A Dynamic Performance Management Approach to Evaluate and Support SMEs Competitiveness: Evidences from a Case Study

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Abstract
The role of Performance Management (PM) systems has become crucial for steering Small-Medium Enterprises (SMEs) to successfully compete during the ongoing critical economic transition. To improve decision-maker strategic learning processes, traditional PM frameworks need to be combined with System Dynamics (SD) modeling. This paper shows how to design and use a Dynamic Performance Management (DPM) approach to assess and support SMEs competitiveness. The emerging framework is applied to a real case of a small business to analyze the empirical effectiveness of the approach hereby suggested.

Key-words:
Performance Management, System Dynamics, SMEs, Competitiveness, Strategy, Case Study.

1. Introduction

In the last years, the financial crisis – which is overwhelming global economies – has deeply weakened Small-Medium Enterprises (SMEs) competitiveness. The battle for surviving in an economic context characterized by (i) a reduction in customer consumption, (ii) an unscrupulous competition from emerging economies, (iii) an extreme impulse toward both efficiency and cost-saving by large-sized companies, (iv) a limited propensity to funding from lending institutions and (v) a decreasing support from public sector bodies, is becoming "bloody".

In the long run, SMEs survival on the market basically depends on the results that they are able to achieve in terms of competitiveness, profitability and capability to satisfy social requests.

As a result, the need to improve SMEs performance based on sustainable competitive strategies has strongly emerged. To address this need, a number of frameworks and approaches for the design of strategic Performance Management (PM) systems have been developed and discussed by scholars since mid-1990s (e.g., the Balanced Scorecards by Kaplan & Norton). These approaches have been primarily designed for being adopted in large-sized companies, while SMEs display distinct characteristics that differentiate them from the majority of their larger counterparts (Storey, 1994).

However, SMEs may need a tailored approach enabling their key-actors (namely, those who cover an entrepreneurial role and their own direct collaborators) to frame their own specific dynamic complexity, so to understand how to pursue sustainable development, design strategies, manage trade-offs in time and space, and assess the results emerging from strategy implementation (Bianchi, 2002).

Particularly during critical economic transitions, organizations must strive towards a continuous search for more efficient and effective management processes, implying a balanced use of the strategic resources that are deployed in value creation processes. The identification of a proper endowment and mix of strategic resources, is important since it allows one to understand how to affect performance targets. Therefore, strategic resources should be recognized as a consequence of a prior and selective identification of specific, measurable, achievable, relevant, time related performance drivers and end-results. Such performance measures should portray a balanced set of targets organizations must pursue, in the short and long run, according to a sustainable development perspective (Bianchi *et al.*, 2012).

PM systems represent useful frameworks to drive SME decision-makers in both designing competitive strategies and measuring resulting outcomes. Such systems are focused on the identification of 'results' (i.e., outputs and outcomes) to pursue and of their own 'drivers' (Fitzgerald *et al.*, 1991; Fitzgerald & Moon, 1996; Otley, 1999; Ferreira & Otley, 2005).

However, traditional PM systems often lack to capture the dynamic complexity of managerial decision making. In fact, they may omit to consider a number of relevant factors influencing organizational performance. Such factors can be associated to delays, non-linearities, intangibles, and to the unintended consequences on human perceptions and behavior caused by a superficial or mechanistic approach in setting performance targets, especially if such targets are used as a basis for organizational incentive and career systems.

Therefore, traditional PM systems may limit decision-makers' strategic learning processes (Sloper *et al.*, 1999; Linard & Dvorsky, 2001).

A "dynamic" perspective in designing and implementing PM systems implies the identification and analysis of end-results, value drivers and related strategic resources accumulation/depletion processes, according to a "cause-and-effect" perspective. A feedback analysis may allow decision-makers to better frame the relevant structure underlying performance and, consequently, to design and assess a set of alternative strategies to adopt, so to affect the system structure according to the desired performance behavior.

The aim of this paper is to analyze how the System Dynamics (SD) methodology may add value to PM in those SMEs operating in dynamic and complex contexts. To this end, a case-study of a Dynamic Performance Management (DPM) system recently designed for a small firm named *Mosaicoon* will be illustrated. The company is sited in Palermo (Italy) and provides innovative web marketing services worldwide.

The paper does not address a specific problem related to SMEs performance behavior over time, rather it aims at discussing through empirical evidences the effectiveness of DPM applied to SMEs, with a view to pursue their own sustainable development.

2. Research methodology

The research presented in this paper is specifically oriented to address the following questions:

- Which are the main limits of traditional PM approaches to SMEs?
- How can the SD methodology support PM systems to improve strategic learning processes of SME decision-makers?
- How to design DPM systems to be used by decision-makers on a regular basis to manage SME performance and competitiveness?
- What outcomes are related to the design and adoption of a DPM system into a specific small firm, such as *Mosaicoon*?

Previous research on PM systems in SMEs seems not to properly consider how critical is the identification and analysis of how to effectively design and implement such systems in smaller firms. In fact, it fails to explicitly address the features of PM development processes that enhance the likelihood of a successful implementation (Hudson *et al.*, 2001) in SME contexts. Namely, a passive application of theoretical approaches to different types of firms can be noticed. Such practice has involved a lack of analysis of those critical success factors that differ from firm to firm. On the contrary, PM frameworks should be designed according to firm's specificity (e.g. size, governance, decision-making processes, industry).

Furthermore, current PM approaches tend to frame SMEs performance from a too static point of view that does not allow one to properly assess policy impacts with reference to the trade-offs existing between both short- vs. long-term effects (time), and results related to different strategic business and functional areas in an organization (space).

As a result, in this paper a theoretical analysis is undertaken to describe a three-dimensional systemic perspective of SMEs performance evaluation. Such dimensions refer to: (i) an

"instrumental" view that investigates how performance is achieved, (ii) an "objective" view, that explores what performance consists of, (iii) a "subjective" view, that frames who is responsible for the pursued goals and objectives, and for the implementation of planned activities aimed to achieve them. The subjective view provides a synthesis of the two previous performance views (Bianchi, 2010).

Particularly, this work focuses on the "instrumental" view as a basis for designing and implementing a DPM system in SMEs. SD provides a suitable methodology for modeling and simulating small business performance, since it is able to support decision makers – through modeling – in framing and understanding dynamic complex social systems, and to foster the design and implementation of sustainable development policies (Forrester, 1958; Sterman, 2000). Model building is accomplished through the identification of causal relationships between key performance variables (i.e., end-results and performance drivers) and strategic resources within the system. The underlying principle is that, if the model structure determines the system behavior and the system behavior determines the organization performance, then the key to developing sustainable strategies to improve performance is understanding the relationship between structure and behavior and managing the leverage points (Sterman, 2000).

From a strategic point of view, the formulation and adoption of a DPM system may enable SMEs to overcome the above shortcomings of traditional PM frameworks and support them in improving decision-making processes. To understand how to implement the emerging DPM framework to SMEs, the second section of the paper focuses on an empirical study conducted in a SME. Particularly, the case study is framed through three stages, i.e.: (1) key actor knowledge elicitation, (2) model building and data collection, (3) policy scenario analysis.

Each stage has implied the involvement of company's key actors (i.e., *Mosaicoon*'s CEO and strategic business units managers). Both semi-structured interviews and "Group Model Building" techniques (Vennix, 1996) have been used to make key actors' experience explicit and, subsequently, design the model structure. The resulting model highlights the main cause-and-effect relations underlying the competitive system of *Mosaicoon*. Particularly, it shows a set of performance drivers where to concentrate both management control and policy design processes. In the last stage, this has allowed us to simulate different scenarios that may come up from the adoption of alternative policies oriented to improve company's competitiveness.

3. Designing tailored approach to SME PM systems: a literature review

To be effective, the design of PM systems in small business requires consistency with the key characteristics that differentiate them from larger firms. Current literature (Addy *et al.*, 1994; Burns & Dewhurst, 1996; Ghobadian & Gallear, 1997; Appiah-Adu & Singh, 1998; Berry, 1998; Marri *et al.*, 1998; O'Regan *et al.*, 1998; Haywood, 1999; Hudson *et al.*, 2001) points out a number of recurring SME characteristics, as listed below:

- personalized management, with little devolution of authority;
- severe resource limitations in terms of management and manpower, as well as finance;
- reliance on a small number of customers, and operating in niche markets;
- flat, flexible organizational structures;
- high innovatory potential;
- reactive to environment changes and legislative reforms;
- informal and unstructured strategy design.

As recommended for public and larger-sized organizations, also SMEs need to focus the design of PM systems on a multidimensional perspective of performance that may capture both financial and non-financial measures. Actually, organizational performance refers to three main dimensions (Coda, 2010): (a) a competitive, (b) a financial, and (c) a social dimension.

As figure 1 displays, the competitive dimension is respectively oriented to satisfy market needs, i.e. providing better products/services to customers in comparison to competitors' ones. The financial dimension aims at increasing company's profitability to both support future investments and reward shareholders. The social dimension is addressed to ensure a stable equilibrium between stakeholders' contributions (e.g., employees, customers, providers, funders, shareholders, State, environment) and the related expected rewards that the company provides them (e.g., work motivation and salaries, product/service quality, regular payments, dividends, taxes, etc.).

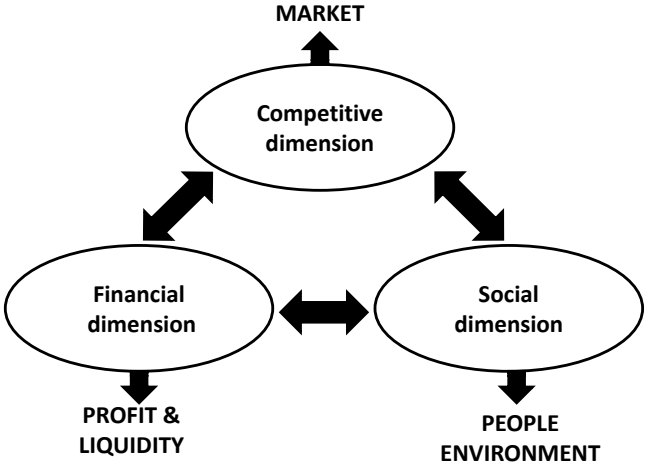

Fig. 1 – A multidimensional perspective of performance dimensions (Source: Coda, 2010).

Each performance dimension includes a set of strategic resources whose acquisition and deployment in a synergetic way implies the possibility to generate certain results. For instance, company's image refers to the competitive dimension, liquidity to the financial one, and employees' satisfaction to the social one. A multidimensional perspective of performance also highlights close connections among the three mentioned dimensions; Therefore, such dimensions must be conceived as a system where resource depletion/accumulation processes and related results of one dimension impact on the performance of the other two[1]. This means that the success of a firm basically depends on a consistent balance among these performance dimensions. To this end, PM systems have to take into account a balanced mix of indicators that allows decision-makers to focus on the trade-offs between not only individual and static performance measures related to competitive, financial and social dimensions, but also short- and long-term effects of adopted policies, as well as different strategic business areas or individual departments of functions (e.g.: Commercial, production, R&D, Finance, Human Resource) within a company.

Based on the characteristics of SMEs as above listed, Hudson *et al.* (2001) have outlined a set of critical performance categories that may be referred to competitive, financial and social dimensions. In doing so, they discussed a comprehensive literature survey by Neely *et al.* (1997) that sorts and links strategic performance measures to performance range targets (table 1). The survey collects a wide array of researches both from theory and practice on PM design (Kaplan, 1983; Lynch & Cross, 1991; Schmenner & Vollmann, 1994; Neely *et al.*, 1995; Collier, 1995; White, 1996; Laitinen, 1996; Slack *et al.*, 1998; Medori & Steeple, 2000; Keegan *et al.*, 1989; Sink & Tuttle, 1989; Jones *et al.*, 1993; Meyer, 1994; Bititci, 1994; Ghalayini *et al.*, 1997; Eccles, 1991; Kaplan & Norton, 1992; Fitzgerald & Moon, 1996).

[1] For instance, an increase in liquidity (financial dimension) allows the firm to hire more employees (social dimension), who may improve product/service quality and, as a result, increase its customer base (competitive dimension).

QUALITY	TIME	FLEXIBILITY	FINANCE	CUSTOMER SATISFACTION	HUMAN RESOURCES
- Product performance	- Lead time	- Manufacturing effectiveness	- Cash flow	- Market share	- Employee relationships
- Delivery reliability	- Delivery reliability	- Resource utilisation	- Market share	- Service	- Employee involvement
- Waste	- Process throughput time	- Volume flexibility	- Overhead cost reduction	- Image	- Workforce
- Dependability	- Process time	- New product introduction	- Inventory performance	- Integration with customers	- Employee skills
- Innovation	- Productivity	- Computer systems	- Cost control	- Competitiveness	- Learning
	- Cycle time	- Future growth	- Sales	- Innovation	- Labour efficiency
	- Delivery speed	- Product innovation	- Profitability	- Delivery reliability	- Quality of work life
	- Labour efficiency		- Efficiency		- Resource utilisation
	- Resource utilisation		- Product cost reduction		- Productivity

Table 1 – Critical performance categories tailored to SMEs management (Source: Hudson *et al.*, 2001).

Particularly, to identify performance measures relevant to SMEs management, Neely (1999) also suggests that measures must be limited to a few critical success factors. As for SMEs – where unstructured decision-making processes are usually adopted – plenty of indexes and indicators may actually outline an unfocussed performance management framework and, hence, may divert management attention from those value drivers having a major impact on company's results and sustainable development.

Evidences from SMEs management practice also reveal that the use of an excessive volume of indicators (in respect to the size and scope of company operations, and its own organizational structure) may involve ambiguity and conflicting information in measuring performance (Dumond, 1994; Kald & Nilsson, 2000; Self, 2004). Due to this, managers can be discouraged to adopt PM frameworks as a diagnostic tool. This negatively impacts on traditional SMEs strategic capabilities (Henri, 2006).

Therefore, a selective approach (Simons, 1995) to performance measurement design is recommended in SMEs as an even more stringent professional practice than for larger firms.

4. Key constraining issues regarding current PM approaches effectiveness: the need for introducing a "dynamic" perspective into SME PM systems

One of the structural issues that characterize SME PM is related to a prevailing resistance in using Planning & Control (P&C) systems, due to the fact that entrepreneurs are inclined to centralize decision-making and design strategies according to their personal experience and feelings. This implies a weak understanding of both the impact of current decisions on future growth and which policies to undertake in order to cope with major change.

Likewise, a "passive" approach to P&C has proved to be counterproductive for the understanding of business processes and enhancing communication with company stakeholders (Bianchi, 2002). On this concern, a field research (Bianchi *et al.*, 1998; Parks *et al.*, 1991; Shuman *et al.*, 1985) has shown that many entrepreneurs conceive the adoption of P&C systems as a bureaucratic constraint, rather than as a learning tool that may support them to be aware of the "business formula" they are going to adopt (Coda, 2010).

Furthermore, the adoption of P&C systems in SMEs has been mainly oriented to a financial dimension of performance. Though fundamental, financial measures are no longer able to provide information that can support: dynamic complex management, measurement of intangibles, detection of delays, understanding linkages between short- and long-term, and setting proper system boundaries in strategic planning. To cope with such problems, the Balanced Scorecards (BSC) have been adopted by many companies (Johnson & Kaplan, 1987; Kaplan & Norton, 1996). The two main concepts underlying the BSC framework can be synthesized as follows: organizational performance cannot be managed by only focusing on end-results, and performance cannot be measured only in terms of finance. It also must include the "customer", the "process", and the "learning & growth" dimensions.

However, in spite of its widely recognized advantages, even the BSC presents some conceptual and structural shortcomings. Linard *et al.* (2002) assert that the BSC fails to translate company strategy into a coherent set of measures and objectives, because it lacks a rigorous methodology for selecting metrics and for establishing the relationship between metrics and firm strategy. Sloper *et al.* (1999) remark that the BSC is a static approach. Although Kaplan & Norton stress the importance of feedback relationships between BSC variables for describing the trajectory of a given strategy, the cause-and-effect chain is always conceived as a bottom-up causality, which totally ignores feedbacks, thereby confining attention only to the effect of variables in the lower perspectives (Linard & Dvorsky, 2001). Misperceiving the dynamic relationships between the system's feedback structure and behaviour (Davidsen, 1996; Sterman, 2000: pp. 107–133) often leads SME entrepreneurs to make their decisions according to a linear, static and bounded point of view, in terms of time horizon and relationships between variables.

In particular, the BSC approach does not help one to understand (Bianchi, 2012; Bianchi & Montemaggiore, 2008):

- How strategic resource accumulation and depletion processes are triggered by the use of different policy levers affect performance drivers;
- How performance drivers affect outcome indicators;
- How outcomes will affect strategic-asset accumulation and depletion processes.

In order to provide SME decision-makers with proper *lenses* for interpreting such phenomena, understanding the feedback-loop structure underlying performance, and identifying alternative strategies to adopt so as to change the structure for performance improvement, SD modeling has been used (Kaplan *et al.*, 1996, Linard, 1996, Morecroft, 2007; Richmond, 2001; Ritchie-Dunham, 2001; Warren, 2008). SD models can be properly linked to either accounting or financial models to support strategic P&C (Bianchi, 2002) and also to implement DPM.

5. A Dynamic Performance Management approach to frame SMEs performance

Combining P&C systems and SD modeling to support SME decision-makers in managing organizational performance according to a sustainable development perspective is the core of DPM.

Namely, SD modeling is adopted to map system structure to capture and communicate an understanding of behavior driving processes and the quantification of the relationships to produce a set of equations that form the basis for simulating possible system behaviors over time. If process structure determines system behavior, and system behavior determines SMEs performance, then the key for developing sustainable strategies aimed at improving strategic learning processes and maximizing performance, is acknowledging the relationship between processes and behaviors and managing the leverage points.

Particularly, it is possible to identify two converging streams of research regarding the application of SD to performance management: (1) a dynamic resource-based view of performance, and (2) a dynamic view of performance management (Bianchi & Rivenbark, 2012). Even though complementary, the distinction between the two approaches is related to the different perspective through which they frame performance.

According to a dynamic resource-based view (Morecroft, 2007; Warren, 2002), decision-making processes aimed at affecting organizational performance focus on strategic resources. Strategic resources are modeled as stocks of available tangible or intangible factors in a given time. Their dynamics depend on the value of corresponding inflows and outflows. Such flows are modeled as

"valves" on which decision-makers may act through their policies, in order to influence the dynamics of each strategic resource, and therefore – through them – performance indicators (Bianchi, 2010). In this respect, models are designed based on the building up and decline of key core assets (e.g., workers, equipment, workload, perceived service quality, financial resources). The feedback loops underlying the dynamics of the different strategic resources imply that the flows affecting such resources are measured over a time lag. Therefore, understanding how delays influence strategic resources and achieved results becomes a key-issue to manage performance in dynamic complex systems.

A dynamic performance management view it is primarily concerned with the identification of both end-results and their respective drivers. To affect such drivers, each decision maker must build up, preserve, and deploy a proper endowment of strategic resources that are systemically linked each other. This also implies that decisions made by different policy makers upon interdependent strategic resources should be coordinated each other, according a systemic view. Figure 2 illustrates how the end-results provide an endogenous source inside a SME for the accumulation and depletion processes that affect the strategic resources that cannot be purchased from the market. These are the resources generated by management routines (e.g. company image & reputation, organizational climate, employees burnout), equity and liquidity (Bianchi, 2012, p. 154). End-results are modeled as in- or out-flows, which over a given time span change the corresponding stocks of the corresponding strategic resources, as the result of actions implemented by decision-makers [2].

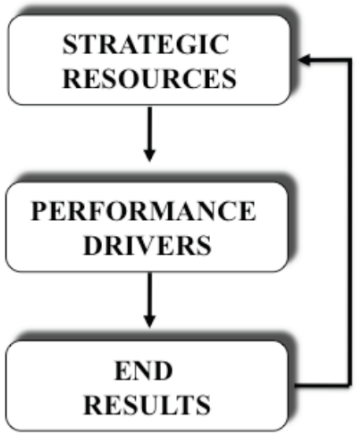

Fig. 2 – A dynamic view of performance management (Bianchi, 2010, 2012).

[2] For instance, liquidity (a strategic resource) may change as an effect of cash flows (an end-result); the image of a SME towards customers (strategic resources) may change as an effect of their satisfaction (an end-result).

Competitive performance drivers are associated to critical success factors in the competitive system. They can be measured in relative terms – as a ratio between the organizational performance perceived by customers and a benchmark – or a target value. Such a denominator must be gauged in relation to perceived past performance, customers' expectations, or even (if relevant) competitors' performance.

Also *social* performance drivers can be measured in terms of ratios between organizational strategic assets and a target, which can mostly be expressed in terms of either stakeholder's expectations or perceived past organizational performance. For instance, a social performance driver could be referred to the ratio between the actual and planned number of perceived undertaken social responsibility initiatives.

Financial performance drivers also must be measured in relative terms. For instance, the debts-to-total investments ratio often affects the change in company solvency perceived by investors. Such driver is the ratio between two stocks. Efficiency measures affecting operational costs can be gauged in terms of ratios as well. For instance, the employee's time per unit of workload is an expression of the ratio between two stocks – employees (unit of measure: people) and workload (unit of measure: widgets per week), multiplied by a constant (working hours per people per week).

To use a metaphor, while the end-results represent the *speed* of an organization's performance, the performance drivers represent the *acceleration* of performance. On the other end, strategic resources can metaphorically be depicted as the *forces* upon which decision-makers act, in order to affect the acceleration rate, and through it, the speed at which an organization is traveling.

6. The Mosaicoon case

Mosaicoon is a company established in 2008 in Palermo (Sicily, Italy); its core-business is viral marketing. Aimed at guarantying the success of its campaigns, *Mosaicoon* developed and introduced an innovative marketing model that combines the components of traditional advertising campaigns with those of interactive videos. Particularly, viral advertising is "a marketing technique that uses pre-existing social networks and other technologies to produce increase in brand awareness or to achieve other marketing objectives through self-replicating viral processes analogous to spread of computer viruses" (Source: Wikipedia). In addition, the firm offers an innovative automated reporting tool to keep track of video views, statistics and feedback from web-users. This allows clients to understand the competitiveness of products and to better identify possible improvements.

More than high-technological equipment, the most important assets of the company are human intelligence and creativity. In fact, interactive video creation and sharing mainly are based on both attractiveness and strategic positioning on the web to enhance the "word of mouth" effect – which in this case might be called "view of click" effect – between users.

Mosaicoon's product portfolio includes design, execution and tracking of advertising campaigns. A total of five different project types constitute the existing services provided by the firm: (1) viral campaigns, (2) web, (3) interactive, (4) video marketing, and (5) distribution.

So far, *Mosaicoon* staff consists of 20 people and, according to current managerial forecasts, the workforce will grow up to 25 employees. The company's organizational structure is divided into four main strategic business areas: Commercial, Creative, Seeding and Financial.

Viral and Interactive campaigns represent the 30%-40% of company's total revenues, while Seeding activities around the 70%. Company's client portfolio mostly includes multinational large-sized firms.

6.1 The design of a DPM system into Mosaicoon

Since *Mosaicoon* is articulated in different highly inter-related business units, in order to assess company's performance according to a dynamic approach, an inter-departmental perspective has been adopted to evaluate the contribution that each area provides to another one located downwards the business value chain. In doing so, we firstly made explicit the end-results related to each business area, to focus subsequently on the identification of those performance drivers that affect them. Then, going backwards, we also defined the strategic resources whose allocation allows decision-makers to intervene on performance drivers. The interconnections between business areas are made explicit by taking into account that the results of one area generate an impact on the strategic resources of another one.

On this concern, the emerging framework – displayed in figure 3 – illustrates how we designed *Mosaicoon* business structure, according to an "instrumental" view of performance, as defined in section 2. Particularly, such framework combines the different business areas through feedback mechanisms in order to capture interdependencies between both performance drivers with end-results, and these latter with strategic resources.

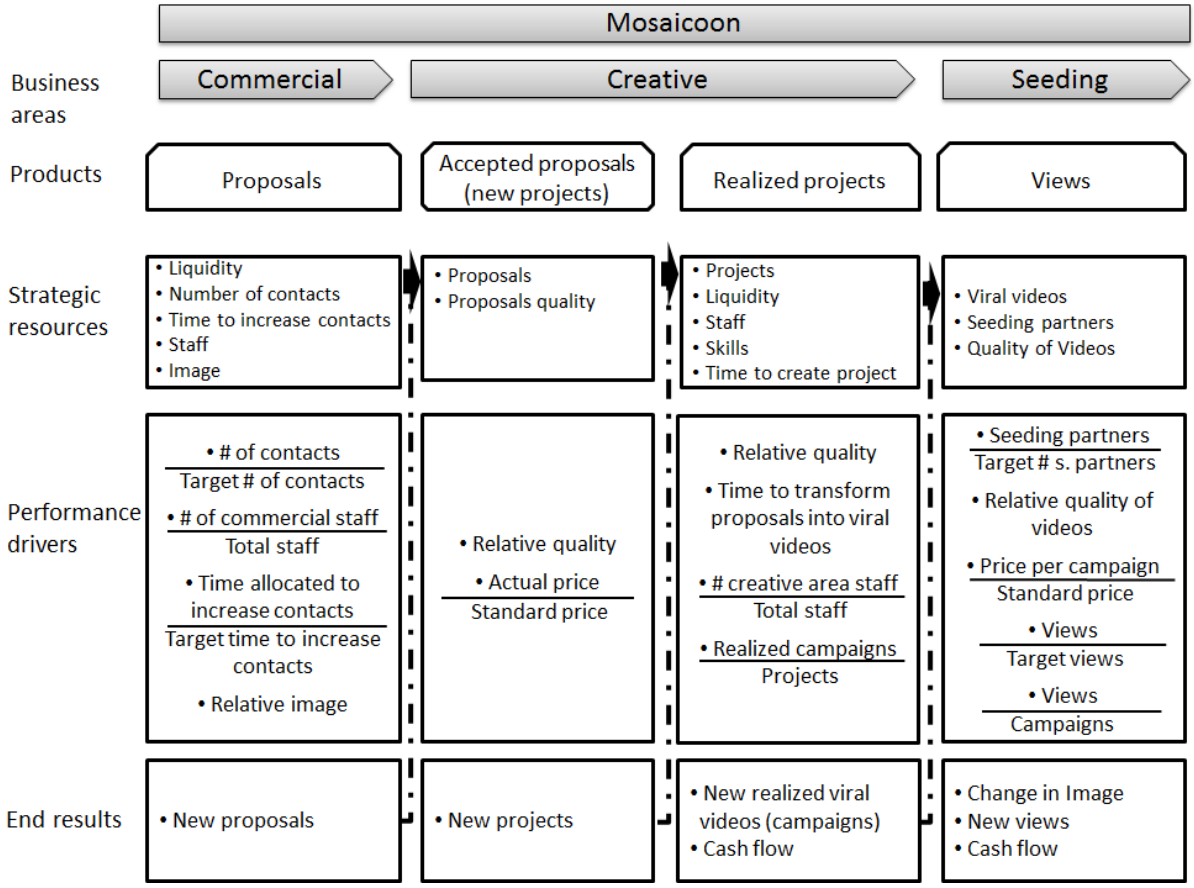

Fig. 3 - An instrumental perspective to frame Mosaicoon performance.

Each business area is connected with a set of indicators affecting the 'results' emerging from each process to which it contributes. It also implies that, for each process, the impact of other areas on end-results, and the effects generated by material and information delays are taken into account. Proposals, accepted proposals (i.e., new projects), realized projects, and views were identified as related products of the mentioned business areas. To start with, for the Commercial business area we identified as main end-result the change in number of new proposals. Then, four main ratios were designed as correlated performance drivers: (1) "Number of contacts/Target number of contacts", (2) "Number of commercial staff/Total staff", (3) "Time allocated to increase contacts/Target time to increase contacts", and (4) Relative image (i.e. "company image/desired or target image). Finally, as main strategic resources, we distinguished five stocks: (1) Contacts, (2) Staff in commercial BU, (3) Liquidity, (4) (Average or perceived) Time to increase contacts, and Perceived Image.

The same approach has been applied to the "Creative" business area. Firstly, relevant end-results for the decision makers are identified according to the "products". In these terms, we have the following end-results: 1) "New projects" (related to the product named "Accepted proposals"), and

2) “New realized Viral videos”, as well as “Cash flow” (both related to the product named “Realized videos”). In relation to such end-results, the following drivers have been identified:

- “Relative quality” and “Price ratio” (related to the “Accepted proposals”), and
- “Time to transform proposals into viral videos”, “Relative quality”, “Staff ratio”, and “Campaigns ratio” (related to the “Realized videos”).

Respectively, main strategic resources are stocks of Proposals and Proposals quality, for the first “product”, and stocks of Projects, Liquidity, Total Staff, Skills and Time to create project, for the second “product” in the “Creative” business area.

Finally, for the “Seeding” business area, the identified end-results are: “Change in Image”, “New views”, and “Cash flow”. The variables which most drive performance, have been identified as follows: “Seeding partners ratio”, “Relative quality of the videos”, “Campaign Price ratio”, “Views/Target Views ratio”, and “Campaigns ratio”.

The applied framework clearly illustrates how the end-results of one business area (e.g., “Change in number of new proposals” (Commercial business area) influence the strategic resource of “Creative” business area, i.e. the “Number of proposals” stock. Identical connection is seen between end-result of the Commercial business area (“Change in number of new realized viral videos”) and the strategic resource of the Seeding business area (“Viral videos” stock).

Main changes in company’s strategic resources are modeled as in or out-flows of the stock that change over a given time, as a result of actions implemented by decision makers. There are also causal relations between different strategic resources: image may affect the number of realized videos. Furthermore, both image and quality may affect the Seeding area product (Number of Views). On that way, following the “instrumental view” was confirmed very useful in model building.

6.2 The model structure

The *Mosaicoon* SD model combines different sectors through feedback mechanisms in order to capture the behavioral complexity of the different business areas and correlated products. Four business areas are included: Commercial, Creative, Seeding, and Financial business area. The feedback system related to *Mosaicoon* is displayed in figure 4. There are four reinforcing and eight balancing loops.

The main reinforcing loop is R1. If company increases number of employees in the Commercial area, this will bring an increase in the customer base (number of contacts). Likewise, this will cause

an increase in the number of proposals, and consequently will lead to greater number of accepted projects. Since most of the accepted projects will be finalized as *viral videos* campaigns, that number will increase as well. This will lead to increase in "Number of Views". Other conditions being equal, this will lead to an increase in the revenues, liquidity and investments. Finally, the more investments are planned the greater hiring rate will be causing increase in the number of employees. This loop has proven to be the most important one and the strongest one in the model.

The second reinforcing loop was found in relation to the Seeding business area. As the Quality of Videos increases, so does the Number of Views. Compared to the Planned number of views the Gap in number of views is decreasing in that case. Gap in number of views and Number of cooperators have the same polarity, direct positive influence, since the bigger the gap is, the more co-operators the company needs. The more co-operators needed to reach the planned number of views, the higher the costs of the company are and that leads to reduction in liquidity. Finally, liquidity positively influences investments in skills, which in turn raise the Quality of Videos, which closes the reinforcing loop.

The last reinforcing loop is mostly connected with Seeding business area and consequently with the Financial business area. Namely, the higher the Quality of Videos is the more Number of Views it will reach. That leads to higher Revenues and consequently to higher liquidity, which allows more Investments in skills and therefore better Viral Videos Quality.

Regarding the Commercial area, it is expect to hire a Desired number of employees (up to 25 people). On this concern, the main limit is related to wages. In fact, wages negatively influence the level of liquidity (loop B6). Likewise, loop B5 shows how an increase in liquidity generates higher investments which, in turn, may drain liquidity. This represents a limit to growth.

Loop B3 shows that an increase in contacts within the company's database positively affects the time employees will spend to maintain existing contacts. This may decrease the time available for gaining new contacts. A reduction of time spent to gain new contacts, in turn, will lead to a decrease in new contacts inflow.

Loop B8 illustrates that the larger the gap between planned and actual number of new contacts is, the higher the desired number of new employees will be. This latter involves an increase of the gap between desired and actual employees in the Commercial area. Similarly, the larger the gap is, the higher the hiring rate will be. As the hiring rate rises, there will be more people working in the Commercial area that will allow the company to increase its contacts.

A balancing loop related to Seeding business areas is loop B7. It shows that the higher the number of co-operators is there will be more views of the campaign. That will diminish the gap in number of views defined as the difference of planned number of views and actual number of views.

The “Creativity” business area also faces certain limits to the infinite growth. The first balancing loop is particularly interesting since it shows how the Quality of Videos influences Image of the Company in the positive way, naturally. The company’s decision makers, with the increasing image, then decide to raise the price (their policy is, once the image is built, to attract only the “best customers”, leading brands and they increase the prices of their videos). That in turn will have some limiting effects to the “Number of Viral Videos” that will be realized. In fact, ratio Actual price per campaign over the Standard price is one of the key drivers in the Seeding area. The second loop in this area, marked as B4 shows so-called “Burn out” effect of the employees and shifts the light on this possible vulnerability in this business area.

The balancing loop related to Seeding business areas is also loop B7. It shows that the higher the number of co-operators is there will be more views of the campaign. That will diminish the gap in number of views that is defined as the difference of planned number of views and actual number of views.

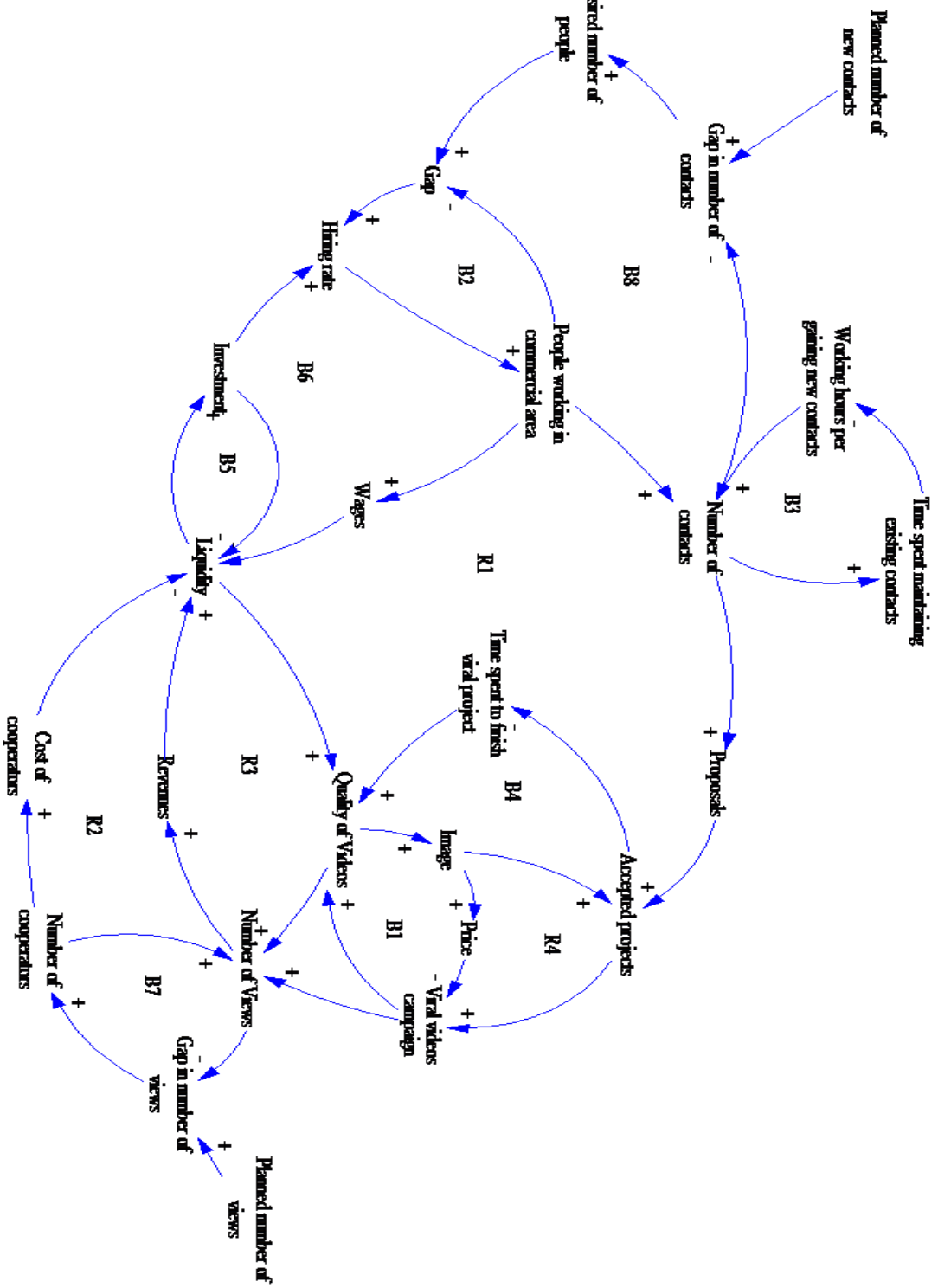

Fig. 4 – Mosaicoon's model structure.

6.3 Alternative policies simulation and scenario analysis

After the model was built and tested the validity, the logical question emerged from the side of decision makers: what can be recommended to manage the performance of Seeding and Viral Campaigns using System Dynamics methodology? In order to answer this question the exogenous parameters, which have the most influence on the key performance indicators, were identified: Planned number of new contacts, Planned number of realized viral videos, and Desired number of views per project.

In the simulations, the initial values of these variables were altered. The most influential endogenous variables were found to be quality and investments in marketing. Therefore, two main different investments from the stock of liquidity are distinguished. Firstly, three policies regarding marketing investment with different levers were outlined.

"Policy 1" implies that from all investments (by the rule of the company it is set to be 70% of the Liquidity) allocation to marketing is 0.33, or one third of the whole amount. "Policy 2" allocates 0.7 to the marketing and finally "Policy 3" gives 0.5 multiplications to the initial amount of money available to invest. Respectively, the rest of the amount is to be invested into increase of skills.

This means that whole investment (70% of the stock's outflow) is invested in certain manner to either aggressive investment into marketing or aggressive investment into the increase of skills, or as in "Policy 3" equal investment in skills increase and in marketing.

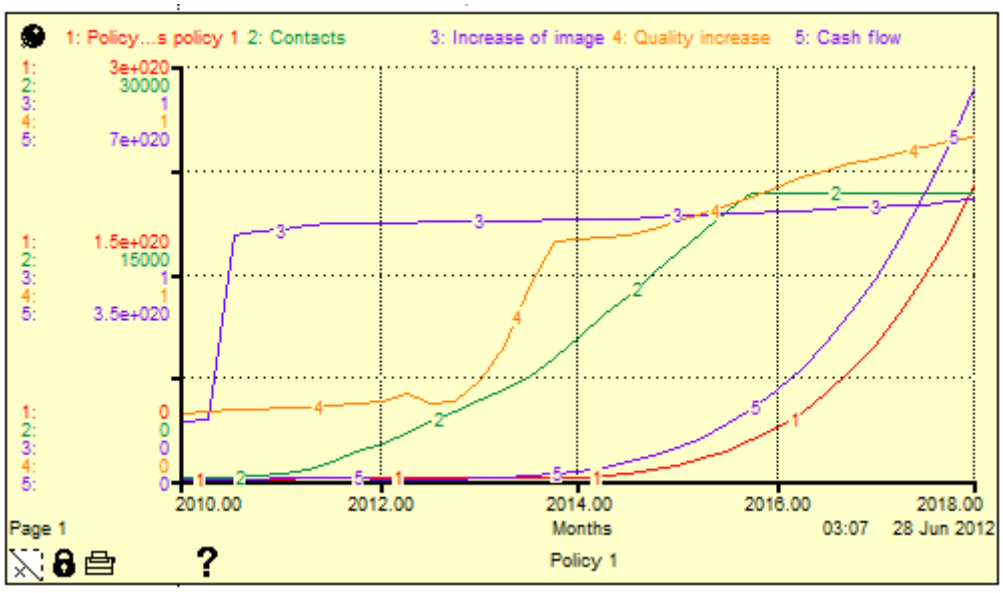

Fig. 5 - Policy 1, aggressive investment in skills.

"Policy 1" implies that Quality increases very fast, although with some oscillations due to the delays in the system. Connected with that, Increase of Image is significant. Then, the Number of contacts gradually will increase up to the limit of the company (set by number of employees). The top will be reached at the end of 2015, other conditions being equal. The end value reaches 20.800 contacts. Consequently, there will also be limits to growth in the number of new proposals, new projects and realized videos.

If we decide to implement "Policy 2", the following results occur (see figure 6). In this case, as expected, Quality increases with a lower rate but the company's Perceived Image is increasing aside from this effect (by direct investment in marketing). This aggressive investment in marketing will lead to a better and more stable effect on Image. However, cash flow is showing considerably smaller growth rate.

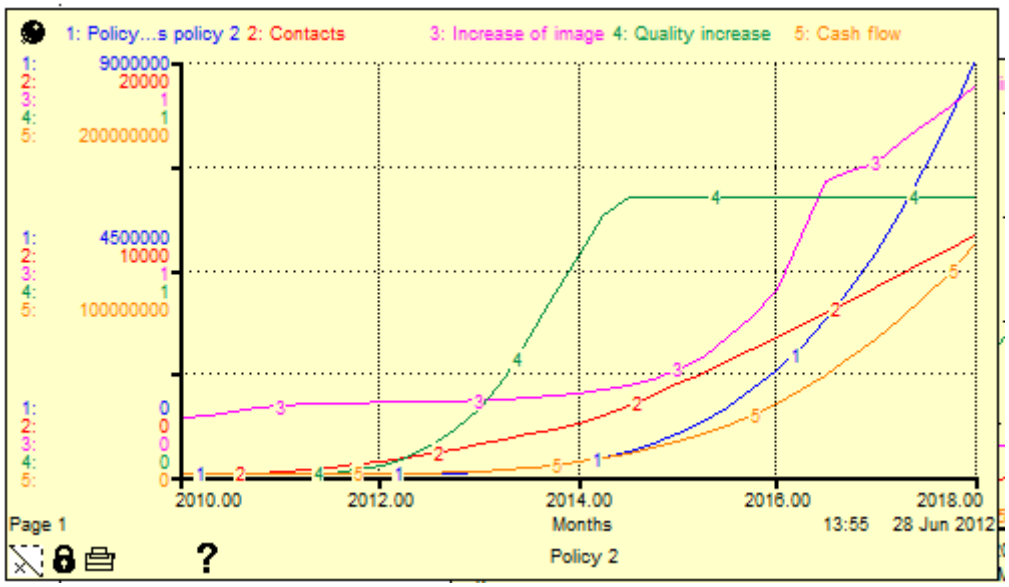

Fig. 6 - Policy 2, aggressive investment in marketing.

As a final point, if we run the third policy, which includes equal investment in skills and marketing, then the results of the model are as presented in the figure 7. Increase of image for both runs – "Policy 2" and "Policy 3" – remained the same. However, differences in the cash flow are noticeable. The company could reach the higher amount, in long term, of cash flow by implementing the same investment in skills and in marketing.

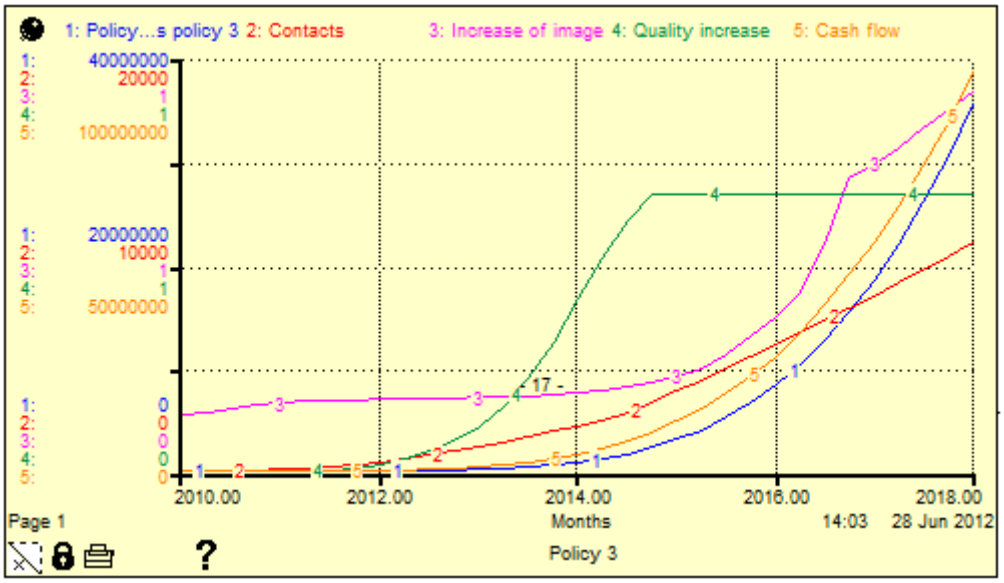

Fig. 7 - Policy 3, equal investment in skills and marketing.

As alternative scenario, it is suggested to the company's decision makers to introduce overtime. This is because more time must be devoted to maintain existing customers with an increase of number of projects and number of contacts, and the maximum number of employees is set on the level of 25 employees in the commercial area, which implies that this is the only way to comply the desired completion rates. As it is illustrated in the figure 8, with introduction of the overtime, employees compensate the increase in the effort required per task with an increase in the capacity and in the long term, it will lead to the increase in number of videos. Instead of the normal value of 160hours per months per employee, the second run was done with the value of 200, and with 40hours more per 200 hours per month per employee, in the long term company will reach accumulated amount of 1700 projects, which is about 200 more projects that without introduction overtime. Having in mind the average price per viral video campaign (around 60.000 euro per campaign) the effect is considerable.

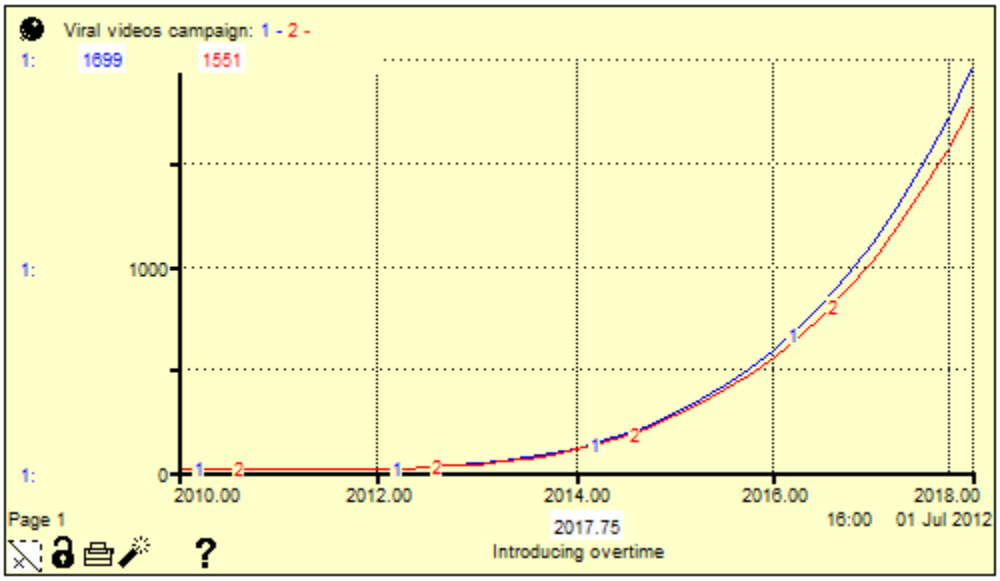

Fig. 8 - Introducing overtime.

At the same time, since change in service attractiveness occurs only after a certain delay (it takes time for current and prospect customers to realize the firm's overall quality has been changed), it is crucial to constantly monitor it and strive for a sustainable quality level at all times. Creating quality pressure requires management to become aware of the implications of their service and then, through training, incentives and measurement, persuade employees that avoiding these costs is a priority and that they will not be punished for slowing their work to correct any quality problems they detect (Sterman, 2000).

One of the initial limitations of the model was setting the maximum number of people working in commercial area on 25 employees. This is a serious limit to growth of the company. If, just for the testing purposes, the model is set with a huge amount of maximum employees in commercial area, for instance 100 employees, then the company could reach 30% more of the viral campaigns and cash flow. Therefore, limit reconsideration was one of the final suggestions to the company's decision makers.

7. Closing remarks

This paper has outlined how to design and use a DPM approach aimed at pursuing a sustainable development in SMEs. Such an approach has allowed us to remark the usefulness of SD methodology applied to SME performance management. In fact, combining SD models with PM systems may support entrepreneurs to better identify and measure key-performance indicators and to effectively influence policy levers to pursue a sustainable development in SMEs.

Particularly, the emerging framework is related to an "instrumental view" of performance measurement that focuses on how results are achieved (i.e., means-ends analysis). According to this perspective, the identification of the strategic resources driving performance is possible through a prior identification of:

(1) the measures that really matter for pursuing a sustainable organizational development;
(2) the "administrative products" which are delivered by main decision areas in a small business.

The paper has also addressed the need to tailor performance analysis and the identification of responsibility areas to the characteristics of SMEs. On this concern, a leaner and more selective approach is needed in respect to what is usually done in strategic performance management through conventional financial analysis, or even through BSC frameworks applied to larger firms.

The application of such DPM framework to a small business, named *Mosaicoon*, has been discussed in the second section of the paper. As a result, the empirical evidences emerging from this case study reveal how the design of a DPM approach, as the one hereby suggested, may effectively improve the strategic learning processes of SME decision makers and support them in adopting long-term competitive strategies according to a sustainable development perspective.

Further research will be necessary to develop more applied knowledge on DPM systems tailored to SME characteristics that provide challenges for researchers.

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