

A WINERY DYNAMIC MODEL FOR "PRODUCT PORTFOLIO" MANAGEMENT

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Abstract

On behalf of the "product portfolio" analysis through Boston Consulting Group (B.C.G.) approach and System Dynamics methodology analysis of a wine production firm, a dynamic model of a company has been developed.

The winery model is designed for different functions of the firm, taking in to account Resource & Production, Economic & Financial and Market subsystems.

Even though the model has been focused to evaluate different market strategies in new product launching, it can be used also to support simulating policies concerning different management functions of the firm.

The model will be described schematically and a series of simulation results will be presented, particularly in evaluating company policies in new product launching, so to put in evidence how system dynamics could be useful in strategic analysis.

Background

In a previous paper (Bianchi C. - Sedehi H., 1995) it has been sketched a dynamic modeling approach to support decisions concerning resource allocation in order to better manage "product portfolio" and new product launching in an industrial firm. The paper demonstrated how strategic control management, for new products launching and monitoring of those which already exist, is possible not only through *accounting models*, but also through *System Dynamics* methodology. Both approaches are indeed useful in "product portfolio" management; however, each of them may better satisfy different information requirements.

Nevertheless, still today, also in the Italian context, only B.C.G. matrix (Hax A.C., 1984), (Morton P, 1987) and other "product portfolio" *accounting-derived* models are mainly used.

The paper underlined the characteristics and limits of the two approaches. What was concluded is as following:

"...traditional approaches may be useful in identifying key-variables relating to the relevant processes. However, these variables should be connected one another, usually according to non-linear relations, and possibly with other "input" variables, that could identify management system levers and/or environmental external constraints."

System Dynamics & B.C.G.

System Dynamics may allow to point out different *policy levers* on which it is possible to act in order to affect product performance and to understand feedback loops underlying financial and economic processes. Figure 1 depicts a general framework concerning *product-mix dynamics* according to the B.C.G view.

It is possible to distinguish at least four groups of policy levers, corresponding to the 4 P's concerning *Marketing mix* (Kotler P, 1986); each of them will be differently used according to the particular growth stage of the product. For example, a mature (*cash cow*) product will require a strategy based on large volumes (an adequate promotion) sold at a low price, a high standardization in production and distribution (place) process; on the contrary, a new product (*question mark*) may require a strategy based on strong promotion efforts and on flexible and selective distribution policies.

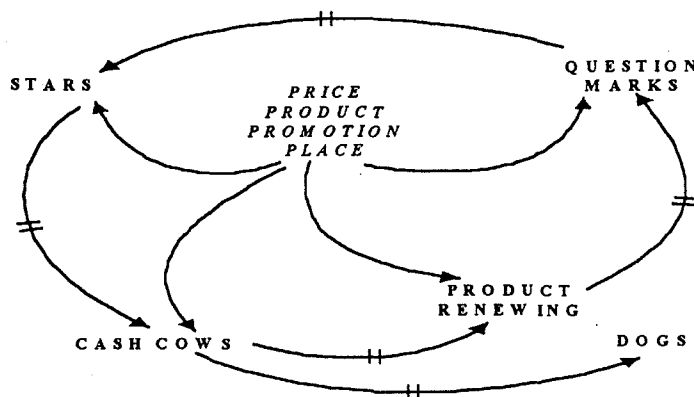


Fig. 1 A general frame work of *product-mix dynamics* according to B.C.G. prospective

Moreover, Figure 1 emphasizes how cash flows coming from mature products may give rise (after a delay) to new activities in product renewing and/or new product launching which cause, after another delay, an increase of the *level* of investments in *question marks*. Launching of *question marks* may give rise, after another delay, to an increase of product *cash flows*, i.e.: to an increase of the level *stars*, that will become - after a given delay - *cash cows*.

Consequently, the main problem, in "product portfolio" management, becomes to assure a proper balance between several classes of products. This objective may be pursued through financial flows allocation generated by mature products to development and support activities. The first ones mainly concern *question marks*, the latter ones mainly relate to *cash cows* and *stars*.

In synthesis it can be asserted that it is of a critical importance for decision makers to understand trade-offs between the two kind of investment (supporting existing products and new product launching) and to figure out different possible scenarios that may follow to the pursuing of several policies according to different sets of external input variables. In this context the understanding of *delays* relating to the path of each product (or group of products) during different stages of its life-cycle, become of crucial importance.

The Winery Firm : "Corvo"

The above problem has been faced in a winery firm, Casa Vinicola Duca di Salaparuta S.p.A. (hereinafter "Corvo"), a multi-product company located in Sicily and operating on a world-wide market.

Today Corvo "product portfolio" market strategy is mainly supported through B.C.G. methodology having a rough and static approach. Moreover the B.C.G matrix does not allow Corvo decision makers to define *when to launch a new product and how many resources to invest*.

The need of a more flexible tool as a support in "product portfolio" management is also increased by the difficulty in assessing some key policy parameters (such as product "recipe" or even the introduction time of new products) which are particularly relevant in product

launching policy as well as in product mix management. Dynamic modeling may particularly help decision makers to understand possible different outcomes relating to different hypotheses concerning a given set of external parameters. It may also allow decision makers to make more explicit product capacity and external (i.e.: grape availability) constraints and their possible effects on "product portfolio" management.

"Corvo" Dynamic Model

A dynamic model has been sketched in order to make more explicit, different possible policies that could be pursued in "product portfolio" management in Corvo.

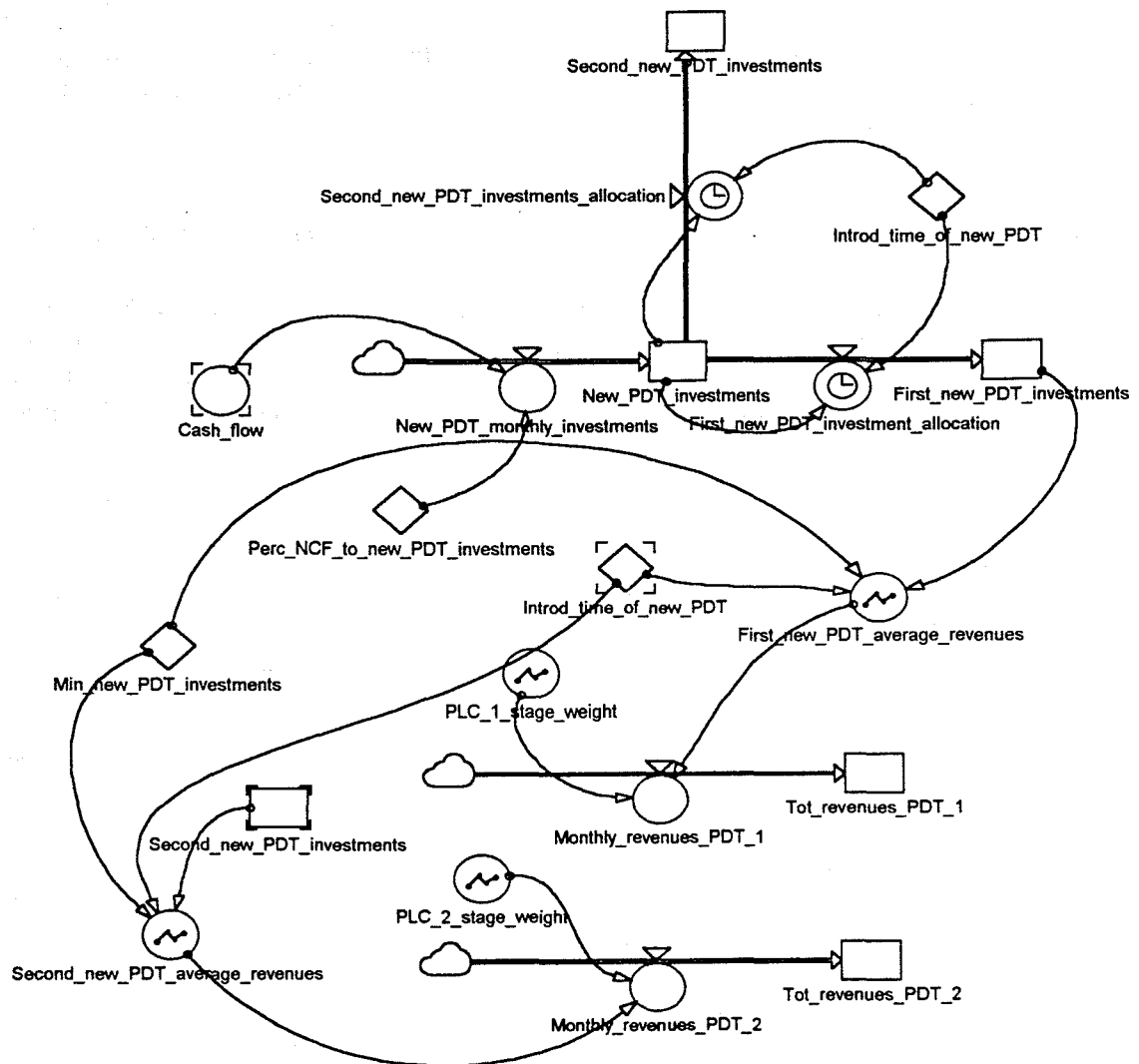


Fig. 2 *New product launching sub-system*

The model consists of three main sub-systems:

1) *resources & production*; 2) *economic & financial*; 3) *new product launching(market)*.

The first one embodies production and all physical resources quantities (grape, unfinished wine, workers. ...). The second one concerns three main different points:

- a) cash flow policy;
- b) cost management (purchasing, production, manpower, etc.), concerning resource acquisition and development;

c) product revenue management (product mix setting, etc.).

The third sub-system implies a distinction between two different new product cycles (Figure 2).

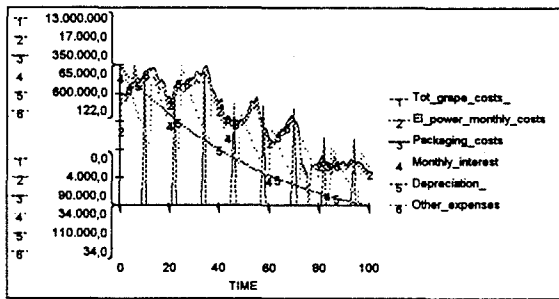
The flow "New product monthly investments" depends on cash flows from existing products and the percentage of allocation to development activities. The input parameter "Introduction time of new products" controls the flow of investments to the first or to the second cycle: this means that after the introduction time for the first cycle has been finished, the flow of new investments is devoted to the second cycle.

Current revenues (and cash flows) of launched products depend on the level of development investments accumulated during the introduction time (i.e.: "First_new_PDT_investments") and on the stage of the product during its life-cycle in the period of simulation (i.e.: auxiliary "PLC_1_stage_weight").

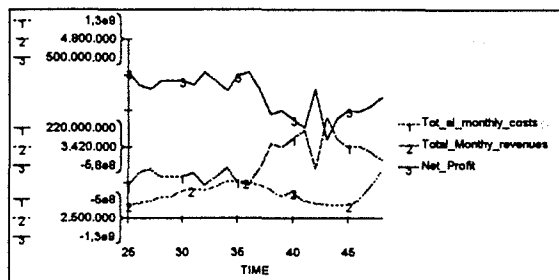
Results

Figure 3 and 4 give an example of graph reports that is possible to obtain from "Corvo" model.

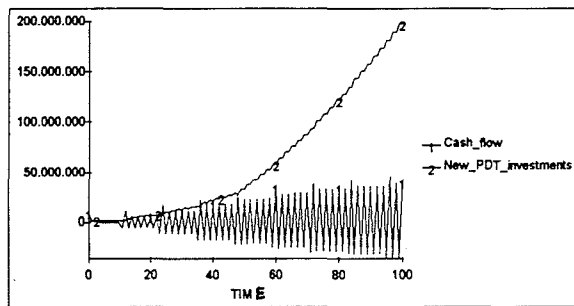
More particularly, Figure 3 illustrates the detailed monthly costs (a) and monthly net company profit (b) while Figure 4 illustrates monthly cash flows and total investments in new products development (a) and the two product life-cycles together with the dynamics of revenues from the set of products existing from the beginning through the simulation time (100 months) (b).



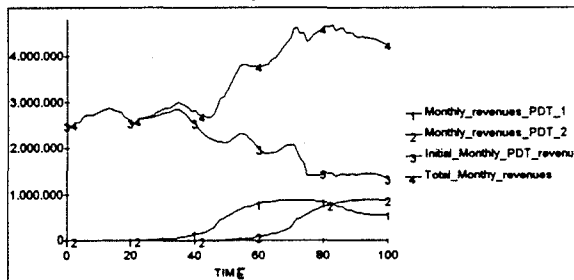
(a)



(b)



(a)



(b)

Fig. 3 Detailed costs and net company profit

Fig. 4 Cash flow and new products monthly revenues

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