertains to public-policy and widespread societal change.

2.1. What are scenarios and what are their purpose?

While definitions of scenarios vary to the extent of “rendering it slippery” (Stout, 1998, p. 3), Kahn and Wiener (1967, p.6), who popularized the term, define them as a “hypothetical sequence of events ... for the purpose of focusing attention on causal processes and decision points”. They are not predictions, but plausible stories about how the future could evolve in uncertain and often surprising ways. Rather than assuming away uncertainties, as many forecasting techniques do, they “maintain the future as an open, but not an empty space, where facts, expectations, and perceptions intermingle” (Wilkinson and Kupers, 2014, p. 13). Drawing on a combination of analytical, creative and critical techniques, they are designed to help their users to gently ‘re-perceive’ reality (Wack, 1985a,b). Scenarios can be thought of as post-cards from the future, which describe different possibilities and potentialities that are then sent back through time to be read in the present.

As with a wide range of scenario definitions, scholars also point out that there appears to be a confusing array of reasons why organizations might engage in scenario planning (Wright et al., 2013; also see Burt and van der Heijden, 2003). Wright et al. (2013) have helpfully identified three primary purposes that the majority of scenario planning interventions are used for in the extant literature. They are to challenge conventional thinking to (i) change mind-sets and reframe perceptions within organizations, (ii) to improve decision-making within strategy development processes, and (iii) to enhance understanding of connections, causal processes and logical sequences of events that may shape the impending future. And while scenario methods are as varied as the multiplicity of definitions and purposes associated with the technique – which at times has led scholars to criticise it for ‘methodological chaos’ (cf. Varum and Melo, 2010; Whaley, 2008) – many are based on, or are a derivative of the ‘basic’ IL method (cf. Wright et al., 2013).

2.1.1. The Intuitive Logics (IL) approach to scenario planning

Successive surveys of corporate planning departments have shown consistently that scenario planning continues to increase in popularity (Linnemen and Klein, 1983; Malaska et al., 1984; Malaska, 1985; Rigby, 1993, 2003; Rigby and Bilodeau, 2005, Rigby and Bildeau, 2015). By 2001, anecdotal evidence suggested that some 70% of scenario planning methods being used for strategic planning were based on, or derivatives of the IL method (Hart and Rudman, 1999; also see Derbyshire and Wright, 2014; MacKay and McKiernan, 2010; MacKay and Parks, 2013). The Bain annual survey of management tools estimates that scenario planning is, at the time of writing, the fastest growing strategic planning tool (Rigby and Bildeau, 2015).

The IL process of constructing scenarios involves combining intuition and imagination with analytical rigour (Wilkinson and Kupers, 2014). It normally follows variations on a number of steps in common (see Table 1: The intuitive logics approach to constructing scenarios). As a former head of the business environment division at RDS sums up, IL scenarios deal with two worlds: “the world of facts and the world of perceptions. They explore the facts but they aim at perceptions inside the heads of decision-makers” (Wack, 1985b, p. 140).

Their popularity as a strategic planning tool is closely associated with their refinement and success at RDS.

2.1.2. A brief history of the IL method as developed at RDS

Its origins can be traced to work carried out in the 1950s at the military-oriented RAND (Research and Development) Corporation, and subsequently the Hudson Institute and Stanford Research Institute (SRI) in the United States (Bradfield et al., 2005). The method was refined in the late 1960s/early 1970s at RDS in response to concerns by some planners that their forecasting method, known as the ‘unified planning machinery’ (UPM), was too reliant on single point predictions looking 5 years out. Such methods, it was felt, were unable to accommodate ‘weak signals’ of changes to come, such as geo-political uncertainties that they intuitively felt to be present in their business environment (van der Heijden, 2005; Wilkinson and Kupers, 2014). For instance, oil demand was beginning to outstrip supply in the 1960s, Middle East countries were deeply resentful of the West’s support of Israel after the 1967 six day Arab-Israeli war, and by 1970 Libya was demanding a greater share of oil revenues. In addition, Saudi Arabia had not the domestic capacity to absorb oil revenues, and Iran’s mounting social challenges were all signs that the status quo was unlikely to continue. The forecasts being produced by the UPM, then in existence since 1965, were not picking up on these signals (van der Heijden, 2005; Wack, 1985a,b).

A group of planners at RDS, led by Ted Newland who had introduced the Head of Group Planning, Jimmy Davidson, to the method in 1968, were tasked with developing scenarios in 1969. By 1972 four ‘exploratory’ scenarios were developed that included a ‘surprise free’ scenario, where shocks never happen, a ‘high stakes’ scenario, where oil producing nations demand a larger share of oil revenues, a ‘low demand’ scenario, characterized by economic depression, and an ‘alternative energy’ scenario, where there is a switch to new energy sources. These four scenarios were refined into six ‘decision’ scenarios, released in January 1973 as “Scenarios for the 1973 Planning Cycle”, and included

a ‘private enterprise’ scenario, where free-market forces intervene, a ‘dirigiste’ scenario, where industrial governments recognize the challenges and act in concert, a ‘high’ supply scenario, where new reserves are found, a ‘muddling through’ scenario, where the West proactively encourages energy saving, a ‘low-demand’ scenario, where a counter-culture of consuming less prevails, and finally, a ‘crises’ scenario where the price of oil increases by 5×. By May 1973 the scenario that was being taken most seriously at RDS was the crises, or ‘rapids’ scenario, whose insights, and those of successive scenarios, helped RDS to gain a competitive advantage over rivals in the turbulent decades of the 1970s and 1980s. The attributed success of RDS during these years to scenario planning has been largely responsible for its proliferation as a strategic planning method (Schwartz, 1991; van der Heijden, 2005; Wack, 1985a,b; also see Bradfield et al., 2005 and Wilkinson and Kupers, 2014 for a more comprehensive overview of the origins of scenario planning).

2.1.3. Critical reflections on ‘standard’ IL approaches to scenario planning

More recently, however, research into the history of scenario planning at RDS has offered a more critical account of their successes and failures, surfaced some useful lessons, and directed attention towards areas in need of further development. Mintzberg (1994), for example, has argued that the team at RDS may simply have been a talented group of people who happened to get it right, rather than there being anything intrinsic about the scenario planning technique itself. Jefferson (2012, p. 195) provides a more in-depth analysis of the development of the IL method at RDS. He argues that while their performance in the turbulent years of the 1970s and 1980s was exceptional, there were numerous failures that could have made it better. For instance, he argues that there was a “serious failure up to early 1974 to understand fully and take due note of forces ‘already in the pipeline’, and a “failure to draw on past experience.” There was also a downplaying of, for example, environmental concerns, and diversions into unrealistic societal changes and life-style shifts leading to over-optimistic scenarios. He argues that, “the realism and awareness of the past (economic, financial, cultural, geographic) were of profound value but not initially recognised and, when recognised, was not always quickly accepted or drawn upon to realise its full value. This is a subject of great current relevance”.

It is, therefore, not surprising that in ‘standard’ IL approaches to scenario planning (cf. Ramirez and Wilkinson, 2014), there has been a nascent but growing focus on interrogating and enhancing conceptualizations of causality in the scenario literature to address perceived

Table 1
The intuitive logics approach to constructing scenarios.

Step	Description	Indicative literature
One	Defining the focal issue, key stakeholders and horizon year (how far into the future the scenarios will look).	e.g. Burt and van der Heijden (2003) and Cairns et al. (2016).
Two	Generating a list of ‘forces’ or ‘trends’ driving the future, normally using a PESTEL (political, economic, social, technological, environmental and legal) framework initially through a combination of brainstorming and research.	e.g. Burt et al. (2006), Wright and Goodwin (2009) and Wright et al. (2013).
Three	Clustering the driving forces using causal mapping or influence diagrams.	e.g. Wright and Goodwin (2009)
Four	Ranking these clustered forces based on their importance/impact on shaping the future environment	e.g. van der Heijden (2005) and Wright and Cairns (2011).
Five	Identifying the ‘predetermined’ or ‘forecastable’ forces from those that are uncertain	e.g. Wack, 1985a,b
Six	Using no less than two, and no more than four of the most highly ranked uncertainties, exploring how ‘predetermined’ forces might interact with key ‘uncertainties’ in a causal chain that establishes a ‘roll-out’ of the logics and a skeletal story-line. This can be done ‘deductively’, using a 2 × 2 matrix, or ‘inductively’, letting the roll-out evolve organically	e.g. van der Heijden (2005), Ramirez et al. (2013), van Klooster and van Asselt (2006), Schoemaker (1991) and Wack (1985a,b).
Seven	Fleshing-out the story-lines by developing the interactions and events that lead to the scenario.	e.g. Bowman et al. (2013) and Schwartz (1991)
Eight	Testing the scenarios for internal coherence, plausibility, surprise and gestalt (how the scenario fit together to reflect the range of uncertainties identified).	e.g. van der Heijden, 2005, Wack (1985a,b) and Wright and Cairns (2011).
Nine	Identifying ‘sign-posts’ and ‘early warning systems’ (key events that can be used to monitor whether a scenario or element of a scenario is coming to pass).	e.g. Derbyshire and Wright (2014), Ramirez et al. (2013), Schoemaker et al. (2013) and Tucker (1999).
Ten	Considering the implications of the scenarios for strategy and/or strategic decisions.	e.g. Goodwin and Wright (2001), Schoemaker and van der Heijden (1992), O’Brien et al. (2007), O’Brien and Meadows (2013), Wilson (2000) and Wright and Goodwin (2009).

shortcomings in the method. This is because, as [Derbyshire and Wright \(in press\)](#) point out, causality is central to the scenario process, but in practice, frequently goes undefined (cf., [Van der Heijden et al., 2002](#); [Wright and Goodwin, 2009](#); [Bradfield et al., 2015](#)). Indeed, the ‘standard’ IL approach emphasizes “something occurring earlier precipitates and brings about something else occurring later in time, in a chronological sequence of cause-and-effect” ([Derbyshire and Wright, in press, p. 4](#); [Van der Heijden, 2000](#)). Or as [Burt \(2007\)](#) has argued, standard IL approaches emphasized building scenarios around what is ‘predetermined’, but yet, the systemic conditions that lead to discontinuities in organizational futures remains under-investigated.

2.2. Causality and the IL approach to scenario planning

The emphasis on linear cause-effect sequences of events leading to qualitatively different futures, [Derbyshire and Wright \(in press\)](#) suggest, privileges ‘efficient’ causation – the primary source of the effect – over other types of causation. Separating what is predictable from what is not predictable, using influence diagrams and rolling-out the different scenario logics by keeping the ‘predetermined’ constant wed the method to a narrow view of causation (e.g. [van der Heijden, 2005](#); [Wack, 1985a,b](#)). To address this blunt conceptualization of causation, they draw on Aristotle’s (*Physics* II 3, *Metaphysics* V 2) conditions for proper explanation, and offer three further alternatives. They include *material* cause, which are the conditions, or materials that enable a ‘step-change’ in the transformation of one ‘state’ into another ‘state’; *formal* causation, which focusses on the structure, or form of activities; and finally, *final* causation, which highlights the motivated actions of ‘actors’, or the reasons for which a cause happens ([Derbyshire and Wright, in press](#)). Such a nuanced typology of causation, we argue here, directs attention naturally towards actors and the structures they interact with, which, we argue, taken together constitute the systemic conditions leading to discontinuity in social systems (cf. [Burt, 2007](#)). We would also argue that this is patently consistent with the IL method of scenario analysis, where scenarios have been described as a “possible future structure” ([Porter, 1985, p. 481](#)), and an approach where uncertainty “is a basic structural feature of the business environment” ([Wack, 1985a, p. 73](#)).

We build on this line of thinking in this paper by suggesting that social theory, which is only beginning to percolate into the scenario literature (e.g. [Hughes, 2013](#); [MacKay and Tambeau, 2013](#)), provides a number of concepts that are useful for augmenting notions of causation in scenario methods by incorporating all four conditions of causation in its lexicon. Social theory draws attention to, particularly, interactions between agency and structure, micro activities and macro configurations. It suggests that pre-existing structures have a causal effect on agency, and vice versa. Agents, be they individuals, corporations, governments, political parties, religious groups or other institutions, are imbued with certain historically inherited predispositions to act in certain ways. But those actions also have an ‘effect’, often unintended, on structure as they change over time. Causal form, material, reasons and source are, therefore, implicit in socio-political explanations of possible futures. We argue that by making them explicit in a social theory-informed augmented framework can lead to a more theoretically compelling approach to causality in IL scenario methods.

2.2.1. Augmenting notions of causality in the IL approach with a “sociological eye”

In addressing issues of causality in the IL method to scenario planning, some scholars have directed attention to the underlying socio-political dynamics of economic systems, and the rules and resources that govern them. [MacKay and Tambeau \(2013\)](#), for instance, argue that agent–structure interactions over time are efficacious in shaping alternative futures. But in responding directly to calls to develop techniques for identifying the role that ‘structure’ plays in the future of socio-economic systems (e.g. [Porter, 1985](#); [Van der Heijden, 2000](#)), they limit their focus to a

structurationist account of scenario development (cf. [Giddens, 1979, 1984, 1989](#)), and thus have less to say about the specific nature of agency itself, multiple types of causal interactions, or the interplay between agent–structure interactions and time. Yet there are a number of concepts from social theory ([Archer, 2003](#); [Bourdieu, 1977, 2005](#); [Giddens, 1979, 1984](#)) that, coupled with different types of causality, provides a useful framework for modifying the privileging of ‘efficient’ causation in the IL approach to scenario planning. Moreover, they also help to augment notions of causality in IL approach to scenario planning by bringing in the role that temporalization plays in causal processes. Time, from both a social theoretic and scientific explanatory point of view ([Adkins, 2009](#); [Salmon, 1984](#)), is of fundamental importance when considering different causal possibilities about how the future might unfold.

2.2.2. ‘Objective’ social structures as an approximation for formal and material cause

Social structures reflect the ‘objective’ configuration of both institutions and players, and the rules and resources (including cultural, economic and symbolic capital) they draw on in a struggle to position themselves in such systems ([Giddens, 1979, 1984, 1989](#)). While social structures are characterized by competing logics at the level of individual players, institutions, organizations and society, and comprise contradictions, they are stabilized through mechanisms that evolve to allow such contradictions to co-exist. This is not to say that they remain unchanging. Indeed, they evolve at times incrementally through processes of interaction, or at other times more radically through ‘jolts’, ‘ruptures’ and ‘unintended consequences’ of action ([MacKay and Chia, 2013](#)). A ‘jolt’, ‘rupture’ and ‘unintended consequence’ of action can result in surfacing contradictions and reconfiguring positions in a social system based on relative access to rules and resources, and ultimately, the *realpolitik* and dispersion/re-dispersion of power in the system as new configurations materialize. ‘Objective’ social structures both enable and constrain the agency of players by incorporating the ‘rules-of-the-game’ that they play by. Any attempt to understand the constraints and potentialities of alternative futures to arise, from this perspective, require an accounting of both the ‘objective’ structures (e.g. approximated as formal and/or material cause) and processes of change (e.g. approximated as formal causation) at work. But social structures, and the institutions that maintain them, change and can be ruptured through, for example, an economic or political shock, the futures that arise will be constrained and enabled by how different causes and the multiple logics of individual ‘agents’ and wider institutions/organizations change and relate to one another over time.

2.2.3. The subjective predispositions of agency as an approximation of final cause

Scholars have begun to draw attention to the role that powerful actors play in shaping alternative futures (e.g. [Cairns et al., 2016](#); [Volkery and Ribeiro, 2009](#)). For example, in a study of scenario planning for low-carbon transitions, [Hughes \(2013\)](#) developed a three stage framework for developing scenarios that attempts to give agency a more prominent place in developing scenarios. It includes a vision and values level, an actor-network level, and a technical-network level. He argues that the discreet choices of actors, the effects of long-term values and visions on choices, and the constraints posed by a physical environment will have a direct impact on how futures evolve.

Social theory suggests that the role of agency is one that reflects a relationship between subjective perceptions of ‘actors/agents’ and the objective possibilities to act based on the material conditions of field-level structures at a given point and time. Agency in this sense is the capacity for actors, be they individuals, governments or other institutions/organizations to act with some effect. Actors both internalize and objectify their environment, thereby producing part of the objective environment they are part of (e.g. approximated as final cause). Objective conditions (the cultural, economic, political and social milieu that constitute ‘structure’) must exist for actors to influence their environment, and by influencing

their environment, the environment then shapes future actions. In this sense, 'efficient cause' can oscillate between agents and structure. The potentialities to change the future depend on the logic from which such potentialities are observed (e.g. final causation). But they are also moderated by the formal and material conditions of structure. Modes of behaviour and dispositions are socialised at an early age in individuals, as they are with the founding of institutions, and reinforced by culturally infused practices. They are conditioned, which imbues them with conditional freedom to act. Action is neither random nor entirely predictable, because all agency takes place within wider interactions with objective structures (See Bourdieu, 1977, 2000, 2005; Also see Hughes, 2013 for his actor-network approach to scenario planning). Futures emerge through a causal 'duality' of structure and agency.

2.2.4. *The duality of structure and agency as causal interactions*

The duality of structure and agency suggests that agency and structure are mutually constituted. It suggests that "social structure is both constituted by human agency and yet is at the same time the very medium of this constitution" (Giddens, 1993; 128–129; emphasis in original; Also see MacKay and Tambeau for their application to scenario planning). At one level of the duality are the behaviours and motivations of the different agents, or players (final causation), while at the other level are the field-level 'objective' structures (formal and material causation). And while they mutually constitute one another, both by constraining and enabling action, taking Archer's (1995, 1996) line of reasoning, they are not conflated because cultural systems and social structures have causal efficacy in their own right. Causality cannot be explained without understanding how these systems and structures interact, both producing and reproducing the environments that emerge. The duality of structure also implies that efficient, final, formal and material causes all have a part to play in shaping possible futures. But such futures, we argue, are also mediated by activity dependencies between forms of causality, inner conversations and unintended consequences.

2.2.5. *Activity dependence, the inner conversation and unintended consequences*

If agents are predisposed to act in certain ways, and pre-existing socio-economic structures condition the predispositions of agents, how then do alternative futures arise? Structure and agency are mediated by what Archer (1995, 2003) has referred to as the 'inner conversation'. Actors 'act' on their circumstances through an ongoing and reflexively deliberative conversation about aspiration, behaviour, identity, situation and values, then adjust future actions to the changed circumstances in ways that are "causally efficacious in relation to himself and his society" (Archer, 2003, p. 14). In other words, the 'inner conversation' refers to the value-base of individuals where their identity and values gradually evolve within the context of society. Such actions and interactions have the potential to result in what retrospection might deem to be "accidents" or "unintended consequences" of action (Mackay and Chia, 2013). But while neither structures nor the predispositions of actors are predictive in themselves, their properties contain both the limits and potential of alternative futures coming to pass. Archer refers to this as 'activity dependence', where actions:

"are only efficacious through the activities of human beings, but in the only acceptable manner, by allowing that these [structures] are the effects of past actions, often by long dead people, which survive them (and this temporal escape is precisely what makes them sui generis). Thus they ... [are the] autonomous possessors of causal powers".

[Archer (1995), p. 148.]

So while an 'accident' or 'unintended consequence' can trigger a possible world, possible worlds are constrained by agent-structure dependencies and predispositions, mediated by inner conversations. Conversations, as instruments of mediation between different forms of

causality, continuously engender perceptions, thoughts and actions, but within limits imposed by the "the historically and socially situated conditions of its production" (Bourdieu, 1977, p. 95). They allow for a conceptualization of the future as "conditioned and conditional freedom", rather than purely as a product of random "accident" or "chance". But such conceptualizations are closely bound up with notions of the temporalization of causality.

2.2.6. *Temporalization of causality: Clock time or event time?*

From this perspective, what is causally possible in terms of alternative futures that can emerge within the constraints and enablements imposed by objective structures and subjective perceptions is linked closely with notions of 'clock' time and 'event' time. Where clock time is viewed by sociologists as a 'thing-in-itself', such as a calendar, time-table or schedule (e.g. the horizon year in scenario studies), event time involves its temporalization, itself constituted by the logic and practice of agents themselves (Bourdieu, 1977). The locus of control for clock-time is, therefore, externally imposed in the form of deadlines and assumes efficient causality. Event-time, by contrast, unfolds through its own logic until a natural break or end is reached and makes room for final, formal and material causal interactions. In other-words, notions that some 'event' will happen by a certain date that is characteristic of scenario studies bellies the possibility that objective structures, and the cultural, economic and social systems that maintain them take time to adjust. The time they take depends on how quickly new institutional or structural arrangements are incorporated in practice, new relationships are established, etc. New technologies, for instance, may have a disruptive and profound impact on society, but their development follows a logic that is constituted by the emergence of new ways of networking, relating, working and so on. The internet, for example, has 'disrupted' entire industries, ways of communicating, working and so on, but such disruption has been more than 40 years in the making. The most important point here is that, from a social theory-informed understanding, the future is not something that is out-there, but its potentiality and the range of alternative futures possible is already latent in the present and the past. In other words, alternative futures are to be found in present configurations of objective structures and the historically constituted predispositions of the players in the game, but their manifestation is determined by causally complex interactions that unfold at their own pace (Bourdieu, 2000, p. 208; Also see Adkins, 2009). A reliance on 'clock-time', we suggest, may explain the reasons why, as in the case of RDS, scenarios can become 'over-optimistic' or fail to take into consideration 'forces already in the pipeline' (cf. Jefferson, 2012). We postulate that by focussing on different forms of causality that are implicit in agent-structure interactions, and giving greater emphasis to 'event-time' in scenario analysis, such short-comings in IL methods can be addressed.

2.3. *Section summary*

In summary, while evidence suggests that the IL approach to scenario planning continues to be a widely used technique, scholars have been calling for critical appraisal of its methodological and theoretical axioms with an aim of improving the method and its prospects (e.g. Wright et al., 2015). Such calls are emblematic of more focused concerns about the systematic interrogation of causal processes in the IL scenario planning approach (e.g. Burt, 2007; Derbyshire and Wright, 2014, in press; Jefferson, 2012). We argue that social theory provides a number of theoretical insights whose incorporation into scenario planning practice has the potential to augment the IL approach and offers the prospect of a novel elaboration of the method, particularly in contexts of widespread societal change.

The framework that we develop here is one that draws attention to a systematic analysis of objective structures, the predispositions of actors, the recursive inter-play between action and structure, the role of inner conversations in mediating between the two, and finally, the role of

temporalization as it relates to ‘event-time’ in augmenting causality in the IL approach (see Table 2: Summary of key social theory concepts).

In the following section we operationalize the framework and illustrate its use by applying it to the Scottish referendum on independence from the United Kingdom in September 2014.

3. Research design

The study was part of a wider programme of research into the *Future of the UK and Scotland*. The programme of activities aimed to both inform the public debate in the run-up to the referendum and to assist in planning across a wide range of policy areas affected by the outcome of the vote – whether for Scottish independence or for Scotland to remain as part of the Union. The following account of the application of an intuitive logics approach with a “sociological eye” is aimed at illustrating the perspicacity of augmenting IL methods through a more social theory-informed notion of causality. This section begins with an overview of the referendum debate itself as background context to the study, followed by an overview of the scenario methods, an illustration of the scenario approach itself, and finally a brief note on what occurred as an indicator of the framework’s validity.

3.1. Prologue: background context to the study

In the September 18th, 2014 referendum, Scottish voters were asked: ‘Should Scotland be an independent country. Yes/No’. The binary nature of the question led to two opposing campaigns offering two distinctly different visions for Scotland and the UK in the lead-up to the referendum. The two scenarios that emerged from the campaign constitute final causation, as they themselves are the end in which the referendum was instigated. They were, therefore, an intrinsic part of the causal texture to any future scenarios.

3.1.1. The ‘Yes’ side

In a series of papers, the Scottish Government argues that Scotland has a highly skilled workforce, world-class businesses, an internationally recognised brand, a reputation for innovation, and substantial natural resources. It suggests that industrial manufacturing has suffered decades of neglect. The UK economy, it proffers, is dominated by London and the South East. Many of the policy levers for creating jobs and wealth in Scotland are reserved powers for Westminster. The Scottish Government states:

“Control of taxation, public spending limits, regulation of business and industry, and competition policy all rest in London. Successive devolved Scottish governments have had considerable success in reducing unemployment, increasing employment and promoting

inward investment. But the fundamental economic decisions that affect Scotland are taken in Westminster, often by governments that have no popular mandate in Scotland, and in the interests of an economy and society with different priorities from Scotland”.

[Scottish Government (2013), p. 42.]

Independence, the Scottish Government maintains, will allow it to reduce Air Passenger Duty by 50%, business rates for small businesses, and corporate tax by three percentage points to counter the gravitational pull of London and the South-East. Compliance costs for business will be reduced through a simplified tax system, and, combined with greater control over immigration and capital investment in infrastructure, will improve productivity. Links between businesses, funding providers, public sector agencies and universities will be improved with a coherent strategy and shared priorities. A package of employment measures designed to enhance employee representation and female participation on company boards and to create cohesion and opportunity in the workplace will help to improve fairness and company performance (Scottish Government, 2013). The economy will be rebalanced through policies to improve innovation and exports and re-industrialisation (Scottish Government, 2014a). They argue:

“An independent Scotland will have the opportunity to pursue policies designed to grow the economy and create jobs. With responsibility for the full range of policy levers, the government of an independent Scotland will be able to create a more supportive, competitive and dynamic business environment”.

[Scottish Government (2013), p. 96.]

The Scottish Government views independence as an opportunity to transform the economy through policy choices that better reflect the priorities of Scottish households and businesses, and to create a fairer society (Scottish Government, 2014b).

3.1.2. The ‘No’ side

The UK Government argues in their *Scotland Analysis* papers that Scotland has flourished as part of the UK; it is one of its wealthiest parts. Scotland’s economy has outperformed many small independent European states. The UK, they maintain, is one of the most integrated single markets in the world, and Scottish businesses have become successful within that policy and regulatory context. Scotland’s strong sectors in defense, energy and financial services rely on the UK market where a majority of their trade is. As part of the UK, Scottish businesses have a market of 63 million people. An independent Scotland would have a population of 5.3 million. They argue that some 70% of Scottish exports go to the rest of the UK (rUK). In addition, goods, services and people can move freely throughout the UK. Furthermore, business and

Table 2
Summary of key social theory concepts.

Concept	Description
Causality	Factors, mechanisms, processes that have some ‘effect.’
	Efficient causation The originator, or source of the change is the cause.
	Formal causation Focuses on the configuration, pattern or structure of activities as the cause.
	Material causation The conditions, or materials that enable a ‘step-change’ from one state to another state is the cause.
	Final causation Emphasizes the ends, motivations, or purpose as the cause.
‘Subjective’ agency	‘Actors’ (individuals, government, institutions, organizations etc.) who act/intervene with some effect.
	Predisposition Actors are a product of their experience and history, which influences and shapes their behaviour, choices and interpretations.
‘Objective’ structures	Objective structures refer to the configuration of actor’s positions and institutions within a ‘field’.
	Capital The cultural, social and symbolic ‘resources’ that agents draw on to position themselves within a field.
	Duality of structure Agency and structure mutually constitute one another. They are both medium and outcome of socio-political processes.
	Process Field-level processes refer to interactions taking place within fields over time and imply change.
Temporalization	A period by which an action, condition, event or process exists, continues, unfolds and is measured by.
	Clock-time Clock-time runs to an imposed schedule and is based on an external logic.
	Event-time Event-time runs until an event has occurred or a task is finished and is based on an internal logic.

consumers benefit from the stability of the pound Sterling, shared institutions, regulations, infrastructure and a single labour market. Costs and investment in, for instance, energy, are shared by the UK as a whole. Moreover, costs for businesses and consumers are kept lower by the reputation of UK institutions and the scale of the UK. They argue:

“As it stands, the UK is a true domestic single market – with free movement of goods and services, capital and people. Businesses are able to trade freely across the whole of the UK; consumers benefit from a greater number and variety of goods and services at lower prices; and workers are able to access a greater number of jobs allowing them to maximise their skills and realise their range of aspirations. It is one market with no internal barriers to the flow of goods, capital and labour”.

[HM Government (2013), p. 5.]

The UK Government argues that if Scotland were to become independent, the UK would cooperate in areas of mutual interest, as it does with other independent states. There would not be a monetary union with a shared currency with Scotland. Scotland would have to support its own financial sector during crises. Scottish businesses and consumers would no longer benefit from the same borrowing rates available to the UK. Scottish firms might no longer be eligible for bidding on MoD contracts. Costs and investment in, particularly, energy, would no longer be spread across the UK as a whole, but borne by Scotland. Scotland would have to set up its own funding councils for universities. Trade might also be reduced by ‘border effects’ caused by trade barriers between the UK and Scotland (HM Government, 2013, p. 6). They state:

“The UK’s shared business framework helps drive growth and competitiveness across the UK, and is at the centre of Scotland’s success in creating businesses that can compete on the world stage. This UK-wide framework and guaranteed access to the whole of the UK’s domestic market, underpins FDI in Scotland”.

[HM Government (2013).]

They conclude that Scottish business has the best of both worlds: they have the benefit of the size, stability and strength of the UK, and they are also supported by the focused and targeted efforts of the Scottish Government using devolved powers.

3.2. Method

The scenario process followed an adapted version of the ‘improvised’ IL approach (see Cairns et al., 2016 for further details). The exercise was part of the Future of the UK and Scotland program, initiated and funded by the UK’s Economic and Social Research Council (ESRC). The scenarios drew on extensive in-depth research by the multidisciplinary academic team involved in the program. The team itself consisted of 12 ‘Senior Fellows’ and some 40 researchers in total. The aim of the program was to provide objective, politically neutral research that could be drawn on by the public, the private sector and policy-makers to inform the debate in the lead-up to Scotland’s September 18th, 2014 referendum on independence from the United Kingdom.

Given the difficulties in coordinating diaries, and time-poor senior academics, the process did not follow a traditional, multi-stage, structured scenario processes (e.g. van der Heijden, 2005; Schoemaker, 1995; Wright and Cairns, 2011; Wack, 1985a,b), but instead incorporated the different stages of the IL approach in an iterative scenario development and on-line debate process that allowed, at each stage of the development of the scenarios, to be challenged, discussed and refined (see Table 3: Scenario method overview).

The objective of the scenario process was to inform the public debate about different future possibilities for Scotland and the UK through objective, politically-neutral evidence-based scenarios.

Table 3
Scenario method overview.

Step	Description of the augmented IL scenario approach drawing on social theory
One	The focal issue was defined in terms of the uncertainty of the Scottish referendum outcome. Participants in the process were identified as Senior Fellows in the ESRC programme. A ‘clock-time’ horizon of 5 years was set.
Two	Drawing on the ‘evidence-base’ produced by the research team, phase one of the data analysis applied a traditional PESTLE analysis to identify scenario drivers/forces.
Three	Phase two of the analysis drew on social theory concepts to cluster the scenario drivers/forces into structures and agents.
Four	Scenario drivers were then ranked in terms of their importance.
Five	Structures were deemed to be pre-configured, and therefore relatively predetermined. Agency was analyzed in terms of their predispositions, and whether actions or reactions could be deemed uncertain.
Six	The binary nature of the referendum question justified adopting a 2 × 2 matrices to structure the initial development of four scenarios.
Seven	Fleshing-out the story-lines by developing the interactions and events that lead to the scenario.
Eight	Testing the scenarios for internal coherence, plausibility, surprise and gestalt (how the scenario fit together to reflect the range of uncertainties identified) by applying ‘event-time’.
Nine	Identifying ‘sign-posts’ and ‘early warning systems’ (key events that can be used to monitor whether a scenario or element of a scenario is coming to pass).
Ten	Considering the implications of the scenarios for strategy and/or strategic decisions.

3.2.1. Data sources and scenario development

The data being drawn on for the scenarios came directly from the extensive research being conducted into the political, economic, social and legal implications of a ‘yes’ or ‘no’ vote in the referendum. Primary data from across the projects included hundreds of semi-structured interviews on different aspects of the independence debate, as well as extensive analysis, both quantitative and qualitative, of secondary data. In this way, the scenarios we produced were evidence-based and routed in rigorous, multi-disciplinary analytical techniques (for supporting evidence see Armstrong and Ebell, 2014; Bekker and Warne, 2013; Curtice, 2016; Dunleavy, 2014; Henderson, 2014; Keating, 2013; King, 2014; Levie, 2012; Lisenkova and Mérette, 2013; MacKay and Stoyanova, 2013; McCollum et al., 2014; McEwen, 2014; Phillips and Tetlow, 2014a,b; Price, 2014; Riddell et al., 2013; Tierney, 2013a,b; Tindal et al., 2014; Young, 2013).

While the Fellows were meeting regularly to discuss their research and disseminate findings, much of the ‘brain-storming’ of the scenario drivers, their relative importance and uncertainty, and the outline of the story-lines came from on-line discussions. Exchanges were often tense, with a clear dividing-line falling between those whose disciplinary training was in politics or related and those whose training was in economics or related. In general, political scientists emphasized the primacy of politics and institutional stability in any future that might evolve, and were more sanguine about the prospects of Scottish independence. Economists were generally more skeptical about the immediate prospects of an independence Scotland (iScotland), and emphasized the economic fundamentals, institutional ruptures and market reactions. The authors of this paper, who have extensive experience as both scenario practitioners and scholars, led the exercise. The ESRC, which was very keen to remain seen as politically-neutral in the debate, moderated the more extreme scenarios that could have emerged from the data and debate. Nevertheless, the research team was comfortable with the range of uncertainties interrogated in the scenarios.

3.2.2. Data analysis and scenario drivers

Data analysis occurred in two stages. In stage one, data was clustered into key drivers/trends based on the academic findings from domain-specific experts. Initial assessments of the importance of such drivers, and their relative certainty/uncertainty emerged naturally from the

evidence-base and through iterative rounds of on-line debate. For example, we identified continuing EU membership, a rejection of a currency union between two independent states, aging demographics in Scotland, deficit and debt-to-GDP ratios and public attitudes towards issues around immigration, some devolution of powers from London to Edinburgh regardless of the vote outcome, and the EU as relatively certain. Transition costs, the division of debt, the removal of the UK's nuclear deterrent (Trident) from Scottish soil, whether the UK would hold an 'in-out' vote on continuing membership in the EU, and the division of UK assets was much less certain. The two primary uncertainties, however, was the vote itself (a 'yes' or 'no'), and how public opinion and the two negotiating governments would react. In phase two, we drew expressly on concepts from social theory to identify and cluster scenario drivers into 'objective' structures and 'subjective' agency. Here, we also kept notions of agency-structure interactions, clock-time vs event time, different forms of causality (efficient, final, formal, material), and concepts of 'activity dependence' (Archer, 1995), 'inner conversations' (Archer, 2003) and 'unintended consequences' (Mackay and Chia, 2013) at the forefront of our analysis as conceptual devices for interrogating agent-structure interactions.

3.2.3. Identifying "objective structures" as an approximation for formal and material cause

In this stage we follow Bourdieu (1977, 2005) and Giddens (1979, 1984) in identifying the field-level deep structures that constitute the predetermined drivers. The predetermined drivers for the Future of Scotland and the UK, then, constitute the semi-autonomous social structures that consist of institutionalized cultural, economic and social systems, and the interconnected network of relations that maintain them. In the case of Scotland, such material structures are revealed in, for example, relatively high rates of public spending on social welfare, modest rates of entrepreneurialism, pockets of innovation particularly around universities, and deprivation around areas where there has been a historical loss of heavy industry, decidedly left-of-center mainstream politics, an aging population, a highly integrated economy with the rUK whose wealth creation is reliant on a small proportion of large private sector companies who depend on access to the rUK market, and the institutions that span the entire UK. They also, however, are reflected in wider social attitudes towards, for example, the EU, immigration, politics etc. Altogether, the objective structures constitute and approximation for material cause, as they refer to the configuration that out of which would constrain and enable emerging futures.

3.2.4. Identifying agency and the subjective perceptions of actors as approximations for efficient and final cause

In this stage we followed Hughes (2013) definition of actors as "human individuals, or groups of humans such as companies, governments or other organizations." Here, the major actors consist of the Scottish government and the broad church of organizations that fall within the umbrella of a the independence camp, the Conservative, Labour and Lib-Dem political parties, industry broadly defined, and particularly large companies and industry bodies, the media, universities, the UK government and its constituent parts, the EU and its 26 other member states, and the international financial 'markets' that consist of the global financial institutions. While each of these actors interpret the independence debate through their own subjective logic, their behaviour is, in part, predisposed to act in certain ways through a combination of experience, history, identity (i.e. Scottishness or Englishness), values and self-interest. And while such behaviors have the potential to effect the "objective structures", such effects are only ever partly intended because of the constraints and opportunities imposed by activity-dependence on such field level configurations and the capital (be it cultural, economic, political, symbolic) they can draw on. In so doing, such interactions become part of the "objective structures" that they contend with in the future, and the activities and practices that result. This is also

why the context for the debate – the two narratives emanating from the two sides of the debate – is crucial context, because those narratives reflect the 'inner conversations' taking place, and inevitably become part of the future landscape as an approximation for 'final cause', even if in unintended ways. But the key uncertainties that are most highly important in this context pertain to agency-structure interactions in terms of (1) will the Scottish electorate vote yes or no; and (2) the degree to which the behaviours of actors lead to structural continuity or change.

3.2.5. Temporalizing causality with clock time and event time

While scenarios are often measured in clock time, as with horizon years, scenarios constructed with a 'sociological eye' direct attention towards 'event' time. Event time suggests that there is a logic to events themselves, where agent-structure interactions result in the actualization of new practices, but those practices are in themselves a form of actualization. The relevance of event time for scenario planning is that it gives a more realistic idea of whether the logics underpinning storylines, the actualization of time found in the unfolding of events, are plausible within the clock-time of horizon years. While the horizon year – the clock time – for this scenario exercise was looking out 5 years, the event time, time internalized by the event, was used to gauge plausibility (Adkins, 2009; Bourdieu, 2000).

The temporalization of causality is particularly important for assessing the transition costs from one structural configuration to another under different scenarios. While it is certain that there will be costs in any transition towards a new constitutional arrangement, it is uncertain what those costs might be, or how long it might take to recoup them. Some academic work suggests that there are three components to transition cost: they include the fiscal costs of setting up new institutions, the costs of disentangling the two states, and the effects of uncertainty (Young, 1994a,b). While the broad range of what the costs of setting up new institutions can be estimated (Young, 2013), the costs of disentangling the two states are relatively uncertain. Most importantly, however, are the effects of uncertainty. There are three main parameters to the effects of uncertainty, which include how much economic output is lost in the transition, the length of time uncertainty effects are prolonged, and the rate of growth that can be achieved following any transition period. How much economic output is lost, how long the transition period from a seceding state to an independent state would take (including how long it would take to conclude all of the negotiations), and how much growth could be achieved afterwards, then, is a significant uncertainty that has wide-ranging implications for Scotland's prospects (Dunleavy, 2014).

3.3. Section summary

We developed our research design with the aim of incorporating concepts from social theory in order to augment notions of causality in the IL method to scenario planning. Against a contextual back-drop of the referendum on Scottish independence from the UK, we developed our scenarios to reflect the parameters of uncertainties following the vote, as analyzed through plausible variations of structure-agent interactions, activity dependencies, inner conversations, event time, and unintended consequences of action. Given the binary nature of the referendum question, four scenarios emerged naturally from the analysis.

4. The scenarios

From the above analysis, the "objective structures" constraining or enabling the subjective, predisposed behaviour of actors suggests that there were thus four broad scenarios, reflecting a range of possibilities, that could have plausibly emerged after the September 18th

referendum on Scottish independence (see Fig. 1: Scenarios for the future of Scotland in the UK).

The scenarios are as follows:

4.1. Independence 'lite'

In the “independence 'lite'” scenario, there is a 'yes' vote where agency is relatively collaborative and conciliatory leading to constructive negotiations, with a significant amount of cooperation and partnership. Such a scenario is predicated on the eschewing of the identity politics in both Scotland and England that had become a hallmark of the referendum campaign, allowing for considerable policy coordination between the two states. We have termed this scenario independence 'lite' landing (quadrant 'A' in the table). This is because in this scenario, the transition event time is short, with agent–structure interactions that keep uncertainty, institutional/structural rupture and volatility relatively modest and short-lived. However, for this scenario to come about, the rUK government, who has publicly stated that the risks of a currency union without fiscal or political union are too high, as well as warnings from over 16 global financial institutions, act against their proclamations, and accept this arrangement. This is on the back of a relatively muted public reaction to Scotland's vote for independence in the rest of the rUK. This, however, necessitates the iScottish government, and electorate, to accept that they will have monetary policy largely dictated by the Bank of England, of which they will have only marginal influence over. In addition, restrictions are placed on Scotland's ability to run significant fiscal deficits. Moreover, the iScottish government, who is demanding the removal of the UK's nuclear submarine deterrent, which is based in Scotland, but of high symbolic value to the rUK and NATO, make conciliations. The 'inner conversation', and the cultural and social capital (in terms of the rules and resources that sustain it) is maintained through considerable structural continuity. Businesses located in Scotland are not put-off by the politically left-leaning, statist disposition of the Scottish government as an unintended consequence of the structural constraints placed on them by the settlement. The existing structures of the EU also serve to constrain the actions of Belgium and Spain, with their own independence movements, and with some concessions, support Scotland's expedited accession into the EU. Finally, the price of oil meets the Scottish government's forecasts of USD\$113/barrel, allowing

them to maintain 10% higher public spending on social programmes. They also achieve the 1% productivity gains from investment in infrastructure and training by the end of their first term. In this scenario, agency is largely constrained by structure, and event time is kept short with modest transition costs.

4.2. Independence 'heavy'

In the “independence 'heavy'” scenario, a yes vote leads to behaviours where actors and their negotiations are combative as motivations conflict, and different sides negotiate on what they perceive to be narrow national-interests. This scenario was termed “independence 'hard' landing” (quadrant 'B' in the table), because it is characterized by prolonged uncertainty, and structural rupture and volatility. The sudden disentangling of shared institutions, be they cultural, economic, social or political, which evolved over centuries, requires the establishment of new institutions, practices and processes, and the rules and resources that sustain them; event time is stretched beyond the 18 month schedule set-out for independence. This results in a much more severe loss of economic output and the tax receipts that finance public spending. Such a scenario is driven by the agency of, in particular, the governments in Brussels, Edinburgh and London. The rUK government, driven by angry public opinion, and a general view that Scotland is financially subsidized by the rUK, follows through with public statements that there is to be no currency union without a fiscal and political union. Large businesses, fearing the disintegration of the UK single market, implement contingency plans to migrate activities to the rUK, where the majority of their markets are. The deep cultural and social structures of, particularly, a much more politically left-leaning Scotland, constrain the ability of the Scottish government to appease business. This leaves the Scottish economy, and the government tax receipts for public spending, much more dependent on volatile oil revenues. The iScottish government, in response, follows through on threats to insist that the UK's nuclear submarine deterrent, based in Scotland, is moved. This is a highly symbolic action designed to appease opponents of it in Scotland, but infuriates both the rUK government and NATO. This leads to a wider fracturing of shared cultural and social institutions across the UK, including the loss of the BBC in Scotland. While the EU accepts an iScotland's ascension into the EU, in such a scenario, countries with their own independence movements, such as

Actor-Structure Interactions

		Continuity	Rupture
Referendum Vote	Yes	<p>'A'</p> <p>INDEPENDENCE 'LITE'</p> <p>(Subjective pre-dispositions constrained by 'objective' structures, short event time, modest transition costs)</p>	<p>'B'</p> <p>INDEPENDENCE 'HEAVY'</p> <p>(Subjective pre-dispositions predominate, rupture of 'objective' structures, long event time, high transition costs)</p>
	No	<p>'C'</p> <p>DEVO MINOR</p> <p>(Subjective pre-dispositions constrained by 'objective' structures, short event time, modest transition costs)</p>	<p>'D'</p> <p>DEVO MAJOR</p> <p>(Subjective pre-dispositions predominate, rupture of 'objective' structures, long event time, high transition costs)</p>
		Short	Long

Event Time

Fig. 1. Scenarios for the Future of Scotland in the UK.

Belgium and Spain, insist that Scotland go through a rigorous ascension process, and sign up to joining the Euro-zone. However, Scotland's vote for independence has the unintended consequence of handing the 'out' campaign in a rUK-EU referendum in 2017 victory, resulting in a resurgence of business investment in Scotland to maintain access to the EU market. With Scotland's economy reeling, the 'inner conversation' in Scotland begins to shift away from inward-looking identity politics and state socialism towards an outward-looking entrepreneurial competitiveness. The 'inner conversation' in the more politically right-leaning rUK, by contrast, does the opposite. In this scenario structure adjusts to the actions and unintended consequences of agency.

4.3. Devo 'Minor'

In the "devo 'minor'" scenario (quadrant 'C' in the table) where there is a 'no' vote, negotiations are combative between government actors, as Scottish devolution slips down the priority list in the lead up to the 2015 general election because the main unionist parties cannot agree on what powers can be devolved. Moreover, public opinion in the rUK is in no mood to accommodate further devolution to Scotland. This leads to a Quebec-style 'neverendum' situation, where the 'inner conversation' in Scotland focusses on independence, with constant calls for a second independence referendum by thwarted nationalists; the symbolic capital of the independence movement increases across Scotland. Anti-English sentiment in Scotland also continues to build, as does 'identity' politics, and the cultural capital of shared institutions across the UK declines. This is accompanied by a prevailing anti-big-business rhetoric, and begins to drag on the Scottish economy as business investment goes elsewhere and big Scottish companies quietly migrate their activity outside Scotland. We have called this scenario 'devo minor' because under the Scotland Act 2012, Scotland is to receive significant new powers, which will inevitably result in structural change as the various actors, be they the UK or Scottish governments, political parties, business etc. are constrained by the existing structural configuration. However, this too is dependent on the changing political landscape with a UK general election in 2015, a Scottish election in 2016, and the possibility of a referendum on the UK's continuing membership in the UK in 2017. A Conservative-led coalition in the UK general elections of 2015, a substantive majority for the Scottish National Party (SNP) in the Scottish elections of 2016, and a vote by the UK to leave the EU in 2017 all conspire to lead to subsequent calls for a second Scottish referendum on independence from the UK in 2019. In this scenario, structural continuity between Scotland and the rUK remains strong, initially constraining agency through activity dependence. But an unintended consequence is that agency becomes increasingly fractious between the London-based UK government, and the Edinburgh-based Scottish nationalist government.

4.4. Devo 'Major'

In the "devo 'major'" scenario, a 'no' vote results in quick accommodation of further devolved powers to Scotland (quadrant 'D' in the table). In this scenario, the Scottish government becomes a relatively autonomous jurisdiction within the UK. Such a scenario sees agent-structure interactions that result in significant structural adjustment (in terms of both attitudes and values, as well as institutions and organizations) between Scotland and the rUK, reducing activity-dependency over time. With more control over tax and spend, and a Scottish government predisposition towards high tax and spend, a shrinking tax base in Scotland quickly leads to pressure on public-spending, and choices over tax and spend that lead to further economic decline. And while Scotland is able to begin tailoring economic and social policy for Scottish needs, it loses the 10% extra funding it receives as an anomaly in the UK's funding formula for its devolved regions. The Scottish government finds it increasingly difficult to maintain their extensive social programs, but blames London for cut-backs. An unintended consequence of declining financial capital in

Scotland, is that the symbolic capital of the nationalists begins to decline, and with the Scottish electorate growing sceptical of the 'blame-London' strategy of the Scottish government as the transition costs to devolution increase, the nationalists lose their majority in the 2016 Scottish elections. In 2017, Scotland's pro-European vote give the 'remain' campaign a narrow victory in a UK in-out referendum on continuing EU membership, creating resentment in a more Euro-sceptical England. Another unintended consequence is that increasing joblessness rates in Scotland begin catalysing entrepreneurial activity and the green shoots of economic recovery. In this scenario, agency changes structure, but then structure constrains agency as event time lengthens and field-level structures go through significant adjustment.

4.5. Epilogue: What happened: Brexit and the specter of 'neverendums'

The Scottish referendum on September 18th, 2014, resulted in a 45% to 55% win for the 'no' side. At 7:00 AM the following morning, with an impending general election, the Conservative Prime Minister, David Cameron, announced that there would be a refocusing of politics on England. This created a backlash in Scotland, with the Scottish National Party (SNP) winning all but a handful of parliamentary seats in Scotland, and the Conservatives winning a majority government nationally, confounding pollsters who had not predicted it, in a May 7, 2015 general election. The UK government, however, had pledged devolved powers to Scotland, and within 15 months of the referendum, the UK government and the Scottish government had negotiated, in effect, somewhere between devo major and minor (with the Scottish parliament now responsible for raising over half of their fiscal spending). Within one month of the Scottish referendum, however, the price of oil dropped to less than half the Scottish government projections. The Government Expenditure and Revenue Scotland (GERS) bulletin for 2014–2015 showed that Scotland's deficit, including a geographic share of oil, was about 9.7% of Gross Domestic Product (GDP) (compared to the UK average of 4.9%). Plans drawn up by the Bank of England (BoE) in the run-up to the Scottish referendum imply that there would not have been a currency union with Scotland. Moreover, some Scottish companies, such as insurer Scottish Widows, have been quietly consolidating their holdings in London. However, the Conservative government held an 'in-out' referendum on its continuing membership in the EU on 23rd of June 2016, with the 'leave' side garnering 51.89% of the vote for a 'Brexit'. Scotland voted in favor of staying in the EU by 62% to 38%, leading its First Minister, Nicola Sturgeon to state that a second Scottish referendum on independence from the UK was "highly likely". This puts Scotland squarely in 'neverendum' (repeated referendums) territory. Initial attempts by the Scottish government to broker a deal with the EU for Scotland's continuing membership in the EU were robustly rejected by, in particular, interventions by the Spanish, which gives an indication of the position some EU countries would have assumed in political negotiations with Scotland.

4.6. Section summary

The four scenarios that we developed are an illustration of the peripatetic of incorporating concepts from social theory into the intuitive logics method. Notions of 'objective' structure interacting with the predispositions of 'subjective actors/agents, we suggest, naturally accommodate different forms of causality, thereby giving a more realistic understanding of the socio-political complexity involved in widespread economical and societal change. Events since the referendum have unfolded largely within the parameters set-out by the scenarios, providing some anecdotal support for the augmentation of the IL method.

5. Analysis and discussion

The article began by asking how can a social theory-informed understanding augment notions of causality in the IL approach to scenario planning? The article also sought to elaborate on how notions of agency

and structure could enhance the IL method, and closely aligned with this, how different notions of temporality could be incorporated into the IL approach to scenario development? To address these questions, we draw on Wright et al.'s (2013) three primary purposes of scenario planning to elaborate on our key contributions.

First, we enhance *challenging conventional thinking* by incorporating notions of efficient, final, formal and material causality in a social theory derived framework, and re-orient scenario planning towards the socio-political foundations underpinning the economic dynamics of emerging futures (e.g. Derbyshire and Wright, in press). As numerous social theorists have argued (e.g. Bourdieu, 2005; MacKanzie, 2006), markets are largely socially constructed concepts. They are not something that exists independent of social interactions, but are indeed both the medium and product of them. O'Brien and Meadows (2013) point out that participants in scenario planning interventions frequently focus on economic activity, be they growth rates, exchange rates, interest rates, productivity changes etc., giving these causally *efficient* factors primacy over other types of dynamics, which leads to "future myopia". This is because, as Wright et al. (2013) argue, there is nothing inherent in scenario processes that lead to a broader, or indeed more in-depth look at the causally *final, formal or material* causes inherent in the subjective predispositions of agents interacting with "objective structures" that both constrain and enable emerging futures. Where we contribute to this line of thinking is by building on a framework informed by social theory that, by incorporating notions of agent–structure interactions, naturally accommodates all four types of causality. Moreover, by incorporating the temporalizing nature of 'event' time, which speaks to an 'internal' logic underpinning the emergence of scenarios, with 'clock-time', which is an external, often imposed logic, a more plausible indication and fuller causal accounting of what is possible as causes and events interact and unfold over time.

In the scenarios for the Future of Scotland and the UK, in the short-to-medium term, there was little evidence that suggested that the cultural, social and economic change that would have had to occur for the independence 'lite' scenario to occur. For there to have been significant institutional continuity between an iScotland and rUK, as with a common currency, the rUK government would have had to have risen above the *real-politick* of national interests. International financial institutions, who were writing increasingly skeptical reports on the prospects of, for example, an iScotland and rUK monetary union without a fiscal or political union, would have had to have suddenly reversed their direction of travel. This assumes that a supra-political will would come to the fore, and agency would overcome structure. Here, efficient and final cause are, therefore, constrained by formal and material cause. Even had they done so, the rUK would have been predisposed to insist on restrictions on an iScotland's ability to borrow and spend. Large businesses who are responsible a significant proportion of both private sector employment and income, and whose UK trade is, on average, 80–90% focused on the rUK (with 60 million people), and 10–20% with Scotland (with 5.5 million people), would have also had to have been willing to accept the risk of being located in a separate jurisdiction from the majority of their customers. In addition, survey evidence suggests that Scottish social attitudes and English social attitudes don't differ markedly on major issues like the EU and immigration. The Scots care a little more about the EU, and a little less about immigration. Such predispositions would constrain a Scottish government's ability to, as one example, throw the doors open to immigration to combat an aging population even if it were in their gift to do so.

An iScottish government whose spend is, on average, 10% higher than the rUK, which is subsidized through a block grant from the rUK, after having spent the referendum campaign guaranteeing free health-care, free prescriptions, free education (including early childhood and post-secondary education), and a more generous range of social benefits, plus keeping taxes consistent with the rUK, would have been reliant on the price of oil (which is a major industry in Scotland) hitting, if not exceeding the optimistic \$USD 113/barrel that they were forecasting (it dropped to half that within one month of the September 18th, 2014 referendum). Or there would have had to have been substantial gains in

entrepreneurial activity and productivity to maintain growth and the accompanying tax receipts. Yet, while Scotland spends about four times the rUK average on economic development, and has some vibrant pockets of entrepreneurial activity as well as enviable support for start-ups, it still lags behind the rUK on new venture creation. Again, the final cause of agency is constrained by the formal and material cause of structure. Whilst none of this is, of course, impossible, it would require a substantial shift in the "inner conversation" that is a mediating mechanism between actors and structures, and many of the actors to act in ways that were counter to prevailing predispositions (even though predispositions can change over time) and would result in a reconfiguration of objective structures, and also the predispositions of actors. The activities, practices and different modes of interacting that would have to evolve are, however, closely bound up with event time (what is possible within the internal logic of unfolding causal interactions) rather than clock time (the imposition of deadlines and schedules).

Second, the framework we have developed here helps to extend the *enhancement of understanding* by developing a set of social theory axioms that can be used for a more robust analysis of the underlying causality, connections and logical sequences of unfolding events. By coupling a more nuanced understanding of causal explanation with an internal logic, rather than an over-reliance on the external logic of cause-effect drivers that predominates in IL approaches to scenario planning theory and practice, we show how different forms of causality interact to both constrain and enable possible futures (cf. Burt, 2007; Derbyshire and Wright, in press). This diverges somewhat from Derbyshire and Wright (2014) who argue for weakening dependence on causation. We take the opposite view, arguing that an emphasis on causality should be strengthened, albeit with a greater focus on efficient, final, formal and material causal explanations inherent in interactions between the predispositions of actors and social structures (cf. Derbyshire and Wright, in press), whose outcomes ultimately determine the evolution of alternative futures. It is also important to note that efficient cause can change; at times it is agency, and at other times it is structure. Final cause, by contrast, aligns more closely to agency, whereas material cause, and often formal cause are frequently reflected in structure.

Third, the success of the scenario interventions in Royal Dutch/Shell in the 1970s and 1980s, we propose, was also down to the sophisticated understanding that the planners of the day had of such social structures, and the logics guiding the actions of different actors. Our framework, therefore, aids *decision-making* by incorporating and extending the work of Hughes (2013), who calls for greater attention to the interests and power between actors to be given in shaping futures in scenario analysis. This is particularly the case in public-policy scenarios, as was the context for our study. It also resonates closely with Wright and Goodwin's (2009) suggestion that there be a more significant incorporation of stakeholder interests, as an indicator of agency, with the unfolding of PESTEL (political, economic, social/demographic, technological, environmental, legal) forces in scenario analysis. In a similar vein, it also extends the work of MacKay and Tambeau (2013) who were more narrowly focused on the 'duality of structure' in their analysis. We do this by delving more deeply into the nature of actors and objective structures and emphasizing the important of temporalization in causal explanations of what is possible, or indeed even plausible in unfolding futures. This implicit understanding of what actions would have to be taken (efficient and final cause) in the face of activity dependence, and how wider structures would respond to them over time (material and formal cause) is arguably what makes the logics of the scenarios intuitively appealing (cf. Wack, 1985a,b; Jefferson, 2012). Causality is important, but as Burt (2007) and Derbyshire and Wright (in press) rightly point out, the type of causality matters also.

6. Conclusions

This paper has sought to augment notions of causality in the IL approach to scenario planning. To do so, we drew on a social theory-

informed understanding of efficient, final, formal and material cause to illustrate how notions of agent–structure interactions can enhance the intuitive logics (IL) process. By incorporating such concepts as the ‘subjective’ predispositions of agency, ‘objective’ structures of social systems, activity dependence, unintended consequences of action and event-time temporality in the IL method, we have developed a framework to systematically analyze causation in the scenario process. We have also sought to illustrate the constraining and enabling role that agent–structure interactions play in the unfolding of futures in social systems by applying the social theory-informed IL framework to a scenario exercise undertaken in the lead-up to the Scottish referendum on independence from the United Kingdom on September 18th, 2014. Our contributions to both theory and practice are, therefore, the extension of the conceptual and methodological axioms underpinning IL approaches to scenario planning.

6.1. Research limitations

There are several limitations of our work that we wish to draw attention to. We are conscious that our analysis, which has stemmed from ‘action-research’, is also a product of our own predispositions. We have attempted to compensate for this by ensuring that the work carried out here is both empirically rooted and theoretically informed. We also acknowledge that this work was carried out in a highly politically charged environment, and as such, will have certainly moderated some of the more extreme future possibilities. A desire to maintain ‘political neutrality’ will have also certainly played a part in how the scenario exercise, and its theorization, unfolded. It is also worth noting that the particular framework we present here may or may not be appropriate for every context. Indeed, the scenario field itself is a vibrant area of theoretical and practical development, and by its very nature it more craft than science. This is something, in our view, that is its core strength and should be celebrated, if critically.

6.2. Future research directions

In this article we have built on previous work that incorporates sociological thinking into the IL approach to scenario planning. We see, however, tremendous potential to continue to develop this line of inquiry. Drawing on ideas around strategic interactions, for example, or even the burgeoning field of institutional logics will help to further develop concepts of causality in IL methods.

Acknowledgement

The authors would like to thank the editors and two anonymous reviewers for their helpful comments. We would also like to acknowledge the generous financial support of the UK’s Economic and Social Research Council (ESRC) and the Future of the UK and Scotland program.

References

- Adkins, L., 2009. Sociological futures: from clock time to event time. *Sociol. Res. Online* 14.
- Archer, M., 1995. *Realist Social Theory: The Morphogenetic Approach*. Cambridge University Press, Cambridge.
- Archer, M., 1996. *Culture and agency: The place of culture in social theory*. Cambridge University Press, Cambridge.
- Archer, M., 2003. *Structure, Agency and the Internal Conversation*. Cambridge University Press, Cambridge.
- Armstrong, A., Ebell, M., 2014. *Public Sector Debt, Borrowing, Taxation and Fiscal Rules: Evidence Presented to Scottish Parliament’s Finance*. National Institute of Economic and Social Research.
- Bekker, P., Warne, P., 2013. *International Law Briefing: Legal Implications for the Offshore Oil Industry of an Independent Scotland*. Steptoe.
- Bourdieu, P., 1977. *Outline of a Theory of Practice*. Polity, Cambridge.
- Bourdieu, P., 2000. *Pascalian Meditations*. Polity, Cambridge.
- Bourdieu, P., 2005. *The Social Structures of the Economy*. Polity, Cambridge.
- Bowman, G., MacKay, B., Masrani, S., McKiernan, P., 2013. *Storytelling and the scenario process: understanding success and failure*. *Technol. Forecast. Soc. Chang.* 80, 735–748.
- Bradfield, R., Wright, G., Burt, G., Cairns, G., van der Heijden, K., 2005. The origins and evolution of scenario techniques in long range business planning. *Futures* 37, 795–812.
- Bradfield, R., Cairns, G., Wright, G., 2015. Teaching scenario analysis – an action learning pedagogy. *Technol. Forecast. Soc. Chang.* 100, 44–52.
- Burt, G., 2007. Why are we surprised at surprises? Integrating disruption theory and system analysis with the scenario methodology to help identify disruptions and discontinuities. *Technol. Forecast. Soc. Chang.* 74, 731–749.
- Burt, G., van der Heijden, K., 2003. First steps: towards purposeful activities in scenario thinking and future studies. *Futures* 35, 1011–1026.
- Burt, G., Wright, G., Bradfield, R., Cairns, G., van der Heijden, K., 2006. Limitations of PEST and its derivatives to understanding the environment: the role of scenario thinking in identifying environmental discontinuities and managing the future. *Int. Stud. Manag. Organ.* 36, 52–77.
- Cairns, G., Wright, G., Fairbrother, P., 2016. Promoting articulated action from diverse stakeholders in response to public policy scenarios: a case analysis of the use of ‘scenario improvisation’ method. *Technol. Forecast. Soc. Chang.* 103, 97–108.
- Curtice, J., 2016. How deeply does Britain’s Euroscepticism run? NatCen for a bibliography of past surveys. <http://www.bsa.natcen.ac.uk/media/39024/euroscepticism.pdf> (accessed January 2014).
- Derbyshire, J., Wright, G., 2014. Preparing for the future: development of an ‘antifragile’ methodology that complements scenario planning by omitting causation. *Technol. Forecast. Soc. Chang.* 82, 215–225.
- Derbyshire, J., Wright, G., 2016. Augmenting the intuitive logics scenario planning method for a more comprehensive analysis of causation. *Int. J. Forecast.* (in press).
- Dunleavy, P., 2014. The set-up costs of an independent Scotland Available at <http://www.futureukandscotland.ac.uk/blog/set-costs-independent-scotland> (accessed 15 January 2014).
- Durance, P., Godet, M., 2010. The role of scenarios in strategic foresight. *Technol. Forecast. Soc. Chang.* 77.
- Giddens, A., 1979. *Central Problems in Social Theory*. University of California, Berkeley.
- Giddens, A., 1984. *The Constitution of Society*. Polity, Cambridge.
- Giddens, A., 1989. A Reply to My Critics. In: Held, D., Thompson, J.B. (Eds.), *Social Theory of Modern Societies: Anthony Giddens and His Critics*. Cambridge University Press, Cambridge.
- Giddens, A., 1993. *New Rules of Sociological Method: A Positive Critique of Interpretative Sociologies*. Polity Press, London.
- Goodwin, P., Wright, G., 2001. Enhancing strategy evaluation in scenario planning: a role for decision analysis. *J. Manag. Stud.* 38, 1–16.
- Gunn, R., Williams, W., 2007. Strategic tools: an empirical investigation into strategy in practice in the UK. *Strateg. Chang.* 16, 201–216.
- Hart, G., Rudman, W. (Chairs). 1999. *New World Coming: American Security in the 21st Century*. Study Addendum. Washington: The United States Commission on National Security/21st Century.
- Henderson, A., 2014. Why Ukup matters in the Scottish independence referendum. <http://www.futureukandscotland.ac.uk/blog/why-ukup-matters-scottish-independence-referendum> (accessed January 2014).
- HM Government, 2013. *Scotland Analysis: Business and Microeconomic Framework*. London.
- Hodgkinson, G., Wright, G., 2002. Confronting strategic inertia in a top management team: learning from failure. *Organ. Stud.* 23, 949–977.
- Hughes, N., 2013. Towards improving the relevance of scenarios for public policy questions: a proposed methodological framework for policy relevant low carbon scenarios. *Technol. Forecast. Soc. Chang.* 80, 687–698.
- Jefferson, M., 2012. Shell scenarios: what really happened in the 1970s and what may be learned for current world prospects. *Technol. Forecast. Soc. Chang.* 79, 186–197.
- Kahn, H., Wiener, A., 1967. *The Year 2000, a Framework for Speculation*. MacMillan, New York.
- Keating, M., 2013. *Scotland and the EU After Independence*. ESRC Scottish Centre on Constitutional Change, Edinburgh.
- King, A., 2014. What if ‘Yes’. <http://www.futureukandscotland.ac.uk/blog/what-if-%E2%80%9C9Cyes%E2%80%9D> (accessed January 2014).
- Levie, J., 2012. *Global Entrepreneurship Monitor Scotland*. Glasgow: University of Strathclyde Business School; Also see Turnbull, J., Richmond, K. 2013. Scotland’s business innovation performance 2008–10. *Fraser of Allander Quarterly Economic Commentary*, 37 65–86; Office for National Statistics, *Statistical Bulletin: Business Demography*, ONS, London, 2011, 2012, 2013; The Scottish Government. 2012. *Business Enterprise Research and Development Scotland 2012*.
- Linnemen, R., Klein, H., 1983. The use of multiple scenarios by U.S. industrial companies: a comparison study, 1977–1981. *Long Range Plan.* 19, 94–101.
- Lisenkova, K., Mérette, M., 2013. Can an Aging Population Afford Independence? National Institute of Economic and Social Research, London.
- MacKanzie, D., 2006. *An Engine, Not a Camera: How Financial Models Shape Markets*. Cambridge University Press, Cambridge.
- Mackay, B., Chia, R., 2013. Choice, chance, and unintended consequences in strategic change: a process understanding of the rise and fall of NorthCo Automotive. *Acad. Manag. J.* 56, 208–230.
- MacKay, B., McKiernan, P., 2010. Creativity and dysfunction in strategic processes: the case of scenario planning. *Futures* 42, 271–281.
- MacKay, B., Parks, R., 2013. The temporal dynamics of sensemaking: a hindsight–foresight analysis of public commission reporting into the past and future of the “new terrorism”. *Technol. Forecast. Soc. Chang.* 80, 364–377.
- MacKay, B., Stoyanova, V., 2013. *The Scottish Independence Debate: Evidence from Business*. Edinburgh: ESRC Future of the UK and Scotland. Also see Bell, D., McGoldrick, D. 2014. *Business attitudes to Constitutional Change*. ESRC/Scottish Chamber of Commerce.
- MacKay, B., Tambeau, P., 2013. A structuration approach to scenario praxis. *Technol. Forecast. Soc. Chang.* 80, 673–686.
- Malaska, P., 1985. Multiple scenario approach and strategic behaviour in European companies. *Strateg. Manag. J.* 6, 339–355.
- Malaska, P., Malmivirta, M., Meristii, T., Hansén, S., 1984. Scenarios in Europe – who uses them and why? *Long Range Plan.* 17, 45–49.
- McCollum, D., Findlay, A., Bell, D., Bijak, J., 2014. *Patterns and perceptions of migration, is Scotland distinct from the rest of the UK?* Centre for Population Change. Also see The Migration Observatory. 2014. *Immigration and Independence: Public Opinion on Immigration in Scotland in the Context of the Referendum Debate*. Oxford: University of Oxford.

- McEwen, N., 2014. Energy independence and interdependence. ESRC Future of the UK and Scotland.
- Mintzberg, H., 1994. *The Rise and Fall of Strategic Planning*. Free Press, New York.
- O'Brien, F., Meadows, M., 2013. Scenario orientation and use to support strategy development. *Technol. Forecast. Soc. Chang.* 80, 643–656.
- O'Brien, F., Meadows, M., Murtland, M., 2007. Creating and using scenarios: exploring alternative possible futures and their impact on strategic decisions. In: O'Brien, F., Dyson, R. (Eds.), *Supporting Strategy: Frameworks, Methods and Models*. John Wiley, Chichester.
- Phillips, D., Tetlow, G., 2014a. Taxation, Government Spending and the Public Finances of Scotland: Updating the Medium Term Outlook. Institute of Fiscal Studies.
- Phillips, D., Tetlow, G., 2014b. Policies for an independent Scotland? Putting the Independence White Paper in Its Fiscal Context. Institute of Fiscal Studies.
- Porter, M., 1985. *Competitive Advantage*. Free Press, New York.
- Postma, T., Liebl, F., 2005. How to improve scenario analysis as a strategic management tool? *Technol. Forecast. Soc. Chang.* 72, 161–173.
- Price, A., 2014. Debt and Destiny: An Assessment of an Independent Scotland's Fair Share of the United Kingdom's National Debt and the Impact It Could Have on Scotland's Future. The Scotland Institute.
- Ramirez, R., Wilkinson, A., 2014. Rethinking the 2 × 2 scenario method: grid or frames? *Technol. Forecast. Soc. Chang.* 86, 254–264.
- Ramirez, R., Osterman, R., Gronquist, D., 2013. Scenarios and early warnings as dynamic capabilities to frame managerial attention. *Technol. Forecast. Soc. Chang.* 80, 825–838.
- Riddell, R., Croxford, L., Minty, S., Raffe, D., Weedon, E., 2013. The Funding of Higher Education in Scotland, the UK and Internationally. Centre for Research in Education Inclusion and Diversity.
- Rigby, D., 1993. How to manage the management tools. *Plan. Rev.* 21, 8–15.
- Rigby, D., 2003. Management tools survey 2003. *Strateg. Leadersh.* 31, 4–11.
- Rigby, D., Bildeau, B., 2015. Management Tools and Trends. Bain and Co.
- Rigby, D., Bildeau, B., 2005. The Bain 2005 management tool survey. *Strateg. Leadersh.* 33, 4–12.
- Salmon, W., 1984. *Scientific Explanation and the Causal Structure of the World*. Princeton University Press.
- Schoemaker, P., 1991. When and how to use scenario planning: a heuristic approach with an illustration. *J. Forecast.* 10, 549–564.
- Schoemaker, P., 1993. Multiple scenario development: its conceptual and behavioural foundation. *Strateg. Manag. J.* 14 (3), 193–2013.
- Schoemaker, P., 1995. Scenario planning: a tool for strategic thinking. *Sloan Manage. Rev.* 36 (2), 25–40.
- Schoemaker, P., van der Heijden, K., 1992. Integrating scenarios into strategic planning at Royal Dutch/Shell. *Plan. Rev.* 20, 41–46.
- Schoemaker, P., Day, G., Snyder, S., 2013. Integrating organizational networks, weak signals, strategic radars and scenario planning. *Technol. Forecast. Soc. Chang.* 80, 815–824.
- Schwartz, P., 1991. *The Art of the Long View: Planning for the Future in an Uncertain World*. Doubleday, New York.
- Scottish Government, 2013. *Scotland's Future: Your Guide to an Independent Scotland*. Scottish Government, Edinburgh.
- Scottish Government, 2014a. *Reindustrialising Scotland for the 21st Century: A Sustainable Industrial Strategy for a Modern, Independent Nation*. Scottish Government, Edinburgh.
- Scottish Government, 2014b. *Outlook for Scotland's Public Finances and the Opportunities of Independence*. Edinburgh.
- Stout, D., 1998. Use and abuse of scenarios. *Bus. Strateg. Rev.* 9 (2), 27–36.
- Tapinos, E., 2011. Perceived environmental uncertainty in scenario planning. *Futures* 44, 338–345.
- Tierney, S., 2013a. Accession of an Independent Scotland to the European Union: A View of the Legal Issues. ESRC Scottish Centre for Constitutional Change.
- Tierney, S., 2013b. Leaving Westminster: constitutional supremacy in an independent Scotland. Economic and Social Research Council (ESRC) Scottish Centre on Constitutional Change.
- Tindal, S., McCollum, D., Bell, D., 2014. Immigration Policy and Constitutional Change: The Perspective of Scottish employers. ESRC Centre for Population Change.
- Tucker, K., 1999. Scenario Planning. *Assoc. Manag.* 51, 71–77.
- Van der Heijden, K., 2000. Scenarios and forecasting: two perspectives. *Technol. Forecast. Soc. Chang.* 65, 31–36.
- Van der Heijden, K., 2005. *Scenarios: The Art of Strategic Conversation*. 2nd ed. Wiley, Chichester, UK.
- Van der Heijden, K., Bradfield, R., Burt, G., Cairns, G., Wright, G., 2002. *The Sixth Sense*. John Wiley & Sons, London.
- van Klooster, S., van Asselt, M., 2006. Practising the scenario-axes technique. *Futures* 38, 15–30.
- van Notten, P., Rotmans, J., van Asselt, M., Rothman, D., 2003. An updated scenario typology. *Futures* 35, 423–443.
- Varum, C., Melo, C., 2010. Directions in scenario planning literature – a review of the past decades. *Futures* 42, 355.
- Volkery, A., Ribeiro, T., 2009. Scenario planning in public policy: understanding use, impacts and the role of institutional context factors. *Technol. Forecast. Soc. Chang.* 76, 1198–1207.
- Wack, P., 1985a. Scenarios: uncharted waters ahead. *Harv. Bus. Rev.* 5, 72–89.
- Wack, P., 1985b. Scenarios: shooting the rapids. *Harv. Bus. Rev.* 6, 139–150.
- Whaley, R., 2008. Comments on Chermack's paper on scenarios and theories. *Futures* 40, 31–312.
- Whittington, R., 2007. Strategy practice and strategy process: family differences and the sociological eye. *Organ. Stud.* 28, 1575–1586.
- Wilkinson, A., Kupers, R., 2014. *The Essence of Scenarios: Learning From the Shell Experience*. Amsterdam University Press, Amsterdam.
- Wilson, I., 2000. From scenario thinking to strategic action. *Technol. Forecast. Soc. Chang.* 65, 23–29.
- Wright, G., Cairns, G., 2011. *Scenario Thinking: Practical Approaches to the Future*. New York and Basingstoke, Palgrave Macmillan.
- Wright, G., Goodwin, P., 2009. Decision making and planning under low levels of predictability: enhancing the scenario method. *Int. J. Forecast.* 25, 813–825.
- Wright, G., Bradfield, R., Cairns, G., 2013. Does the intuitive logics method—and its recent enhancements—produce 'effective' scenarios? *Technol. Forecast. Soc. Chang.* 80, 631–642.
- Wright, G., Meadows, M., Tapinos, D., O'Brien, F., Pyper, N., 2015. Call for papers: improving scenario methodology: theory and practice. *Technol. Forecast. Soc. Chang.* (<http://www.journals.elsevier.com/technological-forecasting-and-social-change/call-for-papers/call-for-paper-improving-scenario-methodology-theory-and-pra/> accessed September 2015).
- Young, R., 1994a. How do peaceful secessions happen? *Can. J. Polit. Sci.* 27, 773–792.
- Young, R., 1994b. The political economy of secession. *The case of Quebec*. *Constit. Polit. Econ.* 5, 221–245.
- Young, R., 2013. The road to secession: estimating the costs of independence in advanced industrial states. available at <http://blogs.lse.ac.uk/europpblog/2013/12/05/the-road-to-secession-estimating-the-costs> (accessed 15 January 2014).

Brad MacKay is Professor of Strategy in the University of St Andrews Management School, Scotland. His main areas of consultancy, research and teaching interest are in the areas of strategy process (including both strategy formation and strategy execution), strategy practice, and the use of scenario planning in decision-making contexts characterized by complexity and uncertainty. He works with companies in diverse industries including automotive, the cultural industries, financial services, general manufacturing, government, military and oil and gas. His research has been published in a number of leading scholarly journals and books. He holds a BA from Dalhousie University in Canada, and an M.Litt (MSc) and PhD from the University of St Andrews in Scotland. Email: rhm2@st-andrews.ac.uk

Veselina Stoyanova is a Lecturer in Strategy at the Department of Strategy and Organisation in Strathclyde Business School. Veselina's research interest centers on issues of organisational change, strategic development and adaptation during times of uncertainty and complexity (e.g. financial crises, changing political or market landscapes). In the last four years, Dr. Stoyanova has been closely engaged with the financial industry in the UK and major international banks. Veselina has also researched and published works in the field of sustainability in emerging markets in particular looking at the evolution of sustainability in SMEs in the wine industry in Bulgaria and the role sustainable practices have on companies' competitiveness. She holds a PhD in Management (Strategy and International Business focus) from the University of Edinburgh, Business School where she was a recipient of the prestigious Principal's Development Scholarship, awarded by the University of Edinburgh. Email: veselina.stoyanova@strath.ac.uk