

# Strategic Resources and Reestablishing Presence in the German Olive Oil Markets: A DPM Case Study

## Abstract

*For Small-Medium Enterprises (SMEs), a companies' continuing presence in a key market can be the difference between success and failure. This case study looks at how Dynamic Performance Management (DPM) , a combination of traditional Performance Management (PM) frameworks and System Dynamics Modeling (SD) can be used to optimize a company's implementation of strategic resources, and performance drivers to recapture lost market share. The paper shows the initial model design and testing for a small Italian SME focused on olive oil manufacturing, then subsequent policy design based on conclusions drawn from the modeling process and DPM efforts.*

## Key-words:

System Dynamics, Performance Management, SMEs, Case Study, Strategy

Authors: Matthew Bigman, Dea Fitri Amelia, Ariel Nian Gani, Enzo Bivona

## **1. Introduction**

In the ever tightening global markets, Small Medium Enterprises (SME's) often search for any strategy which will better allow them to fully engage and use their current market share and resources. This task has often been driven by Performance Management (PM) techniques, which have been developed to help evaluate the best use of resources. However, within these PM techniques, there is suspected room for improvement by integrating additional feedback between variables (Bianchi, 2002). This paper looks at a case study which instead displays the theories behind Dynamic Performance Management (DPM), an altered form of PM which uses the basis of System Dynamics (SD) to better adapt to client needs in an environment of rapid change with un-optimized resources already present.

The combination of the insights from SD can be used to enhance normal PM systems, which are traditionally designed for larger firms and may fail to capture the unique complexities and subtleties associated with SME's (Linard & Dvorsky, 2001; Sloper, Linard & Paterson, 1999). This aforementioned combination is known as Dynamic Performance Management (DPM) where, like in PM, key variables are identified within the system and in addition the interactions of these key variables are also noted (Bianchi, 2002). By implementing a model which frames the key end-results, value drivers, and strategic resources within the system in SD terms, a DPM guide can be created (Sterman, 2000). This guide gives a dynamic and interconnected view of the system, to better help key policy makers adopt their strategies to achieve the desired performance within the system (Sterman, 2000).

The case model and surrounding body of work will help to investigate the development of historical brand sales for an SME and create further development plans. The focus of the study will be on key factors which influence the company's operational profile and brand awareness along with the determination of key pivot points within the system's resources for one specific market. By customizing the model and empowering the main actors to share their dynamic views, the resulting work will allow for a strategy implementation that manages the assets, time and resources present in this unique SME situation (Bianchi, 2002). By keeping the model

focus narrow, it can be used to more thoroughly explore a simplified version of the system which still provides insights for the client using qualitative SD (Martinez and Richardson, 2001).

The theories behind DPM are leveraged to increase the sales revenue in an already established, market where the company has lost sales presence. The model will help to investigate the development of brand sales through the historic period (2007-2012) and make projections for the future (2013-2017) development. Policy implementation and strategies derived from the DPM insights will be reviewed with suggestions for further work being integrated into the final analysis for the firm. The selected firm is representative of the unique situation which is the Italian SME market. SME's in Italy are built upon lessons in local regional dependency and perception of quality to build up a reputation and market overseas (Bianchi et al, 1997). These SME's have a history of both success and failure in the roll out of exports to international markets (Majocchi & Zucchella, 2003). And few products being exported from Italy are more iconic than that of olive oil.

The case study for this research involved an olive oil producer in Italy. The company was a relatively large olive oil producer in Sicily seeking to expand their presence in the international markets. Countries in Northern Europe are among the largest olive oil importers in the world and the total region accounts for 15% of all consumption, with nations such as France, Germany and the United Kingdom being prime markets for expansion thanks to a growing demand for olive oil (Food and Agriculture Organization of the United Nations, 2013).

The company entered this portion of the European market in 1998 and started an expansion of their product to such as France, the United Kingdom, the Netherlands, and Germany which have become significant markets. But the revenue and sales from Germany is less than half of its total revenue and sales for the similarly sized market of the United Kingdom. Noting this discrepancy, the company requested an evaluation of its current policies from a DPM perspective to see what insights into the current market situation could be gained.

## 2. Methodology

The research presented in this paper is geared to address the ways DPM has to add value to the company's long-term strategic plans for the German market. As such the following set of research questions which will be addressed:

1. How can the SD methodology support Performance Management systems to improve strategic learning processes of *Sicilian Olive Oil Producers* decision-makers?
2. What are strategic resources, key driver and end results that process underlying strategies undertaken by *Sicilian Olive Oil Producers*?
3. To what extent does DPM provides the general insights for *Sicilian Olive Oil Producers* to reestablishing its market presence?

The resulting feedback model using SD principles will be interactive allowing managers to look at the complex feedback within the system and create long term strategies for improving the market and review company performance in terms of sales. The modeling process follows six main phases, though this paper will primarily illustrate four main phases relevant to the target research questions (Sterman, 2000):

- Phase 1: Understanding and specifying the cause-effect relationships between the strategic resources, performance drivers and end results of company performance through research and data analysis
- Phase 2: Construction of a Causal Loop Diagram (CLD) and identification of key feedback loops between the aforementioned strategic resources, performance drivers and end results.
- Phase 3: Creation of a numerical based Stock and Flow Diagram (SFD) based on the CLD and integrating historical data to create a behavioral model for analysis
- Phase 4: Simulation analysis, including policy analysis, scenario analysis and policy design.

### **3. Literature review**

Bolton (1971) defined Small and Medium Enterprises (SMEs) as those that have a relatively small market share, a high degree of personalized owner-management, and an independence in that they do not form part of a larger enterprise and that the owner-managers should be free from outside control in making decisions. Qualitative methodology studies performed by Curran and Burrows (1989) and Curran and Stanworth (1986), suggest that quantitative parameters (example: employees, sales turnover) do not define to what extent a firm ought to be considered small or large. Other studies focus on the role of the owner in the firm as the key factor in defining the size of a firm (Bianchi & Bivona, 2000). Goffee and Scase (1980) underlined how a small firm may be significantly affected because of the entrepreneur's personal characteristics, such as leadership attitudes, need for freedom and risk aversion. Another classification concerning small business entrepreneurs are the three types identified by Bianchi, Winch and Grey (1998), which are guts feeling entrepreneurs, technocrats and coordinators. The project team's selected firm, which will be referred to as *Sicilian Olive Oil Producers*, matches these definitions. It is family owned and operated; relying heavily on a limited set of entrepreneur's for key decision making and long term strategic planning.

It has been argued that formal strategic planning is a more typical and relevant issue in big firms rather than in smaller ones as small business firms are more concerned with day-to-day operational problems (Gable & Topol, 1987; Robinson & Pearce, 1984; Sexton & Van Auken, 1985). However other studies found that some small firms that engage in formal strategy planning perform better than firms who do not (Ackelsberg & Arlow, 1985; Bracker & Pearson, 1986)The main reason why only a small fraction of SMEs engage in formal strategy planning is due to resources constraints (Bianchi & Bivona, 2000). Many entrepreneurs have viewed drawing strategic plans as a bureaucratic constraint rather than as a learning tool that may help them to be aware of the business formula that is going to be adopted (Bianchi & Bivona, 2000).

A learning-oriented and dynamic approach to business strategy is likely to support SMEs in understanding cause and effect relationship between cash flows, new products development

and investment (Wolstenholme, 1990). Another important decision area that could be supported by a learning oriented approach is related to the dynamics generated by commercial policies such as sale price, customer development, salesforces and marketing activities (Bianchi & Bivona, 2000).

The need to improve SMEs performance based on sustainable competitive strategies has strongly emerged in the increasingly competitive global world. To address this need, a number of frameworks and approaches for the design of strategic PM systems have been developed and discussed by scholar since mid-1990s such as Balanced Scorecards by Kaplan & Norton (1992). These approaches have been primarily designed to being adopted in large-sized companies, but SMEs display distinct characteristics that differentiate them from the majority of their larger counterparts (Storey, 1994). Bianchi (2002) argues that SMEs may need a tailored approach to PM to enable their key-actors to do a number of tasks. Tasks such as framing their own specific dynamic complexity, understanding how to pursue sustainable development, design strategies, managing trade-offs in time and space, and assessing the results emerging from strategy implementation. The identification of these strategic resources is noted by Bianchi as important since it allows SMEs to understand how to affect performance targets. Bianchi et al. (1998) also argues that conceiving the business strategy in a learning-oriented, SD driven way may allow the SMEs' strategists to foresee the future stages of business growth and understand the proper time to start to build relevant resources-money, workforce, products, brand reputation and customer base.

Therefore, strategic resources should be recognized as a consequence of a prior and selective identification of specific, measurable, achievable, relevant, time related performance drivers and end-results. Such performance measures should portray a balanced set of targets an organization must pursue, both in the short and the long run, according to a sustainable development perspective (Bianchi et al., 2012).

Traditional PM lack the ability to capture the dynamic complexity of managerial decision making such as time delays, non-linearity, intangibles factor and consequences of human perceptions, a fact alluded to by the literature. One example of traditional PM tools failing is the BSC framework, in spite of its widely recognized advantages., the BSC presents some conceptual and structural shortcomings. Linard, Fleming and Dvorsky (2002) argue that the BSC fails to translate company strategy into a coherent set of measures and objectives, because it lacks a rigorous methodology for selecting metrics and for establishing the relationship between metrics and firm strategy. Sloper (1999) finds that the BSC is a static approach, unable to adjust to changing dynamics. Although Kaplan & Norton stress (1996) the importance of feedback relationships between BSC variables for describing the trajectory of a given strategy, the cause-and-effect chain is always conceived as a bottom-up causality, which totally ignores feedbacks, thereby confining attention only to the effect of variables in the lower perspectives (Linard & Dvorsky, 2001). Misperceiving the dynamic relationships between the system's feedback structure and behavior often leads SME owner-manager to make their decisions according to a linear, static and bounded point of view, in terms of time horizon and relationships between variables (Davidsen, 1996; Sterman, 2000). In particular, the BSC approach does not help to understand the strategic resource accumulation and depletion process, how performance drivers affect outcome indicators or how outcomes will affects strategic asset accumulation and depletion process (Bianchi, 2012; Bianchi & Montemaggiore, 2008). SD modeling can be used in order to provide SME decision-makers with proper lenses for interpreting such phenomena, understanding the feedback-loop structure underlying performance, and identifying alternative strategies to adopt so as to change the structure for performance improvement which now is known as Dynamics Performance Management (DPM) (Morecroft, 2007; Richmond, 2001; Ritchie-Dunham, 2001; Warren, 2008).

Combining PM and SD modeling to support SMEs decision-maker in managing organizational performance according to a sustainable development perspective is the core of DPM (Bianchi, 2002). A dynamic and cause-effect perspective, noted by Bianchi, in designing and implementing PM systems implies the identification and analysis of end-results, value drivers

and related strategic resources accumulation/depletion processes. A feedback analysis may allow decision-makers to better frame the relevant structure underlying performance and, consequently, better design and assess a set of alternative strategies to adopt, affecting the system structure according to the desired performance behavior. SD provides a suitable methodology for modeling and simulating small business performance, since it is able to support decision makers – through modeling – in framing and understanding dynamic complex social systems, and to foster the design and implementation of sustainable development policies (Forrester, 1958; Sterman, 2000). The underlying principle is that, if the model structure determines the system behavior and the system behavior determines the organization performance, then the key to developing sustainable strategies to improve performance is to understand the relationship between structure and behavior and managing the leverage points within the system (Sterman, 2000). From a strategic point of view, the formulation and adoption of DPM system may enable SMEs to overcome the listed shortcomings of traditional PM frameworks and support them in improving decision-making processes. This methodology is especially suited for the ever changing sales market, whose ebbs and flows are best captured dynamically for the Sicilian Olive Oil producer, can be likely appropriated for similar markets.

According to a dynamic resource-based view, decision-making processes aimed at affecting organizational performance focus on strategic resources (Morecroft, 2007; Warren, 2002). Strategic resources are modeled as stocks of available tangible or intangible factors at a given time. Their dynamics depend on the value of corresponding inflows and outflows. Such flows are modeled as “valves” on which decision-makers may act through their policies, in order to influence the dynamics of each strategic resource, and therefore – through them – performance indicators (Bianchi, 2010). In this respect, models are designed based on the building up and decline of key core assets such as workers, equipment, workload, perceived service quality, and financial resources. The feedback loops underlying the dynamics of these different strategic resources imply that the flows affecting such resources are measured over a time delay. Understanding how delays influence strategic resources and achieve results becomes a key-issue to manage performance in dynamically complex systems. A DPM view is



primarily concerned with the identification of both end-results and their respective drivers. To affect such drivers, each decision maker must build up, preserve, and deploy a proper endowment of strategic resources that are systemically linked to each other. This also implies that decisions made by different policy makers upon interdependent strategic resources should be coordinated with each other, according a systemic view. Figure 1 below illustrates how the end-results provide an endogenous source inside a SME for the accumulation and depletion processes that affect the strategic resources that cannot be purchased from the market (Bianchi, 2012). These are the resources generated by management routines such as company image/reputation, organizational climate, equity and liquidity (Bianchi, 2012). End-results are modeled as in- or out-flows, which over a given time span change the corresponding stocks of the corresponding strategic resources, as the result of actions implemented by decision-makers. These three categories: strategic resources, performance drivers, and end results, will be the primary focus of the modeling efforts for the case.

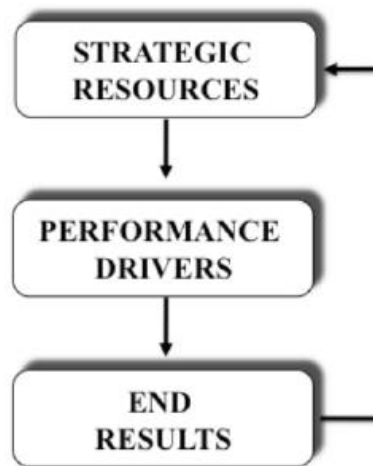


Figure 1: Endogenous Structure Source: Bianchi (2012)

#### 4. Analyses of the system Performance in German Market

In order to understand the underlying strategic resources, performance drivers, and end results within the system, the market in which the Sicilian Olive Oil producer was working with had to be understood. The primary focuses of the strategic efforts for the case were aimed at the German market. Germany imported around 2.6% of the world's imports of olive oil and accounted for roughly 0.9% of the world consumption (Ward, Briz, & de Felipe, 2003). The company's historical position trended with the up and downs of the tremulous 2000s economic market. The company experienced a major sales crash in 2010, as seen in Figure 2 and Figure 3, when their main distributor, abruptly cancelled a primary order contract, opting not to renew.

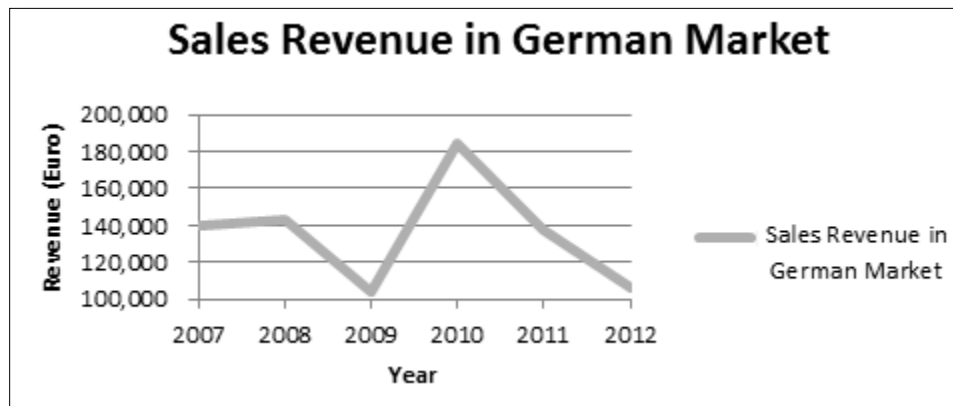


Figure 2: Sales Revenue from German Market (Sicilian Olive Oil Producer, 2013)

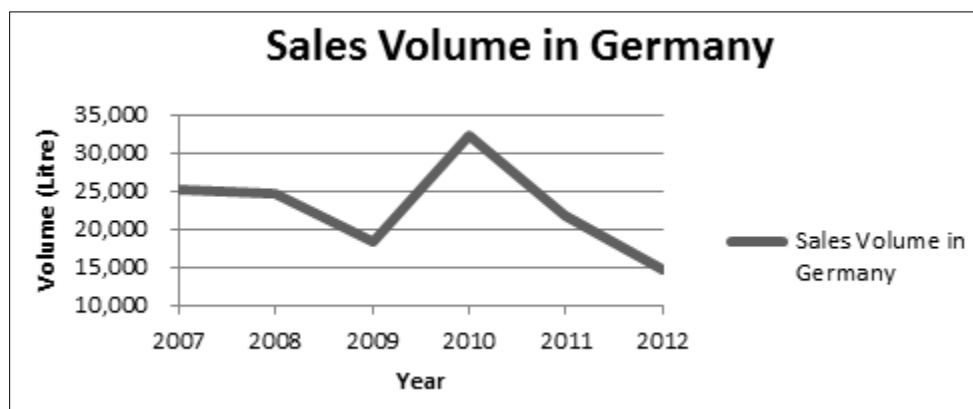


Figure 3: Sales Volume data in German Market (Sicilian Olive Oil Producer, 2013)

Based on the company data, 80% of the revenue and sales volume on average were derived from big distributors. This data is further broken down in sales by distributor and volume.

Years	Sales Volume			Revenue		
	Sales Volume by Big Distributor (L)	Total Sales Volume (L)	Percentage Sales Volume by Big Distributor (%)	Sales Revenue by Big Distributor (Euro)	Total Sales Revenue (Euro)	Percentage Sales Volume by Big Distributor (%)
2007	21,618	25,135	86.0%	116,723	139,985	83.4%
2008	21,486	24,619	87.3%	120,360	142,668	84.4%
2009	16,241	18,262	88.9%	90,806	104,118	87.2%
2010	24,369	32,364	75.3%	134,579	184,555	72.9%
2011	13,020	21,823	59.7%	88,348	137,421	64.3%
2012	12,510	14,692	85.1%	85,344	105,907	80.6%

Table 1: Company's Olive Oil Sales Volume-Revenue Data 2007-2012

Based on the tabulated information in Table 1, big distributors have an important position in determining sales volume and revenue in Germany market and are *Sicilian Olive Oil Producers* current focus. The increases of average sales by big distributors or an increase in the number of distributors will significantly increases the revenue from Germany's market.

## 5. Model development

The purpose of this model is to integrate DPM for *Sicilian Olive Oil Producers* to help determine the behavior of market expansion efforts and create new strategies. By understanding the DPM and its effect, policy to improve performance of the system can be developed and analyzed. The focus of the model is DPM in the relationship between the company and its distributors.

Initial model formation was done with the aid of model building and brainstorming exercises done with key representatives from the distribution department of the *Sicilian Olive Oil Producers* and market data specific to the company. After this initial brainstorming session, this list was pared down to an essential set of ideas following the principals of DPM.

As mentioned in the literature review, DPM is a process integration incorporating SD and consists of three components:

1. Strategic resources are anything to which the firm has access to that might be useful to it in some way (Warren, 2002) and has strategic role to achieve desired end result. Strategic resources also affect performance drivers.
2. Performance drivers are a leverage point that gives an effect on end result.
3. End results are the final objective of the model; end results also have the ability to change strategic resources.

The end results were the key variables listed below in Table 2. While not a comprehensive list of the entire system, these ideas were chosen due to the fact they could be leveraged after the main performance drivers in the system. Of note is the fact that, going through current company strategy, the only way to gain additional large clients was to garner awareness through participation in various food shows and regional trade shows.

No	DPM	Variable
1	Strategic Resource	Perceived quality of product/number of certifications
		Initial Clients
		Number of product line in target market expansion
		Brand Awareness
2	Performance drivers	Food show participated per year
		Price ratio
3	End Results	Sales Order
		Revenue
		Change in perceived quality
		Change in client base
		Change in brand awareness
		Change in number of product line

Table 2: DPM variables used in the model

### Model assumptions and boundaries

Assumptions in the model were made to limit the boundaries to points that the staff felt the company could exhibit influence. Some assumptions, in no particular order are:

1. *New contact(s) with distributors* can be obtained only from food show participation.

2. The amount of current orders is determined by calculating the *effect of market strength* to the *amount of previous year orders*.
3. Due to unknowns in the decision making process of the end distributor's side on how they place olive oil orders, the *change in number of orders* is effected by the *perceived change of market demand*.
4. *Normal market strength* of the company's product and reputation in the market is about 55%.
5. *Normalized market price* in the market for Italian olive oil is approximately six Euro, adjusted for inflation.

Boundaries of the model are:

1. The model only analyzed the relationship between company and distributor, without analyzing end market consumption of the German consumer, besides to dictate overall demand.
2. Other possible ways (website, word of mouth, and reference from other companies) of obtaining distributor contacts are not analyzed in the model, as the data for these areas was not able to be clearly established in the modeling timeframe. It should be noted though, upon realizing their lack of data, the company did move to explore new avenues of contact. This boundary may be expanded upon in further work.
3. Model does not represent any way of investment, nor cost of action and relative gain. Any possible policy taken in this model is not showed any connection with investment nor financial resources. This step was saved for the company's own policy analysis.
4. Marketing efforts are not included in the model beyond *food show participation*, due to data limitations and historical precedence.

### **Dynamic Hypothesis**

The structure of the simulation model is built around feedback based on the DPM variables that have been previously identified. *Brand awareness*, *perceived quality*, *product line*, and *contact base* are portrayed as stocks which represent strategic resources of company in the market development. *Perceived quality* and *brand awareness* are two qualitative stocks in the model which are represented by a 0 to 1 scale.

The *Sicilian Olive Oil Producers'* definition of a customer is limited to that of a large distributor. This definition means that market expansion is defined as acquiring additional distributors to increase current distributor numbers, or greatly expanding base orders. In the relationship between company and distributor, new contracts (*contract base*) are assumed to only be obtained from food shows as

shown in Figure 4. Figure 4 also shows that *contact base* as reinforcing loops begets the accumulation of new distributors.

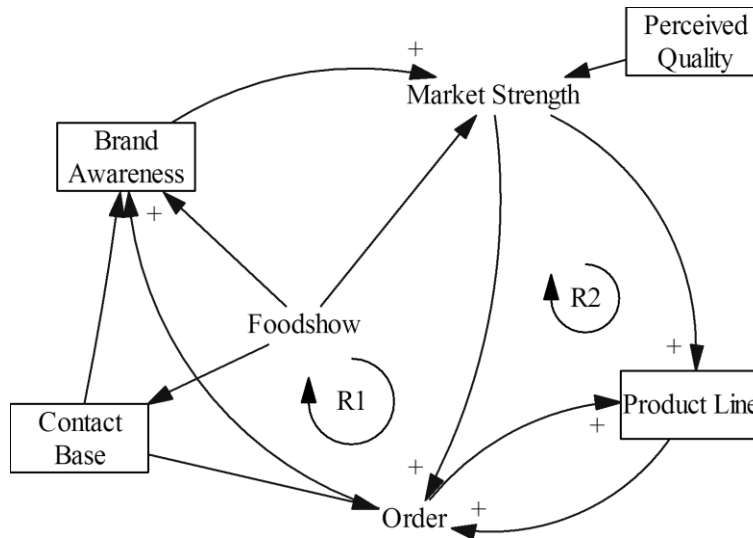


Figure 4: Core Structure of Market Expansion Model

*Contact base* is broken down in the final model as an ageing chain, which shows distributors in the process of being courted for a new contract and illustrates how *food show attended* increases *brand awareness* among all distributors in the market. The increase of awareness as well as *perceived quality of the product* in the market and *food show attended* will also increase *market strength of product* in the new market. Heightening market strength will lead to higher total orders from distributors in the market and will also lead to increase of *brand awareness* in the market.

In Figure 5 it is shown that due to the model boundary of no additional investment feedback, *sales force* acts as a strategic resource, and is not represented as affected by any flows. Figure 5 also shows that market strength, or the outward perception of the companies' own market strength, also affects price.

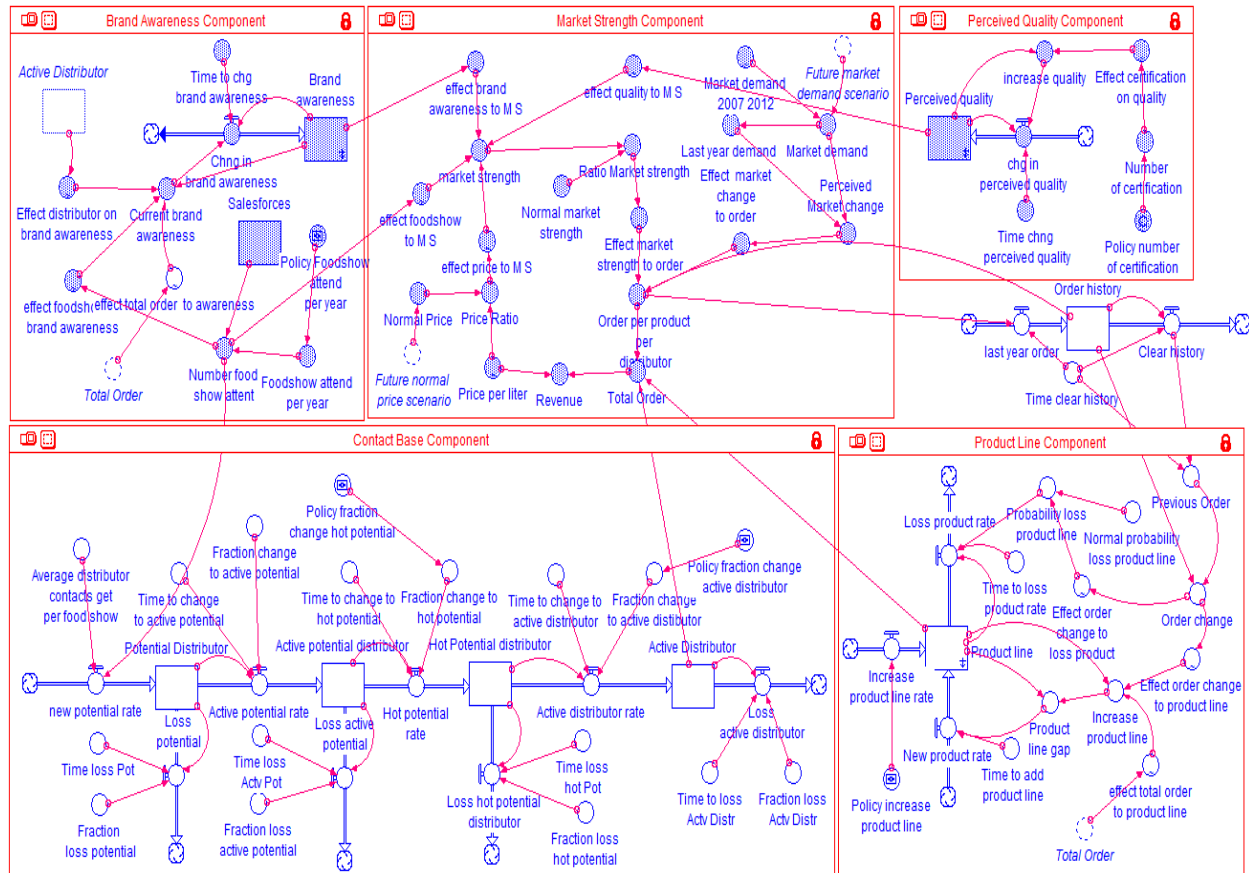


Figure 5: Structure of Market Expansion through Increasing Contact Base

Figure 5 shows that the model structure is divided by its important sectors. There are five important sectors in the model:

### 1. Contact Base

This sector explains the transformational chain of distributors. There are four stocks of different kind of distributors. First is *potential distributor* stock which represents the number of obtained distributors' contacts from food show. Second is *active potential distributor* which represents the number of distributors who are successfully contacted after food show. Third is *hot potential distributor* which represents distributors that have been sent samples of products and have interest to pursue further collaboration with the company. The last stock of distributors is *active distributor* which represents distributors currently cooperating with the company.

Contact base starts with *potential distributor* where 50% of the stock flows into *active potential distributor* in certain time period. A portion of distributors in *active potential distributor* flow into *hot potential distributor* in certain time period. Several percentages of distributors flow into *hot*

*potential distributor* which finally flows into *active distributor* after a certain time period. Besides the transformational flows there are also leakage flows in the first three stocks which represent number of distributors who do not continue to the next stage of distributors. However in the last stock, there is only one outflow which represents number of distributors who stop working with the company.

## 2. Brand Awareness

*Brand Awareness* represents the level of company's product awareness among new market distributors. In this model, *brand awareness* is affected by the *number of food show* and the *number of current active distributors*.

## 3. Market Strength

*Market Strength* represents the strength of company's products in the mind of distributors. In this model, *Market Strength* is affected by products' *price*; *number of food shows attended*, and *perceived quality of product*. *Market Strength* is depicted to have an effect on the *total order per product per distributor*.

## 4. Perceived Quality Component

*Perceived Quality* represents quality of company's product as perceived by distributors and also affects market strength of company's product. As it is represented, the number is only affected by *number of certification* that company has and needs certain time period to increase every time there is an additional number of certification. These certifications represent regional inspection and quality standards, in addition to awards. The company can actively invest resources in pursuing additional certifications as a policy.

## 5. Product Line Component

This section on the model represents the dynamic factors which drive the increase and decrease of a *number of product lines* that is distributed in the new market. The changes in the *number of product line* are only affected by changes in *total order per year*, with higher orders increasing the odds of adoption for new product lines and low orders causing the cancellation of product lines.

## 6. Simulation result

Figure 6 compares the simulation results and historical data. Although the simulation results cannot capture the exact number of total clients' order, it does represent the increase and decrease of total



clients' order along the similar behavior, providing *Sicilian Olive Oil Producers* with a chance to dynamically examine behavior. The simulation result can also capture the sudden decrease of total clients' order due to the decrease of the product lines available in the market between 2010 to 2011, due to unexpected extraneous market factors. This particular order drop is placed in the data simulation through a down step in the product lines due to its abnormality, a static unexpected event outside the control of the olive oil market as a whole, which the client could not generate a feedback view for.

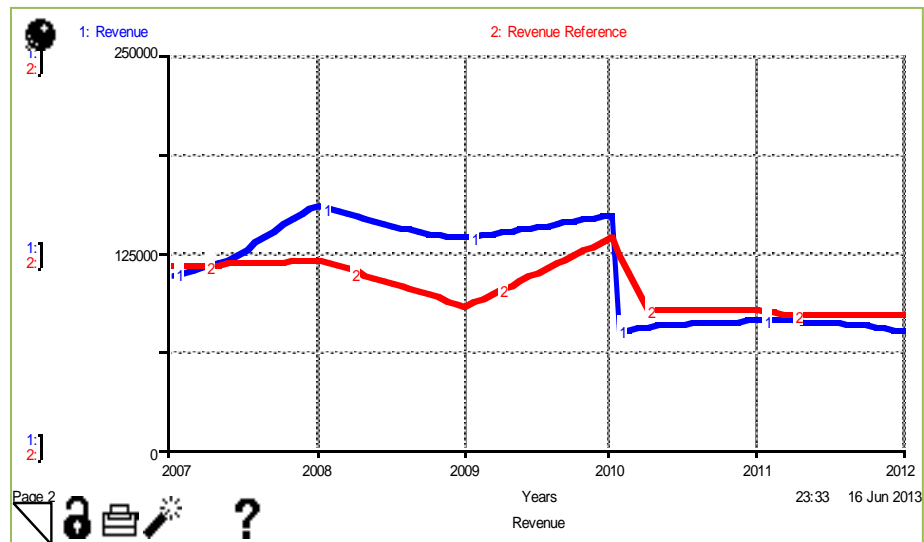


Figure 6. Comparative Graph of Simulation Result and Reference Mode

## 7. Policy Design

The policy is designed to gather insights from the DPM process and model building in order to leverage the strategic resources more efficiently. By leveraging strategic resources, desired end result can be achieved thanks to systematic feedbacks. After comparing behavioural patterns generated by the model and the historical data, a policy for increasing revenue of the company can be designed. For policy design purposes, three scenarios are defined. Policy designs that are explained in this case study are developed based on only three scenarios. Additional scenarios are reserved for the *Sicilian Olive Oil Producers'* use. This limited selection of scenarios however illustrates both extreme values and the most likely scenario:

### 1. Optimistic Scenario

This scenario will capture the condition when market demand increases and Olive oil's price decreases.

### 2. Realistic Scenario

This scenario will capture the condition when both market demand and olive oil's price keep stable in current situation.

### 3. Pessimistic Scenario

This scenario will capture the condition when market demand decreases and olive oil's price increases.

Policies for facing these three scenarios will be designed based on five points of leverage (1) Hot Potential Clients Change Fraction (2) Active Potential Clients Change Fraction (3) Increase in number of product line (4) Number of food show per month (5) Number of certificate that company owns. The reason we can change the fractions within the system is the through additional investment in sales efforts at each stage of the process. The value of these efforts could not be included in the report due to confidentiality, and due the investment needed, feasibility studies are left in the company's hands. Nevertheless, the underlying lessons from these leverage points serve as a guideline for strategic thinking with the company.

The policy is also designed around two main goals for the company, 250,000 Euros increase in revenues and the accrual of at least three active large distributors placing orders.

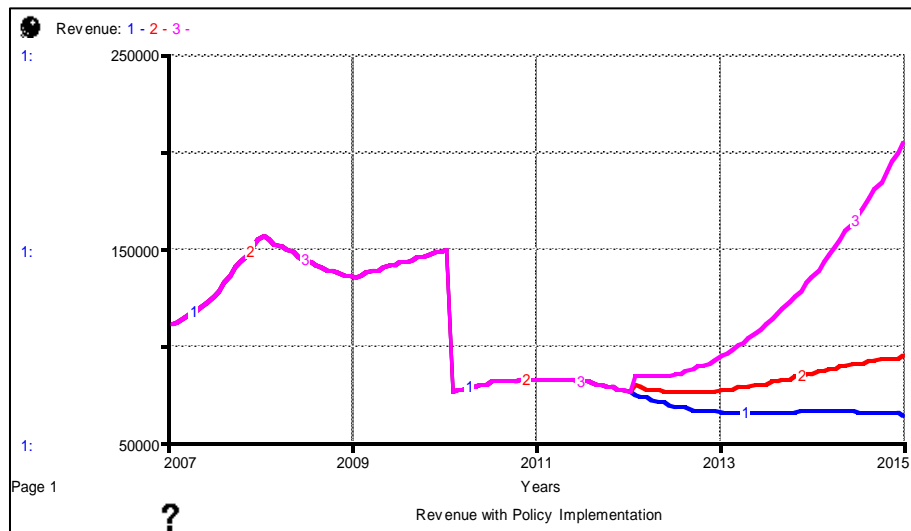


Figure 7: Policies Result on Optimist Scenario

In the best case scenario, illustrated in Figure 7 when the market is growing and the price of olive oil is falling at a reasonable rate, promoting sales but not cutting into profit, some policy steps must still be taken to optimize revenue and make sure company's brands are positioned for growth within the market. Two small steps can be taken to create a strong base:

1. Increase the number of certificates by one, a policy that the company has already planned to adopt.
2. Increase the number of food shows, one of the strongest leverage points within the model, by one.

The blue line on the above graphs represents the path of orders and revenue without any policy intervention while the red line indicates the application of the aforementioned policies. The revenue goal of 250,000 Euros is not achieved within two years as hoped, but do achieve modest growth with a reasonable investment under a solid plan. Goal of three active distributors is also not gained, primarily due to time delays and the decreasing flows despite additional potential distributors but this is largely due to the time flows and delays being so long that such a scenario would be unlikely.

Should even higher growth rate wants to be achieved, as shown on the pink line, it would benefit the company to seek a higher turnaround with potential clients and attend more food shows, but the money invested in the implementation of such scenarios may not be worth the outcome. A heavy investment scenario is illustrated below more detailed in Figure 8. It is based on:

1. The prior scenarios illustrated above in Figure 7's red line.
2. The addition of raising the flows between distributor stocks to 20% instead of 10%.

Note this is likely an unrealistic scenario from an implementation standpoint, as arbitrarily increasing the number of clients which move from one stock to the next might be difficult and but does move closer to the 250,000 Euro goal. If diversification of product lines is added in the long term plans, then the target goal is likely to be achieved.

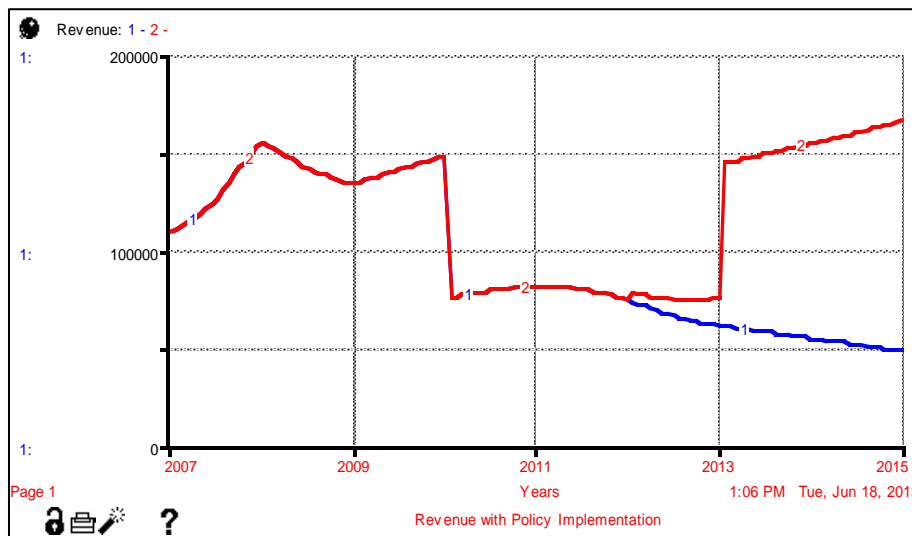
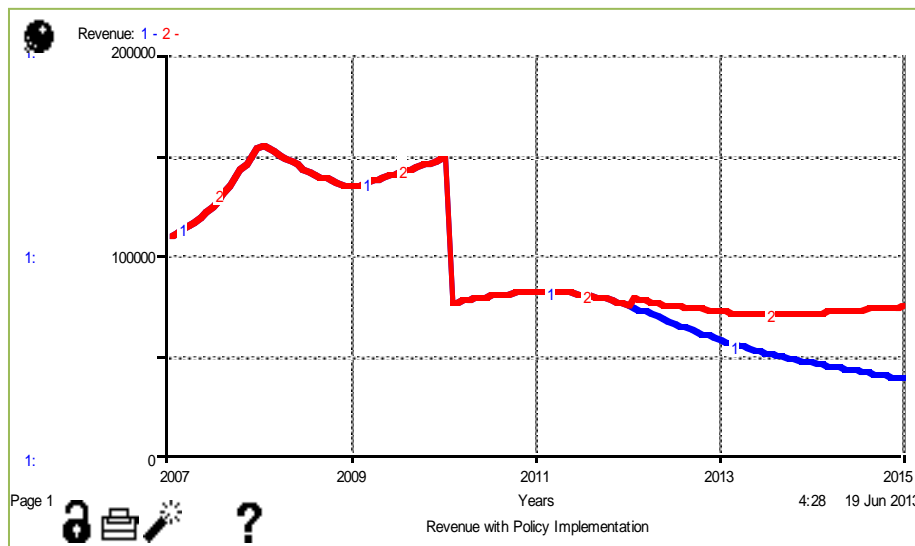


Figure 8. Policy Result for Realistic Scenario

During the realistic scenario, policy combinations which give the best performance to increase revenue are:

1. Increase number food show attended per year into two times per year.
2. Invest time and effort to increase the conversion rate of potential distributor and active distributor from 10% into 20% respectively.
3. Increase product line in Germany market from one product into three products.
4. Increase number of certifications from one to four certificates.

Results of the simulations with this policy compared to the baseline gives dramatic growth rates for revenue and total order. The product line increase gives the effect of an increase in total order which leads to increased revenue. Brand awareness of the product in the market is increased due to high exposure from the food shows and marketing for the new product line which leads to high product market strength thus the distributors increasing the total order of each product.



**Figure 9: Policy Result for Pessimistic Scenario**

In the pessimistic scenario, seen in Figure 9 when the proposed leverages are less likely to increase revenue in the years 2009-2011 yet combination of policies may retain the revenue state stable, as indicated by the red revenue line. The policy combinations are:

1. One increase in number of certification from three certifications to four certifications.
2. One increase in number of food show/year from averagely one food show/year to two food show/year.

3. 0.2 increase in fraction change of hot potential distributors from 0.1 to 0.3.
4. 0.1 increase in fraction change of active distributors from 0.1 to 0.2.

This policy produces better results than the previous policy used because this policy can increase both total order and total revenue also with slightly higher number of big distributor. The result of this policy is due to the 0.2 increase in fraction change of hot potential distributors (0.1 higher than the previous policy). The slight increase in number of active big distributors eventually affects the increase in total revenue and total client's order. Based on previous explanations it can be concluded that in the pessimistic scenario, higher result can be achieved with *higher number* of policy, such as more food show/year if possible, more certification, and higher fraction changes.

These policies have large long-term strategic implications and indicate that the current goals for the German market are unrealistic for the current timeframe, and also highlight the huge delay for recruitment in the current system.

## **8. Conclusion**

This paper has outlined a case in which a DPM approach was used as a method for strategic design to counteract a declining market share for an Italian SME. The paper has previously listed the key drivers, strategic resources, and target end-results discovered in the system, back in Table 1. This approach allowed the project team to work with the key decision makers at the SME and provide them with an instrumental view which allowed them to better recognize and measure key performance indicators with the system.

The DPM process created new learning insights, often from an "instrumental view" perspective, for the client company. For example, it allowed them to identify the tremendous value food shows had to their efforts in penetrating the German market and highlighted the need for diversification of product lines to appeal to multiple demographics. In addition, from a more dynamic perspective, the tremendous time delays present in the system for recruitment of olive oil distributors, such as supermarket chains, from food shows was highlighted for the company for the first time from the ageing chain outlined in the contact base component of the model. This triggered an "aha" moment and *Sicilian Olive Oil Producers* has begun a reevaluation of its recruitment effort, beginning by opening up additional avenues of recruitment or working to accelerate the current contact process..

The policy testing of the DPM model also highlighted the sales department difficult in matching the expected goals for the German market in the given timeline. With revenue and number of distributors acting as the key end-results, it was noted that almost no realistic policy could achieve the current goals, especially in declining overall market conditions. This too has led to the company producing new strategic goals which better match market conditions and current strategic resource stocks. Over all, evidence stemming for the presentation and feedback relating to the DPM has indicated a change in strategic thinking at the firm.

Further research with additional case studies will be necessary to further test the value of applying DPM knowledge and systems to SMEs. Of note, would be a follow up to see if the lessons from DPM stick around for extended time periods or if knowledge and reflections are lost after the model is handed over to the company.

## **9. Works Cited**

Bianchi, P. et al., 1997. The Italian SME experience and possible lessons for emerging countries, s.l.: UNIDO.

Bianchi, C., 2012. Enhancing Performance Management and Sustainable Organizational Growth through System-Dynamics Modelling. Systemic Management for Intelligent Organizations, Springer-Verlag, Berlin Heidelberg, pp. 143-161.

Bianchi, C. & Montemaggiore, G., 2008. Enhancing strategy design and planning in public utilities through “dynamic” balanced scorecards: insights from a project in a city water company, System Dynamics Review, Vol. 24 (2):175–213.

Bianchi, C., 2002. Introducing SD modeling into planning & control systems to manage SMEs growth: a learning-oriented perspective. System Dynamics Review, Vol. 18 (3), pp. 315–338.

Bianchi, C., 2010. Enhancing Planning & Control Systems to Foster Sustainable Growth. paper presented at the EMUNI Research Souk, Palermo.

Bianchi, C., Winch, G. & Grey, C., 1998. The business plan as a learning-oriented tool for small/medium enterprises: A business simulation approach. Electronic proceedings of the International System Dynamics Conference, Quebec, Canada, 1-20.

Bianchi, C. & Bivona E., 2000. Commercial and financial policies in family firms: the Small Business Growth Management Flight Simulator. Simulation & Gaming, 31(2), 197–229.

Bracker, J. & Pearson, J., 1986. Planning and financial performance of small, mature firms. *Strategic Management Journal*, 7, 503-522.

Bolton, J. E., 1971. *Small firms: Report of the commission of inquiry on small firms*. London: HMSO

Curran, J. & Burrows, R., 1989. Shifting the focus: Problems and approaches to studying the small enterprise in the service sector. Proceedings of the 12th National Small Firms Policy and Research Conference, London, pp. 1-8.

Curran, J. & Stanworth, J., 1986. *Small firms, large firms: Theoretical and research strategies for the comparative analysis of small and large firms and their wider environment*. Small firms' growth and development. Gower, UK: Aldershot.

Davidson, P., 1996. Educational features of the system dynamics approach to modeling and simulation, *Journal of Structural Learning*, Vol. 12 (4): 269–290.

Gable, M. & Topol, M., 1987. Planning practices of small scale retailers. *American Journal of Small Business*, 12(2), 19-32.

Goffee, R. & Scase, R., 1980. Problems of managing men. *Small Business Guardian*, 3, 63-78.

Food and Agriculture Organization of the United Nations, 2013. Faostat. [Online]

Available at: <http://faostat3.fao.org/home/index.html#VISUALIZE>

[Accessed 6 June 2013].

isee systems, 2013. iThink. s.l.:isee systems, inc..

Kaplan, R. & Norton, D., (1992). The balanced scorecard: the measures that drive performance. *Harvard Business Review*, January-February: 71-9.

Linard, K. & Dvorsky, L., 2001. People - not human resources: the system dynamics of human capital accounting, Operations Research Society Conference, University of Bath, Bath.

Linard, K., Fleming, C. & Dvorsky, L., 2002. System Dynamics as the Link between Corporate Vision and Key Performance Indicators. paper presented at the 20th System Dynamics International Conference, Palermo, July.

Majocchi, A. & Zucchella, A., 2003. Internationalization and Performance: Findings from a Set of Italian SMEs. *International Small Business Journal*, 21(3), pp. 249-268.

Martinez, I. J. & Richardson, G. p., 2001. *Best Practices in System Dynamics Modeling*. Atlanta, Georgia, System Dynamics Society.

Morecroft, J., 2007. *Strategic modeling and business dynamics*, Chichester: Wiley.

Richmond, B., 2001. A new language for leveraging scorecard-driven learning, reprinted from "Balanced Scorecard Report", Harvard Business School Publishing, Vol. 3 (1):11–14.

Ritchie-Dunham, J.L., 2001. Informing mental models for strategic decision making with ERPs and the balanced scorecard: a simulation-based experiment. in Proceedings of the 19th System Dynamics International Conference, Atlanta.

Robinson, R. & Pearce, J., 1984. Research thrusts in small firm strategic planning. *Academy of Management Review*, 9(1), 128-137.

Sexton, D. & Van Auken, P., 1985. A longitudinal study of small business strategic planning. *Journal of Small Business Management*, 23(1), 7-15.

Sloper, P., Linard, K. & Paterson, D., 1999. Towards a dynamic feedback framework for public sector performance management. Proceedings of the 17th International System Dynamics Conference, Wellington.

Sterman, J. D., 2000. *Business Dynamics: Systems Thinking and Modeling for A Complex World*. s.l.:The McGraw-Hill.

Storey, D. J., 1994. *Understanding the small firm sector*. London: Routledge.

The Ventana Simulation Environment, 2010. Vensim PLE for Windows Version 6.0a-1. s.l.:Ventana Systems, Inc.

Ward, R. W., Briz, J. & de Felipe, I., 2003. Competing Supplies of Olive Oil in the German Market: An Application of Multinomial Logit Models. *Agribusiness*, 19(3), pp. 393-406.

Warren, K., 2002. *Competitive Strategy Dynamics*. West Sussex: John Wiley & Sons Ltd.

Warren, K., 2008. *Strategic Management Dynamics*, Chichester: Wiley.

Wolstenholme, E., 1990. *Systems inquiry: A system dynamics approach*. Chichester, UK: Wiley.

Zolichova, L., 2012. Eurostat. [Online]

Available at: [http://ec.europa.eu/agriculture/olive-oil/prices/presentation\\_en.pdf](http://ec.europa.eu/agriculture/olive-oil/prices/presentation_en.pdf)  
[Accessed 5 June 2013].