



Designing a strategic plan through an emerging knowledge generation process

The ATM experience

Designing a
strategic plan

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Francesco Zanotti
CSE-Crescendo, Milan, Italy

Abstract

Purpose – The aim of this contribution is to describe a new methodology for designing strategic plans and how it was implemented by ATM, a public transportation agency based in Milan, Italy.

Design/methodology/approach – This methodology is founded on a new system theory, called “quantum systemics”. It is based on models and metaphors both of quantum mechanics and quantum field theory. It provides a real conceptual guide to creating profoundly participative strategic plans which are self-implementing. In synthesis this methodology is a new operational model for “strategy government”.

Findings – The output of this experience has been the validation of the methodology: the strategic plans have been self-implemented and planned objectives have been reached. As by-product, taking part in this process enabled all the fundamental communicative and relational skills to be developed.

Originality/value – The originality consists in the “foundation” of methodology (quantum physics). The value consists in the process which generates very participative and, because of that, self-implementing strategic plans.

Keywords Complex system evolution, Complexity sciences, New methods, Strategic planning, Strategic thinking, Complexity theory, Strategic management

Paper type Case study

1. Introduction

Our experience with the Azienda di Trasporti Milanese (ATM), a public company, responsible for public transportation in the city of Milan and many of the surrounding municipalities) goes back several years.

The reason we wish to describe it now is that our new strategic and systemic thought enables us to discover its deeply innovative elements, describe its scope and draw from it a new method of strategy and development government. My “literary” choice in setting up this article is to alternate the description of the ATM experience with the illustration of the new theoretical discoveries that highlight its innovative elements. In short, it is a tale of theory and experience.

2. ATM’s “strategic” challenge

First, a few words on ATM. ATM is the company in charge of managing public transportation in Milan: three underground lines, trolley buses (electric wheel drive), auto buses (gasoline and methane- driven) and trams (electric rail drive). It is owned by the city’s Municipality and manages the public transportation services of Milan and of 56 district municipalities. It also provides car sharing and bike sharing services, manages 19 connecting parking lots and other services. It employs around 9,000



people. In 2010 ATM carried 670,273,532 million passengers. ATM also operates outside Italy managing, since 1 January 2008, the Copenhagen automated underground.

The project started almost ten years ago. ATM's basic problem was quickly explained: the public service's stakeholders (particularly the social ones: citizens, consumers' associations) and shareholders (the Municipality) found that ATM was an inefficient and ineffective bureaucracy-driven machine, incapable of providing fairly priced, satisfactory services.

This type of problem posed three specific challenges.

The first was an efficiency challenge that will lead to cost reduction. The goal was to use ATM's human and technological resources more efficiently.

As a complement to the first challenge, the second was an effectiveness challenge. The goal was to provide citizens with improved transport services thanks to optimised resource use.

The third was a diversification challenge, i.e. to broaden ATM's offer with more products and services.

ATM was governed by a management board that gave the guidelines for ATM's transformation: to become a Total Mobility Operator (people, things, data, and ideas) on a continuous cycle (involved in all the phases of the mobility production cycle: planning, designing, and managing).

How should this challenge of strategic change be dealt with?

3. What is a “strategic” challenge?

First of all, we need to build a model of this challenge.

What does it mean, exactly, to revolutionise an organisation's identity? The answer we found is summed up in Figure 1, which suggests unusual aspects for traditional strategic thought.

Any dramatic change will affect more than just the organisation's identity.

The change of identity is generated by – and in turn generates – new relational processes with the outside world; these processes will affect the organisation as well as the outside world. This process of mutual change in how the environment is organised falls within the concept of “position”. This concept was not a part of our experience with ATM and will therefore not be covered in this article.

These considerations prompt us to find a new definition of “organisation strategy”: a synthesis of structural elements (the identity of the firm and of the environment), process-related elements (relational processes between the firm and the environment) and environmental elements (the change triggered in the environment).

Interestingly, this definition of strategy is akin to the mathematical definition of category. In other words, it aims to overcome the identity-structuralist approach of the past in order to achieve a blended structural and relational approach. From *Bourbaki*, collective pseudonym under which a group of mathematicians since 1935 wrote a series of books having the purpose to found the entire mathematics on set theory, to category theory, when studying properties of particular mathematical concepts and formalising them as objects and arrows, a mathematician would say.

Thus intended, an organisation's strategy is not a static “object” that remains the same until someone changes it. An organisation's strategy has its own specific evolution dynamics that are completely independent of the management's actions.

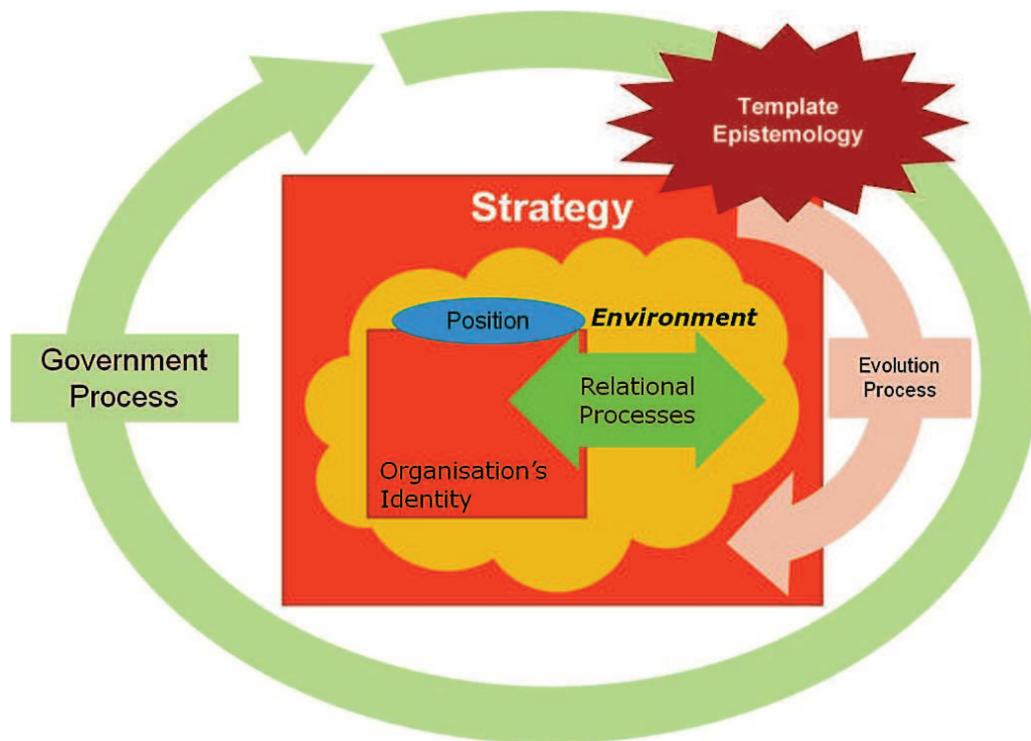


Figure 1.
Model for strategy definition

In terms of strategy – i.e. the organisation’s identity (its products or services, how it is organised etc.), the relational processes and the features of the relevant environment (reference stakeholders) – it builds its future on its own.

If an organisation’s strategy is characterised by its own self-built history, then we must introduce the expression “strategy government”. However, governing a strategy cannot simply translate into an engineering-based, optimised planning of the company’s identity performed by the company’s heads. The reason is simple: this type of designing points to an impossible course of action. If one wanted to follow this course, the organisation and its environment would have to be merely executive agents that switch on and off, act or wait based on the management’s instructions. But since they are autonomous agents, the course of action that is eventually followed must be the issue of the management’s design and of the autonomous path followed by the organisation and the environment.

In short, management-performed designing and outcome reporting interfere with the strategy’s autonomous evolution processes, i.e. with the history of the evolution built up by the organisation and the environment through their specific relational processes. This means that management-performed designing will lead to a partly predictable strategy in action (Mintzberg, 1994; Cummings, 2003). This is due to the interaction between the “strength” of autonomous development and the “strength” of formal directives.

The conclusion that can be drawn is that the government of strategy may be intended as an autonomous evolution process.

Using this language, ATM’s strategic challenge today can be reformulated in these terms: to govern the strategy’s autonomous development process so that this strategy

(identity, relational processes, and reference environment) may produce new efficiency and new quality.

This theoretical basis is deeply innovative and exciting, but it still does not give us an operational approach. So we looked into what the management considers meta-knowledge: system theory, in its most advanced quantum-systemic version that we are helping to build.

4. The reference knowledge: quantum systemics

“Quantum systemics” is a neologism (see, for instance, Del Giudice, 2010; Licata, 2003; Svítek, 2010). It indicates a system theory based on models and metaphors both of quantum mechanics and of quantum field theory.

From Quantum Mechanics I “bought” the idea that the observer, actually, creates the observed object. For example, the entrepreneur creates its own market.

Quantum Field Theory suggested me the active role on the environment (the quantum vacuum).

Further readings about the “quantum” nature of this new theory can be found in (Blasone *et al.*, 2011; Bohm and Hiley, 1993; Minati *et al.*, 2009; Licata, 2003).

Within quantum systemics there is place also for other models and metaphors, such as autopoietic system theory, whose fundamentals can be found in Maturana and Varela (1998) and, for a more sociological perspective (see, for instance, Luhmann, 2005). An alternative approach, based on Chaos Theory, has been proposed by De Toni and Barbaro (2010). We think that quantum systemics is a more general and operationally effective approach.

Quantum systemics provides a real conceptual guide to creating an operational model of the strategy government problem described in the previous section.

In this section I will give a short and targeted description of quantum systemics. For a more complete description, see Zanotti (2010).

The environment in which a system is born can be simulated through the metaphor of quantum vacuum. Using this metaphor the environment reveals these characteristics: it is populated by an infinite number of potential actors, who constantly and unpredictably evolve. Saying in other words the environment can be considered as an infinite space of potentialities that constantly and unpredictably evolve.

If we want to build systems, i.e. stable structures, visible identities (from the elementary particles to all human systems), we need a governing agent able to imagine/generate a mobilising project in which to involve the virtual agents in order to concretise their potential.

I believe it would be correct to call such an agent “entrepreneurial”, because he makes collapse one of the infinite potentialities of the quantum vacuum.

This initial governing action triggers an evolutionary story consisting basically of two macro-episodes.

4.1 *The constructive – i.e. autopoietic – phase*

In reality, to involve means to make emergent. Virtual agents are in fact protagonists subject to stimulation but will never be passively shaped by the governing agent: if anything, they will interfere constructively with it.

This constructive stimulation/response cycle generates a system with an increasingly stable identity. At the same time, it builds up that part of the environment (the relevant environment) from which the fledging system can gaze around. Its gaze will not be unbiased but perturbing, and will lead to change. The rest of the environment remains a vaster reference background consisting of ebullient quantum vacuum.

During this process of emergence (of the system) and of structuring (of the environment) there is a continued increase in the system's ability to produce value ("products" the environment ascribes meaning to) and in the inward flow of resources from the environment. The net balance between the resources the system produces and absorbs is positive. During this phase of continued construction, the entrepreneurial agent synthesises the contributions of the fledging system's protagonist stakeholders. By the end of the constructive phase, both the system and its reference environment will have acquired specific identities. A very precise borderline forms between them. Another borderline, less defined, more flexible but still visible, forms between the relevant environment and the overall environment. At this time in the system's life, the difference between produced and absorbed resources is at its peak.

4.2 The degenerative – i.e. self-referential – phase

During this evolutionary process, however, there is no stability phase. Once this borderline is defined (it is a common, social definition), the system and its environment split. The tie between the system and the environment becomes one of "resonance" – of a structural-coupling type (Maturana and Varela, 1998).

Once a structural-coupling relation kicks in, the system begins to "isolate" itself from its specific environment and starts to evolve on its own. We can call this evolution self-referential closure. The system progressively loses meaning in relation to the overall environment first, and then to the specific environment.

During this phase, there is a drop (that follows along with the loss of meaning) in the system's ability to produce value (system products to which the specific environment ascribes meaning) and in the flow of resources to the system. The net balance between the resources that the system produces and those it absorbs from its reference environment begins to decrease with the consequent increase of energy dissipation costs.

What is the entrepreneurial agent's role during this phase? Basically, its generative capacity is exhausted, because it is too focused on competitiveness. It has concretised all the future opportunities it had imagined. It is completely embodied in the system (enterprise, organisation, social agent etc). It lives off the system, as do the other agents that contributed to its construction.

The entrepreneurial agent's attention, then, shifts from the system's construction to its functioning. In other words, it becomes a manager aiming to turn the star agents into instrumental agents. This managerial work becomes more and more similar to an optimising-calculation process and requires skilled manipulation in order for the "star agents", protagonists of the creative process, to function as "instrumental agents", mere executors realising efficiency. Herein lies a catch – these agents have no intention of becoming instrumental, insisting instead on their star roles. What is triggered off, then, is a permanent unrest affecting the system that slows down the system itself and makes it harder and harder to manage.

In quantum-systemics terms, this shows how the evolutionary process of the system and of the environment engendered by their mutual relational processes is a spontaneous

social creation process. The strategic goal is not to create an identity and strategic actions, but to govern the spontaneous process that will lead to achieving them. We consider more appropriate to talk about how to “govern a strategy” than “make a strategy”, i.e. how to explicitly activate and manage this social creation process.

5. The current strategic thought – intuitions and uncertainties

Quantum systemics suggests a constructive interpretation of “making strategies” – but what type of approach does classic strategic thought suggest? To answer this question we examined the three most authoritative international study reports on strategic thought (Cummings and Wilson, 2003; Pettigrew and Whittington, 2002; Mintzberg, 1994).

We have reconsidered these studies in the light of quantum systemics. The findings we propose here are a synthesis of a more comprehensive study (Zanotti, 2011) (See Table I).

In short, the current strategic thought is something mid-way. What I mean is that these studies have plenty of insights and intuitions but fail to show how to govern a strategy’s self-development processes.

Without going into every detail of our findings, we can say that the current strategic thought recognises that an organisation’s identity is a complex subject. It cannot be treated as a mere business unit – it must be treated also as Ethos (Cummings and Wilson, 2003), as a dynamic resource portfolio (Pettigrew and Whittington, 2002), as power and culture (Mintzberg *et al.*, 1998). No attempt is made to give a comprehensive picture.

Concerning the outside environment, the prevailing vision is that an organisation must try to adapt to the environment’s evolutions (Mintzberg and Varela, 1998; Cummings, 2003).

The relational processes with the outside environment are seen basically as communication processes and not as processes that build up the enterprise’s identity and that of the environment (Mintzberg and Varela, 1998; Bilton and Cummings, 2010).

Concerning the outside environment’s evolutionary processes, there is no explicit recognition that an organisation and its host environment have the ability to self-evolve. “Ecological” models are presented in (Mintzberg *et al.*, 1998), that mentions

Current strategic approach	Our approach based on considering
Planning school	The observer, actually, creates the observed object
Design school	The active role on the environment
Positioning school	The de-freezing process
Entrepreneurial school	The constructive – i.e. autopoietic – phase
Cognitive school	The degenerative – i.e. self-referential – phase
Learning school	
Power school	
Cultural school	
Environmental school	
Ethos	
Orchestrating knowledge	
Exploration and interconnection	
Data plus sense making	

Table I.
Current strategic approach

the “population ecology” line, but the top place is always assigned to the environment. No mention is made to that self-referential closure process that quantum systemics points to as fundamental.

Concerning the government process, the proposals run on a continuum from “summit designing” to “mysterious emergence”.

To put it simply and calling the poles into play, at the “mysterious emergence” extreme I would place the emergence, entrepreneurial vision and cognitive development processes described in (Mintzberg et al., 1998) without mention to their specific dynamics. I would also include intention, orchestrating knowledge, organising and learning as proposed in (Cummings and Wilson, 2003), once again without mention to their dynamics.

At the other extreme, “summit designing”, I would place the anticipation and exploitation and interconnection processes (Cummings and Wilson, 2003) and the designing, planning, decision-making and scenario-planning processes described in (Mintzberg et al., 1998).

6. The strategic praxis – as if theory did not exist

While the most advanced strategic thought can formulate intuitions, but not envisage all the consequences, the current strategic praxis does not even take these intuitions into account.

Indeed, for those who must design strategic changes, the process is directive and rational.

There is a designing phase, which is basically a calculation phase (carried out ideally by a Turing machine-like) (Mintzberg and Varela, 1998; Fogg, 2010). Then we need an implementation phase based on communication and motivation.

We can clearly see that this praxis does not just do away with all the intuitions painstakingly stacked up by strategic and systemic thought, but also proposes a dramatic-change type of government which is almost the opposite of that envisaged by quantum systemics.

Without going into too much depth – as I feel it would lead us off-track – I will illustrate four particularly significant examples of “discordance” between the convictions at the basis of traditional strategy-making, and at the basis of quantum strategy-making that we have experimented with and are now theorising:

- (1) First of all, there is no optimum strategic project. There are thousands of possible strategic projects.
- (2) The best strategic project for any organisation is the one that most inside and outside stakeholders share.
- (3) Communication does not generate action but more communication: a debate circle that can engender courses of action completely different from those communicated.
- (4) A prize&penalty system does not generate action because human beings do not choose, decide and behave on the basis of calculation.

Results, and not just theory, condemn the current strategic praxis:

- the results of summit strategic designing are trivial; and
- the problem of implementation becomes more and more serious.

7. A new reading of ATM's strategic challenge: a self-referential bureaucracy

Taken as a whole, the previous considerations will encourage a deeper and more accurate reading of ATM's strategic challenge.

The proposed vision of quantum system theory shows that ATM's problems stem from its having become a nested self-referential bureaucracy. An excessive bureaucratisation leads to a systemic degeneration, as the company degenerates into its formal organisation, losing the interaction between its components.

A public-service organisation is basically an institution, i.e. an organisation aiming to manage itself through a calculation process (in Turing's sense), and expects that this approach will enable it to produce a service that the outside stakeholders will recognise as a quality service.

Unfortunately, a calculation process will only optimise the organisation's formal dimension, doing nothing for the informal dimension – i.e. the dimension within which people choose which behaviours to adopt.

In other words, it is believed that it is enough to manage an organisation's formal dimension in order to determine its behaviours. But in this way, one only creates a context in which the mysterious and unbridled developmental dynamics of the informal organisation develop behaviours.

The outcome is an organisation that evolves and settles into a state of "nested self-referentiality" that unties the people's individual activities from the flow of resources and from the outside perception of quality.

Quality is a relational quality. Quality is considered an objectively measurable attribute of a product or service. In fact, quality is the fruit of an emerging process. This is true in the case of an industrial product coming from a contractual relation between buyer and builder.

It is true in the case of a long-life product (such as a household appliance) or of a consumer product, which – as its representing brand – is built socially.

It is especially true in the case of a service carrying deep social meaning, such as a public transportation service, consisting of the supplier, the individual customers and all its stakeholders.

8. Making quantum strategy in ATM

In order to face ATM's specific challenge, we envisaged a process that would realise the fundamental discovery of quantum systemics: the government of strategic change is the activation of a process of social creation. The strategic project must be "written" by all those in charge of realising it.

The difficulties in building a shared strategic project seem insurmountable, especially in a large and complex organisation. These difficulties are of at least three types:

The first difficulty is the diversity of people's visions. The second is their limitedness, due to the specialist structure (be it functional, business-related or of any other type) of a classical organisation and to the ideology of a schooled education. We can see, then, that triviality is always lurking. The third difficulty is that different and limited ideas are perforce ideological.

How can these difficulties be managed? By encouraging "integral" participation.

We directly involved in the process the top management (President, vice president, general manager, managerial first-line), the board of directors (the heads of the various

departments, for a total of about 20 people) and all the managers (about 200 people). The managers, in turn, involved all their collaborators: ATM's 9,000-plus employees.

The specific strategy government process we designed and set off was as follows. It is the development of a general development-building method we have called, in Italian, "SorgenteAperta", i.e. Open Source, and which serves to realise the government model suggested by quantum systemics. The method consists essentially in mobilising and establishing a community that builds the coming future organisation and guides its evolution.

9. The project's unfolding

This is how we acted. First of all, we decided to face the three challenges posed by dramatic strategic change in two phases. The first aimed at achieving increased efficiency by re-engineering processes and re-qualifying human resources. The second phase would come later, once the methods used to win the first challenge proved all their effectiveness and efficiency.

The integral-participation method we developed makes it possible to achieve the second objective of the first strategic challenge (re-qualification of human resources) while achieving the first one (re-engineering processes). Thanks to this logic, training is not a separate event isolated from the enterprise's life; instead, it is a form of on-going support that becomes essential as the level of participation of the people involved in the change-planning increases.

The first phase of the process consisted in establishing the project's language. The people were to be tasked with re-designing the fundamental organisational processes, but it was necessary to provide a common description-template of the processes and of the design forms through which to design the required changes.

So we drew up descriptions and design forms for the processes that would be involved in the change-planning process: staff management, information systems, management control, logistics, movement, active and passive cycles.

To give an idea of the descriptions and design forms, I will use management control as an example. The "description" consisted of a presentation of the various control "logics", with special attention to the activity-based approach. The design forms focused on problems/objectives, actions/resources, responsibilities/timings.

For a more effective explanation of the process, I will provide a comparison between the traditional change designing process and the process we proposed. In the traditional process, a technical team designs the "best" control system and then reports it so that it may be used. In our approach, people were presented with an activity-based approach and with the design form with which to decide how to apply the activity-based approach to their own realities.

The second phase consisted in presenting the project's language and explaining how it could be used.

We divided the direct participants into the following groups:

- top management;
- directors; and
- managers, divided into groups based on the fundamental processes to be changed and the relative sub-processes the managers were in charge of, for a total of 12 groups.

Presenting the project language enabled de-freezing and cognitive enrichment, i.e. unlocking personal ideologies and providing new knowledge that would aim at activating project-related wishes.

Then came bottom-up project-related sessions. The managers organised meetings with their collaborators in order to fill in the design forms. Then the managers met up to draw the conclusions.

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The board of directors designed the macro-organisation and the top management gathered periodically to examine the overall progress of the project.

At the end of this course, the consultancy aggregated the individual project proposals into a comprehensive document called the Development Plan.

Overall, the process took about three months' work.

I would like to digress on the profession of the management consultant. If you follow the process I have just described, you will revolutionise the traditional consultancy model. I consider the consultant not like a person who gives suggestions or provides solutions, but rather provides a project-related language and the process through which to use this language. This model of consultancy is destined to revolutionise the management consultancy business.

10. The problem of implementation

Once the Development Plan was approved by the Administrative Commission, its implementation had to be dealt with.

Since ATM is a publicly owned company, under Italian law the consultancy task to follow the implementation process had to be assigned via competitive tender. The procedure was long and complex, lasting nine months. As expected, the tender was won by the consultancy company I represent, since we held a "title" the others did not. This "title" consisted first of all of a radically new methodological structure; and second, we had followed the drawing-up phase of the development plan.

So we got in touch with the directors and managers to carry on with the work and, to our clients' great surprise (but not to ours), we discovered that the project we had drawn up through the intense and integral participation I have described was already at an advanced stage of application. In other words, it was self-implementing.

Once the project had been approved, it was autonomously applied and for two fundamental reasons. The first is that there was no communicative effort required, since the project had been drawn up by those who were in charge of implementing it. Second, the desire to implement the project was thriving. The realisation of that project was the crowning achievement of a great designing effort. It was the completion of that constructive – and not destructive – self-realisation process that the method had triggered off.

11. The results

The achieved results are multifaceted.

The most obvious result is that all the objectives formulated in detail for each of the processes dealt with were reached: staff management, information systems, management control, logistics, movement, active and passive cycles.

In details, as far as Management control is concerned, new tools for improving Programming and reporting of activities were activated. A design of a new control System was developed.

Staff turnaround was improved and the result was the reduction of 500,000 hours of overtime, and the reduction of total drivers (220 less) and blue collars (340 less).

To build a more effective and efficient information system a double path way strategy was adopted: a short time improvement in existing procedures and a plan to build a completely new infrastructure to integrate main ATM processes.

In logistic process ATM obtained an optimisation of operative areas (reduction of overall surface and blue collars: 40 per cent), a reduction of stocks (10 per cent), a reduction of medium supply time (from 30 to 20 days) and several other “local” improvements in the logistic chain.

As far as “core service” (called “movement”) is concerned, the occupation of offered places increased of 10 per cent.

In passive cycle ATM obtained a huge reduction of supply time: 30 per cent.

In active cycle the main result was a reduction of 1 per cent in ticket evasion.

But less visible objectives were reached too – less visible, but deeper. The implementation problem was completely offset by involving in the strategic designing all those tasked with achieving the objectives.

Moreover, it was proven that formation processes are meaningful, effective and efficient only when integrated in designing and change processes. In order to take part in this process, all the required knowledge was gathered; taking part in this process enabled all the fundamental communicative and relational skills to be developed.

These results would open the road to the application of the same method to achieve quality and diversification.

12. The future that never happened

However, the bureaucracy of competitive tenders inevitably slowed down the process and weakened its powerful emotional charge.

In addition, a new management board stepped in. In Italy this type of change is never dictated by strategic or operational shortcomings of the commission in charge, but occurs in accordance with the spoil system’s logic. This phenomenon challenges the old idea that an enterprise is a pure economic actor. An enterprise is a multidimensional actor which has to manage a complex system of stakeholders (Freeman, 2001). This causes friction between opposing political parties and delays in project management. The elections gave Milan a new mayor, who named a new management board. As it usually happens in these cases, to use a euphemism the new managers had no interest in valorising the work of the former managers, who belonged to opposing political parties. And so we managed to complete that part of the development plan we had drawn up and which aimed, as I said, at re-engineering processes and at training human resources.

13. The future we must build

I feel that this tale of action and theory points to a new road leading to a new future.

No doubt the present society is going through a deep economic, social and cultural crisis.

Instead of fixing the odd thing here and there, we must envisage a new social model and redesign all its component human systems (from enterprises to institutions).

- The key resources of a managerial class wishing to envisage and redesign could be:
- the discovery that building development means governing the self-development processes of human systems;
 - the government proposal of these processes that we have defined as an “open source”; and
 - the systemic culture that lays the groundwork for discovery and proposal.

14. Conclusions

I think the approach to strategic management I have described in this paper should be considered as a starting point for a new research program.

Novelties of this program might be the following.

First of all a transdisciplinary approach should be used. Up to now I have used models and metaphors, both of quantum mechanics and of quantum field theory. I think there are other possible sources of models and metaphors that can be used. For example, the so-called EVO DEVO (Evolutionary Developmental Biology) approach or the meta-structural approach (Minati, 2009; Licata and Minati, 2010; Pessa, 2011).

Second, the research process should involve not only scholars, but also practitioners and managers.

The main objective of this research program is to provide ruling classes with new and more effective tools to design and implement a new model of society.

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About the author

Francesco Zanotti gained a Master degree in Physics at the University of Pavia. His professional background has been developed in top consulting groups (Studio Ambrosetti, Hay Group Methodos). Ranging his responsibilities up to Partner and CEO, he also founded two consulting companies (Phonema and Stagira). His main areas of interest and research are corporate strategy, organisational development and complexity science, where he is contributing to build a new discipline, called quantum systemics, that should describe the birth and the development of human systems. Francesco Zanotti can be contacted at: f.zanotti@cse-crescendo.com