MODISC: teaching distribution fundamentals through an experiential model of distribution channel choice

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Abstract

Learning about distribution in the MBA/EMBA marketing class is often done through conceptual models and exercises. Experiential, group-based interactive pedagogies are seldom used, especially in a real-world, "hands on" context. This article details a flexible financial Model of Distribution Channel Choice (MODISC) that has been used in MBA/EMBA classes in which program participants simulate distribution channel choices for real-world, overseas clients. This paper describes the various building blocks of the model that takes the interdependency of the marketing mix (4 Ps) into account and shows how the model was implemented in EXCEL for a processed food products company. IT also provides evidence of the impact of the distribution studies on student learning.

Key words: Distribution Channels; Optimal Channel Choice; Experiential Learning; Interactive Pedagogy

Introduction

Experiential action learning has now become an accepted and desired goal for many leading MBA/EMBA programs worldwide (Argyris, 1982, 1993a, 1993b; Revans, 1982, 1983; Schon, 1983, 1987; Lewis & March, 1987; Keys, 1994; Boyatzis, 1994; Boyatzis & Kolb, 1997; Kolb & Kolb, 2005). It has also received confirmation in the marketing education literature (Young, 2002; Seitz and Razzouk, 2002; Razzouk, Seitz and Rizkallah, 2003; Helms, Mayo and Baxter, 2003; Hunt and Laverie, 2004; Peterson and Albertson, 2006; Wooldridge, 2006; Laverie, Mahdavaram & McDonald, 2008). While experiential action learning methods have been used in teaching marketing principles (Wood and Suter, 2004; Wooldridge, 2006); marketing research (Bridges, 1999; Bove, 2009); customer management and quality systems (Newman and Hermans, 2008); pricing (Smith Ducoffe and Tucker, 2004; Haytko, 2006; Marshall and Pearson, 2007); promotion (Helms, Mayo and Baxter, 2003); and marketing ethics (Hunt and Laverie, 2004), there have been relatively few attempts at doing this for the "place" or distribution function in the marketing mix. This paper is intended to remedy this situation by describing the development of an integrated flexible model for distribution choice used with over 150 undergraduate/MBA students in marketing classes and over 200 EMBA program participants since 2001. The model integrates all the elements of the marketing mix to assist global firms in making real-world distribution choices.

The choice of distribution channel is a complicated decision involving every aspect of the marketing mix. This paper outlines a flexible, generalizable financial Model of Distribution Channel Choice (MODISC) that takes into account the interdependency of the various elements of the marketing mix (four Ps). Developed using MS EXCEL, the model allows the marketing decision-maker to simulate the profitability of alternative scenarios of distribution channel configurations under various assumptions. The paper also describes how the model is implemented using an example of modeling the distribution choice for a consumer good (processed food products) manufacturer in Latin America.

The article is divided in to the following sections. The next section provides a literature review on the experiential models of distribution in the marketing education literature and surveys the models of distribution choice in the marketing literature, as well as an overview of decision science models of supply chain model choice from the production and operations literature. This survey places the model described in this paper in proper context regarding its contributions as briefly discussed in the third section. The fourth section provides a brief overview of the elements of the model and how they are inter-connected. The fifth section summarizes the results of the application of the MODISC model to the distribution channel choice problem of a Brazilian manufacturer selling processed food products in the United States. A final section concludes the article and shows the learning outcome of EMBA program participants who worked on real-world consulting projects using the MODISC model.

Literature Review

There is a limited marketing education literature that addresses using experiential action learning methods or even integrated conceptual models to teach the elements of

distribution systems development and distribution channel selection. Pearson, Lawrence and Hickman (2007) provide a method for selecting foreign distribution partners using the Analytical Hierarchy Process (AHP) along with a computer-based decision support system, *Expert Choice*. They show that student learning is enhanced by use of the classroom exercise and speculate on other possible uses of *Expert Choice* in the marketing classroom. However, by focusing on the foreign distribution partner choice question, this paper does not develop a model that enhances the students' understanding of the intricacies of distribution channel choices and the integration of the channel choice decision with the other elements of the marketing mix and strategic considerations. The authors emphasize that this is a classroom exercise with no attempt to extend this to experiential action learning projects with real-world clients.

Richey, Skinner and Autry (2007) build a conceptual model of retailer to consumer and retailer to supply chain partner interactions in order to develop a new approach to teaching retailing from an inter-firm relationships perspective. While providing a very useful conceptual model with well-defined inter-connections, the authors nevertheless do not detail the issues of distribution channel choice and the complex interactions that are involved with the marketing mix in making such choices. There is also no attempt to use experiential action learning. Our paper attempts to fill this gap by analyzing the distribution channel choice issue in the same holistic and inter-connected manner.

Other pedagogical contributions discuss learning about retailing through the experiential running of a student store to implement concepts learned in lectures (Seitz and Razzouk, 2002); or running a micro business to teach marketing principles including retailing (Peterson and Albertson, 2006) or making supply chain management relevant for marketing majors (Ellinger, 2007). While each contribution is valuable in extending new learning methods to teach marketing concepts, the approach adopted in this paper extends these insights to "hands-on" experiential learning projects with real-world clients in an integrated, holistic manner.

We now briefly discuss the general marketing channels literature and how our paper further develops the insights and ideas therein. The recent marketing literature on distribution channels and supply chain management has brought greater awareness of the complexity of marketing channels and the importance of this element of a marketing program in realizing organizational goals and delivering value to customers (Svensson, 2005). As suggested by Gundlach *et al*., (2006) the channel structure decision, compared to other elements of the marketing mix, is particularly complex because of the difficulty of assessing its impact on other members of the supply chain. Thus, as observed by Coelho *et al.*, (2003), the long term ramifications of selecting a channel of distribution involve significant costs.

Both single channel and multiple channel distribution systems have been considered in the literature. Regarding single channel systems, the literature points to common benefits and disadvantages associated with the basic options of a vertically integrated direct channel versus an indirect channel in which an independent middleman is employed. For example, Coelho *et al*., (2003) note key benefits of a direct channel including a higher level of personal customer contact and less management complexity in terms of avoiding tasks of managing relationships with channel intermediaries and possible channel conflict. Conversely, by utilizing an indirect channel, the firm can

obtain such benefits as more extensive market coverage with lower capital investment and greater flexibility in response to market changes.

The most recent literature has focused on several interrelated topics, including the following:

- a departure from more traditional single channel systems to the use and management of multiple channels structures
- management of conflict in multiple distribution channels
- the emergence of internet channels of distribution
- the integration of channels of distribution with the disciplines of logistics and purchasing within the overall framework of Supply Chain Management (SCM)

Early contributions to the distribution planning oriented SCM literature focused on using mixed integer programming models to simulate production plant locations, distribution center locations and customer location/service dimensions and the dynamics between these variables. These studies include those of Geoffrion and Graves (1974), Cohen and Lee (1985), Hodder and Dincer (1986), Cohen and Moon (1991), and Frankel *et al.* (2008).

Goetschalckx et al. (2002) show the gains achieved by integrating the design of strategic global supply chain networks with the decisions associated with the production–distribution allocations and transfer prices. The authors demonstrate savings opportunities created by designing the system with an integrated methodology using two case studies.

More recently, Alptekinoglu and Tang (2005) developed a model of a two-stage multi-channel distribution system composed of multiple distribution depots and multiple sales locations. The model considers stochastic, correlated demand occurring at the sales locations. The main contribution of their model is that it captures the 'demand pooling' effect on a distribution network, thus able to realize significant inventory related cost reduction. The authors present an integer programming model that provides near-optimal solution. However, it focuses only on minimizing cost, rather than maximizing total profit due to deterministic assumptions about the distribution network and exogenous demand distribution.

While the literature is filled with models of production-distribution choice, absent from this research is a readily understandable and workable model of distribution channel choice in common situations for marketing students and MBA/EMBA participants in which the costs of using such channels, demand requirements and supply considerations are known or can be modeled in terms of different scenarios. We provide a review of the contributions of the MODISC model toward understanding distribution systems in the section below to effectively address these issues in practical manner to embed learning for marketing students and professionals.

Contributions of the MODISC Model

According to the above review and to the best of our knowledge, there is a gap in the literature for arriving at distribution channel choice where distribution channel selections are explicit decision variables, both in the general marketing and marketing education literature. There is also a lack of experiential learning models of distribution choice that can help marketing and other graduate/executive students learn about

distribution choices in a real-world context. The model presented in this paper fills these gaps.

We create an interconnected set of EXCEL worksheets in which the assumptions of the model such as channel margins, product-mix, product prices, capital and operating costs, inflation, sales volume, discount rates can be developed from real-world situations and changed to compare different distribution channel alternatives on the basis of the NPV or IRR criterion. Such an approach provides a very flexible and realistic framework in which the benefits and costs of various distribution channels in any industry can be modeled and the optimal distribution channel identified.

Our MODISC model contributes to research in the field in several ways. First, the model takes into account the interplay between the activities of distribution, logistics and purchasing. By doing this, it provides the marketing student and professional a holistic, practical tool to understand, model and implement difficult issues about distribution choice. As suggested by Gundlach et al. (2006), distribution models should reflect the integration of these activities rather than treating each in isolation.

Second, although multi-channel distribution structures are becoming increasingly utilized, models that thoroughly analyze the economic consequences of a single channel option have an important role. Coelho et al. (2003) note, for example, that it is important to study the factors affecting the determination of an appropriate number of channels in a multiple channel strategy, and this analysis cannot be done adequately without understanding the economic impact of a particular single channel structure. Furthermore, much of the literature points to the greater profitability observed in single channel structures, e.g., Coelho et al. (2003). The MODISC model offers an important avenue for carefully assessing the profitability of single channel options while it can be modified to account for multiple channel options.

Third, previous research, e.g., Vidal and Goetschalckx (1997), Goetschalckx et al. (2002) and Coelho et al. (2003), indicates that profit performance is inversely related with the number of channels used due to such factors as higher capital investment and operating costs, and the greater complexity of managing multiple channels which results in a greater likelihood of channel conflict and reduced customer service. However, declines in profit performance can be mitigated by replacing an existing channel with a lower cost one. This is why careful assessment of a particular channel option is necessary, and the MODISC model offers a comprehensive approach for doing so.

Finally, while most of the empirical research on distribution channels focuses on a particular consumer or industrial product, the MODISC model can be applied to a wide variety of product types. In addition, it is the only pedagogical model to the best of our knowledge that enables students and practitioners to understand, model and implement distribution channel choices.

A key consideration in developing the MODISC model was to use a commonly used financial performance measure to analyze alternative channel choice decisions. By using a NPV based framework, we are able to translate the complex decision process of choosing among multiple channels of distribution into a simple spreadsheet based exercise. This makes the model accessible to the large group of decision makers who may have difficulty in understanding the complex optimization models. In addition, by combining alternatives, the MODISC model can also flexibly incorporate the evaluation of the use of multiple distribution channels simultaneously. Furthermore, our framework

enables the modeling of a variety of distribution channel configurations within real-world contexts.

The Optimization Model of Distribution Choice (MODISC)

This section discusses the elements and modeling approach of the general financial Model of Distribution Choice (MODISC) that we have developed to assist marketers and managers in choosing the optimal distribution channel for their products or services.

The MODISC Model is predicated on a simple NPV maximization framework but with an inter-connected series of decision variables. The basic NPV model is:

$$Max \sum_{t=1}^{n} \frac{(NCI_t - NCO_t)}{(1+r)^t}$$ over all distribution channels

where: NCI_t = net cash inflows in period t,

NCO_t = net cash outflows in period t, and

r = discount rate.

In order to present the inter-connected components of the MODISC model, we represent the basic structure of the model in Figure 1(Appendix).

First of all, the MODISC model is based on our understanding the various configurations of a distribution channel alternatives in terms of whether they are one-step or multiple-step distribution channels (we show a particular example for the processed food market below in the implementation example). Once the channel configuration is specified, we model the input variables in interconnected EXCEL spreadsheets (see INPUT side of Figure 1). The first spreadsheet inputs the FOB ex-foreign country or U.S. retail prices for different volumes per a separate supply price estimation model developed by the producer/supplier (these can be based on a volume-based price schedule). A key input sheet is the "Intermediary Markups" worksheet. This provides the mark-ups for each intermediary in the channel so that applicable mark-ups can be "turned" on or off depending upon the channel configuration being used. Sensitivity analysis of the whole system can be done by using different values for the FOB/retail prices and mark-ups that are entered into the spreadsheet.

An important consideration in distribution channel modeling is the trade-off between the cost of adding more channels and the increased sales that the added intermediaries can generate. There are two ways in which this can be incorporated in the model. The first is in terms of the demand and hence the revenue forecasts that are inputted in to the main cash flow worksheet. Alternatively, the model accounts for the provision for scaling up sales and hence revenues by incorporating sales and productivity factors for each intermediary in the channel configurations so that "switching" on a particular channel configuration automatically scales up the sales/revenue numbers in the cash inflow section of the main worksheet.

It is critical as to what sales/import quantities are inputted in to the main DCF worksheet. Separate interlinked worksheets (not detailed in Figure 1 to keep the explanation simple) provide details of the number of SKUs, their dimensions, the product

mix assumptions, their conversion into cases, number of cases per container and hence the SKUs per container including calculations for separate floor-loading and pallet-loading. The incorporation of these details permits shipping and warehousing quantity dimensions to be determined. However, the exact sales quantities provided by the manufacturer's/supplier's forecasts are inputted from the sales/import quantities worksheet to the main DCF worksheet. These quantities are then matched to the prices assumed in the product mix for the volumes selected.

In order to keep the spreadsheets simple and clear to understand, separate interconnected worksheets for shipping and warehousing costs are developed based on the contracted unit costs of shipping and warehousing of the product shipments under different assumptions of public versus private warehousing and floor loading or pallet loading in the warehouses. These estimates are based on the specific costs in different geographical regions of the country in which the product is being sold. Separate worksheets provide costs of using different types of sales forces (e.g. own versus contracted) with the capital cost estimates for warehousing, transportation and sales offices.

A final input to the model is the incorporation of differential inflation rates on the revenues and costs in the model. A final key element is the choice of a discount rate which is directly entered into the main DCF spreadsheet.

The main worksheet in the MODISC model where all the interlinked spreadsheet calculations described above come together is the DCF worksheet, modeling the product mix, quantities, prices and revenues on the cash inflow side and the intermediary, shipping, warehousing, sales office, sales force and other transportation and return costs on the cash outflow side. This is set up in a standard "capital budgeting" format in which the NPV of using a particular channel configuration alternative or combination of alternatives can be modeled.

As shown in Figure 1, on the OUTPUT side, the MODISC model produces 5-10 year forecasts of discounted cash flows that the decision maker can use to calculate the net cash flows (and free cash flows) that result from using a particular distribution channel or combination of distribution channels. Of course, the NPV, IRR and discounted payback period are key outputs that the decision-maker can use to select the channel configuration or combination. The model can also be used to arrive at the appropriate retail price based on sensitivity analysis on the inputs parameters. Alternatively, for a given retail price, the optimal FOB/CIF price can be estimated.

Implementation of MODISC – An Application to the U.S. Processed Foods and Beverage Industry

First, we provide a brief background about the contexts in which the MODISC model was developed and implemented for marketing students and MBA/EMBA program participants. The model was first developed to help marketing students enrolled in Asian International Marketing (AIM) and European International Marketing (EIM) classes in the undergraduate/graduate programs and to EMBA students required to complete a Global Business Strategic Consulting (GLOBUSTRAT) project in their EMBA program at a large west coast university. It was later incorporated in to the consulting program for a global MBA at the same university where all program

participants were required to complete a comprehensive (usually marketing focused) consulting project for an overseas client where they had to develop the models to achieve the client's objectives (very often a country market entry study). The details of these programs are discussed in a number of papers (Kamath and MacNab, 1998; Kamath, Agrawal and Krickx, 2008; and Kamath, Krickx and Agrawal, 2009).

The MODISC model was developed as an integrated pedagogical and decision-learning tool where enrolled participants worked experientially on a comprehensive business problem over an extended period of time (4-12 months depending on the program) to develop distribution channel choices for their overseas client among other project objectives. Working with a team of faculty advisers for the duration of the project, program participants first developed the objectives and scope of the projects through pre-qualification and project finalization visits to their overseas clients. The program participants then developed the primary and secondary research strategies required to meet the client objectives by developing a series of research questions/hypotheses. Participants then collected the primary and secondary data through secondary and field research (in consultation with their clients) to model the strategic issues and marketing mix considerations, especially the distribution channel choices and impacts for final presentation to their clients. Such a process allowed them to apply their marketing knowledge in a practical real-world context with all the data and modeling difficulties that such a real-world project entails (see below for outcomes). We describe the MODISC model component of this larger exercise as follows.

In order to simultaneously demonstrate the building blocks of the MODISC model and its application to a real-world distribution channel choice situation, we present the model in the context of a Brazilian manufacturer of processed foods entering the U.S. market to distribute its products for consumer purchase and consumption. However, it should be noted that the model can also be applied to other goods that require similar distribution channel selection decision.

There are five basic channels of distribution in the U.S. Processed Foods and Beverage Industry. These are shown in Figure 2 (Appendix).

We discuss the distribution channel choices of a Brazilian processed food manufacturer who wishes to sell its products in the United States. Through the use of the MODISC financial model, the marketing student gains a better understanding of how different channels of distribution impact the Brazilian manufacturer's cash flows and which of the distribution channels requires investments or upfront costs. The model allows students to conduct sensitivity analysis on the NPV/IRR calculations under various assumptions on input parameters.

The following Figure 3 (Appendix) from the MS EXCEL financial model illustrates the data input sheet for monthly orders or demand projections for the product mix of four processed food items (referred to here as Muky, Xuky, Glatin and Cake Mix but generalizable to as many products as there are in the product portfolio of the company assessing the distribution choices).

Row 4 and columns B, C and I are all open to receive data input. The central fields from D9 to H18 are calculations produced from the input. In this sheet, the Brazilian processed food product exporter is able to choose the distribution channel by inputting "y" or "n" in each respective field in the top row that includes all the distribution channel participants. A monthly shipment quantity based on demand

projections is specified by the number of containers of each product in the blue area of the product input as well as the destination port (Miami or Los Angeles, or both) through which the products are shipped from Brazil. The data in the D9 to H18 for each product are obtained from a linked data sheet that provides for the use of pallets, the number of cartons, the cubic foot volume required (hence the container size) and the total number of units of each product required by the demand projection. Target margins can be specified for each product so that product prices reflect this (these margins can be set to zero to provide calculations that reflect the base NPV/IRR obtained without adding the manufacturer's margin). Figure 4 (Appendix) demonstrates the revenue calculations for the MODISC model in the main calculation spreadsheet. It is to be noted that all the data inputted in to the model comes from extensive secondary and primary research through client interviews, focus groups, channel participant interviews, mall intercept surveys, distribution channel surveys and other primary research methods. Both revenue and cost data is similarly collected.

Revenues are derived by making the following assumptions:

1. Beginning with 2 containers of each product (Muky, Xuky, Gelatin, and Cake Mix) for the first quarter, thereafter increasing by one container of each product for each of the following quarters. These projections are based on the company's demand forecast.
2. Number of units is derived by calculating the number of units in a carton of each product.
3. Products are shipped inbound by volume rather than on pallets in 40ft. containers. This maximizes the quantity of each product shipped in a container.
4. Depending on which channels of distribution are utilized, revenues will increase or decrease accordingly. The assumption in this particular spreadsheet is that a food broker should increase revenues by 10% of direct sales to retailer, a food importer should increase revenues by 15%, and a food distributor should increase revenues by 20%. These adjustments are reflected in the "number of containers by product-channel adjusted" section in the financial model. Any other assumption based on the specific distribution channel productivity and company experience can be incorporated here.
5. Retail prices are based on the median retail price of competitors of similar products as the Brazilian manufacturer ($4.54 for Muky, $3.64 for Xuky, $2.40 for Cake Mix, and $.79 for Gelatin). The model seamlessly incorporates any other price assumptions and recalculates the revenue automatically, allowing the MODISC user to analyze the sensitivity of the results to various price assumptions.
6. Retail prices are adjusted for inflation annually at a rate of 2%.

Figure 5 (Appendix) from the financial model illustrates costs/cash flows. Costs are derived using the following assumptions which can be changed to suit the MODISC user's specific situation. Further details regarding the manner in which cost components can be derived are available upon request.

1. Shipping costs from the San Francisco do Sul port in Brazil to Miami are calculated separately and linked to the relevant cell here. The shipping cost calculation spreadsheet is directly linked to the main cash flow calculation

worksheet discussed above and any changes in shipping cost components are automatically updated on the main cash flow worksheet.
2. Warehousing costs based on public warehousing using floor-loading (un-palletized shipments) are calculated separately and linked to the relevant cell in the costs spreadsheet.
3. Office and Staff costs are detailed in a separate inter-linked EXCEL worksheet based on actual cost calculations and directly appear in the relevant cell in this portion of the main EXCEL cash flow spreadsheet.
4. National branding costs are derived from the addition of costs totaling 2.5% of sales in advertising in addition to the costs of office and staff. Of course, any other assumption can be incorporated in a flexible manner.
5. Distribution channel margins are inputted based on expected margins for each channel as a total of sales revenues. Distribution channel participant margins can be obtained either through interviews, surveys or reviews of best practice in the industry. They can be changed to verify the sensitivity of the NPV/IRR to different margin levels.
6. Returns are assumed to be 1% of overall sales in the spreadsheet example but can be flexibly assumed to be something else or zero.

Net Present Value (NPV) is arrived at by calculating the net present value of all cash flows for 5 years discounted at a rate of 6% reflecting the interest rate at the time of the study, assuming funds are borrowed in the U.S.

Having illustrated how revenues, costs, and cash flows are derived and the various assumptions made, Figure 6 (Appendix) illustrates the cash flows and NPV calculation for Alternative 3, the 3 Step distribution channel through the food broker and distributor to the retailer.

The following points may be noted about Figure 6:

1. Cash flows are positive throughout the 5 years with a cumulative Net Cash Flow of $12,517,174.09.
2. This distribution alternative results in a Net Present Value of $7,549,761.38 (which turns out to be less than selling directly via a distributor –Alternative 1).

In addition to the quantitative assessment using the MODISC model, it is also important to analyze the qualitative advantages and disadvantages of each distribution alternative. It may be pointed out here that the MODISC quantitative analysis allows us to also think qualitatively about these aspects. This is done separately each time the MODISC model is used.

The usefulness of the MODISC model is that it provides a direct comparison in quantitative cash flow terms of the various distribution alternatives under consideration. To illustrate this usefulness, the following figures present a summary of the distribution alternatives based on Net Present Value of Cumulative Net Cash Flows.

Figure 7 (Appendix) summarizes the NPV of cumulative cash flows of all the five distribution alternatives. It indicates that alternative 5 - selling directly to a private label retailer has the largest net present value of cumulative cash flows over a 5 year period. It can be seen that the Alternative 5, the private label alternative provides the best alternative

in terms of NPV due to the high volume and low costs that more than compensate for the lower prices.

The usefulness of the MODISC model is further enhanced by the ease with which one can conduct a sensitivity analysis of the model by changing the model assumptions for any of the parameters in the model such as the number and type(s) of intermediaries employed. Examples of changing model assumptions can be provided upon request.

Learning Outcomes

With regard to the learning outcomes that the MODISC modeling approach provides to enrolled students and program participants, the overall impact was measured by impartial third party surveys of the program participants who used this experiential decision learning tool as part of a substantive experiential learning project with real-world clients. These are briefly described below.

The program in which the MODISC model consulting project was embedded was compared to all and six selected peer EMBA programs without such a project that reported to the EMBA Council on a number of professional development outcomes for each of the 2004, 2005 and 2006 academic years. The results are summarized in Figure 8 (Appendix). It can be seen that while the MODISC-embedded program scored substantially higher than the all program average and at the top of the six peer program averages on almost all the outcomes evaluated, the MODISC-embedded program was rated significantly higher as compared to other programs on the key aspects of Critical Thinking, Business Discipline Integration and Improving Decision-Making. This demonstrates the effectiveness and efficacy of using an experiential, integrated and flexible decision-making model like MODISC in helping program participants and executives understand distribution channel (and other discipline) decision-making in real-world contexts.

Feedback from program participants, both verbal and written, confirms the analytical fruitfulness of using the MODISC model and the experiential consulting strategies. Internal surveys and the surveys conducted by the independent EMBA Council discussed above consistently indicated that the experiential learning program embodies in MODISC is seen as the most valuable aspect of the EMBA program in overall terms and especially in terms of learning outcomes. The projects received the highest scores in the program (average scores of 9.3 to 9.5 on a ten point scale for Quality of Team Projects and Appropriate Use of Team Building and Learning).

Conclusions

In this paper, a flexible financial simulation model has been presented that is useful in analyzing distribution choices often faced by marketing managers in a variety of industries. Using the commonly available EXCEL spreadsheet package, the integrated model captures the revenue, cost and strategic decision choice aspects of distribution channel choice. The model represents a very easily accessible alternative to the models available in the distribution and supply chain literature for line and staff marketing managers in evaluating the distribution choice alternatives.

The major conclusions that emerge from the use of the MODISC model in a variety of distribution contexts are the following:

- The profitability of any particular channel is a trade-off between the number of steps in the channel and the total demand that can be met through the use of that channel.
- Using multiple channels may have a positive impact on sales as more channels create greater potential to meet additional consumer demand that may not be met through one channel alone.
- The use of multiple channels may however make it more difficult to coordinate the marketing effort in terms of providing a consistent level of service across channels.
- The marketer can employ concurrent channels in higher growth markets, thus allowing more room for sales for all channel parties. This is to be traded off against the possibility of greater channel conflict.
- The greater the number of steps in a given distribution alternative, the greater margins that need to be paid for that particular channel alternative.
- Warehousing/distribution center costs have a disproportionate impact on the attractiveness of a given channel than any other element of cost, implying that the required contribution margin in most applications of the MODISC model increases with the capital investment involved.
- Using the MODISC model provides students with an effective learning tool which scores high on critical learning, integrating different business disciplines and improving decision-making as compared to comparable and peer EMBA programs that do not use such an experiential learning tool.

Thus, it can be seen that the MODISC model provides a useful framework for modeling distribution choice. Its flexibility in accommodating incremental, avoidable costs and incremental revenues of choosing a particular distribution channel alternative provides an accessible and flexible modeling tool for capturing the profitability and hence desirability of alternative distribution choices.

In conclusion, the MODISC model provides a comprehensive and flexible model of distribution choice that allows marketing students and MBA/EMBA program participants to understand the complexities of the distribution channel choice decision in a comprehensive and holistic manner through a real-world experiential exercise with an overseas client using information and data that is collected from the client and other market actors. Even without the experiential context, the model can still be used by marketing and MBA/EMBA students to understand the distribution decision.

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Figure 1

MODISC Model Components

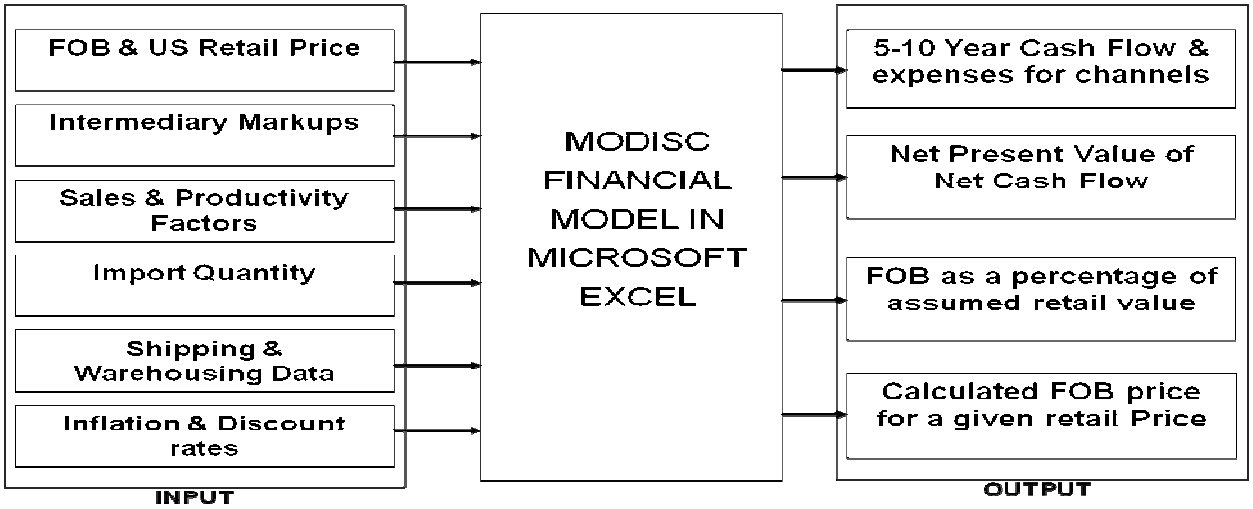
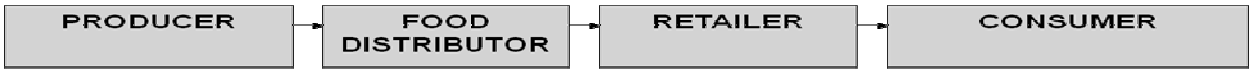


Figure 2

Alternative Distribution Channel Configurations in U.S. Processed Foods

Alternative 1

Alternative 2



Alternative 3

Alternative 4

Alternative 5

Figure 3

MODISC Data Input Sheet for Brazilian Processed Food Products

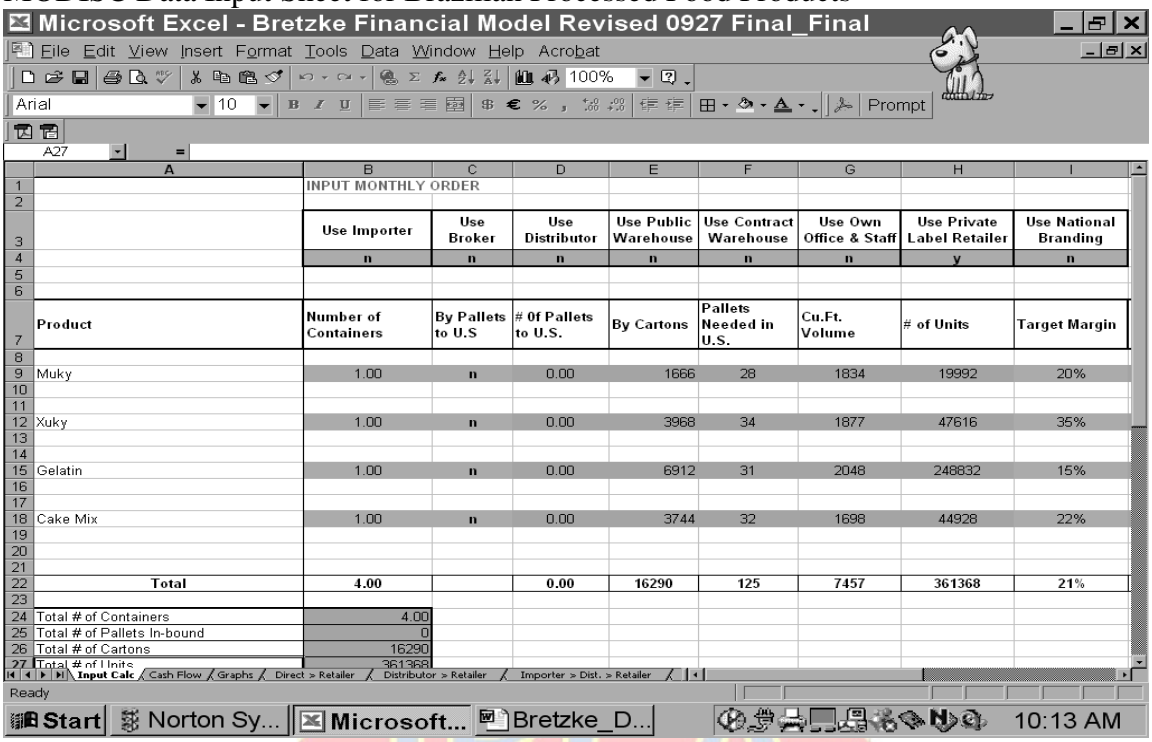
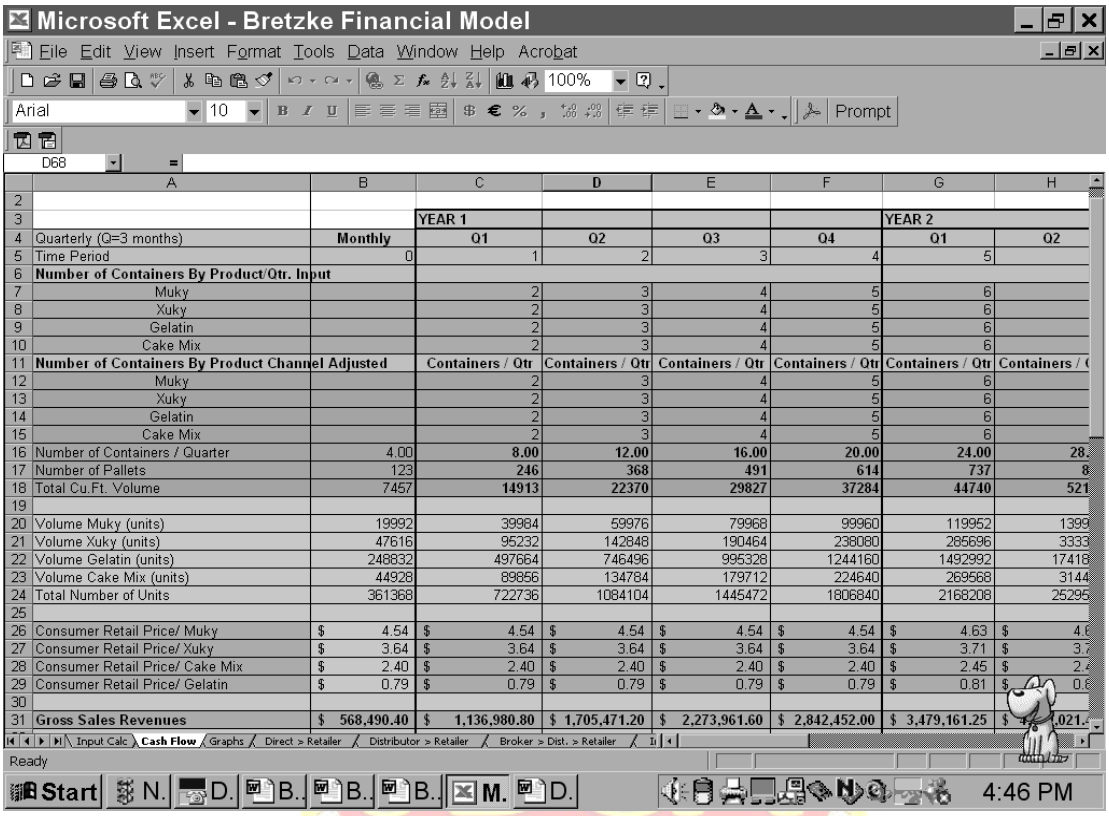


Figure 4

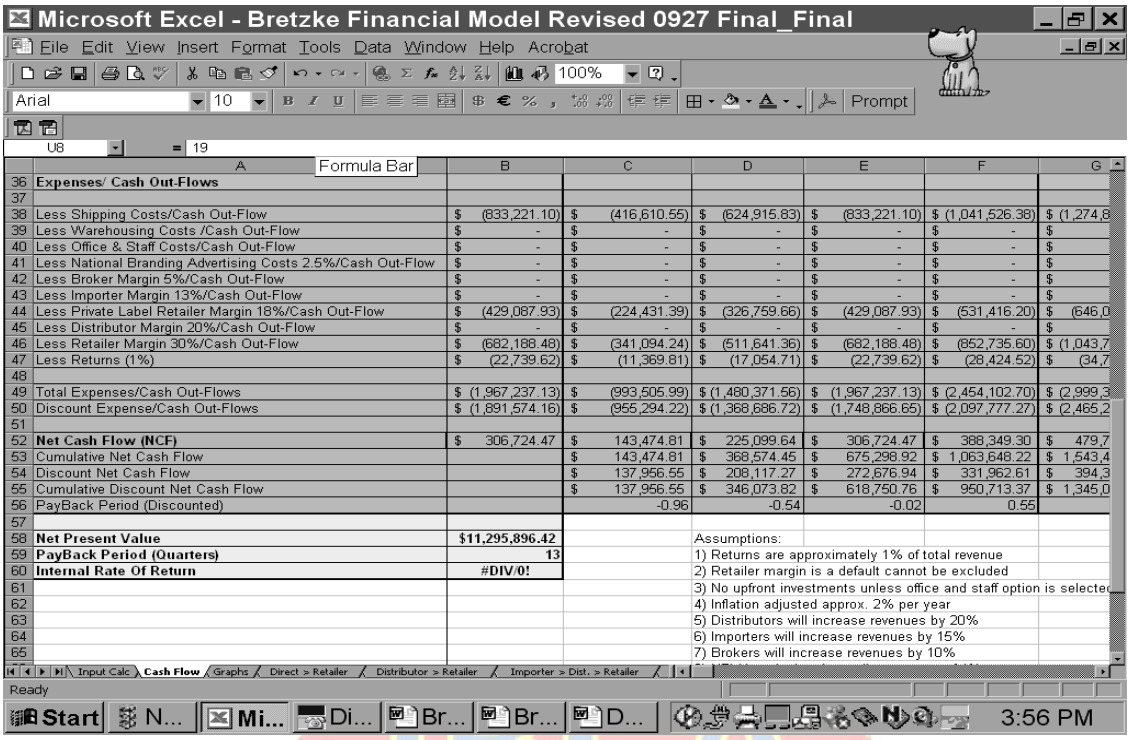
MODISC Revenue Calculations Worksheet Section



	A	B	C	D	E	F	G	H
2								
3			YEAR 1				YEAR 2	
4	Quarterly (Q=3 months)	Monthly	Q1	Q2	Q3	Q4	Q1	Q2
5	Time Period	0	1	2	3	4	5	
6	**Number of Containers By Product/Qtr. Input**							
7	Muky		2	3	4	5	6	
8	Xuky		2	3	4	5	6	
9	Gelatin		2	3	4	5	6	
10	Cake Mix		2	3	4	5	6	
11	**Number of Containers By Product Channel Adjusted**		Containers / Qtr	Containers / Qtr	Containers / Qtr	Containers / Qtr	Containers / Qtr	Containers /
12	Muky		2	3	4	5	6	
13	Xuky		2	3	4	5	6	
14	Gelatin		2	3	4	5	6	
15	Cake Mix		2	3	4	5	6	
16	Number of Containers / Quarter	4.00	**8.00**	**12.00**	**16.00**	**20.00**	**24.00**	**28.**
17	Number of Pallets	123	**246**	**368**	**491**	**614**	**737**	**8**
18	Total Cu.Ft. Volume	7457	**14913**	**22370**	**29827**	**37284**	**44740**	**521**
19								
20	Volume Muky (units)	19992	39984	59976	79968	99960	119952	1399
21	Volume Xuky (units)	47616	95232	142848	190464	238080	285696	333
22	Volume Gelatin (units)	248832	497664	746496	995328	1244160	1492992	17418
23	Volume Cake Mix (units)	44928	89856	134784	179712	224640	269568	3144
24	Total Number of Units	361368	722736	1084104	1445472	1806840	2168208	25295
25								
26	Consumer Retail Price/ Muky	$ 4.54	$ 4.54	$ 4.54	$ 4.54	$ 4.54	$ 4.63	$ 4.
27	Consumer Retail Price/ Xuky	$ 3.64	$ 3.64	$ 3.64	$ 3.64	$ 3.64	$ 3.71	$ 3.
28	Consumer Retail Price/ Cake Mix	$ 2.40	$ 2.40	$ 2.40	$ 2.40	$ 2.40	$ 2.45	$ 2.
29	Consumer Retail Price/ Gelatin	$ 0.79	$ 0.79	$ 0.79	$ 0.79	$ 0.79	$ 0.81	$ 0.
30								
31	**Gross Sales Revenues**	**$ 568,490.40**	**$ 1,136,980.80**	**$ 1,705,471.20**	**$ 2,273,961.60**	**$ 2,842,452.00**	**$ 3,479,161.25**	**$,021.**

Figure 5

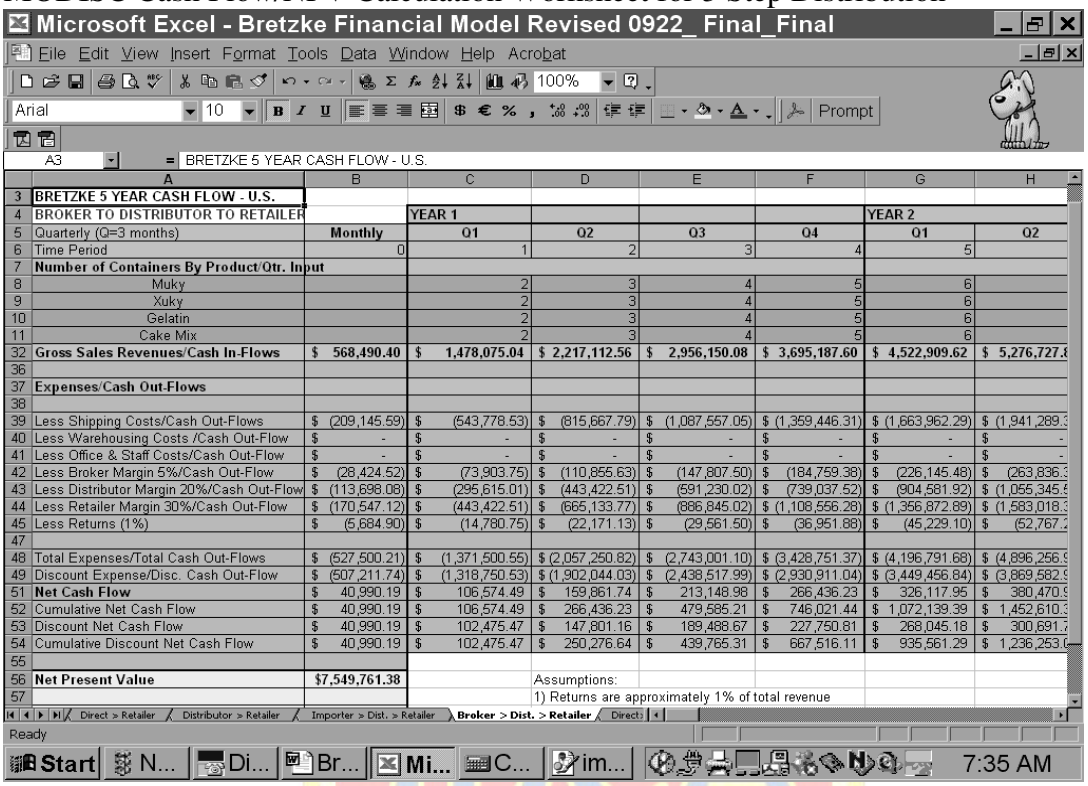
MODISC Costs and Cash Flow Worksheet Section



	A	B	C	D	E	F	G
36	**Expenses/ Cash Out-Flows**						
37							
38	Less Shipping Costs/Cash Out-Flow	$ (833,221.10)	$ (416,610.55)	$ (624,915.83)	$ (833,221.10)	$ (1,041,526.38)	$ (1,274,8
39	Less Warehousing Costs /Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$
40	Less Office & Staff Costs/Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$
41	Less National Branding Advertising Costs 2.5%/Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$
42	Less Broker Margin 5%/Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$
43	Less Importer Margin 13%/Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$
44	Less Private Label Retailer Margin 18%/Cash Out-Flow	$ (429,087.93)	$ (224,431.39)	$ (326,759.66)	$ (429,087.93)	$ (531,416.20)	$ (646,0
45	Less Distributor Margin 20%/Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$
46	Less Retailer Margin 30%/Cash Out-Flow	$ (682,188.48)	$ (341,094.24)	$ (511,641.36)	$ (682,188.48)	$ (852,735.60)	$ (1,043,7
47	Less Returns (1%)	$ (22,739.62)	$ (11,369.81)	$ (17,054.71)	$ (22,739.62)	$ (28,424.52)	$ (34,7
48							
49	Total Expenses/Cash Out-Flows	$ (1,967,237.13)	$ (993,505.99)	$ (1,480,371.56)	$ (1,967,237.13)	$ (2,454,102.70)	$ (2,999,3
50	Discount Expense/Cash Out-Flows	$ (1,891,574.16)	$ (955,294.22)	$ (1,368,686.72)	$ (1,748,866.65)	$ (2,097,777.27)	$ (2,465,2
51							
52	**Net Cash Flow (NCF)**	$ 306,724.47	$ 143,474.81	$ 225,099.64	$ 306,724.47	$ 388,349.30	$ 479,7
53	Cumulative Net Cash Flow		$ 143,474.81	$ 368,574.45	$ 675,298.92	$ 1,063,648.22	$ 1,543,4
54	Discount Net Cash Flow		$ 137,956.55	$ 208,117.27	$ 272,676.94	$ 331,962.61	$ 394,3
55	Cumulative Discount Net Cash Flow		$ 137,956.55	$ 346,073.82	$ 618,750.76	$ 950,713.37	$ 1,345,0
56	PayBack Period (Discounted)		-0.96	-0.54	-0.02	0.55	
57							
58	**Net Present Value**	**$11,295,896.42**		Assumptions:			
59	**PayBack Period (Quarters)**	**13**		1) Returns are approximately 1% of total revenue			
60	**Internal Rate Of Return**	**#DIV/0!**		2) Retailer margin is a default cannot be excluded			
61				3) No upfront investments unless office and staff option is selecte			
62				4) Inflation adjusted approx. 2% per year			
63				5) Distributors will increase revenues by 20%			
64				6) Importers will increase revenues by 15%			
65				7) Brokers will increase revenues by 10%			

Figure 6

MODISC Cash Flow/NPV Calculation Worksheet for 3 Step Distribution



Microsoft Excel - Bretzke Financial Model Revised 0922_ Final_Final

File Edit View Insert Format Tools Data Window Help Acrobat

Arial 10 Prompt

A3 = BRETZKE 5 YEAR CASH FLOW - U.S.

	A	B	C	D	E	F	G	H
3	**BRETZKE 5 YEAR CASH FLOW - U.S.**							
4	BROKER TO DISTRIBUTOR TO RETAILER		YEAR 1				YEAR 2	
5	Quarterly (Q=3 months)	**Monthly**	Q1	Q2	Q3	Q4	Q1	Q2
6	Time Period	0	1	2	3	4	5	
7	**Number of Containers By Product/Qtr. Input**							
8	Muky		2	3	4	5	6	
9	Xuky		2	3	4	5	6	
10	Gelatin		2	3	4	5	6	
11	Cake Mix		2	3	4	5	6	
32	**Gross Sales Revenues/Cash In-Flows**	**$ 568,490.40**	**$ 1,478,075.04**	**$ 2,217,112.56**	**$ 2,956,150.08**	**$ 3,695,187.60**	**$ 4,522,909.62**	**$ 5,276,727.8**
36								
37	**Expenses/Cash Out-Flows**							
38								
39	Less Shipping Costs/Cash Out-Flows	$ (209,145.59)	$ (543,778.53)	$ (815,667.79)	$ (1,087,557.05)	$ (1,359,446.31)	$ (1,663,962.29)	$ (1,941,289.3
40	Less Warehousing Costs /Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$ -	$ -
41	Less Office & Staff Costs/Cash Out-Flow	$ -	$ -	$ -	$ -	$ -	$ -	$ -
42	Less Broker Margin 5%/Cash Out-Flow	$ (28,424.52)	$ (73,903.75)	$ (110,855.63)	$ (147,807.50)	$ (184,759.38)	$ (226,145.48)	$ (263,836.3
43	Less Distributor Margin 20%/Cash Out-Flow	$ (113,698.08)	$ (295,615.01)	$ (443,422.51)	$ (591,230.02)	$ (739,037.52)	$ (904,581.92)	$ (1,055,345.5
44	Less Retailer Margin 30%/Cash Out-Flow	$ (170,547.12)	$ (443,422.51)	$ (665,133.77)	$ (886,845.02)	$ (1,108,556.28)	$ (1,356,872.89)	$ (1,583,018.3
45	Less Returns (1%)	$ (5,684.90)	$ (14,780.75)	$ (22,171.13)	$ (29,561.50)	$ (36,951.88)	$ (45,229.10)	$ (52,767.2
47								
48	Total Expenses/Total Cash Out-Flows	$ (527,500.21)	$ (1,371,500.55)	$ (2,057,250.82)	$ (2,743,001.10)	$ (3,428,751.37)	$ (4,196,791.68)	$ (4,896,256.9
49	Discount Expense/Disc. Cash Out-Flow	$ (507,211.74)	$ (1,318,750.53)	$ (1,902,044.03)	$ (2,438,517.99)	$ (2,930,911.04)	$ (3,449,456.84)	$ (3,869,582.9
51	**Net Cash Flow**	$ 40,990.19	$ 106,574.49	$ 159,861.74	$ 213,148.98	$ 266,436.23	$ 326,117.95	$ 380,470.9
52	Cumulative Net Cash Flow	$ 40,990.19	$ 106,574.49	$ 266,436.23	$ 479,585.21	$ 746,021.44	$ 1,072,139.39	$ 1,452,610.3
53	Discount Net Cash Flow	$ 40,990.19	$ 102,475.47	$ 147,801.16	$ 189,488.67	$ 227,750.81	$ 268,045.18	$ 300,691.7
54	Cumulative Discount Net Cash Flow	$ 40,990.19	$ 102,475.47	$ 250,276.64	$ 439,765.31	$ 667,516.11	$ 935,561.29	$ 1,236,253.0
55								
56	**Net Present Value**	**$7,549,761.38**		Assumptions:				
57				1) Returns are approximately 1% of total revenue				

Direct > Retailer | Distributor > Retailer | Importer > Dist. > Retailer | **Broker > Dist. > Retailer** | Direct

Ready

Start N... Di... Br... Mi... C... im... 7:35 AM

Figure 7

MODISC NPV of Processed Food Distribution Alternatives

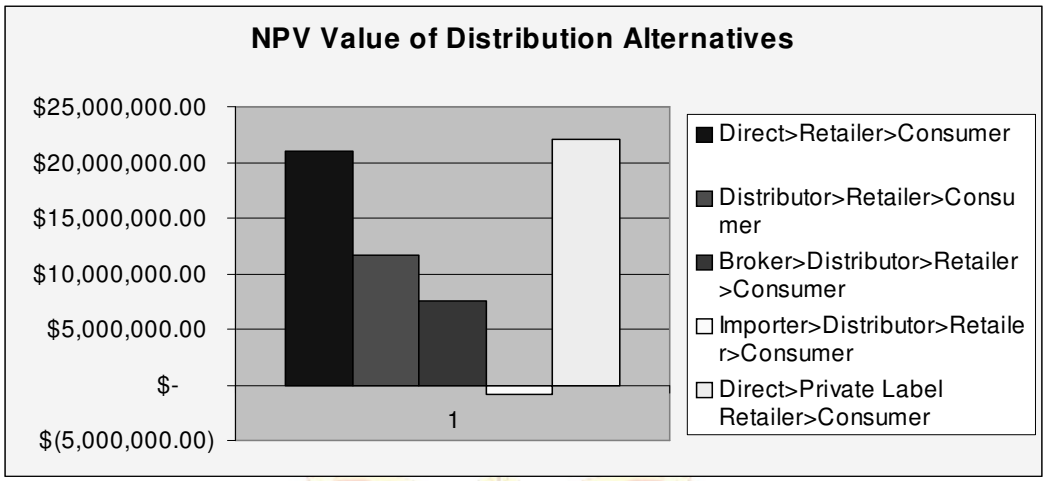
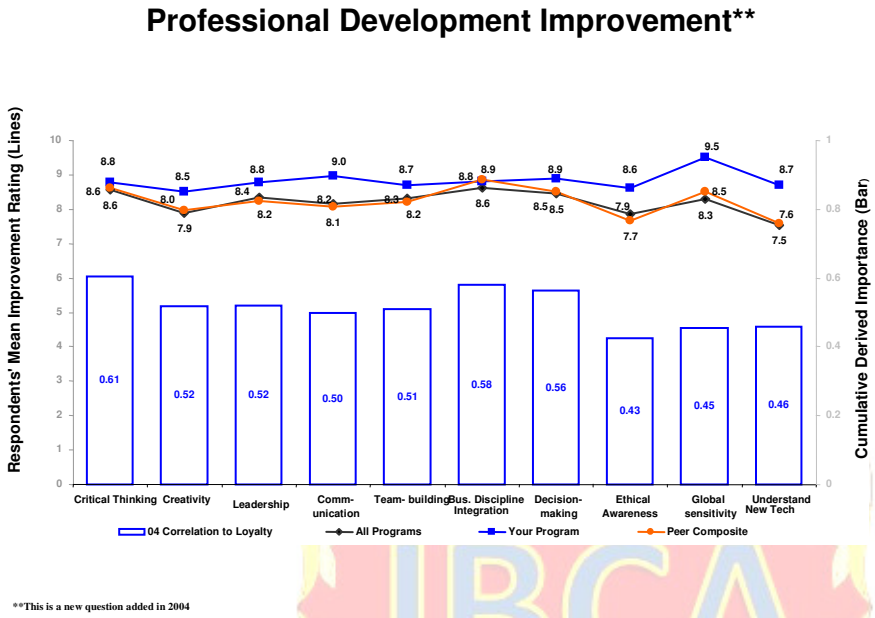


Figure 8

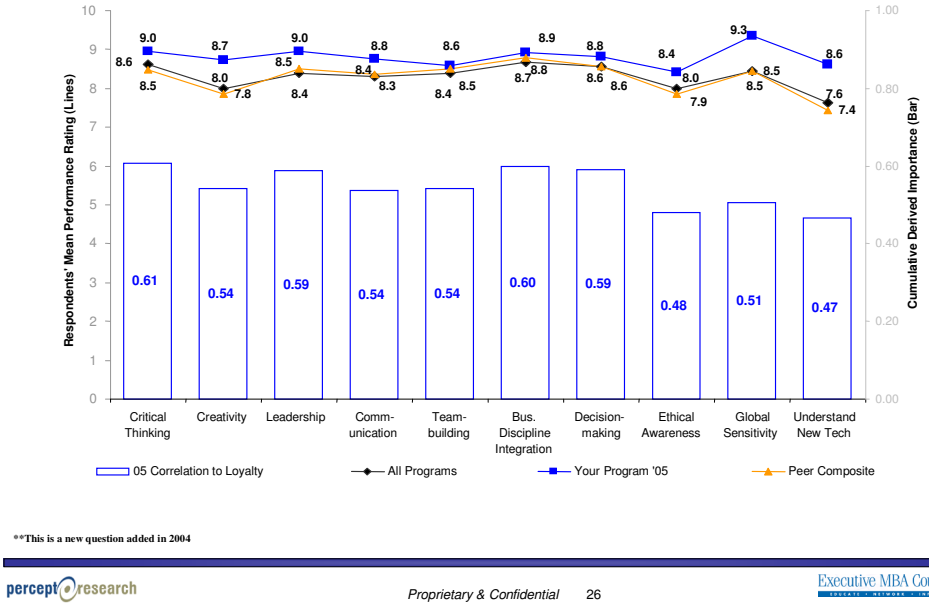
Learning and Professional Development Improvement in MODISC EMBA, All EMBA Council Programs and Six Peer Programs 2004-2006

2004



Source: EMBA Council (2004). EMBA Student Exit Survey. Los Angeles, CA: Percept Research.

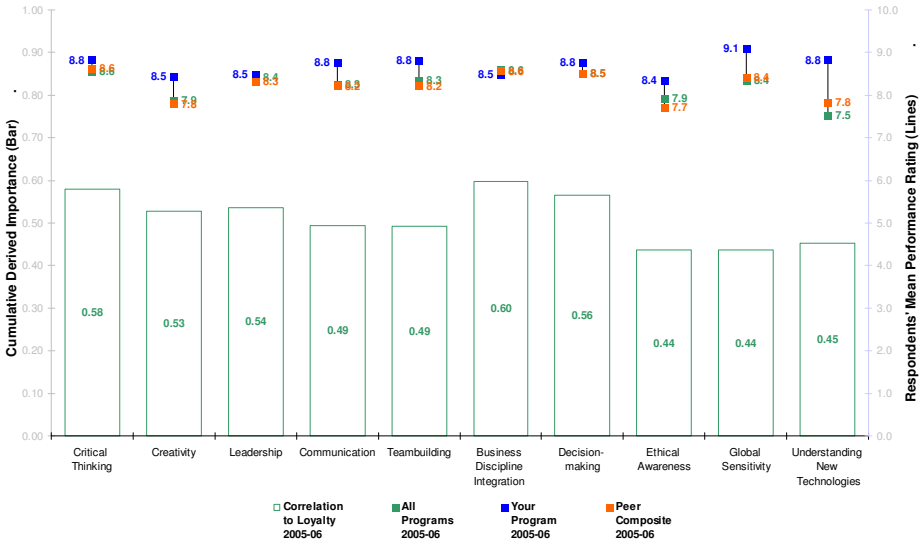
2005



Source: EMBA Council (2005). EMBA Student Exit Survey. Los Angeles, CA: Percept Research

2006

Professional Development Improvement



Source: EMBA Council (2005). EMBA Student Exit Survey. Los Angeles, CA: Percept Research