Methods and Contexts: Challenges of Planning with Scenarios in a Hospital's Division

Guillaume Lamé, Julie Stal-Le Cardinal, Jouini Oualid

Lamé, Guillaume, Oualid Jouini, and Julie Stal-Le Cardinal, "Methods and Contexts: Challenges of Planning with Scenarios in a Hospital's Division." *Futures*. Accepted 18 September 2018. https://doi.org/10.1016/j.futures.2018.09.005

Methods and Contexts: Challenges of Planning with Scenarios in a Hospital's Division

Abstract

Scenario planning is presented as a well-suited approach in uncertain environments such as healthcare systems. In this article, we report a project aimed at defining scenarios in the cancer division of a large hospital. The approach chosen was based on *La Prospective* school of scenario planning. The project stopped before scenarios could be elaborated, for lack of knowledge available on contextual factors influencing the system. From the analysis of this case study, we elaborate on the adequacy of scenario planning in the context of small healthcare delivery organisations. We conclude that most forms of scenario planning are unlikely to work in these cases, especially in the *La Prospective* approach. Perspectives are drawn for scenario planning in hospitals, and for research on the fit between scenario approaches and application contexts, in order to understand what approaches work in which circumstances.

Highlights

- "La Prospective" scenario project in French public hospital division
- Patterns in French healthcare system too uncertain for structuralist-functionalist approach
- Small organisation means limited knowledge available for scenario planning
- Context (small organisation) challenging for scenario planning as a whole
- More research needed on method-context fit in scenario planning

Keywords

Scenario Planning, Failed Project, Health Services Research, Hospital Management, La Prospective

1. Introduction

Through a steady stream of publications (Cole, 2008), scenario analysis has developed into a coherent cluster of research within the 'broad foresight' literature (Lu, Hsieh, & Liu, 2016). It has been considered as a paradigm of its own within futures studies (Mannermaa, 1991), while others even argue that scenarios are 'devouring futures studies' (Sardar, 2010). However, a more historically- than methodologically-driven analysis would picture scenarios as characteristics of what has been termed the 'second paradigm' of futures studies (Kuosa, 2011), rather than as a paradigm on their own. This 'second paradigm' emerged after WWII and rejected the idea that the future could be predicted, but acknowledged the possibility to forecast alternatives, with the future emerging from past and determinants as well as human will and choices. This movement evolved during the 60's to 80's, and has since then been stabilising its methods (Kuosa, 2011; Masini, 1989), while extending its application and spreading into new areas, with futures studies playing an increasing role in management and business (Sardar, 2010) and becoming more strategy-oriented (Masini, 1989). With methodological developments slowing down (Kuosa, 2011), some see the need for a new paradigm (Kuosa, 2011; Mannermaa, 1991). However, this stream of futures studies reaching a stable stage also makes it possible and important for us to deepen our understanding of the applicability of its results (Tsang & Kwan, 1999). In particular, it is worth exploring more in detail the range of applicability of scenario methods and interventions.

In the past decades, scenario planning has been applied at different levels of organisations, from the firm to the country or the supra-national organisation. It is reported to be very successful in a business context, to address uncertain environments and nurture a more robust strategic process. However, some have suggested that not all scenario approaches are equally effective depending on the context of application (Bowman, MacKay, Masrani, & McKiernan, 2013). This research stream has received limited attention so far, which mandates more research on what type of intervention works and in which context (Holmström, Ketokivi, & Hameri, 2009; Nielsen & Miraglia, 2017; Øvretveit, 2004). Only by trying methods in various contexts will we be able to know their limits, to improve them or possibly to invent new approaches. The objective is not to 'invalidate' the essence of the methods, but to assess their range

of applicability, to inform better choices in practice, and to stir new developments where no method is satisfactory.

Since the effectiveness of scenario approaches is likely to be context-dependent, and it has not been tested in health services, and little explored in small organisations, we start from the following question: is scenario planning an appropriate method to support strategic management in a hospital division? To answer, we reflect upon our experience in a scenario planning project in the cancer division of a French hospital. The project is carried in a hospital division comparable to a small business unit (it could indeed work as an independent system). It has the size of a small company (a few tens of employees) and processes a similar amount of money (a few million euros in chemotherapy drugs for instance) inside tightly connected departments and units (Lamé, Jouini, & Stal-Le Cardinal, 2016). Although scenario planning application is primarily reported at the corporate level for large companies, it is allegedly also valid for small businesses (Foster, 1993; Johnston, Gilmore, & Carson, 2008) and divisions (Schoemaker, 1995) or Business Units (BU) (Tapinos, 2013). The project aimed at defining scenarios of the hospital division's operations within a ten years horizon. The approach chosen was based on *La Prospective* school of scenario planning (Bradfield, Wright, Burt, Cairns, & Van Der Heijden, 2005; Durance & Godet, 2010; Godet, 1986) and its structuralist-functionalist paradigm. The project stopped before scenarios could be worked on.

We analyse this outcome from different perspectives: project management, choice of scenario planning method, and adequacy of scenario planning. We report on the difficulties of applying *La Prospective* in contexts were little is known on the structure of the system and the factors affecting its evolution. We also discuss the challenges of applying knowledge-intensive scenario planning approaches in small organisations. The findings can help practitioners decide whether scenario planning is relevant, and which approach to choose, depending on their context. Our analysis contributes to the literature on practical applications of scenario planning, and to knowledge on its relevance and mode of application in different contexts.

The article is structured as follows. In the next Section, we review the literature on scenario planning methods and their application to the context of interest. In Section 3, we summarise the research aims and methods. Section 4 is a narrative of the project. This leads us to discuss in Section 5 the reasons for the dead-end reached by the scenario project and some perspectives for future research. The article ends with some concluding remarks.

2. Literature Review

2.1. Scenario Planning Methods

Bradfield et al. (2005) have identified three main schools of thought in scenario planning: the 'intuitive-logics' and Probability-Modified Trend (PMT) schools, originated in the USA, and the French *La Prospective* school. Important characteristics of the three schools are reminded in Table 1. The intuitive-logics school is process-oriented, following an organisational learning perspective. *La Prospective* is more analytic and uses various systems analysis tools. PMT is mostly quantitative, and uses probabilistic reasoning. We now provide more detail on *La Prospective*, which we used in our case study.

Table 1. The three schools of thought in scenario planning, adapted from (Bradfield et al., 2005)

	Intuitive-logics	*La Prospective*	Probability Modified Trends
Orientation	Process-oriented: insights and learning gained during the process ('strategic conversation') are as important as the scenarios	Outcome-oriented: support decisions with appropriate analysis reflected in the scenarios	Outcome-oriented: support decisions with appropriate analysis reflected in the scenarios

Scenario team	An internal team, possibly facilitated by an experienced practitioner	External expert leads a team with key internal stakeholders	External expert consultants do the work
Role of consultant	Process facilitator	Expert in technical tools, some facilitation	Expert in technical tools
Typical techniques (examples)	Intuition-based techniques such as brainstorming, simple analytic tools (e.g. STEEP and small matrices), interviews with 'remarkable people'	Structural analysis, morphological analysis, Delphi-type expert consultation	Monte-Carlo simulation, expert judgement, time-series analysis
Output	Mostly qualitative: narrative scenarios, all equally probable	Qualitative and quantitative: narratives supported by extensive structural and mathematical	Mostly quantitative: time series analysis, including probabilistic analysis

The principles, process and the tools of *La Prospective* have been presented by Godet (1986, 2000, 2006, 2007a, 2007b) and colleagues (Durance & Godet, 2010). *La Prospective* emphasizes rational analysis, relying on a careful documented analysis of trends and structures. It aims at a form of objectivity, while recognizing the subjectivity of human experience (Godet, 2006, 2007b). To enact these principles, the method involves a set of systems analysis tools, such as structural analysis, morphological analysis, and cross-impact analysis. Godet clearly acknowledges the influence of systems analysis developed by the RAND Corporation in the US and SEMA in France on his development of *La Prospective* (Godet, 2006). *La Prospective* interventions require some expertise in the use of these techniques.

As noted by Bradfield et al. (2005), *La Prospective* sits in-between the intuitive-logics and PMT schools: it uses complex analytical tools and requires expert consultants to lead the work, like PMT, but it is

more participative (including facilitated workshops) than PMT and includes more qualitative and 'soft' variables, which are characteristics of the intuitive-logics school.

In complementary terms, *La Prospective* can be positioned in the paradigms of applied systems thinking as delineated by Jackson (2003). *La Prospective* takes a complex view on the system-at-study, by recognizing the co-existence of multiple interconnected phenomena. It takes a unitary perspective on the project participants, meaning that it is assumed that all participants to the scenario planning project share the same objectives and interests. This is in line with a structural-functionalist paradigm, shared by other systems approaches such as Organisational Cybernetics or System Dynamics[1]. These approaches "seek to identify those key mechanisms or 'structures' that govern the behaviour of the elements or sub-systems and, therefore, are fundamental to system behaviour." (Jackson, 2006, p. 652)

The literature is in general positive about the range of applicability and the benefits of scenario planning. This is true in the intuitive logics school, where claims of wide applicability and usefulness (Chermack, 2011; Schoemaker, 1995; Wright & Cairns, 2011) have been backed by numerous case studies, e.g. (Moyer, 1996; Peterson Garry, Cumming Graeme, & Carpenter Stephen, 2003; Wack, 1985a, 1985b). *La Prospective* is no different, and a number of successful case studies have been reported, e.g. in (Godet, 2006, 2007b). This may leave the impression that "the technique is applicable to virtually any situation in which a decision maker would like to imagine how the future might unfold" (Schoemaker, 1995, p. 27). But does this really apply to *all* techniques of scenario planning, as in the three schools presented above, and to *all* situations? Surely, we could gain by studying carefully what scenario planning methods work in which context (Nielsen & Miraglia, 2017). One way to understand this is to look at unsuccessful projects.

The small number of published studies on inconclusive projects is a known bias in the academic literature (Fanelli, 2012). Yet, reports of failed projects are precious to understand why certain approaches do not work in certain contexts, and how they can be improved. Despite calls for reporting

[1] The influence of Forrester's system dynamics on the development of structural analysis, a central approach in *La Prospective*, has been acknowledged by French prospectivists (Arcade, Godet, Meunier, & Roubelat, 2003).

on failed scenario projects (Chermack, 2005), we could only identify three papers in this category. All three used the intuitive-logics approach, and we are not aware of any account of an unsuccessful *La Prospective* project.

Two of the papers insist on the receptiveness of the participants as an explanation for success or failure (O'Keefe & Wright, 2010; Wright, van der Heijden, Burt, Bradfield, & Cairns, 2008), without explicitly questioning the appropriateness of scenario planning. In both cases, the scenario planning interventions took place large corporations, a context where scenario planning has often been successfully applied. Therefore, suggesting that the intrinsic receptiveness of the participants, or the management of the intervention for triggering the sharing of perception, was faulty, is a reasonable explanation. However, can we conclude from this that scenario planning is relevant in all contexts?

A third article, by Bowman et al. (2013), contributes to answering this question by introducing the notion of fit between the scenario approach and the context in which it is applied. The authors study two scenario planning interventions in the same organisation. The interventions used two different methods, labelled *inductive* and *deductive*, both based on the 'intuitive-logics' approach. The inductive intervention succeeded whilst the deductive one failed. The authors conclude on the need for adequate matching between context and process in scenario planning interventions.

This resonates with calls to better understand how certain interventions aimed at improving organisational performance work better in certain contexts than others (Holmström et al., 2009; Nielsen & Miraglia, 2017; Øvretveit, 2004). In particular, the applicability of scenario planning (in general and under its different versions) in contexts where it has not yet been well-reported, such as hospitals and small organisations, remains uncertain.

2.2. Scenario Planning in Specific Contexts: Healthcare and Small Organisations

Hospitals are major components of a major industry, as healthcare accounts for 16.9% of US GDP in 2013, and 11.6% in France where our case study is located (World Bank, 2017). Healthcare systems are uncertain and complex environments (Kannampallil, Schauer, Cohen, & Patel, 2011; Plsek & Greenhalgh, 2001; Plsek & Wilson, 2001; Tien & Goldschmidt-Clermont, 2009). In this context,

working out the future from historical data is risky (Leggat, 2008) and scenario planning is pictured as a promising approach (Austin, Bentkover, & Chait, 2016a; Ghanem et al., 2015).

However, to this date, there has been little published evidence of the explicit use of scenario planning (as defined in general business) in the healthcare sector. Most contributions are in public health or epidemiology (Vollmar, Ostermann, & Redaèlli, 2015), and do not tackle strategic decision-making of individual healthcare providers, in particular hospitals. On February 2nd, 2017, we carried a search on the ScienceDirect website, with "hospital" in keyword, abstract or title. We restricted the search to *Technological Forecasting and Social Change*, *Long Range Planning* and *Futures*, the three journals publishing most scenario planning studies according to Varum and Melo (2010). We obtained 29 results, only one of which reported the application of a scenario planning method in a hospital. In this article, Van Reedt Dortland, Voordijk, and Dewulf (2014) combine 'intuitive-logics' scenario planning with real options analysis to assess a hospital's real estate strategy and reflect on contracting conditions. The authors found that their approach enhanced sense-making amongst participants, but that real options was deemed too complex by participants.

Besides this example, a few case studies and applications of scenario planning can be found in healthcare journals (Enzmann, Beauchamp, & Norbash, 2011; Ghanem et al., 2015; Hutchinson, Witte, & Vogel, 1989; Neiner, Howze, & Greaney, 2004; Nielsen, 1996; Venable, Ma, Ginter, & Duncan, 1993; Zentner, 1991), but they rather cover healthcare system policy and public health studies. To the best of the authors' knowledge, scenario planning in hospitals has received little theoretical attention–be it because it has never attracted academic attention or because the actual practice of scenario planning is not developed in hospitals.

Another area relevant to our case study and which has received little attention is scenario planning in smaller organisations. After originating in the military, scenario planning was mainly developed for public policy at the regional, national or international level, or for large companies such as the Royal Dutch Shell (Bradfield et al., 2005). Some authors have also presented it as a valid approach for Small to Medium Enterprises (SMEs), where it could contribute to organisational learning (Foster, 1993; Johnston et al., 2008). However, although Foster (1993) provides vignettes of scenario building in

SMEs, there has been no further evaluation of the impact of scenario planning in these contexts, so it is difficult to conclude on these claims. Tapinos (2013) concludes from a case study that scenario planning is possible at the Business Unit level of large companies, but with adaptations due to the more operational uncertainties, the shorter planning horizon and the dominance of industrial and internal uncertainties in the scenario development.

To conclude, an interesting contribution on the topic is the report by Sørensen, Vidal, and Engström (2004) of a project they carried in a Danish SME with ten employees. Although they used SWOT analysis and the strategic choice approach rather than scenario planning, they report useful insights on using model-based interventions in SMEs. Because of the small size of the organisation, the authors had access to only one manager for their SWOT analysis. In such a situation, the method cannot trigger internal debates. Besides, the resources available for business intelligence, trend monitoring and environment scanning in the SME were very limited, and ultimately the contextual knowledge needed for the analysis came entirely from the facilitator. This case illustrates the challenges of using knowledge-intensive methods in small organisations.

3. Research Aims, Materials and Methods

To summarize the above literature review:

- Scenario planning is a broad field of practice, comprising three main schools of thought.
- Although it has been suggested that it could be used in health services, there is only little evidence of its application there.
- Similarly, some have proposed using scenario planning in smaller organisations, but the little empirical evidence we have suggests that specific challenges can be expected.
- Finally, there have been only few reports of unsuccessful scenario planning projects, and the question of fit between methods and context has been largely overlooked.
- On all these topics, the 'intuitive-logics' school of scenario planning has received most of the attention.

This article sits at the intersection of some of these issues. It aims to assess the applicability of a particular scenario planning approach, *La Prospective*, in a specific context, a hospital division. By doing so, we contribute to a conversation on the fit between scenario planning methods and the organisational contexts in which they are implemented. In particular, our context is that of a public healthcare provider and a small-size organisation.

We report a scenario-planning intervention in a French hospital division. One researcher (the first author) acted as an analyst/facilitator in this project. He was external to the hospital, but worked in a mode close to the "researcher-in-residence" model (Marshall, 2014). When the project started, he had an 18-months history of working with this organisation. During the project, the analyst/facilitator regularly convened with the second and third authors. These discussions promoted reflexivity, an important dimension in intervention research. The story is told chronologically, from the point-of-view of the analyst/facilitator, to illustrate the hurdles encountered and how we tried to overcome them.

The hospital in this study is a public hospital in France. It has 1,300 beds and employs 4,000 people. Our project took place in the cancer care division, offers the full range of cancer care for most cancers in adults: surgery, radiotherapy, chemotherapy, supportive care and palliative care. At the time the study started, the hospital was engaging in a wide reorganisation of its facilities. A new building was being planned to host all operating rooms and intensive care units. This new building would free 25% of the previous surface of the hospital. The direction thus launched a strategic reflection process to decide on how to allocate this space to promising activities. All divisions started their own reflection on what this opportunity could mean for them.

4. Narrative of the Project

4.1. Defining the Project

In the context of the development of new facilities in the hospital, the cancer division, covering departments like haematology, radiotherapy, oncology, digestive surgery and dermatology, and the pharmacy division, which includes the chemotherapy unit where all chemotherapies are prepared, started their own reflection. Their aim was to evaluate their future needs for space and how these could be

reflected in projects proposed to the management. One of the most immediate stakes of this project was to help decide whether or not to ask for an investment to set-up a new outpatient unit for chemotherapies, with an integrated pharmaceutical unit. But was that the good thing to do, and how big would that unit need to be?

To inform these questions and provide the background for a robust strategy elaboration, a prospective study was undertaken in the division. The environment was considered to be unstable. In the past, the division had experienced sudden variations in arrival rates of new patients. In the future, turbulences were expected in the local environment due to a major urban planning project, including new public transportation that would modify the accessibility of the hospital and its main competitors in the catchment area. Finally, many hospitals offer cancer treatment within a short distance, making it a very competitive area. For all these reasons, the situation was perceived as complex and uncertain, and the first author suggested that a scenario planning approach could be helpful. A project was launched on the following basis:

- The *expected outcome* of the study was a set of scenarios of the future activity of the division, which decision-makers could then use to inform their choices.
- The *guiding questions* for developing these scenarios were: What will be the demand in the future? , which could be detailed as: How many patients will require cancer treatment in the system, for what type of cancer, and under which kind of treatment? We did not expect fully quantified scenarios, but rather a set of alternatives that would highlight what factors, mechanisms and events would affect the activity under various configurations. It was expected that technological evolutions, such as new types of treatment, and other factors such as developments in local urban planning would affect these evolutions.
- The *time scale* for scenarios was set to 10-15 years.
- The *system-at-study* was defined as all departments in the hospital for which cancer care is a core activity: oncology, haematology, dermatology, radiotherapy, digestive surgery, and the associated support departments, in particular the pharmaceutical unit dedicated to chemotherapy and the platform for supportive cancer care.

- The *project leader* was the first author. He was already working with the division on other topics, and offered to support the process.
- The *project team* consisted of the researcher as the analyst/facilitator, and the head of the oncology department and the head of the cancer division as advisors and supervisors.

4.2. Choosing the Approach to Scenario Planning

We committed to follow the principles of *La Prospective*, and where possible use its tools, but not in a dogmatic fashion. Indeed our aim was "to determine the most likely evolutionary development of a particular phenomenon with a view to improving the effectiveness of policy and strategic decisions" (Bradfield et al., 2005, p. 806), and the project frame was rather outcome-oriented, which is congruent with the choice of *La Prospective* over intuitive logics.

The broad plan we expected to follow was:

1. *Project definition*. This preliminary phase is described above in Section 4.1.
2. *Empirical data collection*. Through interviews, identify important factors (both internal and external) for the evolution of the system. Identify the trends for each factor and stakeholder. Models such as SWOT, STEEP, Porter's Five Forces and Hambrick's Strategy Diamond (Austin et al., 2016a) can serve as guidelines to avoid forgetting dimensions of the system. Data collection through interviews is completed by a literature search (academic literature, press articles, reports from public agencies).
3. *Connect the factors in a model*. Structural analysis (Godet, 1986, 2007b) or qualitative System Dynamics (a different form of structural analysis, e.g. (Wong, Morra, Wu, Caesar, & Abrams, 2012)) are potential solutions. The most important groups of factors are identified and discussed to keep two or three clusters that will serve to map the scenario space.
4. *Scenario writing*. Develop scenarios as narratives, based on possible evolutions of the clusters of factors identified before.
5. *Impact analysis*. Analyse the impact of scenarios on the organisation.
6. *Report writing*. Write and deliver a report on the project.

4.3. Preparing Data Collection

To prepare for data collection, the analyst built a simple conceptual model of the operations of the system using the stock-and-flow formalism of system dynamics, based on the knowledge he had accumulated on the system in the past 18 months working on other projects, and on preliminary discussions with stakeholders (Figure 1).

This first model is quite generic. It focuses on the environment of the system. The analyst used this model to communicate with interviewees and guide investigations. It was not planned as a precursor to a full quantitative system dynamics analysis. The objective was to complete, enrich and elaborate on this model to include all useful variables in the analysis. It is also useful in acknowledging and graphically representing some hypotheses and assumptions underlying the analysis.

This model represents the way patients flow in the system, and in particular our basic assumptions on how the number of patients receiving cancer care in the hospital-at-study (noted 'hospital H' in Figure 1) evolves. The number of new patients ('New Patients in the Area') depends on the number of people living in the area ('Local Population'), and on cancer incidence among these people. Then, some of these patients go to hospital H ('new patients hospital H'), while others go to another provider ('new patients other hospitals'). The 'market share of hospital F' is affected by 'intensity of local competition', the 'reputation of hospital H' and the 'capacity for new patients' at hospital H (which itself depends on the number of patients already under treatment at hospital H, and the total capacity of hospital H). The number of 'Cancer Patients Under Treatment at Hospital H' at any moment depends on the number of new patients, but also on the number of patients leaving the hospital, be it because of 'remission', 'mortality' or 'transfer to other hospitals'. All these phenomenon are affected by the range of 'available procedures at hospital H', which itself partly depends in the 'clinical state-of-the-art'.

This preliminary model is simply an attempt to formalize the mental model used at the start of data collection. It is quite generic in nature, and it suggests three main directions for further investigation:

- The local context: this includes the demographics, the epidemiology, and the local competition. These are factors in the environment, that may or may not be influenced by the hospital (for instance, demographics are almost independent), but for which precise, local information may

vary greatly from more aggregated trends (e.g. at the national level). In the model, the hospital is located in an area with a certain population, which evolves according to local demographics. Some of these people become "new potential patients", i.e. they require medical care.

- This set of patients splits between the providers of the area: some go to the hospital at study, others go to other providers. The ratio of patients going to one hospital over the total number of potential patients in the area is the market share of the hospital. It depends on the competition (how many hospitals, with which characteristics, are present in the area), and the attractiveness of the hospital. The model supposes that attractiveness depends on internal characteristics of the hospital, for instance the range of procedures it provides, its results, its pricing policy, its staff, etc. This reflects the idea that an organisation has influence (not control) over its close environment, also called "transactional environment" (Van der Heijden, 1996, p. 154). Nevertheless, what is the nature of this influence? What is the impact of a hospital's behaviour on its local context and its capacity to acquire patients (competition and attractiveness)?
- Environmental trends affect the system. The hospital is dependent on major trends in the global environment. The PESTEL (Political, Economic, Social, Technological, Environmental and Legislative) mnemonic is often used to describe these macro-level trends. In particular, clinical practices vary, new treatments appear, and therefore care processes evolve. For instance, a shift towards more chemotherapy-at-home could affect both the number of consultations and the number of outpatient chemotherapy sessions. At a more local level, urban planning decisions can affect the accessibility and reputation of hospitals.

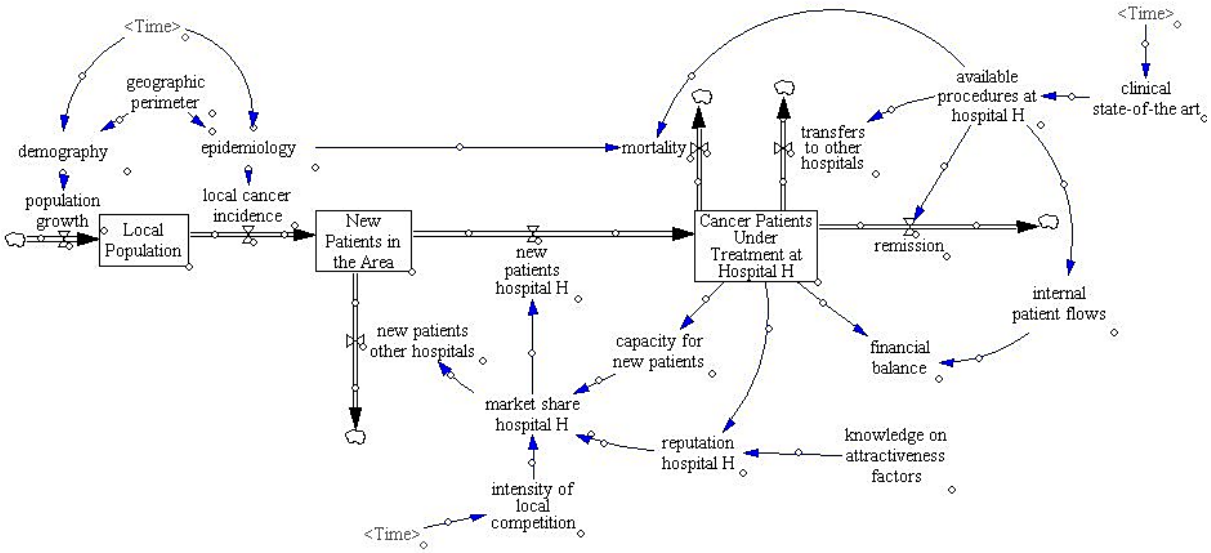

Figure 1 – Stock-and-flow model of a general hospital

Based on this view of the system, the analyst started collecting data. The objective was to specify and enrich the generic model to reflect the factors and the dynamics present in the particular situation of the cancer division.

4.4. Collecting Empirical Data

We carried semi-structured interviews with the head of the oncology department, the head of the pharmaceutical unit for chemotherapy drug mixing, the head of the cancer division, the nurse leader for the cancer division, and the accounting assistant for the cancer division. The interviews were structured around the PEST mnemonic (Political, Economic, Scientific and Technological factors influencing the system) and Porter's five forces (suppliers, customers, potential new entrants, potential substitutes, industry rivalry).

The insights generated were disappointing for the analyst. The type of questions surprised most interviewees, who were not used to reflect upon these issues. No major trends were identified, except the financial pressure on the hospital, and no factors influencing the evolution of the activity could be listed. When asked to discuss the pathway that patients followed before coming to their hospital, interviewees mentioned that they maintained interpersonal contacts with fellow physicians who referred patients to them, although they acknowledged that it did not apply to all patients. One of the interviewees

exhibited a map showing that patients in his unit came from all over the hospital's catchment area, including rather remote locations, but he could not see patterns in this data or explain the repartition of patients' addresses. No structured pathways exists for cancer care in this area, and most relationships between organisations happen at the interpersonal level between physicians. Patients are free to choose their care supplier at each step of the care process, with no external constraint.

Another topic for discussion was the evolution in the activity of the departments. The analysis of the number of outpatient chemotherapy sessions in the oncology department was disconcerting: after years of steady increase (+5% to +10% per year), the number of sessions was decreasing for the past six months whereas nothing seemed to have changed in the system. No interviewee could provide a hypothesis to explain these sudden variations. No service had opened or closed in the hospital, and no major evolution in the competition (such as new treatment capacities or hospitals offering innovative treatments) had happened. Interviewees once again explained that patients are referred by colleagues in liberal practices or in other hospitals, and that this process is uncertain, unstable and complicated. They also explained that they thought patient choices were highly multifactorial and surprising.

In summary, the interviewees were not accustomed to think about the contextual factors that influenced the flow of patients in their system. They had little information to feed this reflection. Faced with this situation, the analyst had to rely on data analysis and documentary research.

4.5. Data Analysis

To compensate the limited information obtained through interviews, the analyst collected data by searching public databases, the scientific literature and the grey literature. This section explains how this data was identified, collected and analysed to feed the scenario planning. The process followed the three main groups of factors identified in the preliminary planning (Section 4.3.): local demography and epidemiology, macro-level environmental trends and interactions between the hospital and its local environment.

4.5.1. Local Demography and Epidemiology

Data analysis started with the local context. The objective was to understand how many people would be affected by cancer in the hospital's area in the next 10-15 years. This requires an understanding of both demographic and epidemiologic dynamics.

Demographic projections are easy to come by, and they have proved to be relatively accurate in the past. The National Statistical Institute proposes six different scenarios for all French departments (INSEE, 2011).

Regarding epidemiology, localized data on the incidence of different types of cancers is more difficult to come by in countries with no comprehensive cancer register. A cancer register is an exhaustive list of all patients diagnosed with cancer in a given area. Some countries have one at the national level, but France only keeps one for four of its 101 departments. National cancer trends are derived from a weighted analysis of these four registers, and used by the National Cancer Institute (INCa) to compute national projections of cancer incidence. At the level of departments not covered by cancer registries, the most relevant information available comes from a specific study of interdepartmental variation in incidence rates (the number of new cancer cases) in 2008-2010. We worked from this information to establish local projections:

- We started from the number of new cancer cases in France in 2012, provided by the National Cancer Institute, INCa (2015).
- Then we multiplied this number by the population of the department of interest at time *t*, divided by the national population in 2012. The population figures are provided by (INSEE, 2011), which offers projections under different demographic scenarios.
- Doing so, we obtained the number of new cancer cases at time *t* in the department of interest, under the hypothesis that the incidence is similar across the whole country.
- To account for local disparities in cancer incidence, we used data provided by the Institute for Public Health Surveillance (InVS, 2015), which provides an indicator of the difference of cancer incidence between French departments for the main cancer locations for the years 2008-2010.

- This way, we obtained rough cancer incidence projections that accounted for geographic disparities in demographics and cancer incidence.

Figure 2 shows the results of various scenarios for the incidence of breast cancer in the area. Two variables are crossed, creating four scenarios: the demography (“central scenario” and “high population scenario”) and the incidence of breast cancer (with national figures from 2008-2010 or local figures from the same period). One can notice that the projections have a spread of 10% from 2030 onwards. The uncertainty on such figures is high, but their sources are identifiable by tracing back their construction. If needed, multiple quantitative scenarios could be computed to better reflect these uncertainties, using Monte-Carlo simulation for instance.

For our purposes, these figures could be used to see the relative evolution in the number of new patients in the area for different types of cancers. From this, experts can quickly assess the quantity of each type of treatment that will need to be provided in order to care for these patients. For instance, some have built projections of the number of radiotherapy sessions needed in various countries, using projections on the number of new patients and knowledge on the type of treatment required for each type of cancer (Barton et al., 2014; Borras et al., 2016).

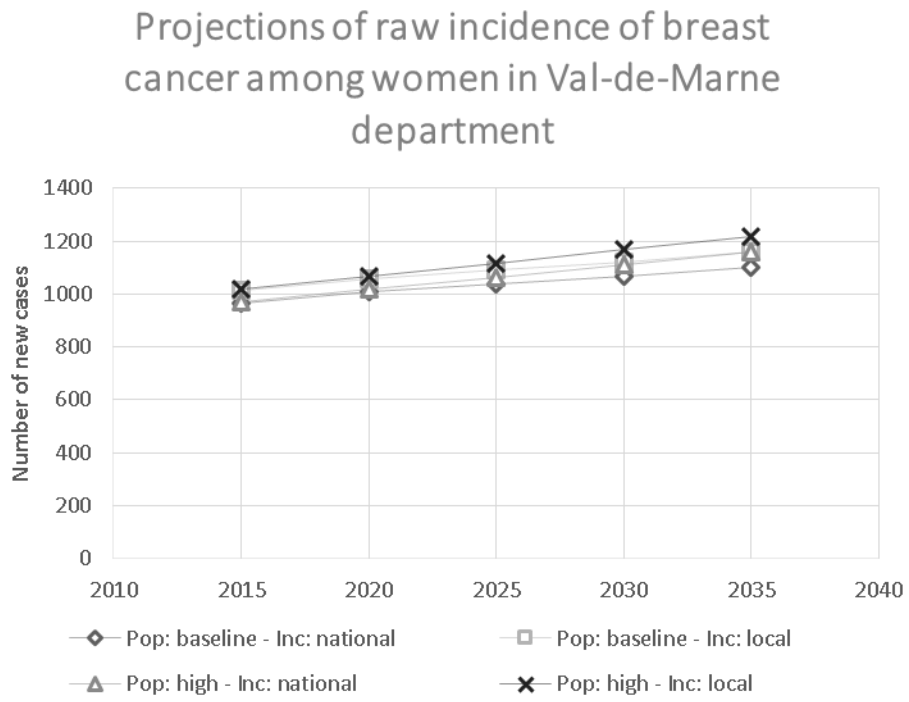

Figure 2 - Projections of raw incidence of breast cancer among women in the Val-de-Marne department (Pop: population, Inc: incidence)

4.5.2. Macro-Level Environmental Trends

Regarding "PESTEL trends", we found various reports from professional organisations depicting future scenarios for the healthcare sector in general and cancer care more specifically, in France or more globally. Some useful references were (Aitken & Kleinrock, 2016; Borras et al., 2016; Gille & Houy, 2013, 2014; Unicancer, 2013). Examples of trends derived from these reports are the development of outpatient care and homecare, the introduction of new expensive targeted therapeutics and the increased focus on integrated care.

4.5.3. Relationships with Local Environment

When it comes to the link between the hospital's activity and its attractiveness, knowledge is much more difficult to come by. As mentioned before, the historical evolution of the activity in the cancer division where the project took place is bewildering, and no interviewee could explain it. Cancer epidemiology is on the rise, there had been no change in personnel, procedures or waiting lists occurred during the period, and no major modification to the competitive environment could be identified. Yet, the number of outpatient chemotherapy sessions was decreasing. A shortage of new patients in the department or in

upstream departments (e.g. surgery) was suspected, but no explanation was provided. So the question becomes, how do patients choose to come to one specific hospital? Referring to Figure 1, this means explaining the factors that send 'New Patients in the Area' to 'new patients on hospital H' or 'new patients in other hospitals'. We had taken the assumption that this process was influenced by the 'intensity of local competition', the 'reputation of hospital H' and the 'capacity for new patients' at hospital H.

As no direct project stakeholder could provide a clear hypothesis to explain the dynamics of the number of patients attending the cancer division, we turned to the literature to identify explanatory factors. Different mechanisms were uncovered. For instance, physicians play an important role in choosing where to have major surgery: in a survey, Wilson (2007) found that 42% of the patients decided equally with their physicians, and for 31% the general practitioner was the main decision-maker. A systematic review on the choice of surgeon concludes to the "heterogeneity and complexity behind patients' reasoning" (Yahanda, Lafaro, Spolverato, & Pawlik, 2016). In the case of oncology surgery, patients favour surgeons with more experience, and hospitals with better reputation and which perform the prescribed surgery more often, but they also rely on word-of-mouth and physician referral (Ejaz et al., 2014). When it comes to the wider question of choosing a physician, patients seem to be rather passive consumers of physician services (Harris, 2003).

As physicians seem to play an important role, studies have addressed their decision-making rationale for referrals. Results reported that comparative information on different providers does not influence GPs in their referrals (Ketelaar, Faber, Elwyn, Westert, & Braspenning, 2014). A scoping review on how patients choose their providers also found that comparative information had little influence (Victoor, Delnoij, Friele, & Rademakers, 2012). More generally, hospital quality is hard to measure (Charlesworth & Cooper, 2011) and the available measures are even harder to understand for patients.

In the context in which the study took place, other apparently sensible factors seemed immaterial to explain patients' decisions. For instance, prices are fixed in French public health organisations, and healthcare costs are fully covered by social security for most cancer patients. They can choose to go to any hospital they like to receive their treatment. In our case, location (i.e. distance to the patient's home)

was unlikely to provide a competitive advantage: a public hospital with a wide range of cancer care is located 2 km away, four others are in a 10 km range, including a large cancer care centre.

In this situation, we struggled to identify a model, or at least a set of factors, that could explain patient arrivals in the cancer division. One option could have been to interview patients directly, or run a survey. However, circulating questionnaires to patients, especially with a view of using the results for research, requires ethical clearance, administrative authorisations, informed consent on the use and storage of the data, etc. Given the very disappointing results yielded by similar attempts reported in the literature, we felt that this was unlikely to be illuminating and would be too resource consuming compared for this project. Besides, we were more interested in patients who could have come to the hospital but decided to go elsewhere, and these were difficult to identify. In short, the perceived potential benefits of this empirical investigation exceeded the time and resources available.

4.6. Ending the Project

At this stage, the analysis reached a dead-end. No additional knowledge on patient behaviour was available with the resources at hand, and it seemed difficult to bypass this knowledge gap. We were missing knowledge in a key area, and the diversity of sources from which patients arrive to the hospital (GPs, independent specialist physicians of different disciplines such as urology, gastroenterology or gynaecology, other public hospitals, private clinics, patients coming on their own initiative…), added to the complexity of carrying empirical investigation on patient behaviours, made it unrealistic to start a local empirical investigation on this subject in the timeframe of the project.

At this stage, the project was put to rest.

5. Discussion

Scenario planning is supposed to be appropriate for situations where the environment of the organisation is complex and the future is perceived as uncertain. However, in our case, it seems to be precisely because the organisation's environment is deemed unpredictable, that the scenario approach failed. We were unable to gather insights on the main factors influencing patient trajectories and on the interactions between these factors. Was the specific scenario method we chose inappropriate, or was the scenario

approach as a whole not fit for use in the context of a hospital division? We now explore three hypotheses for the dead-end reached by the project: i) poor project management, ii) poor choice of scenario method, or iii) scenario planning as a whole is not appropriate in such a context.

5.1. "Poor Project Management" Hypothesis

The first hypothesis is that we chose a relevant approach to scenario planning for the context, but implementation was faulty. In this hypothesis, the words of Peter Checkland are a useful reminder:

> *"… if a reader tells the author 'I have used your methodology and it works', the author will have to reply 'How do you know that better results might not have been obtained by an ad hoc approach?' If the assertion is: 'The methodology does not work', the author can reply, ungraciously but with logic, 'How do you know the poor results were not due simply to your incompetence in using the methodology?"* (Checkland & Scholes, 1990, p. 299)

This quote is part of a discussion on the *undecidability* of methodology, i.e. the impossibility to *prove it*, to state definitely whether it "works" or not in single case studies, an issue also encountered with scenario planning (Harries, 2003). What we can do is analyse the project and build confidence on its proper management.

We first focus on the analyst. Before launching the project, the analyst proceeded to an in-depth review of scenario methods, with classics from the intuitive school (Schoemaker, 1995; Van der Heijden, 1996; Wack, 1985a) and *La Prospective* school (Godet, 1986, 2007a, 2007b), more recent academic works, e.g. (Chermack, 2011), and dedicated works in healthcare (Austin, Bentkover, & Chait, 2016b). He had been working in partnership with the hospital division where the project took place full-time for 18 months, so the healthcare environment and the specific context of this hospital were not new. He benefited from the insights of advisors outside the system-at-study, who could focus on the methodology rather than the specific problems of the hospital division.

Regarding the project team, the participants at the hospital were open to the project and the analyst met with no resistance. There was not much time available, which is a common issue both in small organisations (Sørensen et al., 2004) and in hospitals (Tako & Robinson, 2014), but the analyst managed to organise interviews and review meetings.

Regarding the method, it followed the broad steps for any scenario method. There was no rigid plan in the beginning, as the project was of a problem-solving nature, but rather a leaning in favour of the structuralist-functionalist paradigm endorsed by the *La Prospective* school and some of the methods of *La Prospective*.

To summarize, the analyst adopted a flexible approach inside a well-defined paradigm and school of thought in scenario planning. There was no identified issue in the project system: the participants were cooperative and the context was friendly. The analyst received support from other management academics during the project. Although we still cannot cross out the possibility that another analyst could have succeeded, we have no reason to believe that the project was poorly managed, or that the participants were unreceptive, like in other unsuccessful projects (O'Keefe & Wright, 2010; Wright et al., 2008).

The next question we ask ourselves is: was the method chosen fit for the context of the intervention?

5.2. "Wrong Scenario Approach" Hypothesis

Even though it has evolved, the scenario planning approach lays its roots in the design and planning schools of strategy (Mintzberg, Ahlstrand, & Lampel, 1998), and supposes to some extent that the environment of the organisation and its relationships with it are to the least partly comprehensible, if not controllable. The choice of a structuralist-functionalist approach increased this perspective. *La Prospective* scholars emphasize the *rigor* of the method (Durance & Godet, 2010, p. 1490; Godet, 1986, p. 138), and how *systematic* the approach is (Godet, 1986, p. 145). Bradfield et al. describe *La Prospective* as "a more elaborate, complex and more mechanistic rather than an openly intuitive approach to scenarios development" (2005, p. 803). Mintzberg clearly places Godet's work in the continuity of the planning school of strategy (1994, pp. 140-141). There are two issues with this approach in our context:

- The approach supposes that structures can be identified and modelled, with structural analysis in particular. At the heart of the approach is the idea that "the system structure, i.e. the network of relationships between these elements, is essential to an understanding of its evolution, because this structure maintains a certain permanence" (Godet, 1986, p. 141)

- The approach is knowledge intensive and requires gathering "as many informed judgements as possible" (Durance & Godet, 2010, p. 1489) to identify the aforementioned structure.

La Prospective seems adequate when uncertain evolutions are possible in a system that can be represented as an intricate network of interacting factors. The analysts need to be able to identify a structure. In our case, we saw that the structure was far from clear. There are theories about customer choice in some markets, but we have no available theory to understand patients' choices of hospitals. Furthermore, in small organisations, one quickly interviews all relevant people, as previously noticed by Sørensen et al. (2004). A possibility would have been to turn to national experts, taking our hospital as one in many, and considering broad trends of hospital activity. Yet, this type of knowledge is available in the academic and grey literatures, and was not helpful in our case. What we missed was local knowledge, and fundamental knowledge on the (supposed) structure of the system.

Therefore, we conclude that the *La Prospective* approach was not well suited in our situation. The approach did not fit the context, as identified in another case by Bowman et al. (2013). The reasons were that local knowledge on the dynamics of the system was limited, and that it could not be palliated by more generic knowledge available from other sources. This is because of the size of the system and its limited resources for and familiarity with prospective thinking, and because of a more general lack of knowledge on the dynamics of patient trajectories.

This situation was not easy to foresee. Despite the enthusiasm of some authors for scenario planning in smaller organisations (Foster, 1993; Johnston et al., 2008), we could have anticipated that the approach was maybe too knowledge-intensive for a small organisation (Sørensen et al., 2004). It was more difficult to anticipate that there would not be available knowledge and industry-specific theory on the structure of the system at study.

We now have to go further and analyse if scenario planning as a whole was adequate in our situation. The question is, could another scenario planning approach have performed better in this situation?

5.3. "Scenario Planning Does Not Work In This Context" Hypothesis

The three schools in scenario planning take different perspectives on organisations, which are reflected in the type of data they use, the outcomes they produce and the general way interventions are managed

(Amer, Daim, & Jetter, 2013; Bradfield et al., 2005). We encountered challenges when trying to use *La Prospective*, and concluded that it was difficult to apply in a small organisation with limited local insights and knowledge on the structure of the system.

The PMT school seems even less adequate than *La Prospective* in our case. Indeed, PMT is very quantitative and data-driven, in a context where the available data is limited. Moreover, we already knew that extrapolations were dangerous in healthcare (Leggat, 2008), but in this case it was evidenced by the surprising evolution of the workload in the outpatient oncology unit.

The remaining option among was the intuitive-logics approach. This approach is less data-intensive, and more about group learning than prediction and control (Van der Heijden, 1996). It is usually based on workshops and favours group discussions and collective sense-making. *La Prospective* is a more expert-driven approach, with its software and computational aspects (Bradfield et al., 2005). Although with hindsight the intuitive-logics approach could appear more adequate for the context we worked in, changing the approach would not have instilled more knowledge in the group of participants. The difficulty in small organisations to gather knowledge about their environment is also reported by Sørensen et al. (2004). Therefore, we doubt that the results would have been more satisfactory in the definition of scenarios.

However, other interesting outcomes may have appeared. In the intuitive-logics school, the focus is more on the process than on the outcomes, i.e. more on the intervention and the participative discussions than on the scenarios themselves. This group learning process could have turned the scenario project into something different. Managed properly, when reaching the same question that blocked the present project, a more participative, process-oriented, workshop-based project could have switched from the question: "why do patients choose this hospital or its competitor?" to a more action-oriented question like "how can we attract more patients?" or "how can we make patients choose us over our competitors?" The project would not anymore be an information-processing endeavour, where knowledge is obtained from various sources, discussed and then processed to guide scenario building. Instead, the group could have acknowledged that some information was missing or inaccessible given the resources available. Then we could have turned this lack of information into a motivator to take a different, more action-

oriented perspective and focus on attracting patients rather than anticipating the future. The logic would then have been "given its complexity, change the system to understand it" rather than "understand the system before taking action" (Snowden & Boone, 2007). This requires from the external consultant to enhance his role as a facilitator and put less emphasis on his analyst skills.

6. Conclusion

In this article, we presented an unsuccessful scenario planning project in the cancer division of a French public academic hospital. Our analysis suggests that the issue at hand made it difficult to build scenarios with the existing methods. The project accumulated too many challenges, as we worked in a small organisation, with limited contextual local knowledge available, and no techno-structure that could perform the business intelligence function. Besides, the project tackled a situation where the evolution of the organisation's activity was not well-understood, neither locally nor in other similar systems. Our analysis suggested that this is a general feature of French public hospitals, which have little control over their interaction with potential patients. Therefore, the system was perceived as very unstructured and prevents structure-informed analysis. We conclude that the approach chosen, *La Prospective*, was not adequate. However, we also question the relevance of scenario planning as a whole in such context, if the expected outcome was purely a set of scenarios. The limited information available in the organisation and the relative unfamiliarity with prospective thinking would have made any knowledge-intensive intervention complicated. Other, more pragmatic and short-term interventions may have been more adequate to support the broader decision-making process.

Our results nuance claims on the benefits of scenario planning for health services (Austin et al., 2016a; Ghanem et al., 2015), suggesting that we should better specify what approaches are suitable, and how they should be applied, or develop new approaches altogether. When it comes to the specific issue of analysing patterns of activity in healthcare organisations, new developments in data analysis at the national or regional level could help overcome the issue we encountered. Process mining is not new in healthcare (Rojas, Munoz-Gama, Sepúlveda, & Capurro, 2016), but it has mainly been applied inside the perimeter of the hospital. However, some recent projects have applied these methods to analyse care pathways at the national level, e.g. (Prodel, Augusto, Xie, Jouaneton, & Lamarsalle, 2015, 2016). This

is a promising approach to understand local pathways, partnerships and referral patterns, as they exist *de facto*. This approach could help unveil the structures at play in the system, which is where we stopped. The idea is not to extrapolate from these past trends, but rather to identify relationships between certain aspects of the system, which would be the basis for future models.

Similarly, we met with challenges to develop scenarios in a small organisation that had not been fully described in the extant literature (Foster, 1993; Johnston et al., 2008). Our findings suggest that knowledge-intensive scenario planning approaches are challenging in small organisations, thus confirming observations made on other related methods (Sørensen et al., 2004).

From a broader perspective, this research contributes to the debate on fitness between scenario approaches and organisational context (Bowman et al., 2013). The conclusion is not that scenario approaches do not work, but their range of applicability is more limited than we once thought. This conclusion should, of course, be confirmed by replications of our intervention in hospitals and small organisations. We report a single case study, and more similar projects would help refine the understanding of the factors at play in this situation.

Yet, beyond this specific case, we need to acknowledge that like all interventions, scenario planning methods presumably have a range of applicability, which should be clearly explored and defined. This topic should receive more attention if we are to understand when and how to apply scenario planning methods, and offer proportionate and empirically justified recommendations to practitioners. An experimental approach, where organisations are purposefully sampled to analyse context-method fitness, could help us better understand what works in which circumstances (Holmström et al., 2009; Nielsen & Miraglia, 2017; Øvretveit, 2004). As the 'second paradigm of futures research' reaches maturity, with limited development of new methods (Kuosa, 2011; Masini, 1989), we need to interrogate its products, and to conduct more empirical evaluations on the range of applicability of the proposed methods.

References

Aitken, M., & Kleinrock, M. (2016). *Global Oncology Trend Report - A Review of 2015 and Outlook to 2020*. Retrieved from Parsippany, NJ, USA: https://morningconsult.com/wp-content/uploads/2016/06/IMS-Institute-Global-Oncology-Report-05.31.16.pdf

Amer, M., Daim, T. U., & Jetter, A. (2013). A review of scenario planning. *Futures, 46*, 23-40. doi:10.1016/j.futures.2012.10.003

Arcade, J., Godet, M., Meunier, F., & Roubelat, F. (2003). Structural Analysis with the MICMAC Method & Actors' Strategy with MACTOR Method. In J. C. Glenn & T. J. Gordon (Eds.), *Futures research methodology v2.0*. Washington, DC: American Council for the United Nations University.

Austin, J., Bentkover, J., & Chait, L. (2016a). Tools for Transformational Strategic Planning. In J. Austin, J. Bentkover, & L. Chait (Eds.), *Leading Strategic Change in an Era of Healthcare Transformation* (pp. 47-70). Cham, Switzerland: Springer International Publishing.

Austin, J., Bentkover, J., & Chait, L. (Eds.). (2016b). *Leading strategic change in an era of healthcare transformation*. Cham, Switzerland: Springer International Publishing.

Barton, M. B., Jacob, S., Shafiq, J., Wong, K., Thompson, S. R., Hanna, T. P., & Delaney, G. P. (2014). Estimating the demand for radiotherapy from the evidence: A review of changes from 2003 to 2012. *Radiotherapy and Oncology, 112*(1), 140-144. doi:10.1016/j.radonc.2014.03.024

Borras, J. M., Lievens, Y., Barton, M., Corral, J., Ferlay, J., Bray, F., & Grau, C. (2016). How many new cancer patients in Europe will require radiotherapy by 2025? An ESTRO-HERO analysis. *Radiotherapy and Oncology, 119*(1), 5-11. doi:10.1016/j.radonc.2016.02.016

Bowman, G., MacKay, R. B., Masrani, S., & McKiernan, P. (2013). Storytelling and the scenario process: Understanding success and failure. *Technological Forecasting and Social Change, 80*(4), 735-748. doi:10.1016/j.techfore.2012.04.009

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*(8), 795-812. doi:10.1016/j.futures.2005.01.003

Charlesworth, A., & Cooper, Z. (2011). Making competition work in the English NHS: The case for maintaining regulated prices. *Journal of Health Services Research & Policy, 16*(4), 193-194. doi:10.1258/jhsrp.2011.011038

Checkland, P., & Scholes, J. (1990). *Soft systems methodology in action*. Chichester: Wiley.

Chermack, T. J. (2005). Studying scenario planning: Theory, research suggestions, and hypotheses. *Technological Forecasting and Social Change, 72*(1), 59-73. doi:10.1016/j.techfore.2003.11.003

Chermack, T. J. (2011). *Scenario planning in organizations: how to create, use, and assess scenarios*. San Francisco, CA: Berrett-Koehler.

Cole, S. (2008). The Zeitgeist of Futures? *Futures, 40*(10), 894-902. doi:10.1016/j.futures.2008.07.043

Durance, P., & Godet, M. (2010). Scenario building: Uses and abuses. *Technological Forecasting and Social Change, 77*(9), 1488-1492. doi:10.1016/j.techfore.2010.06.007

Ejaz, A., Spolverato, G., Bridges, J. F., Amini, N., Kim, Y., & Pawlik, T. M. (2014). Choosing a Cancer Surgeon: Analyzing Factors in Patient Decision Making Using a Best–Worst Scaling Methodology. *Annals of Surgical Oncology, 21*(12), 3732-3738. doi:10.1245/s10434-014-3819-y

Enzmann, D. R., Beauchamp, N. J., & Norbash, A. (2011). Scenario planning. *Journal of the American College of Radiology, 8*(3), 175-179. doi:10.1016/j.jacr.2010.08.022

Fanelli, D. (2012). Negative results are disappearing from most disciplines and countries. *Scientometrics, 90*(3), 891-904. doi:10.1007/s11192-011-0494-7

Foster, M. J. (1993). Scenario planning for small businesses. *Long Range Planning, 26*(1), 123-129. doi:10.1016/0024-6301(93)90240-G

Ghanem, M., Schnoor, J., Heyde, C.-E., Kuwatsch, S., Bohn, M., & Josten, C. (2015). Management strategies in hospitals: scenario planning. *GMS Interdisciplinary Plastic and Reconstructive Surgery, 4*(Doc06). doi:10.3205/iprs000065

Gille, L., & Houy, T. (2013). Forecast of the supply of healthcare in France. *Futures, 51*, 50-58. doi:10.1016/j.futures.2013.06.003

Gille, L., & Houy, T. (2014). The future of health care demand in developed countries: From the "right to treatment" to the "duty to stay healthy". *Futures, 61*, 23-32. doi:10.1016/j.futures.2014.04.013

Godet, M. (1986). Introduction to la prospective. *Futures, 18*(2), 134-157. doi:10.1016/0016-3287(86)90094-7

Godet, M. (2000). The Art of Scenarios and Strategic Planning: Tools and Pitfalls. *Technological Forecasting and Social Change, 65*(1), 3-22. doi:10.1016/S0040-1625(99)00120-1

Godet, M. (2006). *Creating futures: scenario planning as a strategic management tool* (2nd ed.). London: Economica.

Godet, M. (2007a). *Manuel de prospective stratégique - Tome 1 : Une indiscipline intellectuelle* (3rd ed.). Paris, France: Dunod.

Godet, M. (2007b). *Manuel de prospective stratégique - Tome 2 : L'Art et la méthode* (3rd ed.). Paris, France: Dunod.

Harries, C. (2003). Correspondence to what? Coherence to what? What is good scenario-based decision making? *Technological Forecasting and Social Change, 70*(8), 797-817. doi:10.1016/S0040-1625(03)00023-4

Harris, K. M. (2003). How Do Patients Choose Physicians? Evidence from a National Survey of Enrollees in Employment-Related Health Plans. *Health Services Research, 38*(2), 711-732. doi:10.1111/1475-6773.00141

Holmström, J., Ketokivi, M., & Hameri, A.-P. (2009). Bridging Practice and Theory: A Design Science Approach. *Decision Sciences, 40*(1), 65-87. doi:10.1111/j.1540-5915.2008.00221.x

Hutchinson, R. A., Witte, K. W., & Vogel, D. P. (1989). Development and implementation of a strategic-planning process at a university hospital. *American Journal of Hospital Pharmacy, 46*(5), 952-957.

INCa. (2015). *Les cancers en France en 2014 - L'essentiel des faits et chiffres*. Retrieved from Paris:

INSEE. (2011). Insee - Population - Projections départementales et régionales de population à horizon 2040 - Projections départementales et régionales de population à l'horizon 2040.

InVS. (2015, 2015/06/10/). Données départementales par type de cancer. *Santé publique France.* Retrieved from http://invs.santepubliquefrance.fr/Dossiers-thematiques/Maladies-chroniques-et-traumatismes/Cancers/Surveillance-epidemiologique-des-cancers/Estimations-de-l-incidence-de-la-mortalite-et-de-la-survie/Estimations-de-l-incidence-regionale-et-departementale-des-cancers-en-France-metropolitaine-2008-2010/Donnees/Donnees-departementales-par-type-de-cancer

Jackson, M. C. (2003). *Systems thinking: creative holism for managers*. Chichester; Hoboken, NJ: John Wiley & Sons.

Jackson, M. C. (2006). Creative holism: a critical systems approach to complex problem situations. *Systems Research and Behavioral Science, 23*(5), 647-657. doi:10.1002/sres.799

Johnston, M., Gilmore, A., & Carson, D. (2008). Dealing with environmental uncertainty: The value of scenario planning for small to medium-sized entreprises (SMEs). *European Journal of Marketing, 42*(11/12), 1170-1178. doi:10.1108/03090560810903628

Kannampallil, T. G., Schauer, G. F., Cohen, T., & Patel, V. L. (2011). Considering complexity in healthcare systems. *Journal of Biomedical Informatics, 44*(6), 943-947. doi:10.1016/j.jbi.2011.06.006

Ketelaar, N. A. B. M., Faber, M. J., Elwyn, G., Westert, G. P., & Braspenning, J. C. (2014). Comparative performance information plays no role in the referral behaviour of GPs. *BMC Family Practice, 15*(1). doi:10.1186/1471-2296-15-146

Kuosa, T. (2011). Evolution of futures studies. *Futures, 43*(3), 327-336. doi:10.1016/j.futures.2010.04.001

Lamé, G., Jouini, O., & Stal-Le Cardinal, J. (2016). Outpatient chemotherapy planning: A literature review with insights from a case study. *IIE Transactions on Healthcare Systems Engineering, 6*(3), 127-139. doi:10.1080/19488300.2016.1189469

Leggat, S. G. (2008). Hospital Planning: The Risks of Basing the Future on Past Data. *Health Information Management Journal, 37*(3), 6-14. doi:10.1177/183335830803700302

Lu, L. Y. Y., Hsieh, C.-H., & Liu, J. S. (2016). Development trajectory and research themes of foresight. *Technological Forecasting and Social Change, 112*, 347-356. doi:10.1016/j.techfore.2016.07.040

Mannermaa, M. (1991). In search of an evolutionary paradigm for futures research. *Futures, 23*(4), 349-372. doi:10.1016/0016-3287(91)90111-E

Marshall, M. (2014). Researchers-in-Residence: a solution to the challenge of evidence-informed improvement? *Primary Health Care Research & Development, 15*(04), 337-338. doi:10.1017/S1463423614000310

Masini, E. B. (1989). The future of futures studies: A European view. *Futures, 21*(2), 152-160. doi:10.1016/0016-3287(89)90003-7

Mintzberg, H. (1994). *The rise and fall of strategic planning*. Hemel Hempstead: Prentice Hall International (UK) Limited.

Mintzberg, H., Ahlstrand, B. W., & Lampel, J. (1998). *Strategy safari: a guided tour through the wilds of strategic management*. New York, NY: Free Press.

Moyer, K. (1996). Scenario planning at British Airways—A case study. *Long Range Planning, 29*(2), 172-181. doi:10.1016/0024-6301(96)00005-2

Neiner, J. A., Howze, E. H., & Greaney, M. L. (2004). Using scenario planning in public health: anticipating alternative futures. *Health Promot Pract, 5*. doi:10.1177/1524839903257692

Nielsen, G. A. (1996). Preparing for change: strategic foresight scenarios. *Radiology Management, 18*(2), 43-47.

Nielsen, K., & Miraglia, M. (2017). What works for whom in which circumstances? On the need to move beyond the 'what works?' question in organizational intervention research. *Human Relations, 70*(1), 40-62. doi:10.1177/0018726716670226

O'Keefe, M., & Wright, G. (2010). Non-receptive organizational contexts and scenario planning interventions: A demonstration of inertia in the strategic decision-making of a CEO, despite strong pressure for a change. *Futures, 42*(1), 26-41. doi:10.1016/j.futures.2009.08.004

Øvretveit, J. (2004). A Framework for Quality Improvement Translation: Understanding the Conditionality of Interventions. *The Joint Commission Journal on Quality and Safety, 30*, 15-24. doi:10.1016/S1549-3741(04)30105-X

Peterson Garry, D., Cumming Graeme, S., & Carpenter Stephen, R. (2003). Scenario Planning: a Tool for Conservation in an Uncertain World. *Conservation Biology, 17*(2), 358-366. doi:10.1046/j.1523-1739.2003.01491.x

Plsek, P. E., & Greenhalgh, T. (2001). The challenge of complexity in health care. *BMJ, 323*(7313), 625-628. doi:10.1136/bmj.323.7313.625

Plsek, P. E., & Wilson, T. (2001). Complexity, leadership, and management in healthcare organisations. *BMJ, 323*(7315), 746-749. doi:10.1136/bmj.323.7315.746

Prodel, M., Augusto, V., Xie, X., Jouaneton, B., & Lamarsalle, L. (2015). *Discovery of patient pathways from a national hospital database using process mining and integer linear programming.* Paper presented at the International Conference on Automation Science and Engineering (CASE).

Prodel, M., Augusto, V., Xie, X., Jouaneton, B., & Lamarsalle, L. (2016, 2016/12/). *Evaluation of discovered clinical pathways using process mining and joint agent-based discrete-event simulation.* Paper presented at the Winter Simulation Conference 2016.

Rojas, E., Munoz-Gama, J., Sepúlveda, M., & Capurro, D. (2016). Process mining in healthcare: A literature review. *Journal of Biomedical Informatics, 61*, 224-236. doi:10.1016/j.jbi.2016.04.007

Sardar, Z. (2010). The Namesake: Futures; futures studies; futurology; futuristic; foresight—What's in a name? *Futures, 42*(3), 177-184. doi:10.1016/j.futures.2009.11.001

Schoemaker, P. J. H. (1995). Scenario planning: a tool for strategic thinking. *Sloan Management Review, 36*(2), 25.

Snowden, D. J., & Boone, M. E. (2007). A leader's framework for decision making. *Harvard Business Review, 85*(11), 68-76, 149.

Sørensen, L., Vidal, R. V. V., & Engström, E. (2004). Using soft OR in a small company—The case of Kirby. *European Journal of Operational Research, 152*(3), 555-570. doi:10.1016/S0377-2217(03)00057-2

Tako, A. A., & Robinson, S. (2014). Is simulation in health different? *Journal of the Operational Research Society, 66*(4), 602-614. doi:10.1057/jors.2014.25

Tapinos, E. (2013). Scenario planning at business unit level. *Futures, 47*, 17-27. doi:10.1016/j.futures.2012.11.009

Tien, J. M., & Goldschmidt-Clermont, P. J. (2009). Healthcare: A complex service system. *Journal of Systems Science and Systems Engineering, 18*(3), 257-282. doi:10.1007/s11518-009-5108-z

Tsang, E. W. K., & Kwan, K.-m. (1999). Replication and Theory Development in Organizational Science: A Critical Realist Perspective. *Academy of Management Review, 24*(4), 759-780. doi:10.5465/amr.1999.2553252

Unicancer. (2013). *Quelle prise en charge des cancers en 2020 ? De la chirurgie ambulatoire aux soins de support : les six tendances les plus structurantes pour la prise en charge des patients atteints d'un cancer à horizon 2020*. Retrieved from Paris, France: http://www.unicancer.fr/sites/default/files/DP_UNICANCER_6_tendances_prise_en_charge_cancers_2020.pdf

Van der Heijden, K. (1996). *Scenarios: the art of strategic conversation*. Chichester: John Wiley & Sons.

Van Reedt Dortland, M., Voordijk, H., & Dewulf, G. (2014). Making sense of future uncertainties using real options and scenario planning. *Futures, 55*, 15-31. doi:10.1016/j.futures.2013.12.004

Varum, C. A., & Melo, C. (2010). Directions in scenario planning literature – A review of the past decades. *Futures, 42*(4), 355-369. doi:10.1016/j.futures.2009.11.021

Venable, J. M., Ma, Q. L., Ginter, P. M., & Duncan, W. J. (1993). The use of scenario analysis in local public health departments: alternative futures for strategic planning. *Public Health Reports, 108*.

Victoor, A., Delnoij, D. M. J., Friele, R. D., & Rademakers, J. J. (2012). Determinants of patient choice of healthcare providers: a scoping review. *BMC Health Services Research, 12*(1). doi:10.1186/1472-6963-12-272

Vollmar, H. C., Ostermann, T., & Redaèlli, M. (2015). Using the scenario method in the context of health and health care – a scoping review. *BMC Medical Research Methodology, 15*(1). doi:10.1186/s12874-015-0083-1

Wack, P. (1985a). Scenarios: shooting the rapids. How medium-term analysis illuminated the power of scenarios for shell management. *Harvard Business Review, 63*(6), 139-150.

Wack, P. (1985b). Scenarios: Uncharted Waters Ahead. *Harvard Business Review, 63*(5), 72-89.

Wilson, C. T. (2007). Choosing Where to Have Major Surgery: Who Makes the Decision? *Archives of Surgery, 142*(3), 242. doi:10.1001/archsurg.142.3.242

Wong, H. J., Morra, D., Wu, R. C., Caesar, M., & Abrams, H. (2012). Using system dynamics principles for conceptual modelling of publicly funded hospitals. *Journal of the Operational Research Society, 63*(1), 79-88. doi:10.1057/jors.2010.164

World Bank. (2017, 2017/01/03/). World Bank Open Data. *data.WorldBank.org*. Retrieved from http://data.worldbank.org/

Wright, G., & Cairns, G. (2011). *Scenario thinking : practical approaches to the future*. Basingstoke: Palgrave Macmillan.

Wright, G., van der Heijden, K., Burt, G., Bradfield, R., & Cairns, G. (2008). Scenario planning interventions in organizations: an analysis of the causes of success and failure. *Futures, 40*, 218-236. doi:10.1016/j.futures.2007.08.019

Yahanda, A. T., Lafaro, K. J., Spolverato, G., & Pawlik, T. M. (2016). A Systematic Review of the Factors that Patients Use to Choose their Surgeon. *World Journal of Surgery, 40*(1), 45-55. doi:10.1007/s00268-015-3246-7

Zentner, R. D. (1991). Scenarios: a planning tool for health care organizations. *Hospital & Health Services Administration, 36*.