EXPLORING INTELLECTUAL CAPITAL IN A CALL CENTRE THROUGH A 'SYSTEM DYNAMICS' RESOURCE BASED VIEW

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ABSTRACT

This paper examines alternative Intellectual Capital (IC) investment policies in a dynamically complex system in order to explain differences in firm performance. The analysis is supported through the use of a System Dynamics (SD) simulation model. This paper is based on the hypothesis that in order to explain superior performance, it is not sufficient to look at the endowment of strategic resources; it also requires an analysis of the dynamics of resources accumulation and depletion processes, which stem from management policies. To assess the impact of IC on company performance, a conceptual framework and an SD simulation model are developed. Finally, the results from alternative scenarios are presented.

Keywords:

Intellectual Capital; Resource Based View; System Dynamics; Simulation

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INTRODUCTION

This paper examines alternative Intellectual Capital (IC) investment policies in a dynamically complex environment to explore how such decisions affect firm performance. The analysis is supported through the use of a System Dynamics (SD) simulation model that was built by the author on the base of an empirical analysis.

The SD methodology is based on the concepts of feedback loops, delays and non linear relationships between variables, and it can be used to investigate the coordination of dynamic resources systems through modelling and simulation. It aims to support decision makers' learning processes through an improved understanding of firm performance over time. Such an approach is also likely to make the Resource Based View (RBV) of a firm more explicit. In fact, the RBV focuses on bundles of unique, difficult to imitate and non-substitutable tangible and intangible resources to explain a firm's superior performance. Firms are viewed as a network of resources that are embedded in closed feedback loops.

This paper is based on the hypothesis that in order to explain superior performance, it is not sufficient to look at the endowment of strategic resources; it also requires an analysis of the dynamics of resources accumulation and depletion processes, which are affected by management policies.

This paper proposes a framework in which to analyze the impact of IC investments on a call centre's and firm's performance. To assess the impact of IC on company performance, I first explore how IC investments influence *business strategic resources*, *drivers* and *indicators*. On the basis of this framework, *investment policies* and *feedback processes*, which control IC stock accumulation and depletion processes over time,

performance drivers and *outcome indicators* are made explicit through the use of a SD simulation model.

The SD simulation model is built with reference to a real telecom call centre case and it focuses on IC investment policies. Simulation results show that IC investments based mainly on human resources (HR) practices lead to a higher customer satisfaction index, higher average revenues per call and, consequently, higher net revenues per call. However, as the above relationships are characterised by nonlinearities and delays, short term effects may significantly differ from those produced in the long run. The use of an SD simulation model can help decision makers to experiment with alternative IC investment policies and to compare their outcomes over time.

The paper is divided into four main parts. In the first part, the benefits of investigating IC through a system dynamic resource base perspective, the IC concept and relevant call centre management issues are explored. In the second part, an introduction to the case-study, the company's main HR practices and a conceptual framework to evaluate IC investments are provided. In the third part, the structure of main feedback loops underlying IC and other strategic assets accumulation and depletion processes, performance drivers and indicators in a call centre are discussed. In the fourth part, an analysis of a base run and two alternative scenarios resulting from the SD model are presented. Finally, conclusions and future research are outlined.

INVESTIGATING IC THROUGH A 'SYSTEM DYNAMICS' RBV

To maintain a superior performance and a competitive advantage – in terms of unique configurations of resources that are difficult to imitate by rivals – a growing number of firms are focusing their attention on investments in intangibles assets, rather than exclusively in tangible resources. Tangible resources are those that are typically displayed

on a company's balance sheet, such as machinery, buildings and inventory. By contrast, intangibles refer to people and their experiences, business processes and routines, company reputation, and image.

A perspective that explains superior business performance on the basis of unique, difficult to imitate and non-substitutable tangible and intangible assets is the Resource Based View (RBV) of the firm (Penrose, 1959; Barney, 1991; Grant, 1991; Peteraf, 1993; Makhija, 2003). This approach views the firm as complex bundles of resources. It asserts that differences in performance happen because successful organisations possess strategic resources (physical, human and organisational) that competitors do not hold.

The above perspective also provides an explanation about the various types of competition among firms, which are the result of differences in resources and capabilities possessed by each organisation (Helfat and Peteraf, 2003). Such resource differences, in terms of nature and value, play a significant role in generating profit for a firm (Amit and Schoemaker 1993; Peteraf, 1993). Firms that are able to accumulate resources with rent-yielding potential may increase the amount of rents generated and, consequently, profits (Szulanski, 2003).

By adopting this perspective, a firm's competitive advantage does not result from the industry dynamics, but from the process of accumulation and exploitation of the firm's strategic resources. Notwithstanding, some limitations to the RBV have to be outlined.

First, some authors emphasise the difficulty in identifying which firm's strategic resources represent a key factor in achieving a superior performance (McGrant, 1996; Mosakowski and McKelvey, 1997).

Second, focusing the analysis on the firm tends to disregard the industry context (D'Aveni, 1994; McGrant, 1996). In a hypercompetitive environment, a firm's outcomes result from the interaction of many internal and *external* forces.

Finally, even though the RBV literature conceptually emphasises the need to balance strategic resource exploration (acquisition of new knowledge) and exploitation (use of knowledge already acquired) in organisational learning (March 1991), very often firms suffer from a myopic focus on exploitation (Levinthal and March, 1993). Such a phenomenon can result from an emphasis on current resource endowments, which were considered appropriate by decision-makers to frame the past, but not necessarily the present or even the future [1] (Prahal and Hamel, 1994).

Opportunities and threats interpreted through frames based on current resource endowments, rather than a dynamic analysis of resource accumulation and depletion processes can lead to systematic errors in resource allocation decisions (Amit and Schoemaker, 1993). This behaviour can be also due to a lack of methods and tools (Bontis, 2002) that enable decision makers to investigate the acquisition of and decline in strategic resources, and the feedback processes that control them and drive their evolution over time, thereby influencing firm performance (Warren, 2002; 2005; Morecroft, 2002). The relevance of such concepts was introduced into strategy literature by Dierickx and Cool (1989) along with the bathtub metaphor reported in figure 1 (Morecroft, 2002).

Insert Figure 1 about here

The "bathtub" metaphor emphasises the concept that in order to understand competitive advantage which is based on, in particular, nontradeable strategic resources, it is fundamental to comprehend the *inertia* underlying asset stock accumulation and

depreciation processes. Assets characterised by non-tradeability can be, for instance, the firm's reputation for quality of service, human capital, dealer loyalty, R&D capability, etc. These resources are the cumulative result of a set of investment policies over a period of time. On this concern, Dierickx and Cool (1989) remark that "*while flows can be adjusted instantaneously, stock cannot"*. A consistent pattern of resource flows is essential to accumulate a desired change in strategic asset stocks.

Through the "bathtub" metaphor the difference between stock and flows can be easily explained. The stock of water is represented by the level of water in the bathtub at a given moment in time, and it is the cumulative result of the continuous flow of water into the tub, net of the outflow of water. Through the tap it is possible to define a policy that will influence the water inflow. Water outflow can result from a "normal" decline process through, for instance, a leak, or an explicit decision to empty the bathtub.

Such a perspective shifts the focus of the strategic analysis from a static view toward a dynamic process of resources accumulation and depreciation. As a consequence, a key role in strategy formulation is covered by the "task of making appropriate choices about strategic expenditures (advertising spending, R&D outlays, etc.) with a view to accumulating required resources and skills (brand loyalty, technological expertise, etc.)" Dierickx and Cool, 1989).

Although analysis of resources accumulation and depreciation processes helps decision makers to understand why firms' performances differ, Dierickx and Cool do not investigate in depth – and make explicit – the managerial policies and feedback processes that control resource flows, and which are the result of strategic expenditures (Morecroft, 2002).

In light of the above, this paper focuses on the stock and the flows relationships resulting from IC investment policies that aim to affect firm performance. To assess the impact of IC on company performance, I first suggest a conceptual framework to explore how IC investments influence *business strategic resources*, *performance drivers* and *indicators*. To this aim, the System Dynamics (SD) methodology (Forrester 1961; Sterman 2000) is appropriate. This methodology is based on the concepts of feedback loops, delays and non linear relationships between variables, and it can be used to investigate the coordination of dynamic resources systems through modelling and simulation (Crossland and Smith, 2002; Gary 2005; Morecroft, 2002; Norton and Kaplan, 2002; Sterman, 2000; Warren 2002, 2004, 2005).

The analysis of cause-and-effect relationships between main business variables is not driven by a mechanistic approach, according to which a given set of feedback loops is defined *a priori*. On the contrary, SD provides the basis on which a dialectic learning process can be built, implying that decision makers' mental models are made explicit and questioned in order to pursue a common, shared view of reality emerging from the analysis of the relevant system (Vennix, 1996). The SD model aims to reproduce the system where decision makers operate in a 'virtual context'. Playing with an SD model allows them to simulate decisions that would be made in the real world in a "safe" environment and to test their effectiveness in the short and long run, according to alternative scenarios (Maier and Grossler, 2000; Sterman, 1992).

More recently, some benefits of the use of SD simulation models have been also outlined by Norton and Kaplan (2002: 312-313). Such authors argue that system dynamic simulation models foster "constructive dialogues" between corporate and business unit executives when evaluating the impact of different strategies on firm performance. Through

such an approach, “managers could understand better the trajectory of the value creation from a given strategy, and they could fully evaluate strategic alternatives before committing resources for new investments”. Modelling business strategic resources dynamics allows managers to clarify and make explicit “key operational drivers of value creation” and to understand the implications of feedback mechanisms on the business unit’s strategic objectives.

THE CONCEPT OF INTELLECTUAL CAPITAL

In the last decade, Intellectual Capital has been widely analysed by both practitioners and academics. These analyses have focused on an *internal* goal (e.g., to better allocate business resources to achieve a superior performance) or an *external* goal (e.g., to provide stakeholders with information related to expected future growth). Although there is general agreement in the field about the strategic impact of IC on a firm’s performance, such consensus cannot be detected in terms of definitions provided.

To mention just a few examples, IC can refer to intellectual material, such as knowledge, information, intellectual property and experience that can be put to use to create wealth (Stewart,1997); to market, human-centered, intellectual property and infrastructure assets (Brooking, 1996); to human capital and structure capital (Edvinson and Malone, 1997); to non-physical sources of value (claims to future benefits), generated by innovation (discovery), unique organizational designs, or human resource practices (Lev, 2001); or to something greater than the sum of human, structural and relational resources of the firm. IC can also be about how to let the knowledge of a firm work for it and have it create value (Chaminade and Roberts, 2003).

Some authors (Bontis 2002; Maar, 2005) argue that definition problems occur because this field has attracted interest from different perspectives or disciplines (economic,

strategy, accounting, finance, marketing, and human resources). On this matter, I strongly agree with the remark that the IC field is truly multidisciplinary. However, to understand the concept of IC and to reveal its *nature*, I suggest going back to the etymology of the terms “intellectual” and “capital”.

The term “intellectual” comes from the Latin *intelligere*, i.e. to understand, to learn.

The term “capital” in management literature refers to investments in tangible or intangible production factors, leading to an expectation of future yields.

It then follows that the concept of “Intellectual Capital” has to be related to those investments made by a firm in order to improve the capability of its people and the organisation itself to understand, i.e. to better frame the system where decisions are made. Therefore, *building IC means fostering the learning capability of the firm to make sound decisions about ends/goals to achieve, and related means*. Such means refer to the resources to acquire or build, coordinate and deploy for the achievement of the firm’s ends/goals. Among such resources, strategic assets are particularly relevant, as they often constitute the core of a firm’s competitive advantage.

As a consequence, managing IC implies an understanding of the net of cause-and-effect relationships that controls the firm’s resource dynamics over time and the impact of strategic expenditures on resource accumulation and depletion processes. In fact, by making the dynamics of the firm’s main stocks and flows explicit, decision makers are able to try out alternative resource allocation policies to achieve sustainable business goals.

The definition of IC provided above seems to be in harmony with the concept proposed by John Kenneth Galbraith in 1969 (Feiwal, 1975). According to Galbraith, IC does not represent a static endowment of resources *per se*, “intellect as pure intellect”, but

instead it stands for a means [a learning capability of the firm] to an end [business goal] (Bontis, 1998).

Most of a firm's strategic assets are intangible and cannot be bought on the market (e.g. business image and reputation, quality of service, or managers' personal contacts). Other strategic assets may refer to tangible resources, which can be purchased from suppliers (e.g. machinery and other technological equipment, warehouses, and product portfolio). However, in both cases, if the current endowment of strategic resources is low, the decision to build or acquire specific resources is insufficient. Dierickx and Cool (1998) call this phenomenon *interconnectedness of asset stocks*. This implies that the accumulation process of a stock "may depend not just on the level of that stock, but also on the level of *other stocks*", which are complements.

Insert Figure 2 about here

Without learning, which leads to a significant increase in the IC knowledge stock, a firm may not be able to build strategic assets exclusively through investment decisions. Thus, IC can be considered a *primary strategic asset* for the acquisition and deployment of others. Organisational routines (Nelson and Winter, 1982) and the interaction processes between the firm and its relevant environment, combined with the existing stock of knowledge (i.e. IC), is likely to build up other strategic assets, such as the quality of training programs and the level of personnel productivity (see figure 2). However, IC can suffer *erosion processes* (Dierickx and Cool, 1998). Stock decay may occur in the absence of adequate "maintenance" expenditures to replace the draining process or as the result of a drastic and unexpected change in technology. In fact, in the presence of a given

obsolescence time, the higher the endowment of a resource – all conditions being equal – the higher the outflow of the resource.

I shall now analyse the main characteristics of a call centre and outline the main issues for decision makers when managing a call centre.

CALL CENTRE MANAGEMENT ISSUES

In the last decade customer care strategies of service firms and, in particular, of telecom companies have received growing attention. In order to offer clients a reliable and effective customer service over time, firms very often decide to provide it directly through their own call centre, or to outsource it. Today most of the companies mentioned in the Fortune 500 list have at least one call centre, and more than $300 billion annually is spent on this service around the word (Gilson and Khandelwal, 2005).

However, it has been shown that most of these initiatives have neither contributed to keeping low costs nor provided customers with a reliable service (Batt and Moynihan, 2006; Gilson and Khandelwal, 2005). An analysis of the US mobile-telecommunications industry (Braff and Leogue, 2004) shows an extraordinary number of unsatisfied customers. This study outlines that customer complaints very often refer to an agent's recurrent failures to fix a problem despite several calls that the customer makes about it, in particular, customer claims that call centre agents often provide inconsistent advice, instructions or clarifications from one call to the next. In addition, critics are also directed at an inability to provide the help requested due to, for instance, systems limitations or lack of available technical resources. The above difficulties very often generate an increase in customer loss and, as a consequence, a decline in sales revenues and market share.

These unexpected outcomes are also due to the complexity of call centres (Mehrotra and Fama, 2003). Call centres typically handle more than one type of call, and each call

type can be referred to as a “queue”; agents also often make outbound calls to customers, either proactively (typically for telemarketing) or as a follow-up to a previous inbound call; each call is of a random duration, as is the work that agents must do after completing the phone call (data entry, documentation, research, etc.); and, finally, call centre agents can be trained to handle one type or all types of calls with different priorities.

In other words, in order to manage a call centre effectively, decision makers must be aware of: *a*) the net of causalities affecting both tangible and intangibles assets over time, *b*) the accumulation and depletion processes that affect such assets, and *c*) how management policies may affect the dynamics of company strategic resources that are fundamental to defend or achieve a sustainable competitive advantage. On these last concerns, Mehrotra and Fama (2003) remarked on the emerging important role played by simulation models in exploring alternative scenarios to identify successful call centre management policies.

In the next section of the paper, a case-study is described, and the company’s main human resources policies are discussed. This analysis enabled the author to build a conceptual framework through which call centre investment policies, which are related to human resources and information systems and organisational structure, affect a company’s tangible and intangible assets and, indirectly, the firm’s performance.

INTRODUCTION TO THE CASE-STUDY

Company *Alfa* is a leader in providing mobile telecom (GSM and UMTS standards) and internet services in the domestic market. In the last three years, their company market share has decreased from 50% to 48.5%. Two rivals compete for the remaining market through aggressive commercial policies.

In order to build a sustainable competitive advantage, company *Alfa* has always paid particular attention to the most up-to-date technological broadcasting stations on one hand, and to advanced training and development through human resources programs on the other. In fact, their strong image in the market is due to the ability of firm *Alfa* to provide its customers with a reliable coverage, proper plan flexibility and timely customer service.

The case-study focuses on the call centre's activities and, in particular, on how investment policies related to human resources, information systems and organisational structure affect the call centre's results and, indirectly, the firm's performance.

For this study, a call centre that deals with about 6 million customers in a given geographic area was selected. The *Alfa* market share and Average Revenue Per Unit (ARPU) in this area are very similar to those recorded by the company for the whole domestic market. The analysis was further restricted to a particular segment of customers that generates about 40% of the total sales revenues in the selected area. This segment is defined as "Gold customers". "Gold customers" are managed by a call centre in which about 410 agents operate.

The company's Customer Satisfaction Index

One of the main reasons that favoured the involvement of company *Alfa* in this research was the possibility to explore in an innovative way the potential causes underlying the oscillations recorded over a period of three years in the Customer Satisfaction Index (CSI). In particular, the project aimed to make explicit and test potential cause-and-effect relationships between the investment policies adopted by the company and the erratic behaviour of the CSI.

The company conceives the CSI as one of the main strategic drivers that affects business results. In particular, the company assesses the CSI through internal surveys and

external analysis carried out by specialised firms. The daily CSI is determined on the basis of a sample of 500 customers who called the call centre the day before. The results are then summarised on a monthly basis, and reports include the CSI scores (which range from 0 min to 100 max) and the main reasons for the calls (e.g., request for information vs complaint).

Insert Figure 3 about here

As it is possible to observe from figure 3, in the selected period the CSI related to "Gold customers" shows an overall decline with some oscillations. The company personnel involved in the study mainly justified these oscillations as being due to temporary failures in the information systems. However, during the meetings, I did not perceive full consensus on these issues. In fact, some participants argued that the oscillations could have been a consequence of the company's aggressive commercial policies whose aim was to set them apart from competitors.

The company's HR practice

At the beginning of the study permanent agents (full-time and part-time) accounted for about 80% of the call centre staff. The rest was made up of temporary or fixed-term agents. During the period analysed a growing number of permanent agents who decided to leave the company were replaced by temporary agents. At the end of the period, the call centre had 260 permanent agents and 150 temporary agents.

The HR policy for temporary and permanent agents differs. Temporary agents usually receive an initial and on-the-job training, but they do not periodically participate in ongoing training initiatives, as do the permanent agents.

In the period analysed, the annual length of the planned HR training programs was set at around 98 hours for permanent agents and only 30 hours for temporary agents. These

programs cover different areas, such as organisation, networks, information systems, commercial and technical issues, loyalty and outbound, administration, communication and learning, and safety on-the-job.

A FRAMEWORK TO INVESTIGATE THE IMPACT OF IC ON CSI AND FIRM PERFORMANCE

The framework proposed here is the result of prior applied research (Bianchi and Bivona 2005). It aims to distinguish the impact of investment policies (related to human resources and information and organisation systems) on strategic resources, which in turn affect performance drivers and indicators.

The framework for this analysis is provided in figure 4.

Insert Figure 4 about here

Figure 4 shows how different primary strategic assets embodying business knowledge are built as an effect of hiring, training, organisational structure and information systems investments.

On the basis of the analysis conducted with company *Alfa*, investments in HR (hiring and training), organisational structure and information systems may enable the firm to accumulate strategic resources related to business knowledge, i.e., human resources knowledge and competences (HR knowledge index), and information and organisational systems improvement (Organisation structure index).

Business knowledge is likely to affect *performance drivers*, such as 'Answer Service Response', the so called 'One-Call-Solution' and 'Pro-activeness' indexes, which in turn can influence CSI.

‘Answer Service Response’ refers to the percentage of calls answered compared to the volume of calls received in a call centre in a given period of time.

The second driver, ‘One-Call-Solution’, measures the ability of call centre agents to solve customers’ problems during the one call.

The third driver, ‘Pro-activeness’, shows agents’ ability to be successful in proposing and selling new services to customers. A high Pro-activeness produces benefits for both the customer, who is informed about new services, and the company, in terms of higher revenues.

An increase in the three *performance drivers* generates growth in customer satisfaction, which in turn is likely to influence three synthetic firm performance indicators: Average Revenue Per Unit, Sales Revenues and Company Market Share.

The use of this framework helps decision makers to make their mental models about perceived relationships between policy levers, business strategic resources, performance drivers, and indicators explicit.

However, such a scheme does not capture how investment decisions affect strategic resource accumulation and depletion processes over time or how virtuous or vicious cause-and-effect relationships may fuel or tackle business growth. Furthermore, it does not take into account delays that may occur between decisions and related effects. As a consequence, decision makers may undervalue short term effects brought about by their policies (i.e. they are perceived as ineffective in a bounded period of time, but may be profitable in a longer time horizon) and may be erroneously forced to change them.

In order to overcome the above limitations, the System Dynamics (SD) methodology can be very helpful in investigating the coordination of dynamic resource systems through modelling and simulation (Crossland and Smith, 2002; Gary 2005;

Morecroft, 2002; Norton and Kaplan, 2002; Sterman, 2000; Warren 2002, 2004, 2005), and in supporting decision makers' learning processes in understanding firm performance over time.

EXPLORING THE RELATIONSHIPS BETWEEN STRATEGIC RESOURCES, PERFORMANCE DRIVERS AND INDICATORS

In order to make explicit the structure underlying the relationships between strategic resources, performance drivers and indicators in a call centre, a Group Model Building (GMB) approach (Vennix, 1996) was adopted.

In particular, investments in human resources training and information and organisation systems were identified as main levers to influence agents' knowledge and productivity. These phenomena synthetically are expressed through two indexes: *Human Resources Knowledge* and *Organisation Structure Indexes*.

A rise in these indexes and the hiring of new employees are likely to affect call centre production capacity positively. The higher the production capacity is, the higher the total number of calls answered will be. As a consequence, all conditions being equal, the answer service response (i.e., the number of calls answered divided by the number of calls received in a given time frame) will also improve. This implies a growth in CSI, which in turn may generate positive word of mouth. A larger customer base implies a high volume of sales revenues and a growing operating income. This result may enable the company to fuel business growth by making further investments in human resources, information and organisational structures (see positive feedback loop in figure 5).

Insert Figure 5 about here

Investments in human resources, information systems and organisation structure can also contribute to give rise to the agents' ability to solve customers' problems in just one call (One-Call-Solution). A high 'One-Call-Solution' enhances CSI and positively contributes to winning new customers. An increase in the number of customers is likely to boost sales revenues, operating income and financial resources, which can be reinvested to promote further growth (see "bold" positive feedback loop in figure 6).

Insert Figure 6 about here

Such investments may also foster agents' 'Pro-activeness' (i.e., an agent's ability to propose and sell new services to customers successfully), which in turn generates a twofold effect: an improvement in CSI and an increase in the average revenue per unit. In both cases, 'Pro-activeness' favours two positive feedbacks that may foster firm growth (see bold positive feedback loops in figure 7).

Insert Figure 7 about here

There are some limitations to the growth mechanisms described above. In fact, as the customer base grows, the volume of calls also tends to increase. It therefore follows that there is a decrease in the answer service response, the CSI deteriorates and the company's customer base declines. A reduction in the company's customer base generates a lower volume of calls, which feeds back into the answer service response (see bold negative feedback loop in figure 8). This negative feedback loop is likely to generate oscillations in CSI that are not easy to perceive due to delays and non-linear relationships between answer service response, CSI and the customer base.

Insert Figure 8 about here

An increase in call volume is also likely to generate an unintended vicious loop, which contributes to amplify CSI oscillation. In fact, a high call volume produces 'unanswered calls', which in turn – in the short term – makes the answer service response worse (see bold positive feedback loop in figure 9).

Insert Figure 9 about here

In order to properly manage the volume of incoming calls and to provide customers with a satisfactory level of service, the company can act in three main areas: human resources (hiring and training), organisation and information systems.

In the three years observed, the company replaced a growing number of permanent agents who decided to resign with temporary agents. Although this current decision is likely to improve company operating income in the short term (due to lower costs in temporary agents' salaries and training), the adoption of a financial perspective prevents decision makers from prefiguring the long term effects on intangible assets, such as agent knowledge.

In light of the feedback loops' structure outlined above, the decision to replace permanent agents with temporary ones enabled the company to keep the call centre production capacity stable with regard to calls answered. However, it produced an unintended and gradual effect on the average human resources knowledge index. In fact, even though temporary agents may have a high productivity, their level of knowledge (compared to permanent agents) reduces the average HR knowledge index. This phenomenon also occurs because the company gave temporary agents only an initial training program due to their high rate of quitting. A low human resources knowledge

index produces negative effects on both one-call-solution and agents' pro-activeness, which represent two fundamental drivers of CSI and sales revenues.

The current study also contributed to making explicit a hypothesis about the growing number of permanent agents who decide to resign, i.e., the increase in quitting stems from the company's decision to reduce the training period from 98 hours to 30 hours. In fact, it emerged from interviews with a small sample of permanent call centre agents that the policy had generated agent dissatisfaction, which strongly contributed to the increase in resignations.

In order to help call centre management to better frame and manage IC investments that impact on CSI and business performance indicators, the feedback structure above provides a conceptual basis on which to develop the SD simulation model (Winch 2001).

Facilitated simulation sessions (Vennix, 1996) with the involvement of company personnel were run to help them to understand the interaction between the identified feedback loops and how their planning decisions may influence the processes of strategic asset accumulation and depletion as well as performance indicators in the short, medium and long term.

Such an approach intends to stimulate decision makers' capability to better frame cause-and-effect relationships underlying business knowledge and firm performance over time.

AN ANALYSIS OF THE PAST VARIABLES AND TWO SCENARIOS

In order to validate the SD simulation model developed, validation tests were conducted on both the relationships among the variables underlying the structure of the model and the sensitivity of key-variables' behaviour under different circumstances (Forrester and Senge, 1980). In addition, the behaviours of some business key-variables

originating from the SD model and past data from the company were compared. Even though the differences between the simulated and actual results have not been verified in statistical terms, the company actors were confident on the ability of the SD model to replicate the investigated phenomena.

In order to show how the potential benefits of the SD simulation model could help call centre management explore the impact of alternative policies on CSI and firm performance, a base run and two scenarios are now presented.

Figure 10 depicts the past behaviours of the main variables using the SD simulation model. The simulation covers a period of three years (time is expressed in days).

Insert Figure 10 about here

Figure 10 shows a decline in permanent agents and a growth in the number of temporary agents. This phenomenon, already discussed in the case-study, is the result of a company policy. In the observed period, the HR knowledge index also shows a reduction (from 0,93 to 0,89), mainly due to an inadequate training program compared to the industry standard. This generates a higher HR turnover in both temporary and permanent agents.

The answer service response in the first year drops and then levels off. This phenomenon can be explained as a consequence of both the increase in permanent agents quitting rate and the reduction in HR knowledge index. Agents' pro-activeness and one–call-solution indexes portray the same path of HR knowledge index over time. The CSI falls and also shows some recurrent oscillations. On the basis of these results, business performance indicators, such as average revenue per unit, market share and customer base, decrease. In order to compare alternative scenarios with the base run results, initial conditions (e.g., market assumptions) do not change. Furthermore, to better understand the

effects generated by HR hiring and training policies, investments in information systems and organisational structure are kept constant in both scenarios.

Scenario 1: a myopic HR practice

In scenario 1 (see lines 1 in figure 11), permanent agents who decide to resign are replaced by temporary agents (see temporary and permanent HR lines 1 and 3 in figure 11). To distinguish the effects of the training policy, after the first year the HR training length is increased to the normal industry standard (from 30, provided in the past by the company, to 98 hours per year). This increase in training produced a slower decline in the HR knowledge index compared to the base run (see figure 10). This phenomenon is likely to contribute to improving the answer service response and, consequently, the CSI. Although such results seem better in monetary terms than those portrayed in the base run, this scenario does not stabilise the HR knowledge index and may produce unsustainable results in the long run. This becomes apparent from the declines in agents' pro-activeness and one–call-solution indexes.

Insert Figure 11 about here

Scenario 2: a long-term oriented HR policy

Scenario 2 (see lines 2 in figure 11) assumes that the company hires a number of permanent and temporary agents equal to those that resign. As in scenario 1, after the first year, human resources training length is increased to the normal industry standard.

The HR policy adopted enables the firm to achieve a superior performance as a consequence of a stable HR knowledge index, and an improvement in agents' pro-activeness and one-call-solution indexes. Agent ability to be successful in promoting and

selling new services to customers strongly contributes to raising the average revenue per client.

Scenario 2 tries to demonstrate that a more coherent IC investment policy is likely to influence strategic assets dynamics (HR knowledge index) positively, and this may help *Alfa* to sustain a competitive advantage in the long run.

CONCLUSIONS AND FUTHURE RESEARCH

This study explores IC investment policies in a call centre through an innovative perspective. In particular, the RBV and the SD methodology have been combined to test the hypothesis that to explain superior performance it is not sufficient to look at the endowment of strategic resources, but it also requires an analysis of the dynamics of the processes of resource accumulation and depletion resulting from IC investment policies. To this end, the use of an SD model enabled the investigation of alternative scenarios and a comparison of the simulated results.

On the basis of such results, it is possible to assert that although a call centre is defined as a “profit centre”, in which activities are mainly oriented to generating sales revenues with a desired yield, in day-by-day operations it is often threatened as a “cost centre”, in which cost savings, efficiency and economies of scales are main imperatives.

In fact, it has been demonstrated that this focus on costs, if applied to IC investment policies in a call centre, may produce financial benefits (due to, for instance, low levels of training or the replacement of permanent agents with temporary agents) in the short term, but unintended consequences, such as a higher absenteeism and turnover, lower productivity, a lower HR knowledge in the long run. High turnover in a call centre is a widely recognised problem that leads to poor customer service (Batt and Moynihan, 2006).

Furthermore, facilitated simulation sessions (Vennix, 1996) helped call centre management to better understand the interaction between the identified feedback loops and how their planning decisions may influence performance indicators.

In spite of the widespread relevance and influence of asset stock accumulation, explicit formulation and modelling are not prevalent in the strategy literature. This shortfall occurs even though successful examples nowadays demonstrate the benefits of modelling and simulation of asset dynamics in helping decision makers to understand alternative corporate diversification strategies (Gary 2005), or performance recovery strategies (Warren, 2005).

Further empirical research is necessary to test the contribution of the methodology adopted in this paper to managers' learning processes, in both educational and planning contexts.

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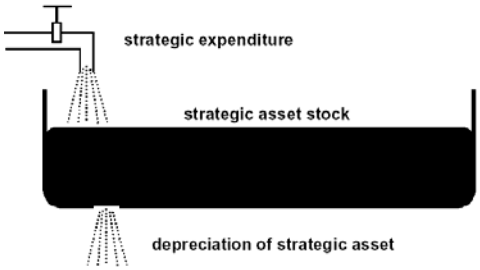
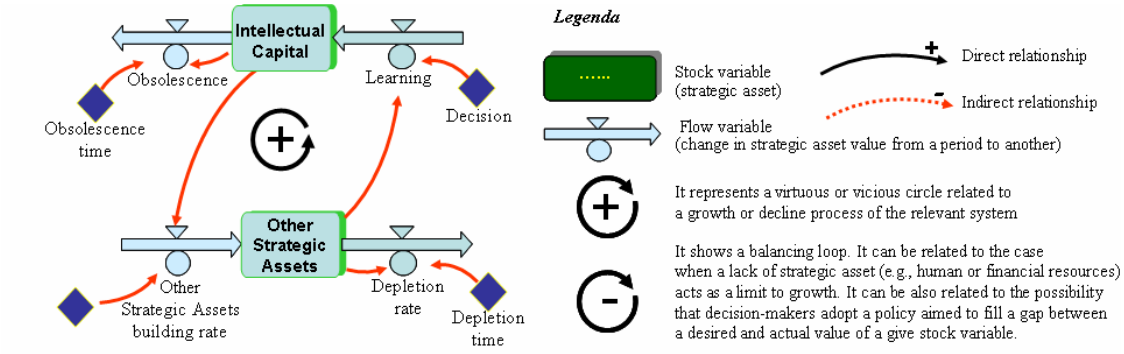
FIGURES

FIGURE 1



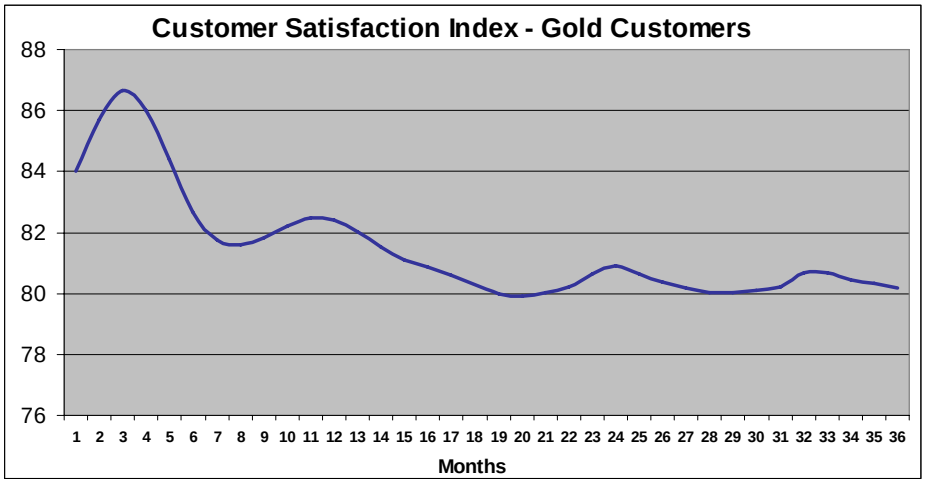
The Bathtub Metaphor, Visualising the Accumulation and the Depreciation of Resources

FIGURE 2



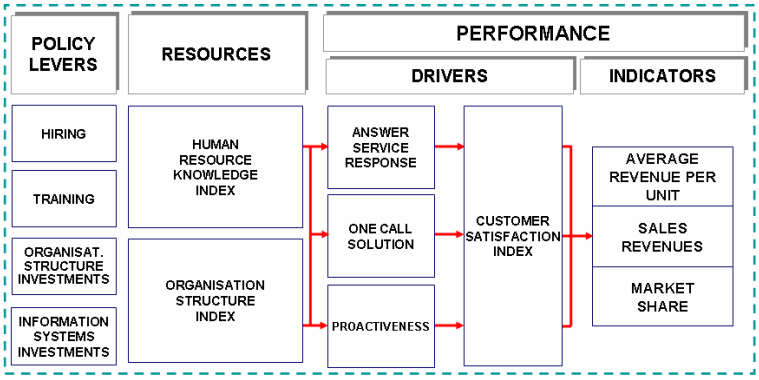
Intellectual and other strategic assets accumulation and depletion processes underlying business growth

FIGURE 3



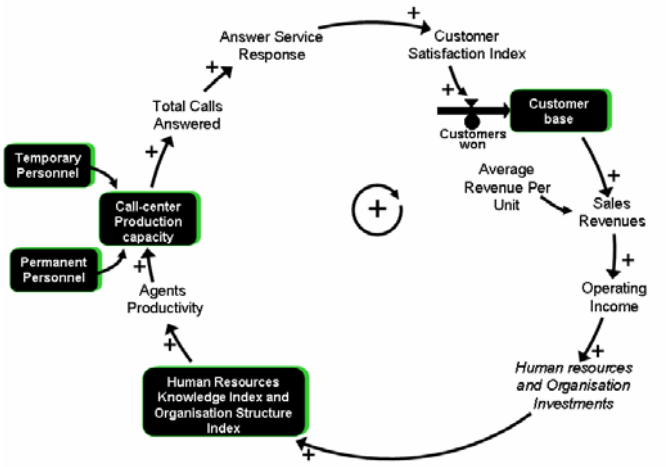
Customer Satisfaction Index of "Gold customers"

FIGURE 4



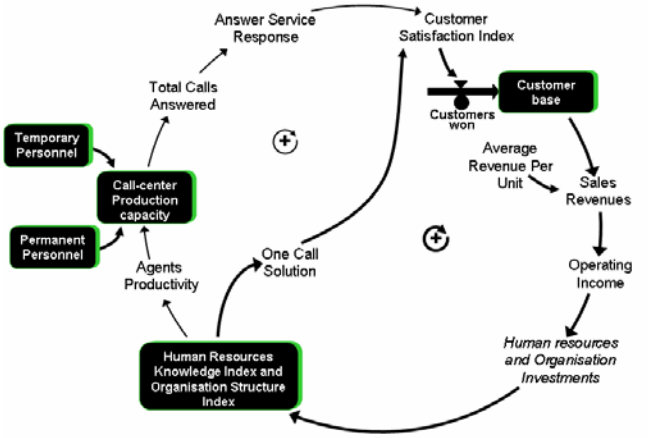
A conceptual framework for Intellectual Capital non-monetary assessment

FIGURE 5



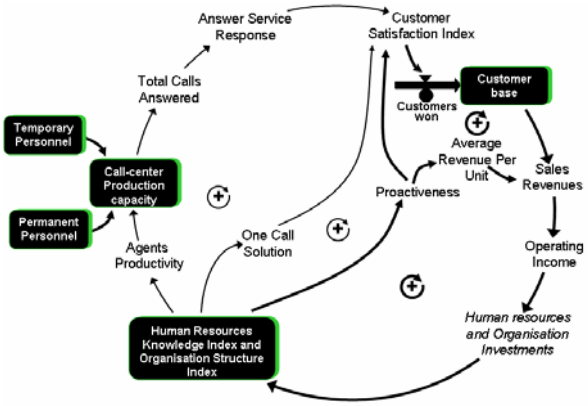
A positive feedback loop related to the effects of human resources and organisation investments on Agents Productivity and CSI

FIGURE 6



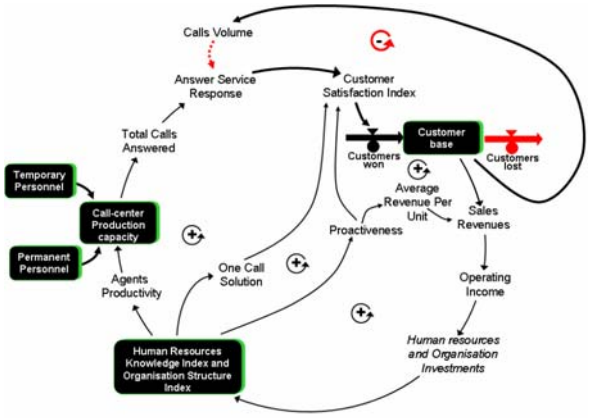
A Positive feedback loop related to One Call Solution and CSI

FIGURE 7



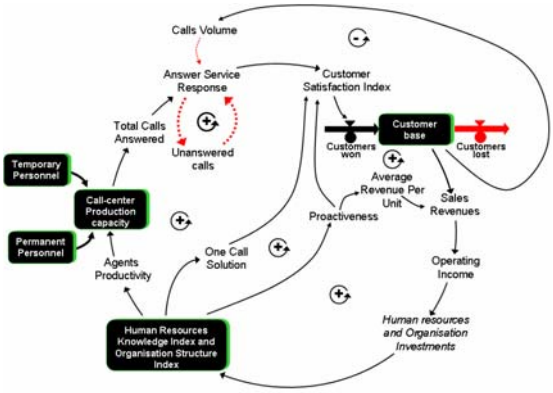
Positive feedback loops related to Proactiveness and CSI

FIGURE 8



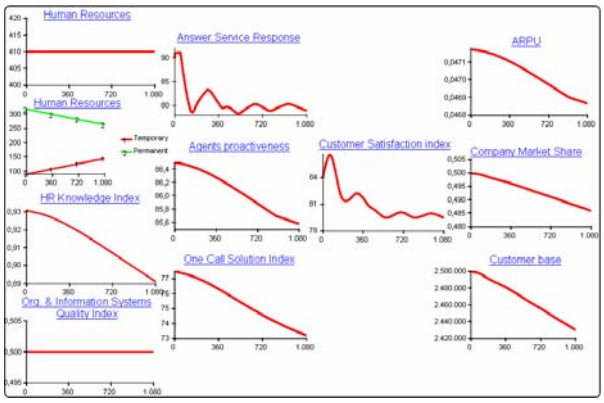
A Negative feedback loop related to the effect of Calls volume increase on CSI

FIGURE 9



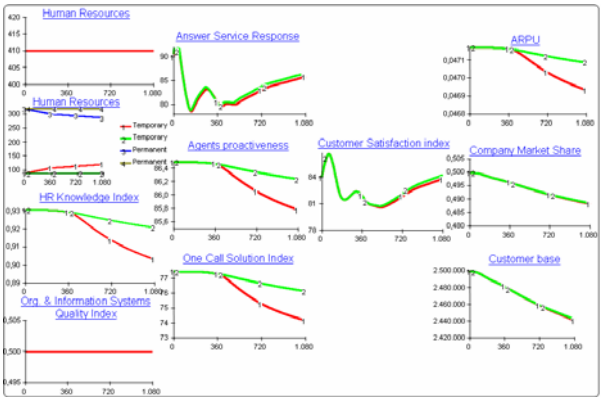
Vicious loop related to the effect of unanswered calls on answer service response

FIGURE 10



Company resources, performance drivers and indicators related to the base run

FIGURE 11



Company strategic resources, performance drivers and indicators related to scenario one (line 1) and scenario two (line 2)

[1] Such a myopic approach has been also remarked by Prahal and Hamel (1994). They argue that a firm has a "corporate genetics" (that is beliefs, values, norms, manager know how, biases and assumptions about the structure of the relevant industry, about who the customers are or are not, etc.) which – when the environment changes rapidly and radically – may become a threat to survival. In order to cope effectively with such phenomena, firms must create within themselves a reasonable portion of "genetic diversity" , selectively "unlearning the past". Managers should question their beliefs and their frames and recognise that Intellectual Capital depreciates over time and there is a need to continuously rebuild it.