

# Scenario Planning. Teaching how to anticipate Perceived Environmental Uncertainty within Strategy Development\*

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## **Abstract**

Scenario Planning is a strategy tool with growing popularity in both academia and practical situations. Current practices in the teaching of scenario planning are largely based on existing literature which utilises scenario planning to develop strategies for the future, primarily considering the assessment of perceived macro-external environmental uncertainties. However there is a body of literature hitherto ignored by scenario planning researchers, which suggests that Perceived Environmental Uncertainty (PEU) influences micro-external or industrial environmental as well as the internal environment of the organisation. This paper provides a review of the most dominant theories on scenario planning process, demonstrates the need to consider PEU theory within scenario planning and presents how this can be done. The scope of this paper is to enhance the scenario planning process as a tool taught for Strategy Development. A case vignette is developed based on published scenarios to demonstrate the potential utilisation of the proposed process.

Keywords: Teaching, Scenario Planning, Strategy Development, Perceived Environmental Uncertainty, Case Study

## **Introduction**

Scenario planning is a strategy tool whose use has increased dramatically in the last decade (Rigby and Bilodeau, 2007b). A number of recent surveys (Gamby, 2005; Rigby and Bilodeau, 2007a) have found that scenario planning is one of the most commonly used tools in strategy development. However, the popularity of scenario planning in the world of practitioners is not reflected in scenario planning being taught as a strategy development tool. Burt *et al.* (2006) calculated that the majority of the leading strategic management textbooks from the period 1965 to 2000 devote a limited number of pages to the evaluation of the external environment. Looking into a series of textbooks on strategic management which includes editions up to 2008, it was determined that very few of them include scenario planning as a strategy development technique. As can be seen from Table 1, all strategic management textbooks contain the 'traditional' external analysis techniques: PEST, 5-Forces, Strategic Group Analysis and Industry Life Cycle, while only half of them mention scenario planning. In addition, only half of those textbooks

referring to scenario planning provide some insights into the scenario planning process. For example, Dess *et al.* (2008) and De Wit and Meyer (2004) provide a descriptive review of the process that does not really facilitate the teaching of 'how to' develop scenarios. Notably, only Johnson *et al.* (2008) present scenario planning as a concept and provide a basic description of the process required to develop scenarios.

*Insert TABLE 1 about here*

There is very limited published research on how to teach scenario planning effectively. The most detailed approach has been suggested by O'Brien (2004<sup>\*</sup>) and O'Brien *et al.* (2007). Wright *et al.* (2008) present a different methodology for the teaching of scenario planning based on (Burt *et al.*, 2006) and highlight the differences to O'Brien's (2004) approach. Other contributions have not really explored the characteristics of the process in great detail concentrating instead on the potential impact of the concept on other fields of management practice such as marketing (e.g. Van Doren and Smith, 1999). Mercer (1995) has also suggested a simplified methodology to teach scenario planning to business students.

The majority of the existing methodologies (O'Brien, 2004; Burt *et al.*, 2006) argue that the teaching and practice of scenario planning are based on Shell's case studies (Schoemaker *et al.*, 1992). For all these methodologies, the basis of scenario development is the assessment of the macro-external environment which is considered the greatest source of environmental uncertainty. Nevertheless, there is an area of literature which highlights that perceived uncertainty is not only created by the macro-environment, but managers also perceive uncertainty created by factors of the industrial (micro-environment) and the internal environment. The present paper seeks to suggest a scenario planning approach for the teaching of this concept as a strategy development tool. In this paper, it is demonstrated the necessity to incorporate all levels of PEU in strategy development using scenario planning; so as to improve the teaching of this tool and enhance the process of strategic decision making.

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\* although O'Brien's (2004) method has been suggested as teaching framework for scenario planning, there are published studies (O'Brien *et al.* 2007; Lienert *et al.* 2006) which have applied it to real life circumstances.

The methodology proposed in this paper incorporates a number of strategy tools and methods in order to address weaknesses of existing approaches. The use of multiple tools is highly praised in the field of management science and operational research. As Mingers and Giles (1997) have demonstrated, it provides greater insights into any intervention. A study into the use of multimethodology (Munro and Mingers, 2002) has shown that scenario planning is rarely mixed with other tools and techniques; nevertheless, the present paper demonstrates that there is scope for integrating scenario planning with other strategy tools.

## **Literature Review**

### *Scenario planning process*

The existing methodologies used to teach scenario planning are based on the most popular literature on scenario planning practice (O'Brien, 2004; O'Brien et al., 2007; Wright et al., 2008). For this reason, this section reviews the works and studies that influence the scenario planning methodologies used for teaching. Scenario planning is a technique which has gained reputation in the last four decades due to the well-known case studies on the way it was employed by Shell to overcome the oil crisis in the seventies (Wack, 1985). Recent reviews (Brandfield *et al.*, 2005) of the history of this strategy tool reveal that its origins are in the military planning (Kahn and Wiener, 1967). The basic idea behind scenario planning is to be used within strategy teams to enhance strategic thinking and to address uncertainties in the external environment. Van de Heijen *et al.* (1998) highlight that scenario planning's value lays within the process of developing alternative futures and not necessarily within the narratives produced, a feature that justifies the learning character of the exercise (Van de Heijden *et al.* 2002; Chermack, 2008).

Considering the evolution of the scenario planning (Brandfield *et al.*, 2005), this paper follows the scenario planning literature of the 'intuitive-logic models' school, which considers scenario planning as a strategy making exercise. Most of the authors (Wack, 1985; Schoemaker, 1995; Schwartz, 1996; Van de Heijen, 1996) who were influenced by Shell's scenario planning suggest a similar process which involves: i) defining the scope of the exercise, ii) identifying significant trends, iii) brainstorming key external

uncertainties, iv) reducing or clustering the uncertainties, v) developing initial scenario themes, v) checking for internal consistency, vi) expressing scenarios in narratives and, vii) identifying potential strategic options.

Wilson (2000) identifies four types of scenario planning\* according to its sophistication. The most basic approach, scenario planning as 'sensitivity/risk assessment', is used to explore potential outcomes from specific strategic decisions. A more sophisticated approach, scenario planning as 'strategy evaluation', would be used to examine the fitness of existing long term strategies against future scenarios. In this approach, the impact of scenarios would be considered in terms of '*opportunities, threats and comparative competitive success or failure*' in order to identify new potential strategic options. At more advanced level, 'planning-focus scenario', the robustness of the strategic options developed is tested against the scenarios developed. At the most sophisticated level - scenario planning as 'strategy development' - the impact of scenarios is examined against the key elements of each strategic option so as to determine their optimal setting. Therefore, to teach scenario planning as a strategy development tool, it is necessary to link the strategy selection to the scenario development.

Chermack and Lynham (2002) provide an extensive review of the definitions and outcomes of scenario planning. The majority of definitions agree that scenario planning is about creating images of the future in order to deal with uncertainty; however most of them do not link scenario planning and strategy development. Chermack and Lynham (2002) observe that there are four different categories of potential outcomes from the scenario planning process: i) change thinking, ii) narratives or stories about the future, iii) improve decision making and, iv) improve learning and creativity. Nevertheless, the majority of published scenario planning processes (Schoemaker, 1995; Goodwind and Wright, 2001) make an explicit link with strategy formulation. This leads us to conclude that scenario planning can be divided in two activities: i) scenario development and ii) strategy development. The two activities are strongly linked, however it is possible that the development of strategies is not merely a result of scenario planning as it is common

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\* Wilson (2000) uses the term 'scenario thinking' instead of 'scenario planning'

for organisations to use combinations of management methods and strategy tools to inform their decision making.

### *Perceived Environmental Uncertainty*

The teaching of strategy development suggests the utilisation of established strategy tools, for example PEST analysis, 5-forces, Value Chain Analysis, Resources and Capabilities analysis, as the means of depicting and understanding more effectively the internal and external environment. The strategic analysis taught to the students engages them with the identification of those factors from the internal and external environment that the company should consider in the decision making process, either as opportunities and threat or as strengths and weaknesses. In parallel, given that scenario planning is a strategy tool which is used to deal with uncertainty, it was deemed appropriate to explore the theoretical background of uncertainty. Uncertainty and Perceived Environmental Uncertainty (PEU) have been under investigation both at a philosophical (Luce and Raiffa, 1957) and practical (Duncan, 1972; Bourgeois, 1985) level for almost a century. Knight (1921) was one of the first researchers to conceptualise uncertainty and to distinguish it from risk, as he explained that uncertainty is created when it is not possible to express 'randomness' in terms of mathematical probabilities, while in risk it is possible to assign mathematical probabilities. Knight's (1921) definition expresses the view of economists on uncertainty, however, as Miliken (1987) observes, there are two more widely cited definitions; uncertainty is created: i) by the lack of information, and ii) by the inability to predict the outcome of a specific decision made.

The literature on PEU has numerous contributions (see Buchko, 1994 for a review) on the development of scales to measure the concept of environment uncertainty in surveys. Early researchers developed some generic taxonomies of the environment as a source of perceived uncertainty; Dill (1958) proposed that PEU can come from general environment, referring to those uncertainties that are not closely related to the organisation, while the task environment consists of the environmental uncertainties with greater direct impact on the organisation. Miliken (1987) has identified three types of PEU: state, effect and response uncertainty. Duncan (1972) suggested the measurement of environment in term of dynamism and complexity. The majority of these scales are of

value in research however they cannot be directly applied by managers and thus helpful for the teaching of the concept.

One of the first conceptualisations of environment that had practical value was developed by Dill (1958) who suggested that the environment is determined by four factors: customer, suppliers, competitors, regulators. Duncan (1972) was one of the first authors to differentiate between internal and external environment; the external environment is determined by factors related to customers, suppliers, competition, socio-political and technology; while the internal environment is comprised by personnel characteristics and skills, functional and staff units and organisational level components (referring to objectives, goals, processes for group integration and nature of product or services). Miles and Snow (1978) suggested that perceived uncertainty in the environment can be created by one or some of governments, markets, regulatory agencies, suppliers, customers, competitors and trade unions.

A significant contribution in the field of PEU has been made by Miller (1992; 1993). Miller (1992) developed a conceptual framework for uncertainty which identifies three levels of PEU: i) *General Environmental Uncertainties*, which refer to the uncertainties in the macro-external environment such as politics, government, economics, social and natural uncertainties; ii) *Industry Uncertainties*, which refer to the market competition uncertainties such as input market, product market and competitive uncertainties, and; iii) *Firm Uncertainties*, which refer to operational, liabilities, R&D, credit and behavioural uncertainties.

A number of PEU studies (Priem et al., 2002; Garg et al., 2003; Freel, 2005) have examined all three levels of PEU to determine that there is a significant influence in the strategic decision making by not only the macro but micro and internal uncertainties. Freel (2005) has found that in some cases (industry related) micro and internal uncertainty had greater impact on Innovation. This demonstrates that managers are not only concerned with the macro-external uncertainty but also that industrial and internal uncertainties are equally important. At the same, existing literature on the assessment of uncertainty and particularly on scenario planning, including the way the latter is taught, seems to ignore the contribution of PEU literature.

### *Scenario Planning and Perceived Environmental Uncertainty*

There is a common understanding that scenarios are built on uncertainties. However, there is not any commonly accepted definition of uncertainties or how these should be expressed within scenario development. One fundamental question, that none has considered yet is whether there are any restrictions on the identification of uncertainties and furthermore should scenario development consider both macro-external and micro-external uncertainties together. There are contradictory views on this; for example Schwartz (1996) is the only author to suggest considering both macro and micro external environmental factors but at different stages of the process; at the second stage in his eight stages process, he proposes the examination of the ‘key forces in the local environment’ which should be considered in conjunction with the ‘driving forces’ (in the macro environment), taking place at the third stage. It has to be noted that Schwartz is an influential author for the scenario planning literature and his methodology has been adopted in a great number of studies (Rigland, 2002). A number of authors (such as O’Brien et al., 2007; Drew, 2006) suggest the examination of both levels of perceived environmental uncertainty simultaneously. Drew (2006) uses them simultaneously because his approach is based on an integration of the Schwartz (1996), Van der Heijden (1996) and Shoemaker (1995) approaches.

On the other hand, authors like Van der Heijden clearly suggest that the current practices of scenario planning are based on the fact that the examination of the macro-environmental uncertainties ‘[scenarios] *are typically deployed to identify and analyse the driving forces enacting from the contextual environment*’ (Ramirez and Van der Heijden, 2007). Furthermore, Cornelius et al. (2005) show that Shell’s scenario planning history has only dealt with macro-external environment factors. Wright et al. (2008) drawing from Burt et al. (2006) highlight that there are significant weaknesses in using ‘taxonomic classification’ as PEST, though they highlight that their approach involves the identification of factors from the contextual environment. Burt et al. (2006) highlight the limitations of using PEST (and its derivatives) as the external environment situation analysis, nevertheless they acknowledge that this framework can be utilised in scenario development to ensure holistic/systemic coverage of the factors of uncertainty.



Van Notten et al\*\* (2003) suggest that it is possible to develop scenarios based on the industrial environment only, nevertheless they explain that the boundaries between macro and industrial environment are vague and there are not really any case studies which explicitly do that. Ramirez and Van der Heijden (2007) have recently highlighted the need for scenario planning interventions to develop more strategic options considering the industrial environment, since that is the ‘battlefield’ of competition. However, they do not provide any specific methodological suggestions as how this can be achieved. Very few attempts have been made to link the macro-external with the industrial and in the internal environment. Schoemaker (1997) suggests an integrative 5 stage approach for the development of strategic options using scenario planning, which combines i) a 10-steps process scenario planning process based on macro-external environmental uncertainties (Schoemaker, 1992) and industry related factors; ii) a segmentation analysis and an assessment of the ‘competitive forces and barriers’; iii) an analysis of the resources and capabilities; iv) using the insights gained to develop a ‘strategic vision’, and; v) the identification of strategic options suitable for the ‘strategic vision’.

A limited number of authors have considered the differentiation between internal and external scenarios. Fink *et al.* (2004) developed conceptually an integrated methodology which combines external or ‘market’ scenarios and internal or ‘strategy’ scenarios. Ringland (2002) claims that internal scenarios ‘*take factors under the control of the organization into consideration*’; however, her study does not provide any additional insights into internal scenarios and how they are integrated in the scenario planning process. Furthermore, Miller and Waller (2003), with the aim of incorporating all levels of PEU into the assessment of the uncertainty, have developed a conceptual methodology which integrates scenario planning and real options. This approach proposes the examination of PEU within the scenario development as well as within the ‘risk exposure’ assessment, however they do not provide adequate guidance on how to integrate these two activities.

### **Integrating the PEU theory in teaching of scenario planning process**

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\*\* scenario planning researchers like Van der Heijden (1996); Van Notten *et al.* (2003); Ramirez and Van der Heijden (2007) call the macro-external environment ‘contextual’ and the industrial environment ‘transactional’.

To address the need to integrate the PEU theory into scenario planning in order to enhance the teaching of this concept, I have selected an established scenario planning approach which is the basis for teaching scenario planning. In the following text, I am going to present how PEU theory can be integrated in O'Brien's (2004) approach. O'Brien (2004) proposes an 8 stages process for the teaching of scenario planning (Figure 1) through which the students familiarise themselves with the concept of uncertainty and understand how to build alternative pictures of the future. This process is in essence very similar to other scenario planning processes (Van Notten *et al.* 2003), but contains one notable difference: O'Brien (2004) does not suggest the development of a two by two 'scenario matrix' for the 'theme identification' as other authors do (Schoemaker 1995; Van der Heijden 1996; Burt *et al.* 2006; Wright *et al.* 2008). However, her methodology has the benefit that it has emerged from the teaching and practice of scenario planning in different organisations and it is flexible to accommodate their different characteristics.

*Insert Figure 1 About Here*

The first six stages of O'Brien's (2004) scenario planning process are what has been described in the literature review as 'scenario development' while the last two stages are 'strategy development' based on the scenarios developed.

In the present paper, it is suggested to expand the activities proposed by O'Brien (2004) for **Stage 1: Setting the Scene**. O'Brien (2004) and O'Brien *et al.* (2007) suggest that at the beginning of the process the team involved should examine the focus of the exercise and who should be participate. At this stage, it is recommended that the agents involved should look into the past of the organisation to understand any major changes. Also, O'Brien (2004) suggests that it is important to specify the planning horizon for the scenarios to be developed.

In the integrated approach suggested in this paper, it is proposed that those involved should firstly develop an in-depth understanding into the company/case study. Initially, it is proposed that the group of students should conduct a strategic analysis of the industrial (micro-external) environment and an analysis of the internal activities. These analyses would help them with the next steps of the scenario planning process as well as with the

strategic decision making. The analysis of the industrial environment would help the students understand the key forces influencing the competition. The analysis of the internal environment should help the student develop a greater understanding on how the organisation operates and the basis of its competitive advantage.

Studies from the Perceived Environmental Uncertainty (Miller, 1993; Steel, 2004) have examined the industrial environment in terms of the key forces that shape the competition. To facilitate the analysis of the industrial environment it is suggested that students should use Porter's Five Forces (Porter, 1980) analysis. This is a strategy tool that all students are taught in Business and Management degrees. It is also a commonly used strategy tool amongst practitioners (see for example Stenfors *et al.*, 2007).

**Five Forces analysis** (Porter, 1980) was developed within the positioning paradigm of strategy development. Porter developed this model to determine industry attractiveness or profitability through identifying the strength of the forces that determine the competition at industrial level. In the present analysis, there is no particular interest in the attractiveness of the industry, rather on the forces that influence the dynamics in the sector. Porter has suggested five forces that should be considered:

- i) *threat of new entrants*: this threat concerns the possibility of a new entrant entering the market to acquire some market share. This threat is influenced by the barriers to entry which are resulted by economies of scale, product differentiation, capital requirement, switching costs, access to distribution channels, cost disadvantage independent of scale and government policy.
- ii) *threat of substitutes*: this threat concerns the introduction into the market of a product or service that 'perform the same functions' with the existing products/services.
- iii) *bargaining power of customers*: this is a threat due to the increasing number of options available. The bargaining power of customers is dependent on the size of the customer, the product/service standardisation, switching costs and profit margins. Porter highlights that customers pose greater threat when they are well informed of the industry.
- iv) *bargaining power of suppliers*: this threat increases when there are not a lot of suppliers available and there is a dependency on the quality or characteristics of the product/service supplied.

v) *competitive rivalry*; this threat is determined by how saturated the industry is and how powerful (size, differentiation strategies) the competitors are.

At this stage, students should also develop a greater understanding of the organisation's internal environment. According to Miller (1992) and Freel (2005) internal PEU concerns the resources and competences of the organisations and particularly their sustainability over time. Dyson (2004) supports the idea of using '*resources and competencies-based planning*' to analyse the internal of the organisation. To examine the resources and competences, the present methodology incorporates the internal analysis as proposed by the Resource Based View (Barney 1991)\*. Barney (1991) quotes Daft (1983) in order to define resources as all '*assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve efficiency and effectiveness*'. There are five categories of resources: financial, physical, human, reputation and knowledge. Barney (1991) also explains that resources are the equivalent of 'strengths' from SWOT analysis from the traditional strategic analysis approaches. Brush and Artz (1999) suggest that there is a clear distinction between resources and capabilities which are useful in differentiating them: resources can '*be either given exogenously or created by activities within the firm*' while capabilities '*emerge from the integration and combination of resources*'.

The analysis of the industrial and internal environment helps the students with **Stage 2: Generate uncertain and predetermined factors**, when the elements of macro-external environment have to be considered in order to identify uncertainties (and certainties) for the future. As mentioned in the literature review, O'Brien's methodology (O'Brien, 2004 and O'Brien et al., 2007) suggest the simultaneous use of macro and micro environmental uncertainties. The present paper proposes that for the teaching of strategy development with scenario planning, it is better to consider the uncertainties created only by the macro-external environment for the development of the scenarios as proposed by Burt' et al. (2006); and then to examine the implications for the micro environment at a later stage.

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\* It is acknowledged that there are other approaches which can be used for the internal uncertainties such as Value Chain Analysis (Porter 1985) as Garg et al. (2003) utilised in their research.

This is the stage at which the initial analysis of the industrial and internal environment becomes beneficial for the students. Having developed an understanding on the industry dynamics it is easier to identify which are the key macro environmental parameters that can influence the forces in the industry.

It is also anticipated that greater understanding developed by the initial analysis would be of benefit for **Stage 3: Reduce factors and specify factor ranges**. To reduce the factors, the participants need to establish their importance to the company and the level of uncertainty. The importance of the factors to the company would be examined with respect to its relevance on the forces of competition and the resources and competences.

No alterations are suggested for the remaining stages of the scenario development process: **Stage 4: Choose themes and develop scenario details**; **Stage 5: Check consistency**; **Stage 6: Present Scenarios**. Nevertheless, a series of significant changes are proposed for the strategy development which is realised in the next two stages.

In **Stage 7: Assess the impact of scenario planning** and **Stage 8: Develop and Test Strategies**, O'Brien (2004) suggests the utilisation of a Threats Opportunities Weaknesses Strengths (TOWS) matrix in order to identify potential strategic options, which is considered (Wright *et al.* 2008) as an important innovation for scenario planning practice. TOWS matrix requires an internal analysis of the organisation to identify Strengths and Weaknesses and an external analysis for Opportunities and Threats; the latter would be determined by the scenarios developed. O'Brien's (2004) approach for this stage assumes that there will be no changes in the internal of the organisation in terms of strengths and weaknesses; hence it is implied that key resources and capabilities are sustainable. However, the changes in the macro-external environment would have an impact on both the industrial and internal environment. For example, in the recent years consolidation has been observed in the pharmaceutical industry which is attributed to raising costs of R&D (Orsenigo *et al.*, 2001). Consequently, changes in the industry structure – mergers and acquisitions – have affected the basis of competition in the sector (Heracleous and Murray, 2001).

Therefore at this stage, it is proposed that the impact of the scenarios developed would be assessed on the industrial environment and the sustainability of the key resources and

capabilities. To assess the impact of the scenarios developed in the industrial environment the students should examine whether potential changes or trends would influence and/or change any of the five forces identified in the first stage of the process. To facilitate this assessment it is recommendable to utilise an impact matrix which will depict the changes in the forces of the industrial environment within each scenario (see Table 2).

*Insert Table 2 about here*

To investigate the impact of the potential scenarios developed, on the internal of the organisation, it is propose to employ Barney's (1991) criteria of resources sustainability. These are:

- i) *valuable*: resources have to support the development and implementation of organisational strategies;
- ii) *rare*: resources which are not common among all competitors;
- iii) *inimitable*: resources that cannot be easily imitated;
- iv) *non-substitutable*: resources that are easily substituted.

Barney's (1991) criteria were originally designed to assess the sustainability of the resources; however the evolution of the field (Barney 2001) has expanded the use of these criteria for both resources and capabilities. These criteria are part of the Resource Based View (RBV) (Barney 1991; 2001), though this paper does not suggest the integration between scenario planning and RBV theory. In the present paper, it is proposed to use these criteria in order to evaluate the impact that macro and micro external environment would have on the internal of the organisation. Priem and Butler (2001) have highlighted the difficulties and challenges of using these four criteria in strategy development. However, it is anticipated that the previous analysis on the impact of scenarios on the structure of the industry should also be helpful in assessing their effects on the internal environment of the organisation. To organise the assessment of each scenario on the sustainability of the resources it is suggested to depict them with another impact matrix as in Table 3. In this analysis, the students examine whether each of the resources that provide competitive advantage at the present will be sustainable within each of the scenarios.

*Insert Table 3 about here*

The ultimate aim of this analysis will be to determine the Strengths and Weaknesses for the future of the organisation. The '*Strengths in the future*' will be those resources and capabilities which will remain sustainable over the time defined for the scenarios development; while the '*Weaknesses in the future*' will be the weaknesses at the present and those resources and weaknesses that are not sustainable within the future scenarios.

Once the potential strategic options are identified, O'Brien (2004) suggests testing their robustness against each scenario. A number of studies (Goodwin and Wright, 2001; Driouchi et al., 2009) propose the integration of decision analysis into the strategic options evaluation based on quantifying the assessment of the impact of the strategies against a hierarchy of organisational objectives for each scenario. However, this approach would not be suitable for the students who are not part of the organisation and do not have access to all necessary data. Furthermore, this analysis would require skills that are not usually taught in Strategy Development courses.

In the present paper, it is suggested to integrate more specific evaluation criteria into the assessment of robustness as suggested by O'Brien et al. (2007). Limited theory has been developed within strategy literature for the assessment of strategic options. Rumelt (1998) has proposed four criteria: i) *Consonance*, which refers to the fit of the strategy with the external environment, ii) *Consistency*, which refers to the fit of the strategy with the existing organisational goals, iii) *Advantage*: which refers to the ability of the strategy to contribute to competitive advantage and iv) *Feasibility*: which refers to ability (resources availability) of the company to implement the strategy selected. These criteria are similar to the more established Feasibility, Acceptability, Suitability (FAS) framework (Johnson et al. 2008) which comes from the military practice (US Department of Defence 2000). *Feasibility* examines whether the organisation has the resources and capabilities required for the realisation of the strategic option. *Acceptability* investigates the potential outcomes of the strategic option and their fit with stakeholders' expectations. *Suitability* considers the fit of the strategic option with the positioning of the organisation in the market. Hence, to improve the assessment of the strategic options,

FAS framework is integrated within O'Brien *et al.*'s (2007) test of robustness, as in Table 4.

*Insert Table 4 about here*

### **Case Study Vignette: Fishing Co**

To demonstrate the utilisation of the improvements suggested, a case study vignette is provided. This case study vignette is not a Harvard Business School style case (Thomas, 1998), but an example used to explain (and teach) the various stage of the scenario planning. To emphasise the differences suggested by this paper compared to O'Brien's (2004) method, I have used the same case study vignette developed by O'Brien *et al.*, 2007, so as to emphasise the differences in the application of the tool. In the following, text, O'Brien *et al.*'s (2007) analysis is provided firstly and then the suggested changes are described in order to highlight how this paper enhances the teaching approach of scenario planning within strategy development. O'Brien *et al* (2007) present the scenario planning process for a fishing company (Fishing Co.) and have created 3 scenarios for the future of the fishing industry (attached in the Appendix). Fishing Co. is a fishing company which according to the description provided, is assumed to be engaged only with fishing and not with farming\* or importing fish. Additionally, even if it is not clearly stated, O'Brien *et al.* (2007) imply that Fishing Co. is established in Great Britain.

**Five-forces** analysis provides the description of the industrial environment for Fishing Co.:

-The barriers to entry are relatively low for any new fishing company because there are not any major resources required; even if knowledge and 'know-how' are rather demanding in the fishing sector. Hence the *Threat of New Entrants* is **Medium**.

-Assuming that *Suppliers* are only those providing fishing equipment, then given the great number of available options, their power is **Low**.

-There are two types of potential *Customers* for a fishing company: i) direct consumers who have great choice from where to buy thanks to the developed supermarket/retail industry and online businesses and ii) distributors who buy from the fishing companies

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\* Fish farming currently accounts for approximately one fifth of global production (FAO 2006)



for the larger supermarket chains. Both these groups of customers have **High** bargaining power.

-The *Threat of Substitutes* is created by a variety of sources. One category of substitute is other types of food such meat and vegetables. Also fish farming and fish importing could be considered as substitutes to fishing. Hence, the threat of substitutes is **High**.

-A large number of fishing companies exist in the UK. At the same time, there are not any particularly dominant players in the market. Hence *Competitive Rivalry* is **Medium**.

For the internal analysis, due to the lack of any details, the *Strengths* provided in the case study are considered as key **resources and competences**: i) skilled at catching fish, ii) already have equipment, iii) skilled and experienced staff and iv) good knowledge of the sea.

O'Brien *et al.* (2007) have produced three scenarios following the process suggested by O'Brien (2004) with stages 1 to 6 as presented in the previous section (attached in the Appendix). In Table 5, the impact of each scenario on the five forces of the industrial environment is examined using the impact matrix suggested.

*Insert Table 5 about here*

As can be seen from Table 5, each of the scenarios will affect the industrial environment; the greatest impact is observed on substitutes with the influence of farming and on competition, which will be driven by demand.

To examine the impact of the scenarios on the internal of the organisation, the cross impact matrix which utilises the theory of resources and competencies sustainability will be used.

*Insert Table 6 about here*

To test the robustness of the strategic options, the integrated impact matrix which considers the FAS criteria will be employed. To demonstrate the use of this approach, three of the strategic options developed by O'Brien *et al.* (2007) are evaluated in Table 7.

*Insert Table 7 about here*

It has to be noted that the analysis presented in Table 6 is based on assumptions about this company in the absence of real data. However, given that the same assumptions were

made for each scenario and strategic option, the example is considered adequate to demonstrate the use of the analysis.

### **Discussion**

The purpose of this article is to improve the process of teaching of scenario planning within strategy development by integrating the PEU theory. The teaching of scenario planning provides the opportunity to address the concept of uncertainty within strategic decision making and encourage the students to think beyond the present. It engages the students with a strategy tool which seeks to enhance their creativity and innovative thinking (Liedtka and Rosenblum, 1998). Scenario planning is a learning process and as such it is essential that those participating should get the chance to gain an in-depth understanding about the company analysed; that is the reason that strategy tools were integrated in the first stage to improve the strategic analysis of the company.

This study innovates by suggesting the differentiation between scenario development and strategy development. The improvements suggested seek to facilitate the process of comprehending the organisation and use this knowledge within the scenario planning process and strategic decision making. Hence, the process suggested for the teaching of scenario planning, seeks to provide an integrated methodology which fulfils the need to include all levels of PEU within the scenario planning and facilitate the engagement of the students with the organisation that they analyse.

The totality of the existing textbooks on strategy development treats scenario planning as an independent strategy tool without incorporating it within the overall strategy development process. This has been caused by the fact that the teaching of scenario planning is based on the most dominant theories in the literature which have not paid adequate attention to the PEU theories. The latter emphasise the study of the environmental uncertainties as a system of three interlinked layers which consider the macro, the industrial and the internal environment. To combine these three layers of uncertainty, the present paper has suggested the teaching of scenario planning together with well established strategic analysis tools, Porter's Five Forces and Resources and Capabilities analysis which are taught in all strategy development courses.

The teaching of strategy development differs (Thomas, 1998) across different institutions. For this reason this paper has not discussed the format that should be used to teach scenario planning. Nevertheless, it is acknowledged that the format suggested by O'Brien (2004) and O'Brien et al (2007), that is splitting the students in syndicate groups and giving them real life organisations to develop scenarios and strategies, is the most effective way to engage the students with this tool.

The approach suggested here has been developed as an enhancement of current practices of teaching scenario planning; nevertheless, it is anticipated that the same approach would be beneficial in real life cases. However, the structure of this approach is oriented for strategy development related exercises which concern business focused organisations and would have limited applicability in 'world-scenarios' (Van Notten et al 2003) or scenario planning work of larger scale interventions (such as the example of sustainable health care and education for Sub-Saharan region as described by Wright *et al.* (2008)).

This paper provides significant contribution for the most recent theories on strategy development (Dyson et al 2007) which call for a systemic 'strategy rehearsing' within the strategy development process. The suggested scenario planning methodology, links traditional situation analysis 'exploring internal and external environments' with the 'assessment of uncertainty', developing 'models of the organisations' and provides a holistic 'assessment of strategic ideas'.

### **Conclusions**

The purpose of this paper was to demonstrate the need to incorporate PEU theory into scenario planning and thus to develop an integrated methodology which enhances its teaching. The proposed methodology suggests a division between scenario development and strategy development. The enhancements suggested in this paper concern the integration of strategy tools in the strategy development part of the process. The present paper does not suggest that the teaching of strategy development should be built around scenario planning; however it demonstrates that there are clear links between scenario planning and the most commonly taught strategy development tools and concepts. Future research should investigate in greater depth the impact of all three levels of PEU in strategic decision making. Also, future research should test the integrated scenario

planning methodology suggested in this paper, in real life organisations and report the results. It is essential to determine the implications of examining macro and micro PEU separately and whether the use of more strategy tools within scenario planning is beneficial for those involved.

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	PESTEL	5-Forces	SGA	Industry Life Cycle	Scenario Planning	
					Mentioned	Process
Barney and Hesterly, 2008	✓	✓	X	✓	X	X
Hill and Jones, 2008	✓	✓	✓	✓	✓	X
Mintzberg et al., 2003		✓	X	X	X	X
Ireland et al., 2009	✓	✓	✓	X	X	X
Pearce and Robinson, 2007	✓	✓	X	X	X	X
Dess et al., 2008	✓	✓	✓	X	✓	✓
McGee et al., 2005	✓	✓	✓	✓	✓	X
Johnson et al., 2008	✓	✓	✓	✓	✓	✓
Grant, 2007	✓	✓	✓	✓	✓	X
Thompson et al 2008	✓	✓	✓	✓	X	X
De Wit and Meyer, 2004	✓	✓	✓	✓	✓	✓

Table 1: Strategic Management Textbooks and Scenario Planning

	Scenario 1	Scenario 2	Scenario 3
Customers			
Suppliers			
New Entrants			
Substitutes			
Competition			

Table 2: Impact Matrix for Industrial Environment

	Scenario 1				Scenario 2				Scenario 3			
	V	R	I	S	V	R	I	S	V	R	I	S
Resource 1												
Resource 2												
Capability 1												
Capability 2												

Table 3: Impact matrix for Resources and Capabilities Sustainability

	Scenario 1			Scenario 2			Scenario 3			Robust
	F	A	S	F	A	S	F	A	S	
Strategic Option 1										
Strategic Option 2										
Strategic Option 3										

Table 4: Robustness Test of Strategic Options

	Mad Fish	New Horizons	Desert Seas
New Entrants	Low	Medium	Low
Customers	High	High	High
Suppliers	Medium	Medium	Low
Substitutes	High	High	High
Competition	High	High	Medium

Table 5: Impact Matrix for Industrial Environment of Fishing Co.

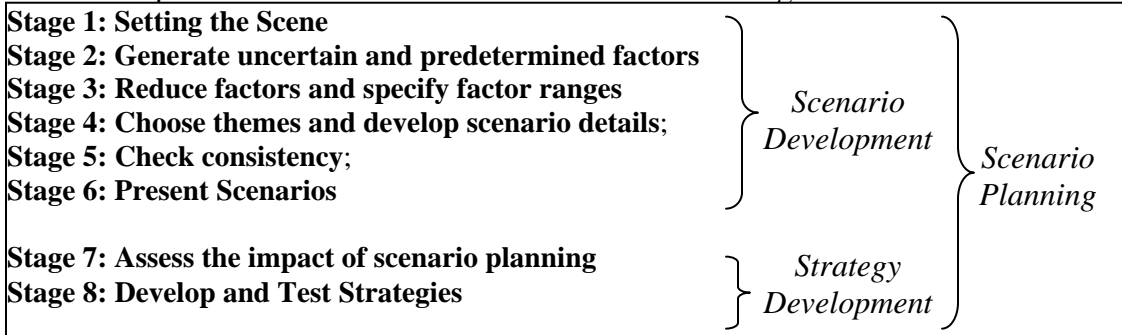


Figure 1: Scenario Planning approach for teaching (adapted from O'Brien (2004))



	Mad Fish				New Horizons				Desert Seas			
	V	R	I	S	V	R	I	S	V	R	I	S
Skilled at catching fish	☹	☺	☺	☹	☺	☹	☹	☹	☺	☺	☺	☹
Already have equipment	☺	☹	☹	☹	☺	☹	☹	☹	☹	☹	☹	☹
Skilled and experienced staff	☺	☺	☺	☺	☺	☹	☺	☺	☺	☹	☺	☺
Good knowledge of the sea	☺	☺	☺	☹	☺	☺	☺	☺	☹	☺	☺	☹

Table 6: Impact matrix for Resources and Capabilities Sustainability of Fishing Co.

	Mad Fish			New Horizons			Desert Seas			Robust
	F	A	S	F	A	S	F	A	S	
Diversify into farming	2	3	1	3	3	4	2	3	3	24/45
JV with new entrant	4	3	2	5	2	2	4	3	1	26/45
Become an importer	2	2	4	2	2	3	3	2	3	23/45

Table 7: Robustness Test of Strategic Options for Fishing Co

**Appendix:**

Factors	Mad Fish	New Horizons	Desert Seas
Health Scores	Major	None	None
Attitudes to healthy eating	Strong	Convenience-driven	Weak, cost-driven
Image of fish	Poor	Good	Average
Demand for fish products	Fresh	Canned/frozen	Canned/frozen
Work-Life balance	Leisure focus	Work focus	Work focus
Industry Technology	No advances	New advances in farming methods	No advances
Fishing regulations	Tight	Subsidies for farming	Non-existent
Size of Europe	2004 state	2004 state	Pre-2004 members
UK Joins EURO	No	Yes	No
Public Awareness of conservation issues	High	Low	Low
Level of competition	High, non-European	High, local entrants	Low, local market
Level of non-EU imports	High	Low	High
<i>Predetermined:</i> Demographic distribution	More older, less younger	More older, less younger	More older, less younger

Table 8: Scenarios for the future of the fishing industry (O'Brien et al., 2007).