

The role of goal setting practice on sales and on the broader commercial system: a case study

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1. Introduction

'Goal Setting', applied to organizations, is one of the most investigated and empirically validated practices in human resource management (Locke & Latham, 2002).

A wide literature have shown that goal setting practices increase personal motivation, especially in highly commercial activities. The positive effects, exercised by the practice of goal setting, for organizations, have been outlined in various researches: particularly in reference to some performance indicators such as productivity and profit.

The purpose of the present work is to demonstrate the strength of a model in which tangible and intangible elements are integrated: processes underlying the goal setting practices together with processes underlying other business functions, such as commercial, financial and organizational ones.

It is, however, fundamental to keep into consideration the human factor (workers attitude toward organization, workmates, supervisors, targets), to completely understand the variations and trends of the main variables of a business firm.

This study ultimately aims at:

- ✓ explaining how the application of the 'goal setting theory' in a business firm, constitutes a vital directional lever in the growth of motivational standards
- ✓ showing the opportunity of an efficient integration between the goal setting process sub-system and other business sub-systems
- ✓ demonstrating how income and sales dynamics are influenced by personal motivation and, indirectly, also by the ways in which the goal setting processes are governed
- ✓ demonstrating why system dynamics constitutes an effective methodology in the elaboration and validation of organizational models, which are able to include a strong connection between the tangible and intangible realms.

This paper is the result of a research project conducted with a firm operating in the Household Electrical Appliances industry. The firm has its registered office in Sicily, but operate in all Italy regions.

In the first part of this paper, an analysis of Goal setting theory and the role of goal setting practice in enhancing individual performance is remarked.

In the second part, the case-study, the evolution of the business, feedback analysis of adopted management growth policies, unperceived potential limits to growth of management policies and policy design to remove limits to growth are discussed.

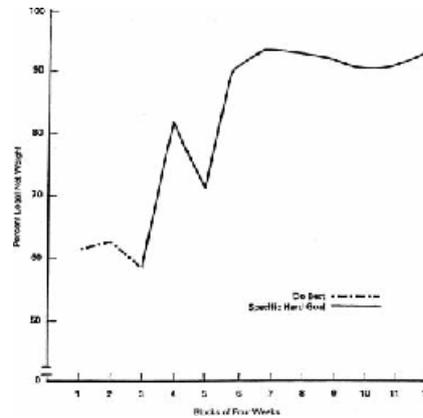
2. Goal Setting Theory

2.1 Goal difficulty and goal specificity

The Goal Setting Theory is by many researchers considered one of the major motivational theories (Locke & Latham, 2002). The theory is based on the assumption that setting challenging goals, hard to reach (goal difficulty), yet well described (goal specificity), contributes to a general improvement in working performances. Latham & Baldes (1975) acknowledged that in a specific application of these procedures, in which difficult goals were assigned, rather than generic recommendations as 'do your best', increased the quantity of cargo, transporters were able to fit into their vehicles, from 60% to 90%. This resulted in a reduction of expenses of \$250000 in only 9 months (fig. 1).

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Figure 1. Goal setting effect on percentage increase of cargo the transporters produced without the recommendation to “do your best” (Latham & Baldes, 1975).



A meta-analysis conducted by Tubbs (1986) revealed that setting challenging goals for workers, after a clear and detailed explanation of the objectives, and giving a minute feed-back after mid-term achievements, positively influence workers’ performance. The value of the effect, expressed as effect size, of the variables acting on the performance (dependent variables) are illustrated in table 1.

Table1. Overall tests of hypotheses (Tubbs, 1986).

Overall Tests of Hypotheses—Direct Goal Measurement							
Hypothesis	M	k	n	SD	% s.e.	Range	95% C.I.
Goal difficulty	.816	56	4732	.409	26.6	-.58 1.95	.01 1.62
Goal specificity	.502	48	4960	.255	42.3	-.14 2.12	.00 1.00
Feedback	.564	3	176	.000	100.0	.31 .76	.56 .56
Participation	.002	17	890	.400	36.9	-.68 .99	-.78 .79

Note: Statistics reported in this table are those obtained after correcting for sampling error and unreliability. When the amount of observed variation in effect sizes was less than or equal to that which could be expected to be due to sampling error, a standard deviation of .000 is reported. *k* = number of results averaged; *n* = total sample size across studies; % s.e. = percent of observed variance attributable to sampling error; 95% C.I. = 95% credibility interval.

The analysis has also considered the value of ETA, (degree of relationship between study characteristics and effect size) relative to the averages of each sub-group, subject to the differential analysis (research conducted in laboratories and on the field, research in which the goals were assigned or defined by means of a participative procedure, research in which no feed-back (formal nor informal) was communicated, research in which the goal was processed in terms of a quantitative unit of measure, rather than time, experimental and correlated research), and shows how the typology of research project influences the effect size between independent and dependent variables.

Table 2. Tests of differential analysis of sub-groups (Tubbs, 1986).

Breakdown of Goal Difficulty Results—Direct Goal Measurement							
Subgroups	M	k	n	SD	% s.e.	95% C.I.	Eta
Laboratory	.897	45	3722	.403	27.8	0.11 1.69	.38
Field	.520	11	1010	.270	42.4	-0.01 1.05	
Assigned	.857	31	2024	.526	22.3	-0.17 1.89	.12
Participative	.751	17	1888	.333	29.1	0.10 1.40	
No feedback	.349	5	367	.080	90.6	0.19 0.51	.35
Informal feedback	.885	28	3110	.423	20.6	0.06 1.71	
Formal feedback	.763	14	979	.351	37.0	0.07 1.45	
Quantity goal	.845	52	4406	.400	27.5	0.06 1.63	.26
Time goal	.420	4	326	.320	37.2	-0.21 1.05	
Experimental	.783	23	1628	.494	22.9	-0.19 1.75	.06
Correlational	.817	30	2146	.355	30.1	0.14 1.53	

Note: Means, standard deviations, and credibility intervals reported in this table are those obtained after correcting for sampling error and unreliability. *k* = number of results averaged; *n* = total sample size across those studies; % s.e. = percentage of observed variance attributable to sampling error; 95% C.I. = 95% credibility interval; Eta = degree of relationship between study characteristic and effect size.

Further meta-analyses, conducted by Locke & Latham (2002), point out that setting goals with a high degree of difficulty better working performance with an effect ranging between .52 SD (Standard Deviations) to .82 SD (tab. 2). Improvements come to a stall or even diminish in the cases in which the worker possesses limited abilities and skills, or for loss of commitment (Erez & Zidon, 1984). Some researches underline the fact that more complex tasks require more qualified abilities, on behalf of the individuals undertaking the task (Wood & Locke, 1990; Latham et al., 1994). Challenging goals produce adequate performances only in cases in which the individuals possess the competence and technology to carry out the task efficiently. Another investigation has proved that goal difficulty influences levels of performance within a range of .48 SD, for extremely difficult goals to .67 SD, for extremely simple ones (Wood et al., 1987). This empirical evidence compels researchers to include many psychological variable factors in any scientific approach to the study of practices relating to the setting of goals, for instance goal commitment.

2.2 Goal Commitment

Many researchers have stressed the importance of partaking in the decision making process and acceptance of defined goals (goal commitment) for the determination of high performance standards. According to these studies a strong feeling of commitment helps to intensify dedication and persistence to work and to better working performances (Hollenbeck & Klein, 1987; Locke & Latham, 1990).

Scholars suggest that the management of goal setting procedures contributes to the enhancement of goal commitment levels in a participative set-up. In fact, high levels of commitment accelerate the processes of acquisition of the specific skills, fundamental for the accomplishment of particular tasks (Seijts & Latham, 2001). It also boosts the ego with the sense of well-being and satisfaction individuals feel when carrying out jobs (Brunstein, 1993). Others suggest that goal commitment works as a variable of moderation in the balance between goal setting and performance (Klein et al., 1999). Researches in this direction have recognized two basic factors responsible for the determination of high commitment levels: the first refers to the importance workers place on the achievement of the set goals. Scholars, investigating in this field, suggest that the management of goal setting procedures, in a participative set-up, contributes to the enhancement of goal commitment levels. Participation to the decision making process seems to increase the sense of belonging and spirit of integration of group members. They will eventually develop the idea of being part of a team, striving to reach a common objective, thanks to the effort and dedication of every single individual (Hollenbeck et al., 1989).

The second factor to influence commitment is the sense of self-efficiency, that is the trust every individual places on his/her abilities in gaining a goal (Bandura & Cervone, 1983; Bandura, 1986; Bandura, 1989).

2.3 Tell and Sell

Various works show how some specific procedures of goal setting administration influence the degree of commitment to the goals (Klein et al., 1999). Participation is the key word: those practically involved in goal attainment should take part in the process of goal definition. Yet, empirical evidence to support the above hypothesis has given rise to contradictory results and opinions: some studies seem to sustain this proposition positively (Klein et al., 1999), while others strongly oppose it (Tubbs 1986). These apparently contrasting results should be, however, analyzed keeping into consideration the different modalities with which goals are assigned every time.

Some researchers have specified that in cases in which determination of goals had been beforehand articulately described and reasoned, to explain the choice of difficulty level, the participation effect was practically null (Latham et al., 1982; Earley & Kanfer, 1985; Erez & Arad, 1986).

The above described mode of goal setting, called tell and sell, seems to generate commitment levels similar to those aroused in the participative mode (Latham et al., 1988). This appears to be due to a greater aptitude of individuals of recognizing a comprehensible purpose for the assigned goal, which allows them to bring forth a shared sense of responsibility and a greater motivation towards the achievement of the difficult task (Earley, 1986; Locke & Latham, 1990).

2.4 Goal Setting Theory and Social Comparison theory

Another branch of research has dealt with the connections between the goal setting theory and the social comparison theory: individuals personal representation of his/her own abilities influences the perception and, consequently, the prediction of his/her working performance as that of others (Hinsz, 1995; O'Leary-Kelly et al., 1994; Matz & Hinsz, 2000).

This theory postulates the basic need expressed by individuals to evaluate their own personal abilities and opinions (Festinger, 1954) and that, whenever confronted with a task, tend to esteem their competency and subsequent performance above average (better-than-average effect). This triggers a psychological pattern which helps keeping high levels of self-confidence (Jellison & Riskind, 1970; Myers, 1980; Alicke et al., 1995). Other studies show that the better-than-average effect is deeply restrained every time individual are well aware of the actual abilities and skills held by the individuals they are comparing themselves with: the more ambiguous and fanciful is the information one holds of the comparing group, the greater the is the better-than-average effect (Perloff & Fetzer, 1986).

2.5 Feedback information provided by supervisor

The implications of feedback in the goal setting theory have been subject of investigation by many scholars. They have attempted to assess the incidence of supervisors' feedback information on individual and group performances (Guzzo et al., 1985; Ilgen et al., 1979; Nadler, 1979; Sassenwrath, 1975; Ivancevich & McMahan, 1982; Taylor et al., 1984; Nadler et al., 1980). A meta-analysis conducted by Guzzo et al. (1985) on the effects of feedback applied to psychological studies, have registered, for overall generic working performances, the average value of .35 DS; while feedback applied to goal setting practices increases performance to an average value of .75 DS.

Feedback, fed by supervisors to individuals engaged in the accomplishment of any given goal, is considered by researchers a variable of moderation in the balance between goal progression and performance improvement. The common opinion is that people need to know whether the direction of action engaged and initial results are congruent to the general work project. Having received such information the workers' motivation mounts and so does persistency and determination (Bandura & Cervone, 1986).

Bandura (1989) further conceptualizes the function of feedback, as a balancing element of moderation between goal and commitment, introducing the idea of feed-forward. This refers to the tendency of individuals to anticipate the future: once they have acknowledged the state of progression of the project (feedback). Bandura (1989) points out that having gained a difficult goal successfully, having thus reinforced the general feeling of self-efficiency, individuals are apt to set and accept the challenge of working for the attainment of an even greater one.

In this complex psychological process, an important part is played not only by the feedback control mechanism, which monitors the effectiveness of the actions engaged and project development, but also by that of feed-forward, which leads individuals to set greater and greater goals as a result of a growing confidence in his/her capabilities (Bandura 1989). There is a great deal of documented research to prove the function of feedback in the goal setting theory (Locke et al., 1981; Tubbs, 1986).

2.6 Goal Setting, Self-Esteem and Cognitive Action

A study conducted by Locke & Latham (2002) explains that performance is influenced by goal definition thanks to 4 basic mechanisms. In the first place, the goal plays a directional function, in the sense that it drives the individual's attention and action towards the goal, allowing him/her to distinguish what is relevant and what is not, in terms of cognitive action and behaviour (Rothkopf & Billington, 1979; Locke & Bryan, 1969). Secondly, goal assignment stimulates empowerment and engagement toward the task (Bandura & Cervone, 1983). Third: the given set goal increases the individual's skill in maintaining attention and actions focused on the objective (LaPorte & Nath, 1976). Finally, the goal also stimulates the activation of strategies and know how for a better completion of the job.

It is in fact proven that individuals with a high self-esteem will most probably identify and apply strategies more readily than those with low self-esteem (Smith et al., 1990; Wood & Locke, 1990; Latham et al., 1994; Wood & Bandura, 1989). Earley & Perry (1987) stated that in cases in which individuals are trained to the use of appropriate strategies in the accomplishment of difficult tasks, they most likely greatly improve their working performance, whenever difficult goals are assigned to them.

3. Methodology

The present investigation has been supported by the System Dynamics methodology (Forrester, 1961, Sterman 2000), and applied to the project of organizational development of an Italian business firm, operating in Sicily.

The project has been decline into the following steps:

- a. Preliminary analysis of basic traits of the firm;
- b. Analysis of the main sub-systems, for a significant description of the business in terms of 'business growth' and 'growth limitations';
- c. Attention focus on goal setting practice, as sub-system;
- d. Description and representation of the connections between the goal setting sub-system and the ones individualized previously;
- e. Elaboration of simulation models using Vensim software;
- f. Progression analysis of significant indicators of intermediate and final achievements;
- g. System dynamics analysis sales quantity
- h. First attempt to model validation

Data and general information related to the firm were gathered with the use of structured and semi-structured interviews, developed by a team of 15 members, including the president of the administration board, the marketing manager, the commercial manager and a network of sales agents. The data provided by semi-structured interviews allow the author to design the feedback loops structure.

4. Beta s.r.l. Household Electrical Appliances Division case study

4.1 Beta s.r.l. Household Electrical Appliances Division: a brief history

Beta s.r.l. is a small company of young business men, dealing with computers and mobile phones since 1991. After a slow but sure growth, the company expanded its business into a new line of products: household electrical appliances.

Beta s.r.l. created a division within the company for the purpose of commercializing the new products. The division resulted from the acquisition of another firm: Alpha s.r.l., which has been working in the distribution of electrical appliances. At the time of the acquisition, Alpha s.r.l. was buying from a sole supplying company, which, due to its international impact and high quality products, kept a strong contractual capacity against Alpha s.r.l.. On the other hand, Alpha s.r.l. was the exclusive distributor throughout the nation.

In this venture the board of administration for the new division was represented by members of Beta s.r.l. and also, minority quota, by members of Alpha s.r.l.

4.2 Beta s.r.l. Household Electrical Appliances Division: business firm

Beta s.r.l.'s business is to buy goods from the suppliers and to sell them through a network of sales agents throughout the national territory. The merchandise is kept in two large stock houses, property of a different company which is also engaged in shipment the goods to retailers.

For the determination of selling prices, the company keeps a general price list indicative of cost, to which a percentage standard mark-up is added. The selling prices are determined on a nationwide basis. The variables concurring in the determination of the mark-up percentage are cost and marketing strategies (business status is more important than business bulk). The final selling price may vary from 5 to 7 points of percentage, in relation to business swings during the year.

The goods distributed are generally of medium obsolescence rate and vary in cost prices and consequent selling prices. Beta s.r.l. holds a distribution agreement of exclusiveness with the manufacturer, for Alpha s.r.l. merchandise.

5. Main sub-systems in the Beta s.r.l. Division for Household Electrical Appliances

After a first analysis of the characteristics of the business and organizational structure, the following sub-systems have been identified:

- 5.1 demand analyses
- 5.2 stock management and shipment
- 5.3 professional training (installation and repair service)
- 5.4 returned goods and warranty management
- 5.5 goal setting processes

5.1 Demand analysis

The procedure by which the company builds up a price list for its customers (retailers) implies a periodical reference estimate, usually carried out every year between October and November. After that the company draws a prevision of supply according to the below described indicators:

- purchasing cost from supplier
- total sales registered in previous and current year
- income registered during the previous and current year
- stock remnants
- estimation of agents' selling potential
- analysis of the firm's investment capacity in purchasing goods
- analysis of regional and national marketing dynamics

The choices of commercial policies and strategies for the following year are determined by the results of the above mentioned analyses.

5.2 Stock Management and Shipment

The goods ordered are then delivered by the supplier to the stock houses within 90 days, after the order is sent. The firm agrees to make orders for a certain negotiated amount of goods within a period of 3 years (the contract will fail if in any cases the agreement is not observed). Keeping into consideration the annual plan, orders can be sent on a monthly basis during the year, or in cases in which there are negative variations in the amount agreed on. The policy for stock management is of stock coverage: keeping a few items for as many articles as possible, particularly for those of greater demand, yet always avoiding backlog effects (remnants). The analyses of stock dynamics show that very frequently the backlog effects are corrected mainly through commercial strategies. The firm receives orders daily from sales agents working on the field and transmits them to the stock house. If the products are available in the deposit the shipment agent sends them to the customers within 4 days, depending on the distance the carrier has to cover from the stock house to retailers' shops.

5.3 Professional Training: installation and repair service

Professional training for the technicians responsible of installation and repairing services is fundamental.

Facts related by manufactures show that up to 90% of the damages reported in the goods were due to bad installation.

Customer service is on the behalf of Beta s.r.l..

Two types of training course are held : basic training (1/2 days) and advanced training (1 day). They are free of charge and the purpose is the acquisition of technical and commercial competency. There are about 165 Customer Service Centres authorized by Beta s.r.l .to exhibit the trademark of their products.The technicians, working in the service centres, have all received appropriate training. All Regional Chief sales agents provide for the training of installation technicians, signalled by the retailers.

5.4 Returned Goods and Warranty Management

The Italian legislature governs the matter related to returned goods and warranty, it compels the firm to guarantee the product for at least 2 years from purchasing. Beta s.r.l. has extended this period to 3 years, for commercial reasons. The laws oblige, within a year of purchasing, customer service centres to repair the appliance of damages, directly.

Afterwards the customer brings the appliance to the retailer, who will in turn send it to the repairing service. Service centres also deal with consumer complaints. In circumstances in which malfunctioning is due to bad installation, the cost for the service is charged to the retailer, responsible for installation, and not to Beta s.r.l. Yet, most of service costs are on Beta s.r.l. In matter of controversy, the company's policy is to avoid or limit the risks of conflict with customers.

5.5 Goal Setting Processes: sale force management

After a preliminary evaluation of the expected demand the firm summons a meeting, calling on all the sales agents operating on nationwide grounds. Here the firm's project is exposed by illustrating:

- The firm's new catalogue and price list
- Commercial policies and general strategies
- Incentive system for the agents

At the end of the meeting, usually after 2 days, the commercial manager assigns sales goals to all agents. The time schedule has a scansion of a four month period. The goal setting procedure includes a certain elasticity, allowing time to recover for delays built up in the previous period. During the meeting agents get the opportunity to negotiate commission percentages, keeping into consideration the size of orders and discounts applied: the company's philosophy is to share the profits with the agents. Once the goals are socialized, the agents begin their work: they collect orders for merchandise from retailers and convey them to Beta s.r.l..

Retailers will often appreciate the sales person's competence and experience in evaluating the sales capacity of his/her shop and will gratefully accept suggestions. The final order is often a result of the trust the retailer replaces on the agent's expertise and professionalism.

The effectiveness of a sales agent is determined by the factors listed below:

- Number of trademarks represented (the more the better, yet they should never deal with similar competitive goods) indirectly express the contractual power they exert over buyers (retailers)
- Ability to establish positive, trustworthy work relations
- Technical competence

6 The dynamics of some system key-variables

After a dynamic analysis of revenue and sales data it appears that these figures are definitely influenced by factors attaining to two major areas:

- a. general market movements for the products commercialized by Beta s.r.l.
- b. changes introduced in Beta s.r.l., following the acquisition of Alpha s.r.l., which have increased its market quota.

Figure 1. Total number of goods sold in one year. Data referring to the year 2001 results form activity prior to the acquisition of Alpha s.r.l.

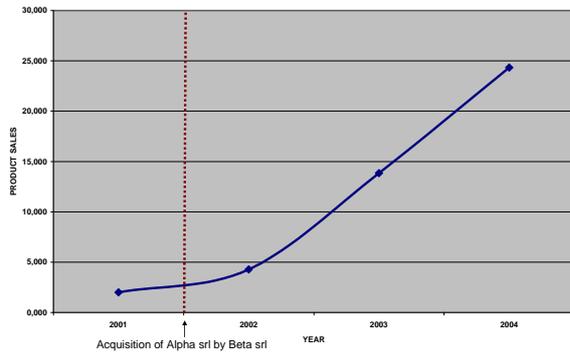
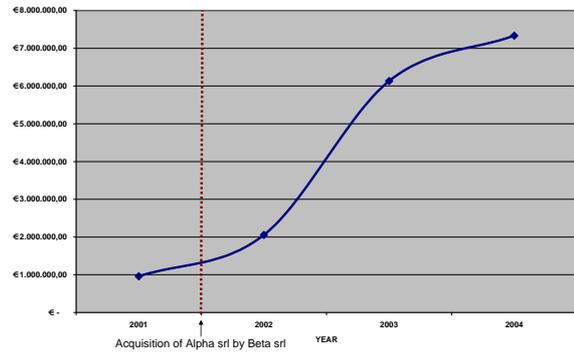
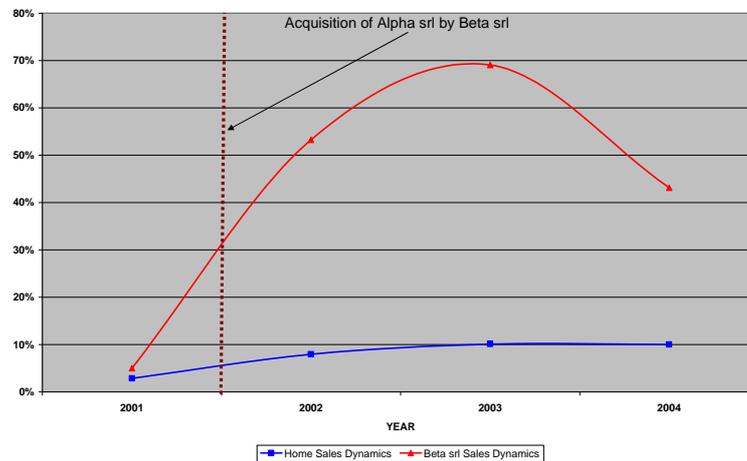


Figure 2. Yearly income. Data referring to the year 2001 results form activity prior to the acquisition of Alpha s.r.l.



As shown in figure 3, Beta s.r.l. registered a general demand increase of its commercialized goods, which cannot alone be responsible for the home sales increase registered in the period 2001-2004 in Italy. It is hypothesized by the author that this performance is a result of specific choices in commercial and financial management for the purpose of becoming more competitive made by the management of Beta s.r.l.

Figure 3. Sales increase expressed in percentage, compared to the precedent year, relative to products commercialized nationwide and those commercialized by Beta s.r.l.. Data referring to the year 2001 results form activity prior to the acquisition of Alpha s.r.l..



Analyses and monitoring of the main business processes has allowed researchers to assess the importance of the goal setting theory. Much literature and investigation has proved that it is one of the most innovative procedures introduced in business management. Managers and administrators at Beta s.r.l. have concretely evidenced the deep interaction between goal setting practices and the general business of the company.

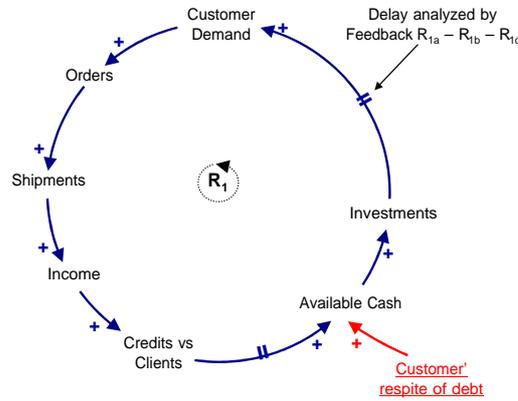
The next paragraph will specifically illustrate the cause-and-effect relation among structural key-variables in the firm, responsible for the final results in sales and income trends. The feedback that underlies the business dynamics will be highlighted and the connections between tangible and intangible variables will be traced, for the construction of an integrated model able to draw a greater portion of variations: indicators for final results of Beta s.r.l..

7. Causal loop modelling

After a first generic approach towards the main business sub-systems, the complex mechanisms of cause-and-effect in the business system of Beta s.r.l., has also been taken into consideration of our study.

The first feedback spotted out is generated by available cash, capable of increasing investments. In turn investments increase customer demand, amount of orders, shipment, income, credits vs clients, thus available cash.

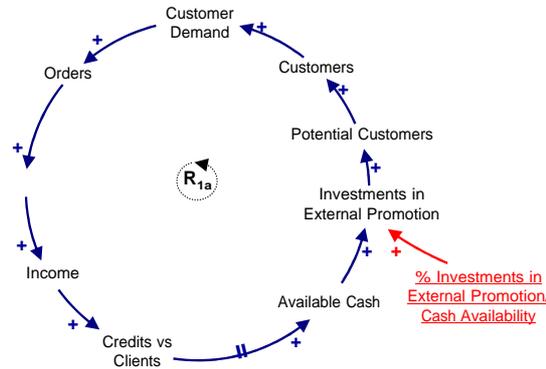
Figure 4. Positive feedback R_1



Upon this positive feedback acts a Control Lever determined by the customer' respite of debt policy, which ultimately affects available cash for the firm. The three following feedbacks (R_{1a} , R_{1b} , R_{1c}) describe the measures adopted in the management of time delay, responsible for the cause-and-effect relation between increase in investments and consequent increase in customer demand.

The first of the three feedbacks (R_{1a}) is generated by available cash, which makes possible a greater quota of Investments in External Promotion (fig.5). These investments contribute to the augment the number of potential customers and - under the same conditions - the number of actual customers of the firm, which in turn increase customer demand, amount of orders, shipment, income, credits vs clients, thus available cash.

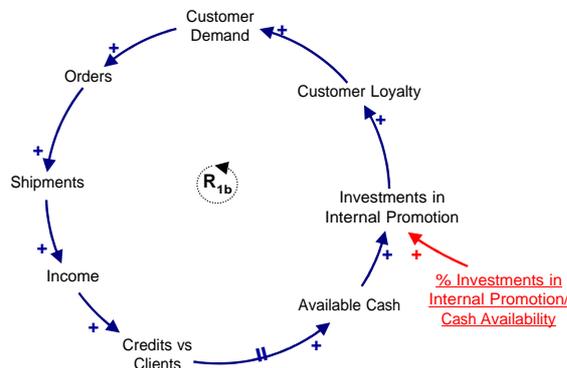
Figura 5. Positive feedback R_{1a}



Upon this positive feedback acts a Control Lever determined by the Investments in External Promotion policy. Available cash is obviously determined by the size of the investments.

The second of the three feedbacks (R_{1b}) is generated by the available cash, which makes possible a greater quota of Investments in Internal Promotion (fig.6). These investments contribute to the increase of demand - through a the consolidation of customer loyalty to the firm - and consequently amount of orders, shipment, income, credits vs clients, thus available cash. Upon this positive feedback acts a Control Lever determined by the Investments in Internal Promotion policy.

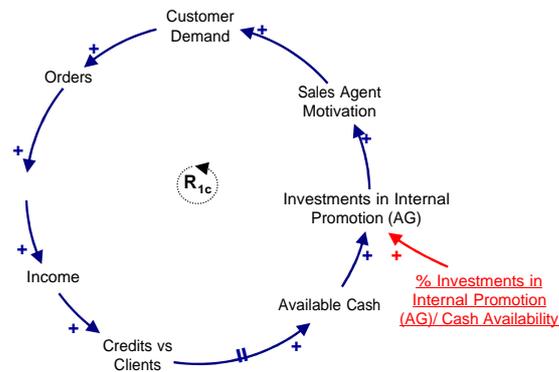
Figure 6. Positive feedback R_{1b}



The last of the 3 feedbacks (R_{1c}) is generated by available cash which enables a greater quota of Investments in Internal Promotion (for the sales agents - AG) (fig.7). These investments contribute to the increase of sales agent

motivation and, consequently, amount of customer demand, orders, shipment, income, credits vs clients, thus available cash.

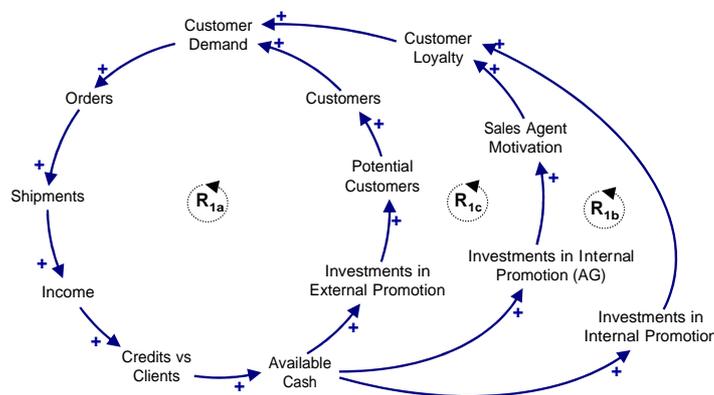
Figure 7. Positive feedback R_{1c}



Upon this positive feedback acts a Control Lever determined by the Investments in Internal Promotion (AG) policy.

At this point, it is possible to show the way in which the three above described feedbacks, labelled R_{1a} - R_{1b} - R_{1c} , interact with each other. What appears visibly evident, is the relation of cause-and-effect between investments and customer demand increase and the way in which the resulting time delay has been operationalized. This positive feedback is generated by available cash which enables a greater quota of Investments in Internal and External Promotion (fig 8).

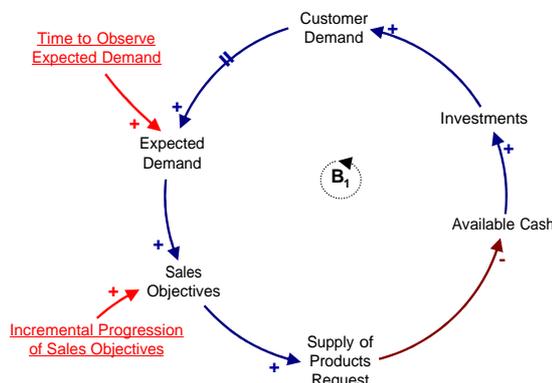
Figure 8. Positive feedback Full R_1



The function of the agents' motivational variable is worth of attention, when analyzing the demands of the company's clients. The agents' motivation strongly contributes to the growth of demand by the clients, thus indirectly enclosing feedbacks R_{1a} and R_{1b} .

Other feedbacks here considered are those of balance. Feedback B_1 is generated by available cash which enables a greater quota of investment (fig.9). These investments contribute to the growth of purchasing demand, expected demand and better define sales objectives. Once the sales objectives are defined the request of goods is made to the supplier. This in turn briefly determines a loss of available cash.

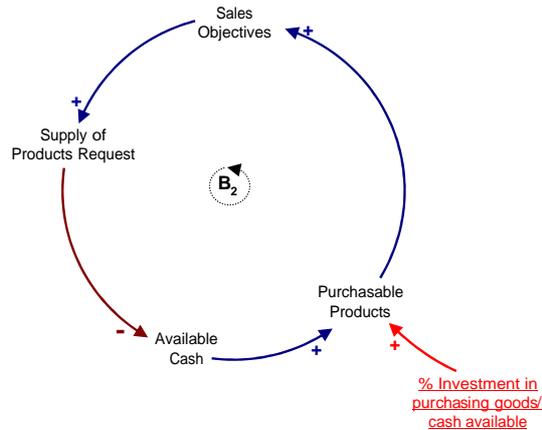
Figure 9. negative feedback B_1



Inside this balancing feedback act 2 Directional Levers. The first one is the Time of Demand Observation, which has an influence upon the time delay, necessary for the restoration of balance between the real demand and expected

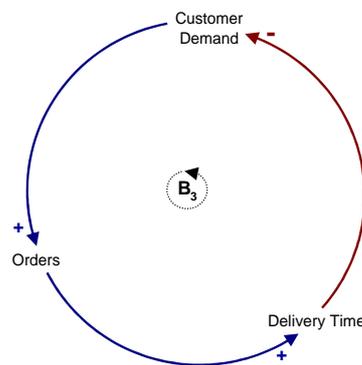
demand. The second lever acting inside B_1 feedback is the Incremental Progression of Sales Objectives policy applied to the expected demand, acting on the definition of sales objectives. Another negative balancing feedback (B_2) is generated by available cash and permits the purchase of a greater quantity of goods (fig.10). The greater purchasing capacity helps define sales objectives. Once the sales objectives are defined the request of goods is made to the supplier. This in turn briefly determines greater debts and loss of available cash.

Figure 10. negative feedback B_2



Inside this balancing feedback acts a Control Lever represented by the Investment in purchasing goods/available cash policy which determines the amount of purchasable goods. Feedback B_3 defines how as demand from the firm's clients grows, the amount of orders grows as well: time of delivery slows down and the growth of demand from the firm's clients slows down also (fig.11).

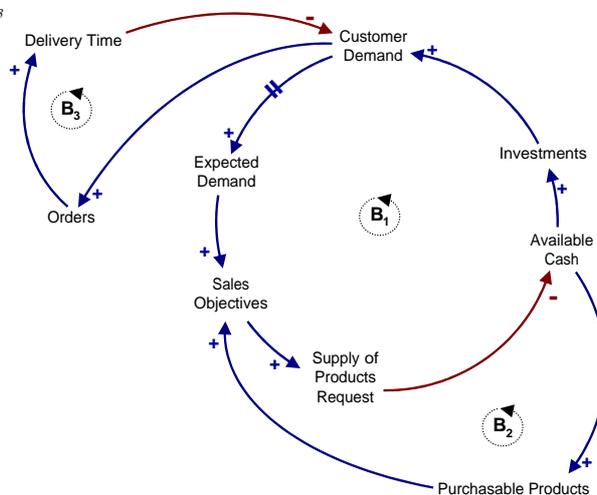
Figure 11. negative feedback B_3



In this particular situation there seems to be no Control Lever acting directly on the feedback model. Whenever an unexpected increase in the amount of orders occurs, the safety stock management policy influences time of delivery, avoiding shipment delays. Time of delivery is usually 4 days, that is in case the goods are available in stock, to reach any part of the territory in Italy with low standard deviation indexes. Time of delivery is considered satisfactory. This process proved an example of good management practice.

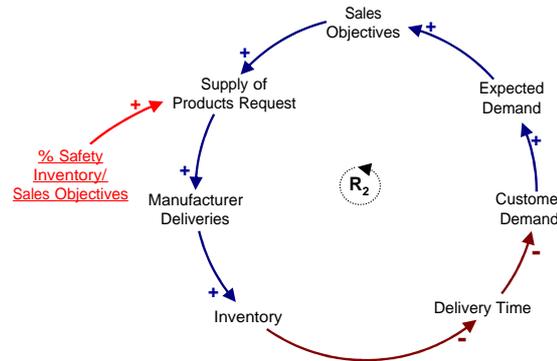
At the present point of investigation it is now possible to illustrate how the 3 balancing feedbacks B_1 - B_2 - B_3 integrate and flow into B_{1-2-3} (fig.12). It is obvious that as the sales objectives grow, the request for product supply increases. This in turn briefly determines greater debts and loss of available cash, which in turn limits the growth of sales objectives.

Figure 12. Full negative feedback B_{1-2-3}



Feedback R_2 shows that as sales objectives grow the request for product supply grows, this in turn increases deliveries from the manufacturer and consecutively stock deposits (fig. 13). This high quantity of goods available in stock houses reduces delivery time to firm's clients. This influences positively demands from those clients, expected demand and the growth of sales objectives.

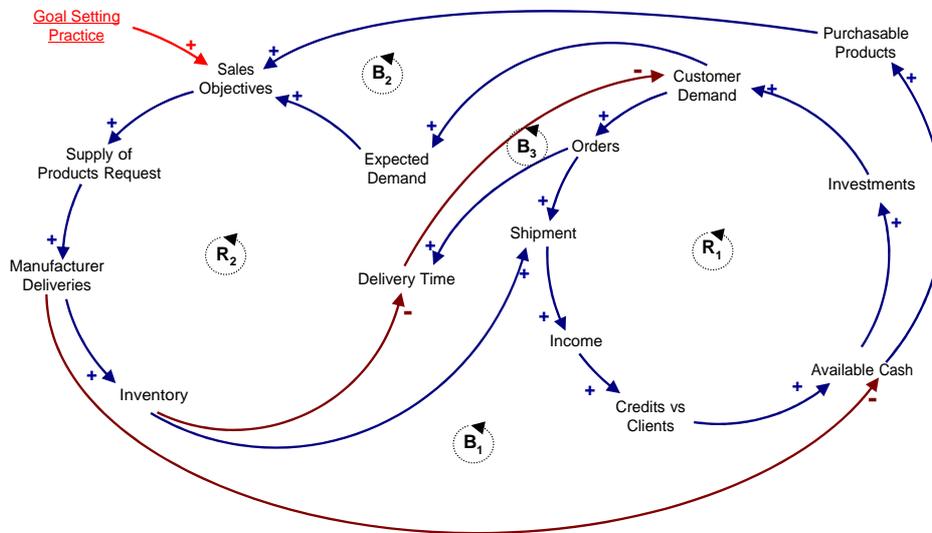
Figure 13 . Positive feedback R_2



Upon this reinforcement feedback acts a Control Lever determined by the Safety Inventory policy, which influences the quantity of goods to order from supplier.

All feedbacks can now be illustrated: Full R_1, R_2, B_1, B_2, B_3 . The integration of all feedback forces allows a schematic representation of the System for the Definition of Sales Objectives (fig.14). It is possible to detect, as limitative to increase in sales objectives, the reduced capacity of product purchasing and also a low expected demand. The limitations in shipment to clients is determined by low amounts of orders as well as little stock availability.

Figure 14 . System of balancing and reinforcing feedback and Goal Setting Practice in Beta srl.



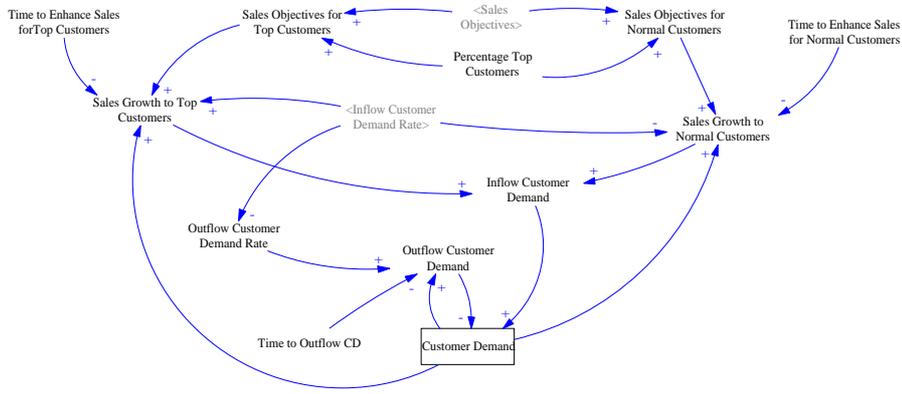
8. An analysis of the main stock and flow structure of the system dynamics model

Based on the above commented feedback structure, the author built an insight System Dynamics model. Such model has been used to capture company key-variable past behaviours (in particular, products sales quantities)

8.1 Customer Demand Structure

As is possible to note in figure 15, the inflow customer demand variable is positively affected by the sales growth related to two kinds of customers: top and normal. In particular, the Beta srl split its market in two different segments: top customers, which make orders for more than 100 products per year, and normal customers, which make orders for less than 100 products per year. The business experiences made by Beta srl show that the time necessary to enhance sales for top customers is quite different compared to the time needed to enhance sales for normal customers. This awareness affects the sales objective definitions, that are differentiated for top and normal customers.

Figure 15 . Stock and flow structure related to Customer Demand



8.2 Inflow Customer Demand Rate Structure

The inflow customer demand rate is affected by four main variables: the sales agent motivation, the agent skill effect on sales, the external promotion effect, and delivery time. Whereas the first three variables are positively related with the dependent variable (inflow customer demand rate), the last one is negatively related, that is, if while delivery time increases, inflow customer demand rate decreases (fig. 16).

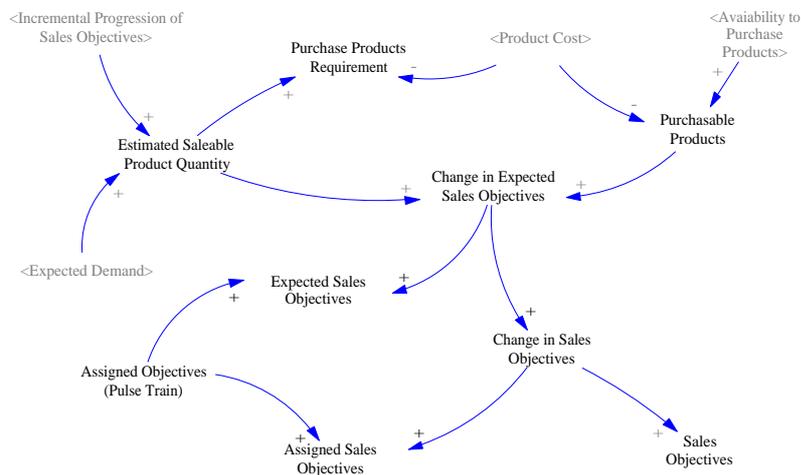
Figure 16 . Stock and flow structure related to Inflow Customer Demand Rate



8.3 Sales Objectives Structure

As shown in figure 17, the sales objectives – and their related dynamics - are affected by the purchasable products and the estimated saleable product quantity. This last variable is the result of the expected demand and the incremental progression of sales objectives, which is a control lever managed by the commercial director of Beta srl.

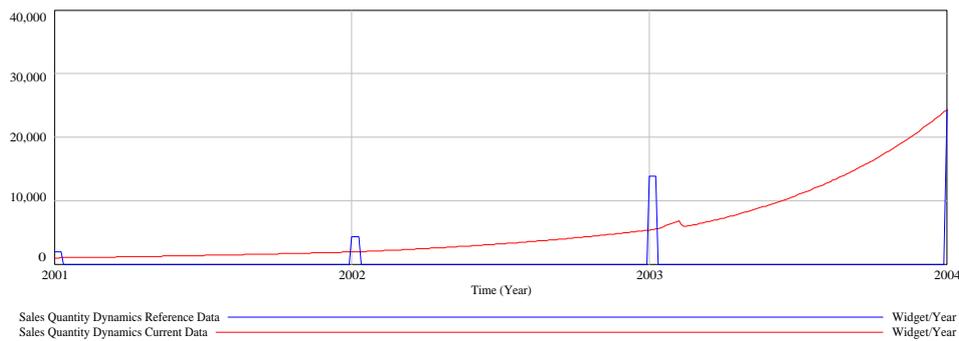
Figure 17 . Stock and flow structure related to Sales Objectives



9. First Step Model Validation

A first step model validation has been made comparing sales quantity, related to reference data, with sales quantity created by the system dynamics model itself.

Fig. 18. Fit between Sales Quantity (Reference Data) and Sales Quantity (Current Data)



As shown in fig. 18, the sales quantity created by the model seems to fit with the sales quantity related to reference data only at the starting (2001) and at the final (2004) time of the simulation. The model seems to reproduce insatisfactorily the dynamics that are responsible of the business growth during the 2002-2003 period.

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