The Leadership Game – Experiencing Dynamic Complexity under Deep Uncertainty

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Abstract

In this ever more complex, interconnected, and uncertain world, leadership is needed more than ever. But the literature and most leaders largely ignore dynamic complexity and deep uncertainty: only futures characterized by ever faster change, ever more (required) flexibility, and ever more scarcity (especially in terms of highly qualified human resources) are taken into account. Plausible consequences of dynamic complexities and deep uncertainties are ignored and robustness of strategies for dealing with many different futures is hardly ever considered. But what if this future does not materialize? This paper describes a System Dynamics-based leadership flight simulator and the experiential serious gaming workshop it was tailor-made for. During the first part of the workshop, participants play the part of the leader of an organization but in rather different virtual worlds (scenarios) in order to experience the impact of long-term dynamic complexity and deep uncertainty on leadership, as well as the influence of leadership on the success of their virtual organization. After having experienced the role and effect of different leadership styles/strategies in different virtual worlds, participants dialogue/brainstorm in a bounce-casting session about strategies and actions to build robust leadership capabilities for an uncertain complex world.

Keywords: Leadership, System Dynamics, Serious Gaming, Uncertainty

1 Introduction

The broader concept of leadership –beyond the strict interpretation of 'behavior of leaders'– includes aspects of inter-personal relations, social influence processes, relationship between leader and team, environmental factors surrounding the team, relationships between teams, and perceptions of the organizational climate. Here, leadership is considered at a higher level –at the organizational/collective level as opposed to the individual leader– and over time. Hence, this paper focuses on building of future organizational leadership capabilities.

In this ever more complex, interconnected, and uncertain world, genuine leadership is needed more than ever. But the literature on leadership and most leaders largely ignore dynamic complexity and deep uncertainty: only a gradual continuation of recent trends or a future characterized by ever faster change, ever more (required) flexibility, and ever more scarcity (especially in terms of highly qualified human resources) are taken into account. Plausible consequences of dynamic complexities and deep uncertainties are ignored and robustness of strategies for dealing with many different futures is hardly ever considered. But what if this future does not materialize?

This paper describes a System Dynamics-based leadership flight simulator and the experiential serious gaming workshop it was tailor-made for. During the first part of the workshop, participants play the part of the leader of an organization but in rather different virtual worlds (by means of

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exogenous scenarios) in order to experience the impact of long-term dynamic complexity and deep uncertainty on leadership, as well as the influence of leadership on the success of their virtual organization. After having experienced the role and effect of different leadership styles/strategies in different virtual worlds, participants dialogue/brainstorm in a bounce-casting session about strategies and actions to build robust leadership capabilities for an uncertain complex world.

An overview of factors that influenced leadership in the past 25 years (and that might continue to influence leadership in the coming 25 years) from (Segers 2011) is provided in section 2. Serious gaming is briefly introduced in section 3. The leadership simulation model is presented in section 4, the set-up of the gaming session in section 5, and some results in section 6. Concluding remarks are made in section 7.

2 Factors that influenced leadership in the last 25 years (and that might continue to influence leadership in the next 25 years)

Segers (2011, p) describes the evolution of factors that influenced leadership in the last 25 years. The first eight paragraphs of this section are mainly based on his overview.

Since the 1950s communication and information transmission costs have declined precipitously, while multilateral trade agreements have reduced import and export barriers. In addition, in the early 1970s the introduction of the flexible exchange rates increased capital mobility, which all lead to increases in globalization. In addition, the increased use of technology and its rapid advancement (Karoly and Paris 2004) ties stakeholders more closely together as a result of Reed's law (Reed 2001; Rheingold 2002).

As a response to this increasing global and complex business world, employers and governments have focused on more flexible and adaptive work structures and policies as a response (Guest 1987; Legge 1995; Wilthagen 1998). This flexibility should allow them to more easily explore the future. At the same time, however, organizations also want to exploit the present by remaining (cost)-efficient (cf. ambidextrous organizations, (O'Reilly and Tushman 2004)).

Greenan, Kalugina, and Walkowiak (2007, p6) observed a clear increase in the EU-15 countries between 1996 and 2004: 'business functions that are increasingly performed within specialized service sectors. Evidence has been found of a shift of specific business functions from sectors in which they are 'peripheral' to the production process, towards sectors in which they constitute the core activity. The most obvious example of this trend has been found in IT services and logistics, but this shift can be observed also in marketing and sales, and legal and financial services'.

The above has resulted in more numerical flexibility (cf. (Atkinson 1984)) between 1995 and 2005 in the EU-15 countries (Birindelli and Rustichelli 2007) such as temporary work (32,1% increase vs. 11,4% employment growth), shift work (46% increase), and part-time work (41,9% increase vs. 5,4% increase in full-time employment). In addition, companies are requesting more functional flexibility (cf. (Atkinson 1984)) of core employees, meaning that they can be redeployed to other tasks and activities within the same organization. Hence, career flexibility defined as switching between occupations (e.g. a professional becomes a manager) or industries has been shown to be high in Europe. In Belgium for example 55.9% of the workforce changed occupation between 1997 and 2005 and in the UK approximately 40% switched industry. The majority (59.1% to 74.2%) of these career changes in Europe are career changes at the same level (Byrin and Longhi 2007).

As a result of these changes traditional job security, defined as high job tenure in relation to a specific job, has been undermined. Hence, Rousseau (1990) argued that the 'old' psychological contract –in which job security is exchanged for loyalty– has been under pressure. Kanter (1989) therefore concluded that employees should be employable in order to have some form of security in the current labor market. Although no consistent definition of employability has been provided so far (Rothwell and Arnold 2007), essentially 'employees have to acquire the knowledge, skills, abilities and other characteristics valued by the current and prospective employers'

(Fugate, Kinicki, and Asforth 2004, p15) in order to be able 'to make labor market transitions' (De Cuyper, Bernhard-Oettel, Berntson, De Witte, and Alarco 2008, p.490).

Between 1991 and 2005 work has become more intense in the EU-15. This intensification is mainly market-driven: 'the pace of work is more and more dependent on the direct demands of customers and clients. In contrast, technical constraints, those linked to automatic speed of a machine or numerical production targets, haven't changed significantly. The percentage of European workers whose job involves working at very high speed and to tight deadlines has slightly increased (from 56% to 58% and from 54% to 57% respectively)' (European Foundation 2007) (Greenan, Kalugina, and Walkowiak 2007, p8). Nevertheless, the percentage of people regularly using computers at work has increased significantly, from 31% to 47% in 15 years (1991-2005) (European Foundation, 2007). Instead of technology reducing work/family conflict, the use of technology may have increased an individual's stress as the boundaries between work and nonwork become more blurred. People may feel like they are always 'on call', even during vacations, holidays, and weekends (Boswell and Olson-Buchanan 2007). On the other hand, although it took a long time to solve Robert Solow's paradox ('You can see the computer age everywhere but in the productivity statistics' (Solow 1987, p36) a very strong productivity growth as a result of the adoption of various information technologies (Karoly and Paris 2004) is observed from 1995 on.

In many European and other developed countries entire workforces are ageing (e.g. (Taylor 2006) (Kinsella and D. 2005)), and shrinking (OECD, 1998, 2000). In member states of the European Union an average increase of 12% in the proportion of the 50-59 age group has been predicted over the next 10 years (Taylor 2006). Although the increase of migration slows down this process, migration makes the workforce more ethnically diverse (International Labour Organization 2009; United Nations, Department of Economic and Social Affairs, Population Division 2009). This diversity is also reflected in a steady increase of women in the workforce since the 1970s, and between 1995 and 2005 it was observed that women are slowly moving into managerial roles (European Foundation 2007). On the other hand, since the beginning of the 1990s, a high proportion of workers in Europe feel overqualified for the work they do. This is especially high amongst people with fixed-term contracts or in casual work (Byrin and Longhi 2007).

Developing countries lose 10 to 30 per cent of skilled workers and professionals through 'brain drain' (International Labour Organization 2009). There is an increase in ethics-related regulation (Van der Heijden and Bochah 2006).

The changes described above already lead to significant changes in leadership requirements.

(Luthans, Luthans, and Luthans 2004) point out that 'business academics and practitioners have operated in the belief that sustained competitive advantage could accrue from a variety of industry level entry barriers, such as technological supremacy, patent protections, and government regulations' but that the changes described above 'have eroded these widely recognized barriers'. This implies that the traditional focus on economic capital (i.e. financial and tangible assets) is no longer sufficient, and that 'in today's environment, which requires flexibility, innovation, and speed-to-market, effectively developing and managing employees' knowledge, experiences, skills, and expertise-collectively defined as 'human capital'-has become a key success factor for sustained organizational performance' (Luthans, Luthans, and Luthans 2004). Harter, Schmidt, and Hayes (2002) among others, revealed that when the human capital in an organization is engaged and aligned with the corporate strategy, the performance of the organization increases. Clearly, such finding is in line with the resource-based theory of the firm (Barney 1991) that stipulates that human capital can be valuable, rare, and difficult to replicate - and therefore can create a sustained competitive advantage for a company.

Next to managing and developing the human capital of organization, organization should also focus on another, but more intangible capital: social capital. Social capital refers to resources of trust, relationships, and contact networks (Luthans, Luthans, and Luthans 2004). Stated differently, human capital is about *what you know*, while social capital is about *who you know*. Adler (2002) review demonstrates that social capital has a positive impact positive impact on or-

ganizational areas, such as inter-unit resource exchange, intercompany learning. entrepreneurship, regional production networks, and supplier relations, and on HR areas, such as career success, job search help, turnover, and executive compensation. Hence, it seems vital to invest not only in human capital, but also in social capital today in order to create a sustained competitive advantage today.

Recently, however, Luthans, Luthans, and Luthans (2004) added a fourth type of capital organization should manage and develop in order to gain a sustained competitive advantage in an uncertain environment: psychological capital. In essence, psychological capital is about 'who you are'. Psychological capital exist out of four constructs hope, optimism, self-efficacy and resiliency and is commonly referred to as PsyCap (Luthans, Avolio, Avey, and Norman 2007), (Luthans, Norman, Avolio, and Avey 2008) and has been shown to individual performance and satisfaction (Luthans, Avolio, Avey, and Norman 2007).

Interesting to note, is that individuals who have a lot of PsyCap are argued to be authentic leaders, something Jensen and Luthans have demonstrated. More specifically authentic leaders are 'those who are deeply aware of how they think and behave and are perceived by others as being aware of their own and others'values/moral perspectives, knowledge, and strengths; aware of the context in which they operate; and who are confident, hopeful, optimistic, resilient, and of high moral character' (Avolio, Luthans, and Walumbwa 2004).

On the organization level, authentic leadership is defined by Luthans and Avolio (2003) as 'a process that draws from both positive psychological capacities and a highly developed organizational context, which results in both greater self-awareness and self-regulated positive behaviors on the part of leaders and associates, fostering positive self-development'. We have chosen to incorporate this model as it is at the root of all other forms of positive forms of leadership: e.g. transformational leadership theory, behavioral and self-concept theory of charismatic leadership, servant leadership theory, spiritual leadership theory,... (Avolio and Gardner 2005).

But what about future leadership requirements? Could the trends described above be extrapolated? What about the consequences of combined trends? And what if the underlying dynamics is too complicated for simple linear extrapolations to be useful? At a closer look, it seems like the underlying dynamics are indeed much more complex and uncertain for trend extrapolation to be justified. Dynamic complexity and uncertainties should therefore be taken into account. But in order to do that, leaders and managers first need to see the need and feel the urgency for doing so from today on. This could be accomplished through experiential serious gaming.

3 Experiential serious gaming

3.1 Interactive Games and Flight Simulators

Interactive games (Duke 1974) (Greenblatt and Duke 1975) are 'serious' games, in which real people (inter)act. They could –among other uses– be used for experimental, validation, training, experiential learning purposes (see Table 1). They enable experiments in which human (inter)action processes can be observed in a (semi-)controlled environment, by means of which hypotheses could be tested, conclusions could be extended, models could be validated. Such games could also be used –apart from aforementioned traditional 'scientific uses'– for experience-based learning under deep uncertainty.

In all cases, real people assume the role of key stakeholders and (public) policy makers. Players have to make the kind of decisions that the corresponding real world actors have to make in reality, thus simulating human (inter)actions and (strategic) behavior.

In *model-supported* interactive games, computer models are used to add real world complexity, perform detailed calculations, generate and display specific information, and deduct the overall system behavior resulting from actor (inter)actions. These models also keep track of decisions made by the players, and hence, could be used to compare the actual behavior of many players, also with 'optimized' and/or 'simulated' behavior. The computer models used in this research are (exploratory and experiential) System Dynamics simulation models. System Dynamics model-

	Multi-Actor games (people & process)	Multi-Actor-Systems games	Systems games (system/issue)
games to experiment and test hypotheses			
games to calibrate and validate (simulation) model(s)			x
games to explore possible (inter)/(re)actions		x	x
games to experience and open up minds and dialogues		x	Leadership FS
games to foster learning and generic understanding			x
games to foster learning and specific understanding			
games to train skills and sharpen intuitions/reactions			
games to assess and evaluate people (e.g. hiring)			x
games for team-building and fun			

Table 1: Location of the current Leadership Flight Simulator and possible extensions in a classification of types of model-based games in terms of the main goal/aim and Multi-Actor-Systems characteristics

supported board games are not new: well-known examples include the Beer Game, Fish Banks, and Strategem. However, many of these traditional games are games to foster learning and generic understanding (5) and therefore always generate the same outcomes (e.g. the depletion of a common resource), insights and conclusions. They are not focused on (deep) uncertainty – quite the opposite.

Flight simulators –also called learning environments or microworlds– are interactive decision-making computer games, based on computer models, that are mostly used to 'enable [users] to pre-experience the changed environment, preparing them better to face the transients of the change implementation and the challenges of managing the post-change situation' (Winch 1998, p354)[1], hence, for specific learning purposes (6). In these flight simulators, players need to take decisions at certain moments during the model run, the consequences of which are then calculated by means of the model. Flight simulators are mostly built for a single player or team: the computer interactively generates the behavior of the other actors. Flight Simulators built on top of SD simulation models are not new either. Relatively new are internet based single player and multi-player model-supported flight simulators (see for example `www.forio.com`).

3.2 Uncertainty-focused Games and Flight Simulators

Although uncertainty, and asymmetric/partial/private information ought to be important ingredients in all interactive games and flight simulators, they are mostly ignored or reduced. Depending on the game, different uncertainties could be included: consumer or market uncertainties, resource uncertainties, technological uncertainties, competitive uncertainties, supplier uncertainty, policy uncertainties, etc. Players should also only receive *partial* information that would also be available to them in the real system. At most, bounded rationality should therefore be assumed. Players (inter)act based on partial information available to them, as well as upon their beliefs, motivations, and perceptions of the situation. These beliefs, motivations, and perceptions cannot be controlled, and only steered to a certain extent: specific situations could be created in these games, and beliefs, motivations, and perceptions could be asked for and monitored at every step.

Exploratory games and experiential games do not need to be fully controlled/controllable. These experiential sessions and games are designed specifically to allow the participants to experience the importance of uncertainty and of taking uncertainty into account in policy/decision making.

4 The Leadership Model and Flight Simulator

The leadership model (see Figure 1) and flight simulator (see Figure 2) were tailor-made for a gaming workshop with 20 CEOs and senior managers to pull managers out of their predictive

[1]See also (Kim and Senge 1994; Groessler, Miller, and Winch 2004; Langley and Morecroft 2004).

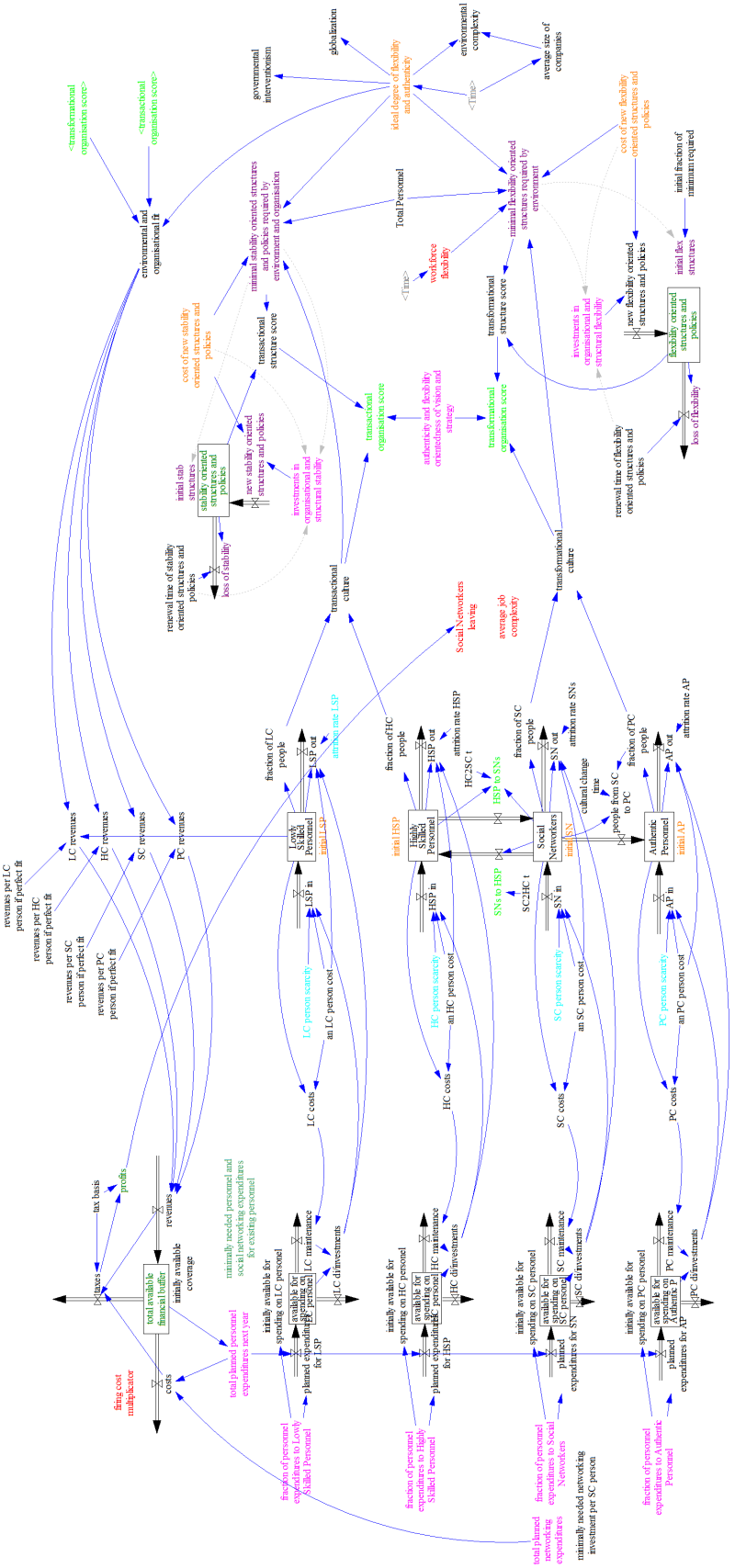


Figure 1: Stock-flow structure of the Leadership simulation model (all but the main links are hidden)

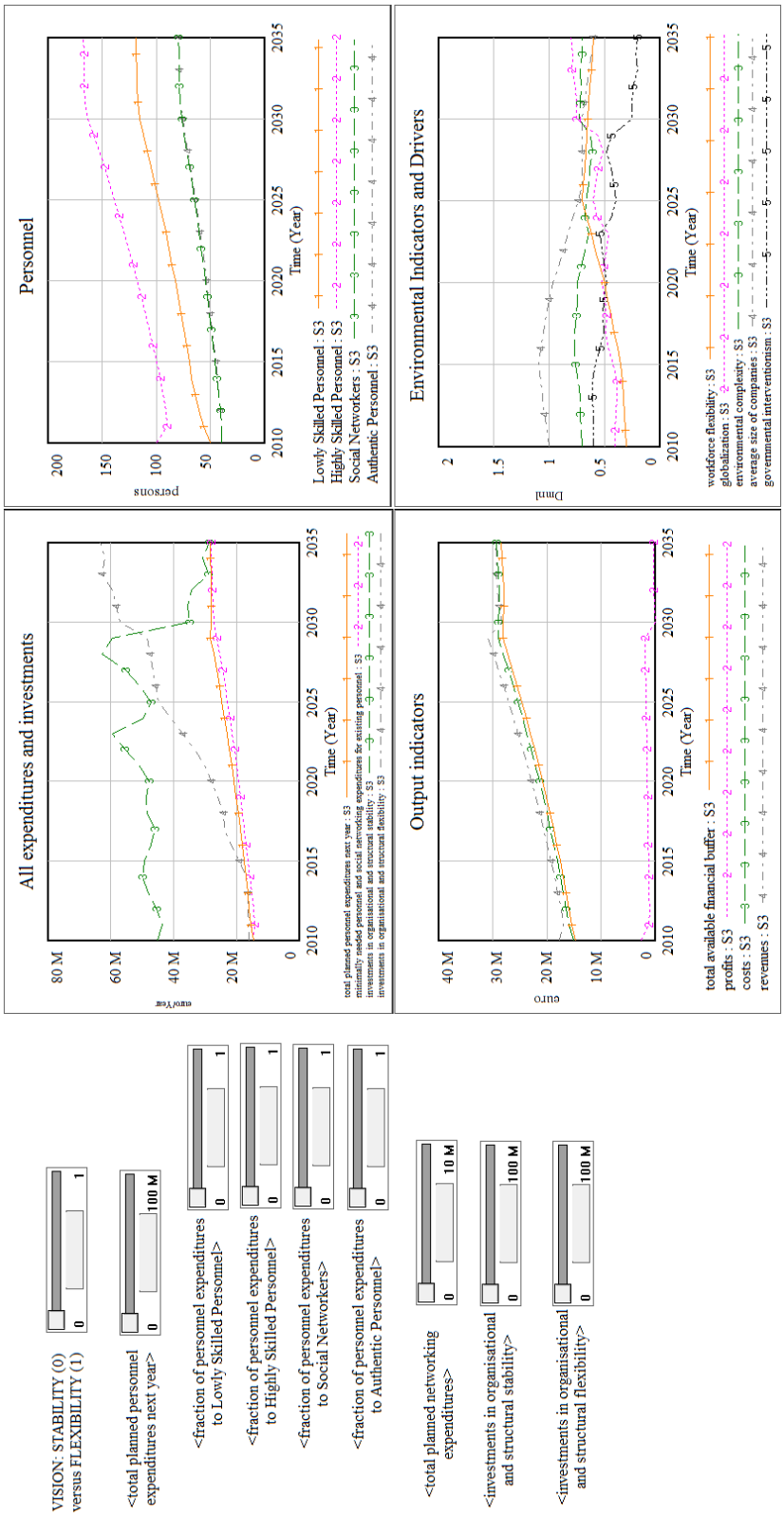


Figure 2: Interface of the Leadership Game

modes and to help them broaden their perspectives on the uncertain(ty of the) future.

The model is built based on the extension of the concept of capital for competitive advantage. Traditional *economic capital* relates to financial capital, materials, patents, data, et cetera – in other words: to what you have. *Human capital* relates to the people, their skills, knowledge, ideas, et cetera – in other words: to what you know/can do. *Social capital* relates to relationships, networks, et cetera – in other words: to whom you know. And *positive psychological capital* relates to self-esteem, optimism, resilience, hope, self-awareness, et cetera – in other words: to who you are.

Lowly skilled/educated people and highly skilled/educated people are human capital. Highly educated people with networking skills and extended networks are social capital. And authentic personal leaders are positive psychological capital.

The model contains explicit stock-flow structures for lowly skilled personnel, highly skilled personnel, social networkers[2], and authentic personnel[3]. These categories could be hired and fired, but some categories are so scarce (i.e. authentic personnel) that it takes time and resources to hire (just a fraction of) them. Mobility between these groups –except the lowly skilled– is concluded: part of the highly skilled employees (could) become social networkers, but social networkers fall back to 'just' highly skilled personnel if insufficient recurrent resources (money and time) are invested in their networking skills and networks, and only social networkers (could) possibly become authentic personnel. Once authentic, always authentic. These different groups are characterized by different degrees of scarcity and attrition rates.

Six decision variables capture all HR decisions: (1) the total planned personnel expenditures for next year, (2) the fraction of next year's personnel expenditures spent on lowly skilled personnel, (3) the fraction of next year's personnel expenditures spent on highly skilled personnel, (4) the fraction of next year's personnel expenditures spent on social networkers, (5) the fraction of next year's personnel expenditures spent on social networking activities and networkers, (6) the total planned networking expenditures (which are necessary to breed and keep social networkers, else they leave or regress into highly skilled personnel). These decisions are budget decisions (i.e. future allocations): it therefore mostly takes one year or more for decisions to take effect (and in some cases, they may not even lead to the desired results).

The degree of transformational culture of the organization corresponds to the sum of the fraction of authentic personnel and the fraction of social networkers. The degree of transactional culture of the organization corresponds to the fraction of lowly skilled and highly skilled people.

Decisions also need to be made about *investments in organizational and structural stability* and *investments in organizational and structural flexibility*, and about the *authenticity and flexibility orientedness of vision and strategy* (the vision).

The '*transformational structure score*' then equals the minimum of the *transformational culture* score, the *transformational structure score*, and the *authenticity and flexibility orientedness of vision and strategy*. And the '*transactional organization score*' equals the minimum of the *transactional culture* score, the *transactional structure score* and the complement of the *authenticity and flexibility orientedness of vision and strategy*. In other words, the weakest link (i.e. vision, personnel, or policies and structures) determines the strength of the chain (leadership and outcomes of the strategy).

But vision, composition of personnel, and policies and structures also need to match the environment – driven by the exogenous lookup variable *ideal degree of flexibility and authenticity*. This environmental and organizational fit determines the revenues earned per employee. And the total available financial buffer cumulates the bottom line (revenues minus costs minus taxes).

This model is –in spite of the fact that the model leadership does not feature once in the model–

[2]Social Networkers are –in this model– highly skilled employees with actively developed networking skills and networks, who are allowed to spend part of their time on networking activities. If insufficient resources are made available to support their networking activities, then they leave the organization or lose their networks and skills.

[3]Authentic employees are highly skilled employees who are intrinsically motivated and are almost naturally talented social networkers with an intrinsic authentic ethos and ethic. Attrition rates of authentic employees are much lower than those of other social networkers.

a leadership model because it is centered around three important decisions related to leadership and building organizational leadership capabilities: vision, workforce (composition and size), and (institutional) policies and (work) structures.

Although the model the flight simulator is built on is overly simplistic, it can be used to simulate different 'leadership strategies':

- transactional leadership: a vision focused on transactions and stability, HR focussed on lowly and highly skilled personnel, and implementation of stability oriented policies and structures;
- transformational leadership: a vision focussed on authenticity and flexibility, HR focussed on networking and authentic personnel, and implementation of flexibility oriented policies and structures;
- ambidextrous leadership: a vision focussed on flexibility *and* stability (efficiency), HR focussed on a delicate balance of all types of employees, and implementation of both types of policies and structures;
- robust leadership: a contingent vision, HR focussed on hiring at least a sufficient number of employees of different types (especially of those types that are difficult to hire) that would be minimally required for an ensemble of futures, and sufficient investments in both types of structures and policies;
- contingent leadership: a contingent vision, HR focussed on hiring and firing according to the evolution of the environment of the particular future, and reactive investments in the type of structures and policies required by the environment of that particular future;
- transitional leadership: gradually shifting from one leadership strategy to the other;
- inconsistent leadership: any inconsistent combination of vision, HR decisions, and policies and structures.

The interface (see Figure 2) is a flight simulator dashboard with four dynamic Figures –one related to all expenditures, one to personnel, one to financial bottom line and buffer, and one to environmental indicators and drivers– and nine sliders for the decision variables. In these four views, players see the evolutions of key external and internal indicators from the start of the simulation until the year before the one they have to make their decisions about (e.g. in 2025 information is available from 2010 till 2024).

The topmost figures display choices made by the players, the bottom-left figure displays the financial consequences of these choices given the scenario. The bottom-right Figure is important for reactive decision-making: it displays the indicators and drivers. The two drivers of the three exogenous scenarios played –namely the environmental flexibility and the ideal degree of flexibility and authenticity– are in this version of the model and flight simulator displayed 'in disguise' in this very graph: the environmental flexibility is displayed and the evolution of the globalization depends on the evolution of the ideal degree of flexibility and authenticity.

5 The Leadership Gaming Session

First, participants –CEOs, HR and high-level managers from different organizations– were informed about the goal of the evening (to experience deep uncertainty about the future in order to rethink visions and strategies in the face of deep uncertainty about the future) and about the event itself.

After a short introduction about 'leadership', and before running a first 'trial scenario', basic information about the logic of the virtual world –a slightly simplified version of their world– they were about to play in. In other words, the model structure (see Figure 1) was briefly presented before starting the actual game session.

The decision variables were briefly explained in relation to the model and each other without emphasizing the required consistency of vision, HR decisions, and policies and (work) structures:

- the authenticity and flexibility orientedness of their vision and strategy (0 = 100% stability-oriented; 1 = 100% flexibility-oriented)
- the total planned personnel expenditures for the next year
- the (budgeted) fraction of personnel expenditures to Lowly Skilled Personnel
- the (budgeted) fraction of personnel expenditures to Highly Skilled Personnel
- the (budgeted) fraction of personnel expenditures to Social Networkers
- the (budgeted) fraction of personnel expenditures to Authentic Personnel
- the total planned networking expenditures (without which Social Networkers cannot be supported and kept)
- the (planned) investments in organizational and structural stability
- the (planned) investments in organizational and structural flexibility

Participants were informed that they were allowed to invest in stability or in flexibility or in stability and flexibility.

Participants were familiarized with the interface (see Figure 2), their decision variables, and had some time to play around in order to get familiar with the dynamic implications of their virtual decisions. After warming-up, groups of three participants were asked to develop their strategy for building organizational leadership capabilities and to apply this strategy using the model-based flight simulator without foreknowledge about the future (scenario). Relevant and available pieces of information about past and present were provided through the interface. After playing the game given a particular scenario, the teams were informed about the scenario and were asked to revise (if desirable) their strategy. After this first iteration, the teams were asked to apply their revised strategy on a new scenario, in other words, once more, but in a new uncertain future world. After the second iteration, participants also played in a third future.

Apart from warming-up with the S0 scenario, participants played three scenarios, S1, S2, and S3. Scenario S1 (see 3(a)) consists of an increasing workforce flexibility especially between 2015-2025 followed by a slowly decreasing workforce flexibility, a continued globalization, a rather stable environmental flexibility, a decreasing average company size, and exponentially decreasing governmental interventionism. Scenario S2 consists of similar evolutions of the same indicators as in scenario S1 (see Figure 3(b)) except for somewhat less gradual and slightly more cyclic evolution of the globalization, the environmental flexibility, and the governmental interventionism. Scenario S3 consists of more pronounced changes at the beginning followed by gradual developments Figure 3(c).

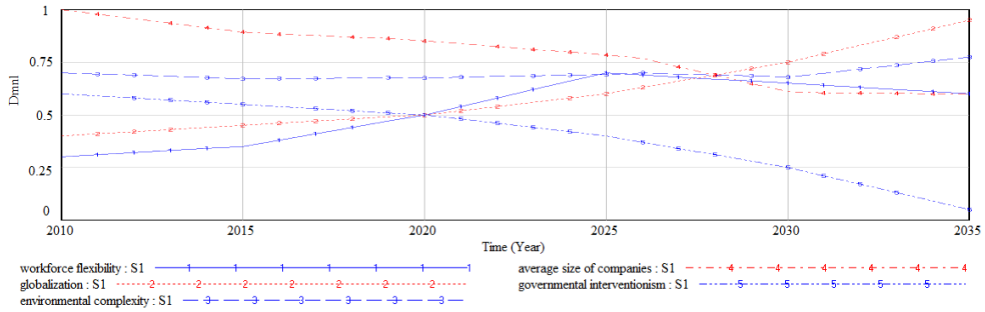
Some of these indicators do not influence the underlying simulation model. And most changes are generated by the time series generated by two lookup variables: *ideal degree of flexibility and authenticity* and *workforce flexibility* (see Figure 4).

6 Results, Debriefing and Bounce Casting Dialogue

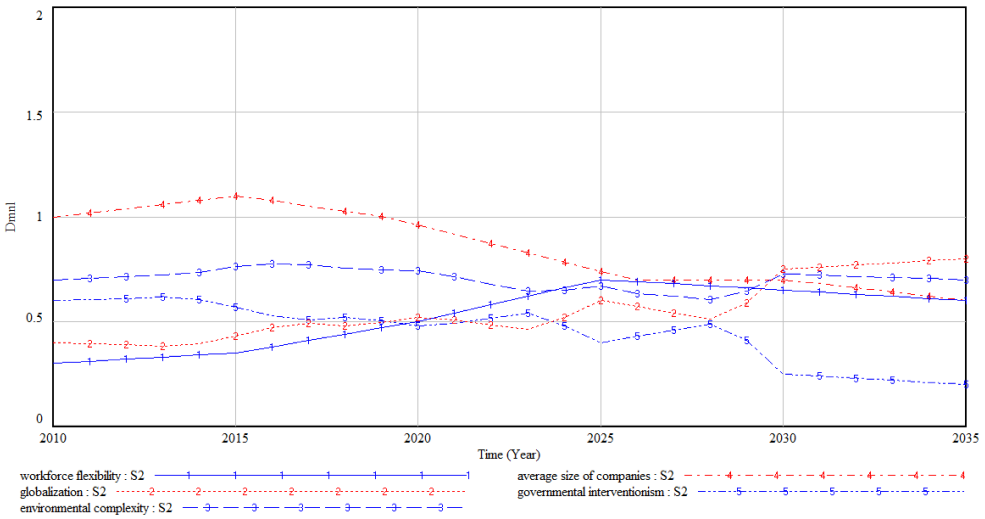
These scenarios are plausible and gradual –big shocks do not occur. And even these smooth and plausible scenarios caused serious problems to all groups.

All results were collected after playing through all scenarios. These results (see Figure 5) were grouped and analyzed during the break and were used during the debriefing.

The Causal Loop Diagram displayed in Figure 6 was used to explain how different patterns could be generated from the same underlying structure. The general story –starting at the top of the diagram– sounds as: ever more complexity (caused by several –mostly external– evolutions) leads to a continued increase in the expected degree of flexibility needed (so all workshop participants agreed at the start of the workshop), and hence –ceteris paribus– a widening perceived



(a) Environmental indicators and drivers for Scenario S1

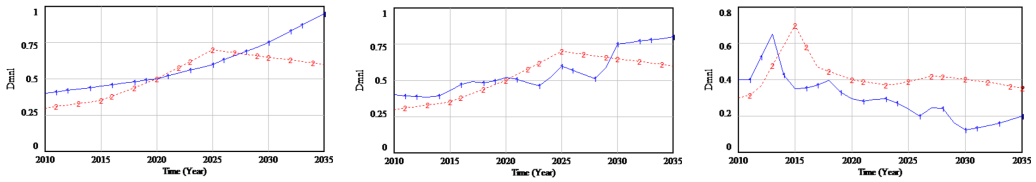


(b) Environmental indicators and drivers for Scenario S2



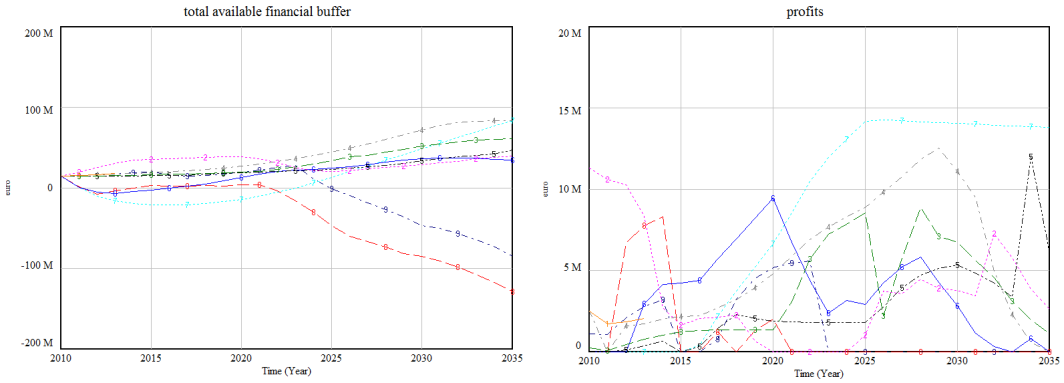
(c) Environmental indicators and drivers for Scenario S3

Figure 3: Environmental indicators and drivers for scenarios S1, S2, and S3 (+ results of simplistic and regressive results of the computer solution)

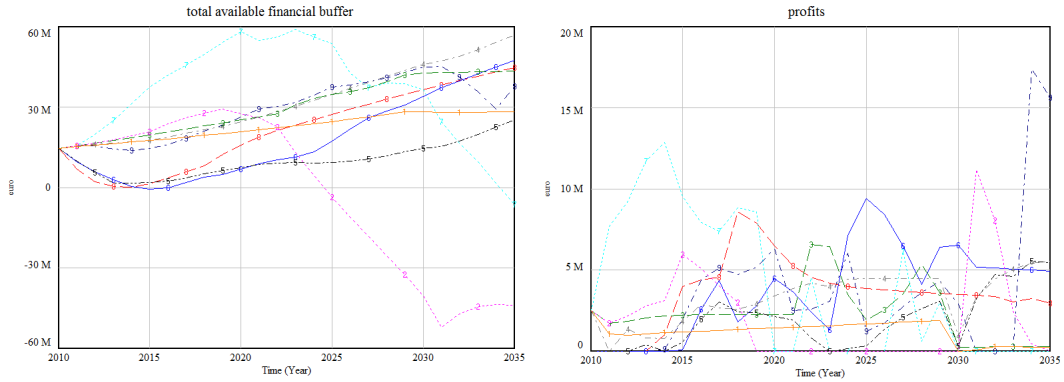


(a) Underlying drivers S1 (b) Underlying drivers S2 (c) Underlying drivers S3

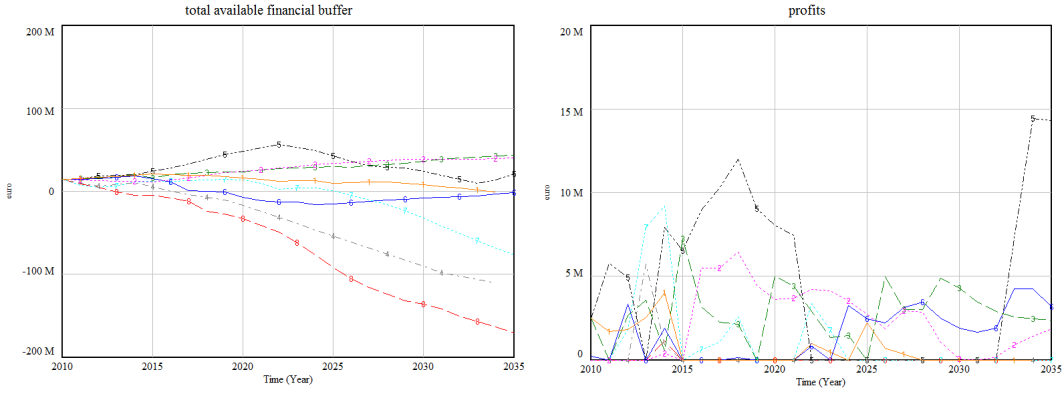
Figure 4: Underlying drivers of three scenarios: ideal degree of flexibility and authenticity (–1–) and workforce flexibility (–2–)



(a) Performance of the groups on scenario S1



(b) Performance of the groups on scenario S2



(c) Performance of the groups on scenario S3

Figure 5: Performance of the groups on the 3 scenario played

gap between the expected required degree of flexibility and the current degree of flexibility of the organization. The perceived widening of the gap will lead to more means going to flexibility (flexibility-oriented people, structures and policies) and less means for more stability, raising the effective degree of flexibility of the organization and hence reducing the gap (negative feedback loops). But more flexibility-oriented people will also activate reinforcing feedback loops passing through the perceived utility, possibly leading to excessive investments in flexibility and underinvestments in stability.

But if the effective degree of flexibility of the organization is not in line with the effectively required degree of flexibility of the organization, then the organization will become less successful, leading to a decreased level of total means available. If the right people start doubting the (excessively) flexibility-oriented vision and structure of the organization, and succeed in questioning the perceived utility of more flexibility and less stability, then the vision and strategy may become more adapted to those needed. If not, the company may become less successful. This is of course not the case if the effectively required degree of flexibility of the organization keeps on rising. But the ever increasing need for flexibility may not be sustainable, not for an organization, for its employees, or for society at large. At some point, governments may need to step in and enforce more stability.

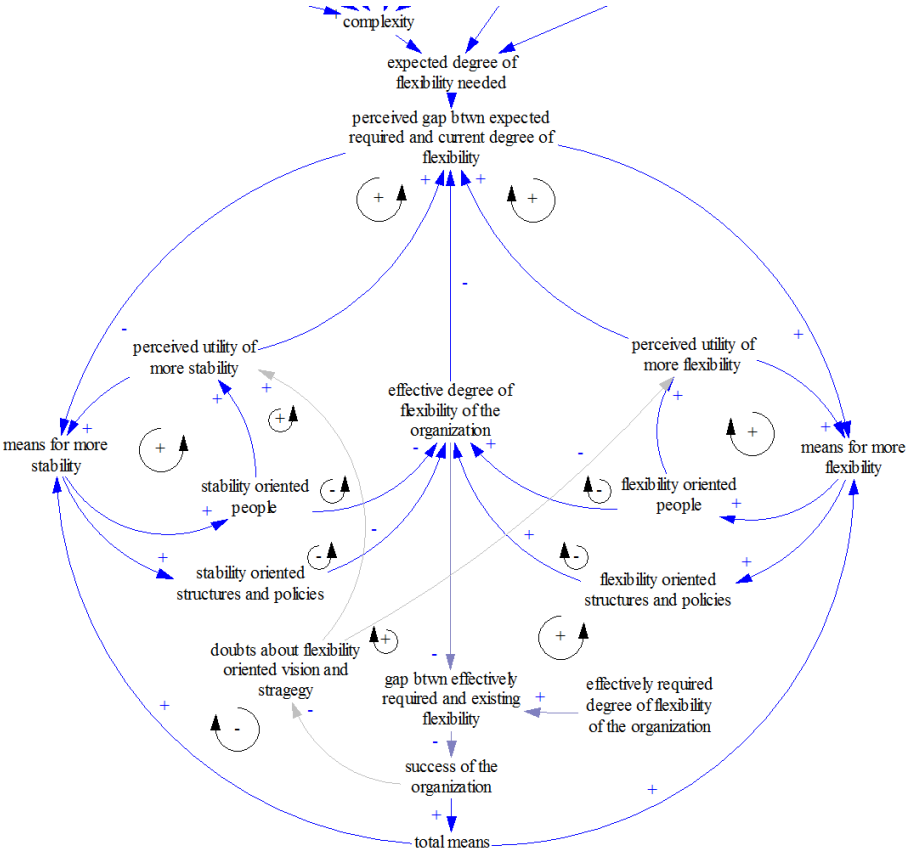


Figure 6: Highly aggregated CLD related to the Flexibility-Stability dynamics

One of the main results of playing the game, was that the participants seemed to be much more open-minded about long-term dynamic complexity and deep uncertainty – an important prerequisite for the ensuing bounce-casting dialogue.

The bounce-casting dialogue –a dialogue in which forward and backward explorations are iterated (see Figure 7)– focused on the appropriateness of their leadership styles, visions and strategies for a deeply uncertain complex world.

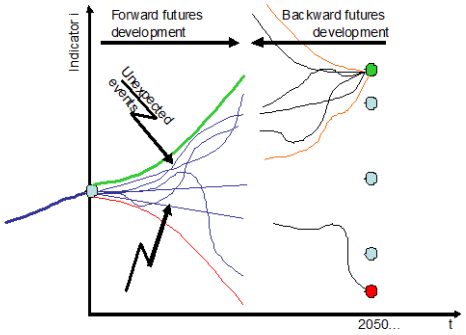


Figure 7: Bounce Casting consists of forward reasoning from the present and backward reasoning from multiple futures

7 Conclusion: games for experiencing complexity & uncertainty

7.1 The leadership Flight Simulator and Gaming Workshop

Uncertainties dealt with in this workshop were far from 'deep' – they were moderate uncertainties at best. This particular experiential gaming session was nevertheless an eye-opener for most participants of the workshop. Gaming through different futures increased their impressionability. Participants experienced and afterwards acknowledged the importance of uncertainty and agreed that further research related to developing organizational leadership capabilities for a deeply uncertain dynamically complex world was necessary. Plausible futures were embraced and ideas about possible (adaptive) strategies were advanced.

These remarks opened up the discussion about predictability of 'the' future and optimal strategies for one predicted future versus deep uncertainty and adaptive strategies that are robust for ensembles of plausible futures.

It could be said in general that this type of experiential games is very useful for opening up rusty minds for considering deep uncertainty. It allows enthusing policy/decision makers for 'ensemble forecasts' about the future (tens of thousands of plausible scenarios) and for considering adaptive and robust instead of optimal policies.

Experiential Model-Based Gaming allows policymakers to experience dynamic complexity and deep uncertainty, and helps them feel the need to embrace both method(ologie)s in policymaking. Before having experienced different plausible futures, almost all high-level managers that played this experiential games applied inappropriate strategies in most plausible futures played, and hence failed in the face of dynamic complexity and deep uncertainty. Failing repeatedly actually prepared them for thinking outside their old/reactive/predictive modes in the subsequent bounce-casting session. Most participants only acknowledged the need to take uncertainty and dynamic complexity seriously into account after having participated in the experience-oriented gaming session.

Although several participants needed some time to see the point of playing the game before starting the dialogue, only one participant really did not see the point of playing the game.

7.2 Possible Future Work and Possible Extensions

This 'quick and dirty' model and flight simulator –developed in about 3 days– was tailor made for opening up the minds and dialogue. Other uses would require serious rework.

However, several Leadership games for different purposes could be derived from it: Table 1 shows possible uses or direct extensions of this particular experiential Leadership Flight Simulator.

And model-based games related to Leadership –but not directly derived from this model/game– can be imagined for almost any location in the table.

Finally, small adaptations to the model and Flight Simulator could possibly be useful contributions to related organizational issues, such as organizational alignment.

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